



ATTACHMENTS

Development and Infrastructure Services Committee Meeting

9 May 2018

6.00pm

City of Albany Council Chambers

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DRAFT REPORT

Results of Noongar Community Consultation Regarding Recreational Use at Lake Mullocullup (Warriup Swamp)

Report prepared for:

City of Albany

by:

Dr Myles B. Mitchell

February 2018

EXECUTIVE SUMMARY

In January 2018, Myles Mitchell coordinated a community consultation with members of the Albany Noongar community regarding recreational use of Lake Mullocullup. This project was commissioned by City of Albany based on the following Council Resolution:

At the Ordinary Council Meeting in August 2017 Council supported a recommendation to support the gazettal of Lake Mullocullopp for the purpose of allowing the operation of speed boats, specifically for water skiing subject to consultation with the local Noongar community to adequately address any concerns and/or to identify the lake's cultural significance and importance to Noongar people.

The objectives of this project were:

1. To gain an understanding of the values of the lake to Noongar people and identify threats and impacts associated with the use of speed boats.
2. Discuss solutions and provide recommendations in how the threats/impacts could be mitigated.
3. Provide a short report summarising the consultation process, who was consulted, key themes and recommendations.

Key Findings of Community Consultation

1. Everybody consulted during this project agrees that Lake Mullocullup and the surrounding area is deeply significant to Noongar people. There is a wide range of cultural, social, ecological, emotional, historical and traditional values associated the place which are discussed in more detail elsewhere in this report. The lake continues to be regularly used by Noongar people for cultural and spiritual activities, collection of bush foods and medicines, and for inter-generational teaching/learning
2. Everybody agrees that there is value in publically acknowledging the strong cultural values associated with the lake in the form of public signage at the lake. Everyone also agrees that it is important to ensure that the cultural values associated with the lake are well understood within City of Albany planning processes.
3. Everybody agrees that there are very important ecological values associated with the lake and that maintaining and protecting those values is of utmost importance.
4. Everybody agrees that currently there is insufficient information about the ecological impacts of water skiing to make an informed decision on ecological grounds.
5. Nobody objects to the lake being used by the public for passive (non-motorised) recreation such as swimming, canoeing, fishing, bird-watching etc.
6. Of the 22 people who provided input into this project; 13 people (59%) are opposed to the lake being used for water skiing.
7. Of the 22 people who provided input into this project; 8 people (36%) are not opposed to the lake being used for water skiing.
8. Of the 22 people who provided input into this project; 1 person (5%) is undecided about the issue of water skiing on Lake Mullocullup.

Recommendations About Lake Mullocullup

1. **It is recommended** that the City of Albany seek more detailed scientific data relating to ecological and environmental effects of motorboats at Lake Mullocullup before deciding whether or not to gazette the lake for water skiing. This could include impacts on birds, and effects on their breeding and nesting.
2. **It is recommended** that City of Albany work with the Noongar community to develop and install interpretive signage that highlights and celebrates the cultural and ecological values around the lake reserve and encourage conservation and respect among all user groups.
3. **It is recommended** that City of Albany assess the results of the heritage information submission form (HISF) lodged with Department of Planning, Land and Heritage and then seek advice about the City's obligations under the Aboriginal Heritage Act with regards to water skiing on the lake.
4. **It is recommended** that City of Albany notify the Wagyl Kaip Working Party via South West Aboriginal Land and Sea Council (SWALSC) of the matter.

Additional Recommendations about Processes for Noongar Engagement and Managing Cultural Heritage

1. **It is recommended** that City of Albany consider how the objectives and strategies articulated in the *City of Albany Aboriginal Accord*, can be applied in similar circumstances in future. This recommendation applies to Council and Staff.

See especially:

Section 5.2 Consultative Mechanisms and Liaison

- Formation of an Advisory Committee to oversee the implementation of the Accord and to advise Council on Aboriginal issues.
- Formalise procedures for consultation with local Aboriginal people and community organisations on relevant issues.
- Formalise protocols for the involvement of local Aboriginal people in the management and care of land that comes under the control of the City of Albany. (I.E. On land that has significance to Aboriginal people and where Native Title has been extinguished)

Section 5.4 Environment

- The involvement of Aboriginal people in the development and implementation of reserve management plans and in parks and gardens development planning.

Section 5.5 Local History and Site Conservation

- Identification, recognition and protection of sites that have cultural and historical significance to Aboriginal people.

2. **It is recommended** that the City of Albany actively acknowledge in their planning processes that ALL waterways and especially freshwater sources have cultural significance to Noongar people. Therefore a pro-active (rather than reactive) process of consultation and engagement with Noongar people should be enacted for all decisions affecting waterways in the City of Albany.
3. **It is recommended** that the City of Albany review the February 2017 correspondence from Peter Nettleton (Senior Legal Officer – SWALSC) and clarify the City’s processes around assessing Aboriginal heritage matters within its planning processes.
4. **It is recommended** that the City of Albany consider developing its own inventory and mapping system for places of Aboriginal significance within its jurisdiction to assist with effective planning in future. This would need to be undertaken in partnership with the Noongar community. The Department of Aboriginal Affairs Heritage Register does not provide a comprehensive inventory of places of cultural significance in the City.

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1. INTRODUCTION

In January 2018, Myles Mitchell coordinated a community consultation with members of the Albany Noongar community regarding recreational use of Lake Mullocullup. This project was commissioned by City of Albany based on the following Council Resolution:

At the Ordinary Council Meeting in August 2017 Council supported a recommendation to support the gazettal of Lake Mullocullup for the purpose of allowing the operation of speed boats, specifically for water skiing subject to consultation with the local Noongar community to adequately address any concerns and/or to identify the lake's cultural significance and importance to Noongar people.

Lake Mullocullup has been used for recreational water skiing for a number of years. The lake is not gazetted for this purpose and prior to the above resolution, the City undertook community consultation and sought feedback on environmental factors regarding the use of the lake for water skiing. During the consultation period, members of the Noongar community raised concerns about water skiing on the lake.

The objectives of this project were:

4. To gain an understanding of the values of the lake to Noongar people and identify threats and impacts associated with the use of speed boats
5. Discuss solutions and provide recommendations in how the threats/impacts could be mitigated.
6. Provide a short report summarising the consultation process, who was consulted, key themes and recommendations.



2. LIST OF PEOPLE CONSULTED

The following people took part in this consultation:

Eugene Eades	Treasy Woods	Glen Colbung
Carol Peterson	Cheryle James Wallace	Eliza Woods
Robbie Minitier	Ezzard Flowers	Glenda Williams
Vernice Gillies	Wendy Williams	Aden Eades
Lynette Knapp	Mark Colbung	Kelvin Flugge
Lester Coyne	Steven Woods	Joey Williams
Olivia Roberts	Shandell Cummings	
Oscar Colbung	Lorna Knapp	

Invitations were delivered in person to the following people:

Hazel Brown	Lester Coyne	Olivia Roberts
Averil Dean	Stan & Gerry Loo	Graeme Minitier
Aden Eades	Alwyn Coyne	Sandra Woods
Treasy Woods	Eugene Eades	Glenda Williams
Bertram Williams	Eliza Woods	Ezzard Flowers
Carol Pettersen	Lynette Knapp	Kelvin & Elizabeth Penny

Invitations to participate in this project were emailed to the following people:

Dallas Coyne	Oscar Colbung	Thomas Dimer
Harley Coyne	Rebecca Khan	Shandell Cummings
Kelvin Flugge	Robbie Minitier	Lindsay Dean
Lissant Bolton	Olivia Roberts	Shona Coyne
Leonie Cook	Shirley Hanson	Margaret Jones
Kim Scott	Diane Gray	Ezzard Flowers
Larry Blight	Dianne Williams	Stuart Roberts
Lester Coyne	Graeme Simpson	

People outside the Albany Noongar community consulted about legal matters and due process:

Peter Nettleton (Senior Legal Officer – South West Aboriginal Land and Sea Council)
 Jeremy Elliot (Director South West Settlement – Department of Planning, Land and Heritage)

3. SUMMARY OF CONSULTATIONS

Consultations took place in a range of different formats including group discussions, attendance at formal meetings, one-on-one discussions, phone discussions, and written correspondence via email.

The basic format was the same for each consultation, as follows:

Firstly, I would provide a short background about the project, as it had been communicated to me in the project brief provided by City of Albany. As part of this I made it clear that my role is to be an independent facilitator and that my position was neutral. I would make it clear that everyone within the Noongar community had the opportunity to freely offer their opinion on the matter, and I would endeavour to accurately reflect that opinion within the final report. I answered all questions to the best of my knowledge to ensure people were able to make informed decisions.

I then asked people about what values they associate with the lake? Followed by what impacts they see arising from water skiing? I asked people if they agree with the lake being used for water skiing or not, and if not, why not? I also asked people if there were ways to mitigate the impacts of skiing by imposing rules or restrictions about how and when skiing takes place on the lake.

I took care to be receptive and respectful to all perspectives and not to offer any negative judgement on anyone's opinion.

Lester Coyne– phone conversation 4/1/17

Lester said that he is not aware of any specific negative impacts resulting from water skiing at Lake Mullocullup and therefore he does not oppose the activity. He said that to his knowledge the ecology of the lake is in good health which is pleasing and every effort should be made to maintain the condition of the lake. He said that if it became apparent that there were negative ecological impacts resulting from skiing, then he would oppose skiing on the lake.

Ezzard Flowers – Phone Conversation 10/1/17

“All we want to do is protect and preserve that environment for cultural sustainability.” – Ezzard Flowers

Ezzard stated that for him the issue is about a holistic vision of the impacts on the whole ecology. “Its not just about black fellas kicking up”. He is concerned about effects on the birds mating season, impacts to vegetation (aquatic and terrestrial) and on water quality (impacts of pollutants in the water).

He also raised the issue of people's safety and wanting to ensure that controls were put in place for safety.

Ezzard raised the issue of the totemic landscape, a system in which every Aboriginal person has the responsibility to care for their totems to ensure the health of the entire ecosystem. He is concerned that water skiing will have impacts on some totems (especially birds) at the lake.

In summary, Ezzard called for greater integration and understanding between various parties including City of Albany, the Noongar community, South Coast NRM, Bush Heritage, Gondwana Link and other interested parties in caring for the lake and the broader landscape of which it is a part. He suggested Noongar monitoring of the lake.

Carol Petterson and Eugene Eades – In person meeting in Denmark 5/6/18

The primary purpose of this discussion was to plan for the Noongar community meeting scheduled for the following week. Eugene and Carol provided their advice to me about how best to organise the workshop, including transport, catering, invitations and facilitation. As part of this meeting, we drafted an invitation letter (see appendix) for Noongar community members. Carol and Eugene assisted me in compiling a list of people to send the invitation to and they both hand-delivered the invitations to community members around Albany. I paid \$200 each to Carol and Eugene as remuneration for their time and petrol used in delivering the invitations. It was made explicit that the payment was for their assistance in delivering the invitations, not as a consultation payment.

We also spoke about Warriup and some of the values and impacts associated with the lake and impacts associated with waterskiing.

“Our issue is protecting the spiritual significance of the lake. That’s our concern. When you look at spiritual significance, we are still holding on to that little bit we’ve still got in situations like this.” – Carol Petterson

Carol made the connection between ecology and spirituality stating that when the animals and environment are impacted upon, there are direct impacts for Noongar spirituality and culture.

Eugene and Carol pointed out the special significance attributed to freshwater lakes in Noongar culture. Highlighting Lake Sepping, Lake Vancouver and Lake Mullocullup as key freshwater lakes within the City of Albany.

“The Waugal created Warriup as part of his travels. It links all the waterways. Through the underground water too.” -Eugene Eades

Eugene spoke about the early settler times and the strong connections that were forged between Noongar people and the early pioneering families – Hassells, Moirs, Dunns, and later the Wellsteads. The settlers used to water their sheep at all the freshwater sources and Noongar shepherds helped guide them to the water sources. Warriup was an important part of this story and many Noongar people used to work and live at Warriup, adjacent to the lake.

Warriup was also an important part of seasonal movement corridors before and after European settlement as a key freshwater resource. Eugene Eades recalls his mother with about 8 other women used to ride horses from Nightwell (near Borden) to Warriup and Cape Riche.

Olivia Roberts- Email correspondence 11/1/18

“This place was very important to my family due to cultural connection. My family would object to the use of the place for water skiing, sadly far too many areas of importance to Aboriginal people have been destroyed around this region.” – Olivia Roberts

Community Meeting – 14/1/18

The meeting was initially scheduled for the 13th January but was rescheduled because I had to attend a funeral of a close friend on that day. As a result some of the people who had been planning to attend were not able to be there in the end. There were some further last minute cancellations resulting from the hospitalisation of an Elder in Albany that morning, and some community members who had been planning on attending the meeting were taken up supporting her and the family.

Community members who attended the meeting were Eugene Eades, Carol Petterson, Lynette Knapp, Lorna Knapp, Shandell Cummings and Steven Woods. City of Albany staff that attended were Rani Param, Matthew Thomson, and Susan Kay.

The first part of the day was community members only. We met at the Warriup Homestead, hosted by Jane and Peter Jeffries and had constructive discussions. A brief summary of the main points is provided here.

“Far as I am concerned, leave it pristine. There is plenty of room for skiing in town.”
Steven Woods

“Our Great Grandfather (Mooyerie) used to live in that hut and grow all his veges for the Hassells.” – Lynette Knapp

Carol Petterson discussed her concerns about the use of language by City of Albany staff referring to the ‘boat ramp’ on the lake. The access point to the lake is officially for fire vehicles to fill their water tanks.

Concerns were raised about the impacts of grasses from the lake bed which have been observed by local landholders washing up on the lake shore after boats have been in the lake.

“I’m just so sick of fighting all the time, fighting for our beliefs.” – Carol Peterson

“This is a place of tranquillity and connection.” – Carol Peterson

“We need this landscape to teach our children about the spirituality, about the protocols and the language. Its about creating that sense of belonging for our children.” – Carol Peterson

“We are not claiming it for ourselves, we want to share it for passive recreation, research and study. – Carol Peterson

“All freshwater lakes are sacred. If you messed around with water as a Noongar, you got dealt with, and that still applies.” – Eugene Eades

“Where there is water, there is life and there is people. Its been that way through the ages.” – Eugene Eades

“Its on a storyline, it interconnects with other lakes, the Stirlings, Nightwell, Waychinicup, Mt Many Peaks.” – Eugene Eades

“We need to keep this as a legacy for our children.” – Eugene Eades

“We are still the caretakers and we want to care for these places in partnership.”

“My DNA is here because my mother was born here”. – Carol Peterson

“If this place is damaged, we can never bring it back, spiritually.” – Carol Peterson

Carol discussed the processes that the City of Albany have followed in this matter. She feels that due process has not been followed with regard to the Aboriginal Heritage Act, the Noongar Standard Heritage Agreement and the City of Albany Aboriginal Accord.

We are tired of coming from behind all the time because of the flawed processes of the City of Albany.” – Carol Petterson

It was emphasised by the group that the lake is part of inter-regional connections through the movement cycles of people along the coastline and from the coast to the inland.

Meeting with City of Albany Representatives (Susan Kay, Rani Param, Matthew Thomson)

We met as a group by the edge of the lake for a constructive conversation which began with opening statements by Eugene and Carol as senior man and woman in the group. After this Matthew Thomson provided an overview of the situation from the City of Albany point of view. A few key points from the overview were:

- Earliest record of skiing circa 1980
- Lately things have been out of control with rubbish, mess associate with lack of toilets, the use of jet skis etc.
- City of Albany cannot stop it
- Water skiing is jurisdiction of Department of Transport, not City of Albany
- Only control is a local by-law to prevent motor boats, which gives City power to issue fines
- Objections to the local law preventing skiing were put forward by local water skiing enthusiasts, prompting the recent council decision
- Council resolution to gazette lake for skiing subject to conditions; environmental monitoring, Noongar consultation, monitoring of skier numbers
- Matthew acknowledged that the City of Albany did not do well with the initial engagement with Noongar people over this matter
- The gazettal process allows for rules and restrictions to be put in place. Matthew asks if there are certain restrictions/controls which could allow for skiing to be acceptable or not?

Shandell Cummings raised the matter of how this lake fits into a broader landscape and that it has regional importance as an environmental and cultural landmark.

“The whole of Australia is an Aboriginal site.” – Lynette Knapp

“We would camp minimum 100m from waterways out of respect and to protect them.” – Lynette Knapp

“This is religious to us. If we did a pee on a church or something, we would be put in jail.” – Lynette Knapp

“Its like a university for us.” – Eugene Eades

“You’ve really got to take into account our culture because it means everything to us. We live by it. – Eugene Eades

“We worry about the environmental impacts on the ducks, birds, turtles, frogs.” – Eugene Eades

“Its humiliating to us to come from behind. It’s a legal process that needs to be followed. There needs to be a mechanism in the City of Albany to trigger the Aboriginal Heritage Act.” – Carol Peterson

Steven Woods raised a number of concerns about further impacts:

- Increasing numbers
- More clearing of vegetation to accommodate greater numbers (bush gradually getting pushed back by human impacts)
- Fire risks
- Safety risks
- Liability
- Resources within City of Albany to monitor and police the situation

It was agreed that Matthew would report back to the Noongar community about the recommendation that he puts forward to council.

Following the meeting with City of Albany representatives we reconvened as a group and compiled a final list of values, impacts and recommendations as follows:

Values

- Women’s place associated with birthing and other sacred activities
- Part of Songlines/ Storylines
- A rich and healthy ecosystem
- Totemic landscape
- Freshwater
- Corroborees
- Meeting place
- Historical connections – droving, shearing, shepherding, practicing culture whilst integrating into farming economy, settler/Noongar relationships

- Bush foods and medicine – Shandell Cummings regularly collects bush foods and medicine as do other Noongar people
- Place where the Waugal rested when he came down from the hills

Impacts

- Motorboats are a high impact invasive activity
- Water pollution
- Impacts on seasonal nesting of birds (these are not dictated by the calendar but by seasonal changes)
- Noise pollution
- Clash of activities – Noongar people can't practice cultural and spiritual activities while speed boats in operation. This can lead to conflict between user groups
- Lack of toilet facilities means people pollute the bush and lake
- Lake is a living mythical creature, that is being hurt by motorboats

Recommendations

- No motorized vehicles
- Encourage passive recreational use, research and conservation
- Vehicle access to the lake restricted to fire trucks
- City of Albany implement an alert system for matters that trigger the Aboriginal Heritage Act
- Look at opportunities to seek grant funding for pro-active, collaborative project to enhance cultural and environmental values. Eg. State NRM grant.

Carol Petterson- Email correspondence 14/1/18

“Lake Mullocolup is of such importance to families today from the Great Southern Region, that they still hold the site on utmost reverence, so much so that they continue to visit to pay respect and to pass on stories to younger generations.”

Vernice Gillies- Email correspondence 15/1/18

“In relation to the lake, I think having it gazetted will help to protect it, after all it has been used as a water skiing lake for quite some time now. That should enable to CoA to be able to monitor and manage the lake better.”

Colbung Family Representatives 15/1/18

I met with Oscar Colbung, Mark Colbung and Wendy Williams (nee Colbung) in Albany to discuss the matter. I had subsequent phone conversations with Mark Colbung and Glen Colbung and email correspondence with Mark Colbung. All members of the Colbung family were in agreement with putting forward the following statement.

“As Traditional Owners from this area, we recommend:”

- No objections to skiing on Lake Mullocullup.
- Provisions are put in place to ensure the area is protected including:

- Rubbish bins
- Toilets
- Regular ranger patrols
- Installation of signage at the lake acknowledging Noongar connections
- Warriup is a part of seasonal movement trails

The Colbung family also requested that historical documents demonstrating their ancestral connection to the Albany area be included as appendices to this report.

South Coast NRM Aboriginal Reference Group Meeting – 31/1/18

Noongar community representatives present at the meeting were Treasy Woods, Robbie Minter, Ezzard Flowers, Carol Petterson, Cheryle James-Wallace.

Treasy Woods highlighted that for her, skiing on the lake poses an issue because of the cultural sites at the lake and what she sees as the invasive impacts of motor boats including noise, pollution, disruption of birds and other animals. She mentioned that many Noongars were born around the lake which makes it a very special place. Treasy also talked about an important cultural site called “Warluk”, known colloquially as “Tooth Rock”. Treasy spoke of how many families, including her family (Williams) worked for the Hassell family and therefore lived close to the lake. Treasy said ration orders were distributed at Warriup at certain times so many Noongars used to come there as part of their subsistence which combined rations, farmwork and bush tucker.

Robbie Minter said he had not heard about the issue of skiing on the lake but had recently felt a strange ‘pull’ to come to Lake Mullocullup and had travelled from his home in Gnowangerup to go fishing there just last weekend. He believes this feeling that drew him there was auspicious and now he understands that it is related to the issue of skiing. Robbie does not think that skiing should be allowed on the lake.

The group raised the issue of freshwater in the lake which makes it not only an important ecosystem, but also an important camping place for Noongar people in the past.

The group all agreed that they are not opposed to passive recreation and encourage everybody to come and enjoy the lake. However, they are opposed to motorized watercraft because of fumes, petrol, oil (pollution), stirring up sediments and impacting on nesting birds. This in turn affects the totemic system and has negative implications for cultural values.

Cheryle James-Wallace talked about important cultural values associated with women’s business and birthing. The details are not for public knowledge or to be discussed with men, so no details were discussed in this context, or with me (as a male anthropologist) at all. Cheryle felt insulted that this project needs to be mediated by an anthropologist at all. She feels that their views on the matter had not been taken seriously and questioned why an independent ‘adjudicator’ needed to be involved. She feels there has been a lack of respect shown by the City of Albany to Noongar concerns on this issue.

Carol Petterson talked about what a frightening experience it was to address council about the matter and found it humiliating to have the veracity of her statements questioned, while other non-Aboriginal people putting forward concerns on the same issue were not questioned.

Carol raised the issue of City of Albany staff referring to a ‘boat ramp’ instead of the fire truck refilling ramp.

There is concern among the group about the effects of pollution on frogs, turtles and birds.

Cheryle James-Wallace says she has found this a very traumatic experience because of the way the City of Albany has approached the process. She stated that it should have been dealt with as a cultural site and therefore due process should have been followed with an activity notice submitted to SWALSC and a subsequent heritage survey taken place.

Carol Petterson raised the issue of the UN Charter on the Rights of Indigenous People which stipulates people’s rights to partake in religious and cultural activities unimpeded. For her, motorboats impact her ability to practice her culture and religion.

Treasy Woods reiterated this point saying that Noongar people can’t practice their culture with noisy motor boats going round the lake.

Ezzard discussed his concerns about lake ecology (discussed earlier in this report, see above).

“Aboriginal input is vital to the ecology.” – Ezzard Flowers

Ezzard discussed the negative ecological impacts of speed boats and Noongar people being shut out of management at other lakes in the region such as Lake Dumbleyung, Lake Towerinning and Lake Ewlyamartup. He cites a lack of birdlife and severe ecological impacts at those lakes as a reason to look after this lake better.

Ezzard believes proper flora and fauna surveys should be undertaken at Lake Mullocullup before any further decisions are made about the gazettal. He would like to see issues of threatened species and habitat loss addressed within planning for the lake with detailed and strategic environmental planning undertaken. He believes initiating a monitoring plan with key stakeholders (including SWALSC, Dept. Aboriginal Affairs, South Coast NRM, City of Albany) is important.

Eliza Woods – phone conversation 5/2/18

Eliza was unable to attend the community meeting due to a health matter so I discussed with her over the phone.

Eliza emphasized the range of cultural values associated with the lake having been used as a camping place for Noongar people during traditional times and throughout the historical era. As a freshwater place it is significant for Noongar culture.

She stated that her grandfather Chris Penny used to shepherd sheep from Jerramungup to Cape Riche and that Warriup was an important part of that journey. It was an important landmark because of shade, shelter and water.

“Warriup is a sacred place, a special place.” – Eliza Woods

Eliza says she does not have enough information to make a statement about waterskiing but she believes that some public acknowledgement of the significance to Noongar people would be valuable as part of efforts to get users to respect the place as much as possible.

Glenda Williams – phone conversation 5/2/18

Glenda spoke of her values associated with the lake which begin with an old photo she has of her mother (or grandmother?) Lilly Birchell Williams standing at Warriup next to a pear tree. She says this is an important place for her family (Williams family) who have a long connection with the place.

Glenda says the ecology of the place is very significant and is concerned about the impacts of motor boats.

Glenda does not support the gazzetal of the lake for waterskiing.

Aden Eades – phone conversation 5/2/18

Aden is strongly opposed to waterskiing on the lake because he wants to preserve this pristine location and ecosystem.

“There are plenty of other places for water skiing.” – Aden Eades

“Noongars are caretakers. We don’t see it (land) as money. The richness of it is for future generations.” – Aden Eades

Warriup was an important part of coastal shepherding runs. The Noongar used to shepherd the sheep along the coast to avoid the poison bush which could be found inland.

Aden says it is important for his family because his grandfather Chris Penny and grandmother Agnes Woods used to spend a lot of time there while they were working for the Hassells (Chris was a shepherd for the Hassell family). Aden says one of Chris and Agnes’s children was born at Warriup. He can’t remember whether it was his uncle Cyril Penny or his aunt Marie Penny.

Kelvin Flugge – phone conversation 5/2/18

Kelvin Flugge says that while there are very significant cultural values associated with Warriup, he does not have concerns about waterskiing. He emphasizes a “constructive management approach” which has dual signage to emphasise the Noongar cultural values and promote respect and understanding and encourage all users to care for the place.

Lets promote it (Lake Mullocullup) as a cultural asset, promote the cultural values and promote understanding.: - Kelly Flugge

Joey Williams – phone conversation 5/2/18

Joey believes that protecting cultural assets such as Warriup is very important but he does not have specific concerns about waterskiing on the lake. He agrees with the idea to develop signage emphasizing “sharing and respect” for the place and for Noongar culture.

4. KEY FINDINGS OF COMMUNITY CONSULTATION

1. Everybody consulted during this project agrees that Lake Mullocullup and the surrounding area is deeply significant to Noongar people. There is a wide range of cultural, social, ecological, emotional, historical and traditional values associated the place which are discussed in more detail elsewhere in this report. The lake continues to be regularly used by Noongar people for cultural and spiritual activities, collection of bush foods and medicines, and for inter-generational teaching/learning
2. Everybody agrees that there is value in publically acknowledging the strong cultural values associated with the lake in the form of public signage at the lake. Everyone also agrees that it is important to ensure that the cultural values associated with the lake are well understood within City of Albany planning processes.
3. Everybody agrees that there are very important ecological values associated with the lake and that maintaining and protecting those values is of utmost importance.
4. Everybody agrees that currently there is insufficient information about the ecological impacts of water skiing to make an informed decision on ecological grounds.
5. Nobody objects to the lake being used by the public for passive (non-motorised) recreation such as swimming, canoeing, fishing, bird-watching etc.
6. Of the 22 people who provided input into this project; 13 people (59%) are opposed to the lake being used for water skiing.
7. Of the 22 people who provided input into this project; 8 people (36%) are not opposed to the lake being used for water skiing.
8. Of the 22 people who provided input into this project; 1 person (5%) is undecided about the issue of water skiing on Lake Mullocullup.

5. VALUES, IMPACTS AND SOLUTIONS

VALUES	IMPACTS	SOLUTIONS/MANAGEMENT ACTIONS
Women’s place associated with birthing and other sacred activities		Consider ways to highlight and celebrate Noongar cultural values and connections to the place (eg. Interpretive signage, public events, flag the area as culturally sensitive within CoA planning processes).
Part of Songlines/ Storylines	Lake is a living mythical creature, that is being hurt by motorboats	Consider ways to highlight and celebrate Noongar cultural values and connections to the place (eg. Interpretive signage, public events, flag the area as culturally sensitive within CoA planning processes).
A rich and healthy ecosystem	Water pollution from boats. Lack of toilet facilities and bins has potential for people to pollute the bush and lake. Impacts on seasonal nesting of birds (these are not	Look at opportunities to seek grant funding for pro-active, collaborative project to enhance cultural and environmental values. Eg. State NRM Grant. Encourage conservation values in public signage and public education.

	dictated by the calendar but by seasonal changes). Lack of detailed knowledge about environmental/ecological impacts from motorboats.	Encourage passive recreational use, research and conservation. Consider undertaking detailed ecological studies about the ecosystem and impacts of motorboats before approving gazettal.
Totemic landscape	Lake is a living mythical creature, that is being hurt by motorboats. Potential impacts on seasonal nesting of birds (these are not dictated by the calendar but by seasonal changes). Lack of detailed knowledge about environmental/ecological impacts from motorboats.	Consider ways to highlight and celebrate Noongar cultural values and connections to the place (eg. Interpretive signage, public events, flag the area as culturally sensitive within CoA planning processes).
Freshwater	Water pollution. Lack of detailed knowledge about environmental/ecological impacts from motorboats.	Look at opportunities to seek grant funding for pro-active, collaborative project to enhance cultural and environmental values. Eg. State NRM Grant. Encourage conservation values in public signage and public education. Consider undertaking detailed hydrological/water quality studies about impacts of motorboats before approving gazettal.
Corroborees		Consider ways to highlight and celebrate Noongar cultural values and connections to the place (eg. Interpretive signage, public events, flag the area as culturally sensitive within CoA planning processes).
Meeting place		Consider ways to highlight and celebrate Noongar cultural values and connections to the place (eg. Interpretive signage, public events, flag the area as culturally sensitive within CoA planning processes).
Historical connections: droving, shearing, shepherding, practicing culture whilst integrating into farming economy, settler/Noongar relationships		Consider ways to highlight and celebrate Noongar cultural values and connections to the place (eg. Interpretive signage, public events, flag the area as culturally sensitive within CoA planning processes).
Bush foods and medicine (still regularly collected at	Water pollution/Impacts to vegetation/Impacts to animal	Consider ways to highlight and celebrate Noongar cultural values and connections to the place (eg.

Lake Mullocullup by Noongar people)	activity, especially bird nesting. Lack of detailed knowledge about environmental/ecological impacts from motorboats.	Interpretive signage, public events, flag the area as culturally sensitive within CoA planning processes). Look at opportunities to seek grant funding for pro-active, collaborative project to enhance cultural and environmental values. Eg. State NRM Grant. Encourage conservation values in public signage and public education.
Place where the Waugal rested when he came down from the hills	Water pollution/Impacts to vegetation/Impacts to animal activity, especially bird nesting. Ecology and Noongar spirituality are inter-twined.	Consider ways to highlight and celebrate Noongar cultural values and connections to the place (eg. Interpretive signage, public events, flag the area as culturally sensitive within CoA planning processes).
Practicing culture/spirituality, including inter-generational knowledge exchange	Noise pollution. Clash of activities – Noongar people can't practice cultural and spiritual activities while speed boats in operation. This can lead to conflict between user groups	Consider ways to highlight and celebrate Noongar cultural values and connections to the place (eg. Interpretive signage, public events, flag the area as culturally sensitive within CoA planning processes). Encourage passive recreational use, research and conservation

6. LEGAL REQUIREMENTS, DUE PROCESS AND BEST PRACTICE

Members of the Noongar community have stated they believe an activity notice should have been submitted to SWALSC in regard to the matter of gazetting Lake Mullocullup for water skiing. I agree that submitting an activity notice (or similar) would constitute a best practice approach. However, it is not a legal requirement currently. Negotiations between SWALSC and WALGA are ongoing.

I sought further clarification on the matter from Jeremy Elliot – Director of Southwest Settlement/Aboriginal Heritage at Department of Planning, Land and Heritage; and Peter Nettleton – Senior Legal Officer at South West Aboriginal Land and Sea Council. A written response from Jeremy Elliot is printed verbatim below. Peter Nettleton made the following statement in regards to Jeremy Elliot’s response:

“I do concur generally with Jeremy Elliott’s views, however I have not had the occasion to obtain instructions on the matter from the Wagyl Kaip & Southern Noongar Working Party”.
– Peter Nettleton (SWALSC)

Jeremy Elliot – email correspondence 16/2/18

- The City of Albany is not legally bound to enter into a Noongar Standard Heritage Agreement (NSHA).

- Whilst Local Governments are not parties to the SWS Agreements, and therefore not bound to follow the NSHA, a consistent approach to heritage across the SWS area is encouraged. SWALSC and WALGA are working together to develop a suitable Local Government-specific Noongar Heritage Agreement template (LG NHA) that will tailor the NSHA to align with Local Government Regulations and policies (including in relation to procurement).
- In the interim, Local Governments are encouraged to follow the key heritage elements of the NSHA as per the attached document [see below];
- As a result of a search of the Aboriginal Heritage Inquiry System (AHIS) DPLH have identified that Lake Mullocullup is not a Registered Site, Lodged Place or Stored Data/Not a Site.
- DPLH understand that the City of Albany will lodge a HIS form for Lake Mullocullup. This will then need to be assessed by the ACMC to determine if Lake Mullocullup meets the requirements of s5 of the AHA and if it would become a Registered site. In doing so DPLH will consult with SWALSC and the Wagyl Kaip Working Party.
- Once the heritage values of Lake Mullocullup are assessed DPLH can provide further advice about what activities may constitute a breach of the Aboriginal Heritage Act 1972.
- To maintain good relationships with the local Noongar community we recommend that the city of Albany raise the issue with the Wagyl Kaip Working party through SWALSC and seek their views.

Noongar Standard Heritage Agreement - Information for Local Government

The following text is taken verbatim from the Department of Planning, Land and Heritage document of the above title:

A key element of the South West Native Title Settlement (SWS) is the Noongar Standard Heritage Agreement (NSHA), which provides a uniform and efficient approach to Aboriginal heritage surveys in the SWS area. The NSHA sets out a clear process for Noongar community engagement, and provides all parties with a clear, timetabled framework about their various obligations in compliance with the Aboriginal Heritage Act 1972.

Under the SWS all State Government Departments, and certain Government agencies and instrumentalities, are required to enter into a NSHA with SWALSC when conducting Aboriginal Heritage Surveys in the six Agreement areas comprising the SWS unless they have an existing heritage agreement. Government proponents must enter into the NSHA with SWALSC on behalf of the relevant SWS Agreement group, or once established, the relevant Noongar Regional Corporation (potentially in the second half of 2018).

Whilst Local Governments are not parties to the SWS Agreements, and therefore not bound to follow the NSHA, a consistent approach to heritage across the SWS area is encouraged. SWALSC and WALGA are working together to develop a suitable Local Government-specific Noongar Heritage Agreement template (LG NHA) that will tailor the NSHA to align with Local Government Regulations and policies (including in relation to procurement).

In the interim, Local Governments are encouraged to follow the key heritage elements of the NSHA which are as follows:

- Undertaking early engagement with SWALSC (acting on behalf of the SWS Agreement Groups) regarding proposed Activities that may impact Aboriginal sites (NSHA clause 7);
- Assessment of risks of proposed works damaging or altering an Aboriginal heritage site by using the Due Diligence Guidelines (NSHA clause 7.2) <http://www.daa.wa.gov.au/globalassets/pdf-files/ddg>
- Issuing notices for works that may potentially damage or alter Aboriginal heritage sites in a format similar to the 'Activity Notices' within the NSHA (NSHA clause 8, Schedule 4, and using the Template Activity Notice).
- If a heritage survey is to be completed, seeking the names of suitable Aboriginal survey participants from SWALSC (NSHA clause 9)
- Following the NSHA heritage survey processes (NSHA clause 9 and 10)
- Following the NSHA timelines (NSHA clauses 8 to 12)
- Adhering to the NSHA heritage survey costs schedule (Schedule 5)
- Following the NSHA heritage survey reporting requirements (NSHA clause 12 and Schedule 6)
- Providing the heritage survey reports and Heritage Information Submission forms to the Department of Planning, Lands and Heritage (Clause 12.5)

Copies of the NSHA including the Schedules, can be found

<https://www.dpc.wa.gov.au/lantu/south-west-native-title-settlement/Noongar-Standard-Heritage-Agreement/Pages/default.aspx>

Further information about the Settlement, including the six Settlement Agreements (or Indigenous Land Use Agreements - ILUAs) can be found on the website of the Department of Premier and Cabinet <https://www.dpc.wa.gov.au/lantu>

7. CONSIDERATION OF THE CITY OF ALBANY ABORIGINAL ACCORD RELEVANT TO THIS MATTER

What became apparent in this consultation, is that the root of the discord between some members of the Noongar community and the City of Albany, is the lack of Noongar involvement early in the decision-making process on this issue. Whatever the final decision, some Noongar community members who are passionate about this place, feel that they had to agitate for their position to be heard, rather than being engaged in a constructive dialogue from an early stage. The result of this was feelings of humiliation and anger, which led to a less constructive conversation during the later stages. It should be noted that not all Noongar community members shared these concerns. None the less, consideration for improved processes in future is provided here.

The *City of Albany Aboriginal Accord* lays out a very effective groundwork for a constructive process based on clearly articulated Objectives and Strategies. Of particular relevance is section 5.2 – Consultative Mechanisms and Liaison which promotes the strategy of formal

procedures and protocols for the involvement of Aboriginal people on “relevant issues” and “in the management and care of land that comes under the control of City of Albany”. Decisions affecting the management of waterways are always ‘relevant issues’ of utmost importance for Noongar people. The Accord also lays out the objective of an Aboriginal Advisory Committee. Would the Advisory Committee have been an effective mechanism for discussing similar issues in future?

Sections 4.4 and 5.4 of the Accord lay out objectives and strategies for Aboriginal involvement in environmental planning. This is directly relevant to the current matter, which has environmental implications for the management of the lake ecosystem. Noongar people have a customary responsibility to care for their land and water. In order for these responsibilities to be upheld, Noongar people require a ‘seat at the table’ in decisions affecting their country. While acknowledging that it is difficult for this to always be the case, a prudent approach would be for the City of Albany to ensure Noongar involvement in decisions that affect waterways in particular, and other distinctive landscape features such as hills, granite outcrops and areas of remnant bushland.

Sections 4.5 and 5.5 articulate objectives and strategies for the “identification, recognition and protection of sites that have cultural and historical significance to Aboriginal people”. In this instance it appears not to have been known by City of Albany personnel that Lake Mullocullup was a site of cultural and historical significance to Aboriginal people. The place was not registered with the Department of Aboriginal Affairs, just as many places of significance are not. The Aboriginal heritage register is not a reliable inventory of all places of significance within the City of Albany. Perhaps the City of Albany would consider developing its own inventory of Aboriginal heritage sites in the City? As a general rule, waterways should always be considered places of cultural significance to Noongar people.

In summary, this process of consultation has demonstrated that the City of Albany could benefit from upholding the objectives and strategies of the *City of Albany Aboriginal Accord* more effectively in the future by engaging the Noongar community early in the decision-making process for matters affecting waterways, and other prominent landscape features. Contacting the Wagyl Kaip working party (via SWALSC) in writing in the first instance to seek their views is an appropriate way to begin the process of engagement.

8. RECOMMENDATIONS ABOUT LAKE MULLOCULLUP

5. **It is recommended** that the City of Albany seek more detailed scientific data relating to ecological and environmental effects of motorboats at Lake Mullocullup before deciding whether or not to gazette the lake for water skiing. This could include impacts on birds, and effects on their breeding and nesting.
6. **It is recommended** that City of Albany work with the Noongar community to develop and install interpretive signage that highlights and celebrates the cultural and ecological values around the lake reserve and encourage conservation and respect among all user groups.
7. **It is recommended** that City of Albany assess the results of the heritage information submission form (HISF) lodged with Department of Planning, Land and Heritage and then seek advice about the City’s obligations under the Aboriginal Heritage Act with regards to water skiing on the lake.
8. **It is recommended** that City of Albany notify the Wagyl Kaip Working Party via South West Aboriginal Land and Sea Council (SWALSC) of the matter.

9. ADDITIONAL RECOMMENDATIONS ABOUT PROCESSES FOR NOONGAR ENGAGEMENT AND MANAGING CULTURAL HERITAGE

5. **It is recommended** that City of Albany consider how the objectives and strategies articulated in the *City of Albany Aboriginal Accord*, can be applied more effectively in similar circumstances in future. This recommendation applies to Council and Staff.

See especially:

Section 5.2 Consultative Mechanisms and Liaison

- Formation of an Advisory Committee to oversee the implementation of the Accord and to advise Council on Aboriginal issues.
- Formalise procedures for consultation with local Aboriginal people and community organisations on relevant issues.
- Formalise protocols for the involvement of local Aboriginal people in the management and care of land that comes under the control of the City of Albany. (I.E. On land that has significance to Aboriginal people and where Native Title has been extinguished)

Section 5.4 Environment

- The involvement of Aboriginal people in the development and implementation of reserve management plans and in parks and gardens development planning.

Section 5.5 Local History and Site Conservation

- Identification, recognition and protection of sites that have cultural and historical significance to Aboriginal people.

6. **It is recommended** that the City of Albany actively acknowledge in their planning processes that ALL waterways and especially freshwater sources have cultural significance to Noongar people. Therefore a pro-active (rather than reactive) process of consultation and engagement with Noongar people should be enacted for all decisions affecting waterways in the City of Albany.
7. **It is recommended** that the City of Albany review the February 2017 correspondence from Peter Nettleton (Senior Legal Officer – SWALSC) and clarify the City’s processes around assessing Aboriginal heritage matters within its planning processes.
8. **It is recommended** that the City of Albany consider developing its own inventory and mapping system for places of Aboriginal significance within its jurisdiction to assist with effective planning in future. This would need to be undertaken in partnership with the Noongar community. The Department of Aboriginal Affairs Heritage Register does not provide a comprehensive inventory of places of cultural significance in the City.

APPENDIX A –CAROL PETTERSON GENEALOGY

Carol Pettersen

Genealogy and connection to Warriup

Carol (nee Gray) - born Gnowangerup Mission 1941

Daughter of:

Colin and Kathleen Gray (nee Knapp)

Kathleen Gray - born 1921 at Warriup Springs- (Lake Mulloculop)

Daughter of:

Johnny and Lily Knapp (nee Bevan)

Johnny Knapp born 1876

Son of:

Jacbam (aka Polly or Nailcan) born 1830.

Jacbam daughter of:

Melgan and Barnagain (Meneng peoples)

Further details of family tree is available.

Lily Knapp (nee Bevan born 1887

Daughter of Moses Bevan (aka Moonjeree/Mudjeree) and ‘Maggie’

Moses Bevan (aka Moonjeree/Mudjeree) is therefore my Great Grandfather and there is documentation of his time at Warriup.

Although he worked there for many years, he eventually had a stone hut built for him in which he lived out his life.

During his latter years and ailing in health, The Hassell family cared for him until his death

That stone hut has been repaired and kept in good condition by the Hassell’s and present Owners, such is their respect for my Great Grandfather Moonjeree/Mudjeree

Note

See mention of Knapp Family traditional connection to Warriup in Hassell’s notes and pers cons.

Further Notes:

Warriup and immediate surrounds, especially the waterways (feeding) into Mulloculop are viewed and held in reverence as birthing places for our Women...There are two particular huge granite boulders that are seen as a woman in a birthing position in the immediate area which give credence to this view

Carol Pettersen

APPENDIX B – EVIDENCE OF COLBUNG FAMILY TRADITIONAL CONNECTIONS

- that Copron and his sons were amongst the group of Aborigines who may be speared by Wills people. The group threatened included the males belonging to the immediate families of Nakina and Tulcatwali and includes Tringole, Mokare and Tiparti and his sons (13 Feb).
- COROPAN** M
1829 Name recorded by Isaac Scott Nind (1831) . May be Copran.
 - COURTINGAIT** F
1829 A name recorded by Isaac Scott Nind (1831) .
 - COWEROLE** M
1829 Name recorded by Isaac Scott Nind (1831) .
 - CURRAWAY** F
1830 Dr Uredale's spouse and a tribal healer. She is first observed at the settlement in the company of her child and Coolbun's wife (her daughter-in-law) (Barker, 1 Mar). The following month she returned with Waiter. Dr Uredale, Coolbun, his wife and her two children, 14 Apr). The following month she was one of a group of women attracted to the settlement by the arrival of Wallongoli's family. (23 Apr). Nothing further was recorded of Curraway until October 1830 when Barker was informed of her death of influenza (25 Oct). Mokare explained that women were not always buried but Curraway because of her status would be an exception (7 Nov). Curraway's husband, Dr Uredale, died a few weeks later (5 Dec).
 - DALBEAN** M
1839 A Monegal-ung man recorded by George Grey.
 - DALWIN** M
1829 Recorded by Isaac Scott Nind (1831) and is most likely Talwin.
 - DOM-ER** M
1839 A Toondarup male recorded by George Grey.
 - DOR-O-NUR-RU** M
1839 A Noyan-nook male recorded by George Grey.
 - DYLU-BUR-U** F
1839 A Nyotung-ur (or Nyotuch) female recorded by George Grey.
 - Dr UREDALE** M
-1821 When Captain Phillip Parker King visited the Sound in 1821 he recorded the name of U-der-ra and as he was recorded in the company of Coolbun it is likely that U-der-ra and Uredale are the same person.
1830 Barker always prefixed his name with the title 'Doctor' and acknowledged this man's status as a tribal healer. He was the father of Coolbun and husband to Curraway. The first mention of him appears on the early pages of Barker's journal when he was the only Aboriginal visitor to Barker's camp (Barker, 20 Jan). He came into Barker's

camp 'very wet and miserable', and told Barker that Mokare's brother had died from over-eating. This was a reference to Yallepole who died in 1829 (27 Jan). In February he was brought into camp to have his foot treated by Dr Davis and 'he seemed to be aware of the need for cleanliness of his wound' (28 Feb). The next day he came into camp for his biscuit and then went a short distance from the settlement where, 'it seems' his wife and child were with Coolbun's wife (1 Mar). Dr Uredale was at Taragon's side when Barker and Mokare approached. Taragon had just died. Dr Uredale lay down by his side with his left hand over the body in an endearing manner and the right under his head'. Nakina and Tulcatwali sat opposite him, and the group began to mourn, some crying, wailing and some showing more violent grief (see Taragon for more details) (8 Mar). Early one morning a week after Taragon's death, Dr Uredale came into Barker's camp with Taton, Waiter, Coolbun and Talwin saying he was going to Bald Head. He was given food and a tomahawk (13 Mar). Two weeks later he returned with Talwin, Nakina and Coolbun after their stay to the west. They had not been to Bald Head (29 Mar). In April he came in with Copron for rice (1 Apr), and remained at the settlement with Waiter after the other Aborigines had appeared with their spears and at 5.30 p.m. had gone out to 'reconnoitre'. Some were sent to the north of Mt Clarence as lookouts (2 Apr). The following week he was in the camp with Nakina, Pattyvert, Waiter and one other. They had been near Woolyongup for a few days and reported that the custom of spearing was in full activity following the death of Taragon (8 Apr). He went with Nakina around the bay for salmon and then proceeded towards Bald Head with the others except Nakina who went back to camp (9 Apr). Next day Dr Uredale warned Mokare that the Wills people were nearby and were looking for Mokare and Nakina to spear them (10 Apr). Dr Uredale, his wife Curraway and their two children came to camp looking for food. They were with Coolbun, his wife Neeranja, their two children, and Waiter (14 Apr). Dr Uredale was an Aboriginal doctor or wizard and had special powers that enabled him to travel through the air. He reported to Barker that because Coolbun had speared Wallangoli, Dr Uredale would be speared if Coolbun was not killed (15 Apr). He came to Barker with his wife asking for food (22 Apr). Early next morning he was in camp with Coolbun and several others. Later that day the alarm was given that Mokare and his excursions (5 May). It was reported to Barker that for some reason Dr Uredale was in a bad mood. He scolded Talwin over sharing kangaroo and threatened to spear Mokare, Nakina and 'everyone'. Talmundi then speared Dr Uredale in the leg. Barker notes that this satisfied the others who left Uredale by himself (23 Apr). A week later he came into camp with several other Aborigines. He may be going to the Porongrupers for Talmundi (11 May). The next entry is two months later when Uredale came into camp with Coolbun who was accompanied by 'his wife and children'. She was slightly sick and they asked Dr. Davis for help for the child, a boy about four months old (11 Jul). The next week he was at Woolyong with a party of Aborigines (13 Jul) and gave two spears to Talmundi (14 Jul). Six days later he came into camp with Nyaren and was given

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- 1831 This had at Bald Head, now had certain restrictions placed on it that only Coolbun could lift. Barker was told that they passed the males in the family but not to females (13 Jan). Local Aborigines would not pass over the head at the head of the bay because of Dr Uredale's death (18 Jan).
- DR HEROLD'S TITTLE GUN.** F
1830 Dr Uredale stated food given him by Barker for his little girl he has in the bush (Barker, 25 Oct).
- DMR** M
1836 referred to in a letter by Sir Richard Spencer, the Government Resident to Mr. Deas Midford, 26 December 1836. Your servant Dey married a black sister; her sister has never been heard of; they were wrecked on the coast 200 miles east of this.

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brought and asked to preclude tomorrow. The first word of the doctor as usual was 'very ill' (29 Jul). True to his word he came to the bedside and said he was 'very ill' and had been (21 Jul). He will appear to remain quiet from the others (23 Jul). A week later Barker noted him because of his 'grumpy' ways (27 Jul). There was apparently a strong relationship with Mokare whom he visited two or three times a day even when he was 'very ill' (31 Jul). In October there are indications of some sickness amongst the group. Mokare visited Uredale (18 Oct) and there days later told Barker that Uredale was 'very ill' at Mt Middle. Talwin was there when Mokare arrived to see the night (19 Oct). During the last week of October, Uredale visited Barker and told him his wife's death. When Barker gave him food he ate very little, saying that he could get the little girl he has in the bush. He looked ill and miserably (25 Oct). He was in camp on Monday 27 October but very ill. The next day he stayed at the settlement for most of the day and seemed anxious to obtain some food. Later he took most of his food out to the little girl (28 Oct). Early in November Dr Uredale came into camp before breakfast and 'yelled' before the fire, saying out his tons to introduce his art on Mokare. Barker took the opportunity to give an inventory of his possessions, the spear, warrara, knife, umahank and kangaroo skin cloak. When a man dies his belongings were buried with him or 'destroyed' (4 Nov). Dr Uredale appeared in camp towards the end of November but he was 'very ill'. He sat by the fire until 3 or 4 p.m. without saying a word. Barker gave him some food which was received with great contentment. He had a large blister on his chest which was made by pulling fire on that part, perhaps as an attempt to cure the sickness (26 Nov). On 5 December he died beside a pond where he had been camped. Mokare was present and described the death to Dr Deas who thought Dr Uredale had died from an infection of the lungs. His infant daughter was taken by Coolbun his full brother. Talwin was also to stay with him. Talwin and Nakina would go a long way into the bush when they heard the news. Talwin was said to be Dr Uredale's son (5 Dec) yet Mokare indicated that Coolbun was his as the only man in the family (12 Dec) and that the land owned by Dr Uredale was passed on to Coolbun.

- DUMN** M
1831 Came into King George Sound settlement (Barker, 18 Jan).
- DMWT** M
1830 Came in from King River with Waiter (Barker, 26 Jul).
- DEANBARE** see **WUNAWAR**
- ERINGOOL** M
1829 Recorded by Isaac Scott Nind as one of the four men the garrison identified as significant persons. The others were Nakina, Orent and Wand (1831).
- FOOSHEKA** M
1821 Recorded by Phillip Parker King (King 1827:147).
- GALUPPERT, GALUPPERT, GALUPPERT** M
1831 When Charles Brown (Talwin) was seriously ill, Colbe wanted to keep him at the settlement for treatment. He met a great deal of opposition from Coolbun and the others but was supported by Gullipert and Talwin (Colbe 1934).
- 1833 Accompanied Monegal (Margaret) to Perth in a unique public relations exercise to advise the Swan River Aborigines how they should behave with Europeans. The settlement at King George Sound had been comparatively peaceful and Acting Governor Brown, concerned at the increasing conflict in the Perth district, believed that such a visit might be useful. The visitors arrived about the 15th and were met at Perth by Dr Colbe, the former Government Resident at Albany. Colbe took the two men to Monegal's Lake where the Perth leader, Yallegaga, was camped. The other of the Perth Governor of 19 January, 1833 noted a certain amount of difference in their responses to each other. There were also discernible differences in their habits but they were able to communicate. Galupert was embraced by one of the older women and he and Monegal, another important man, exchanged steel clubs. The other commented: 'The arrival of these natives will lead in every probability to the ultimate establishment of a amiable intercourse with the original possessors of the country... a result most sincerely to be desired.'
- The following week, Ensign Robert Dale and George Snythe accompanied the NGS men to Monegal's Lake again, this time to meet Yegan and about ten men with no women present. The other of the Perth Governor, 26 January, noted that all were armed. Dale's report of the meeting would indicate that Yegan's welcome was cordial with a contribution for the visitors. Spears and knives were exchanged and Yegan and Gullipert camped at spear throwing with Yegan winning by hitting a walking stick placed in the ground at about thirty metres. The meeting with Yegan lasted about four hours and seemed to end on a cordial note.
- The cordons presented by the Perth Aborigines was briefly described by George F. Moore, who regarded the visit a great success. Their visit has been of great service, for many reasons subsequently came into Perth and Fremantle and remained their desire to be on friendly terms, and to refrain from offering injury to us or our cattle.

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King George Aborigines went to Cojinnup because of the assemblage of doctors there, one of them being Capara (Barker, 27 Oct).

CAPTAIN see MANYAT

CARRAWUNG M
1830 The young wife of an old man present at the fires of Tringole and some others. She was suffering from 'catarrh' which had made her lose her 'good looks'. She was amusing herself by nursing a young puppy which appeared to be in good condition (Barker, 11 Dec).

CARRAWUNG'S HUSBAND M
1830 An old man mentioned by Barker as having a young wife Carrawung. He was happy as usual when Barker met him with a group of Aborigines, including Tringole (Barker, 11 Dec).

CHARLIE BROWN see TATON M
1831 This is the nickname Collie gave to a young boy who spent a great deal of time in the homes of the settlers, his Nyungar name is not recorded. Collie is concerned for the health of the lad as a number of the King George Sound Aborigines had succumbed to influenza including Mokare and Talwin. Collie chided Koolburn (Coolbun) for wanting to take the boy away from the comfort of a settler's house and into the bush. With the support of Taton and Gallipert he persuaded Coolbun to leave the boy (Collie, 1834).

CHILLOC M
1830 Yandert's brother who fought with him against Yunghitte and others. Chilloc received high praise from Talimundi for dodging all the spears (Barker, 13 Jul).

CHOCKOBERT F
1829 A name recorded by Isaac Scott Nind (1831).

COLUP M
1839 A Toondarup male recorded by George Grey.

CONDILYAN M
1830 The eldest of Mokare's sister's two children who came into camp with Nulloch. She is described as a 'fine little girl', 'sociable but wild looking'. She is engaged to a man a long way off (Barker, 10 May).

COOLBUN M
1821 His name was first recorded by Captain Phillip Parker King during his visit to the Sound in December 1821 (King, 1827:146).
1829 Isaac Scott Nind the doctor at King George Sound recorded the name of Coolbun which is most likely Coolbun (Nind, 1830).
1830 He has a daughter Tlachabert about seven years old who is engaged to a man about 25 or 26. He was mentioned in the story of Yallepole's death as one of the group of Aboriginal men who gathered around the crown prisoners' camp and threw a spear at Captain Wakefield (Barker, 8 Jan., 1830). Coolbun accompanied Barker and the doctor

(European) out of camp to visit the ailing Taragon. Coolbun carried a pot of rice from the garrison. About three quarters of a mile from Taragon they met Nakina who threw himself to the ground. All the Aborigines followed his example and began to cry, 'most of them held their noses between their forefinger and thumb'. Back at the settlement, after Taragon's death, Coolbun reached for his spears to avenge Taragon's death, but was quietly dissuaded by the others and relinquished his spears (8 Mar). Three days later he speared a man (12 Mar).

The following morning he came to Barker's hut with Dr Uredale, Talwin, Taton and Waiter. Coolbun had speared a sleeping Wills man named Wallangoli. (This later proved untrue). Barker showed his dislike for Coolbun's action and refused him entry to his room and denied him food. When the others had left for Bald Head, Coolbun stayed at King George Sound. He was afterwards seen coming in with Talwin, Waiter and Dr Uredale (13 Mar). Coolbun was on lookout all day at the sand hills watching for Wills men ready to signal the others if he saw them (11 Apr). He came into camp with his wife (Neernanja) and two children, and his father and his wife and two children, also Waiter, all looking for food. Coolbun begged for biscuit but when Barker mentioned the name of Wallangoli he asked no more (14 Apr). It was said to Barker that Coolbun or his father, Dr Uredale would be killed for spearing Wallangoli (15 Apr).

On the morning of 23 April, Coolbun came into camp with Dr Uredale and several others. Later that day, in reaction to the alarm being sounded, they all rushed off with spears at the ready. A large group of women gathered with fish, to exchange news. Coolbun's wife, Neernanja was amongst them. (23 Apr.). The Wills men arrived at the settlement and Coolbun was recognized as a member of the group who speared Wallangoli (also Nakina, Tulicatwali, Tringole and several others) (24 Apr). Barker was concerned for Coolbun's safety, and despite his opposition to Coolbun's act, he gave him permission to sleep at the settlement. He went out with several local Aborigines and returned with Talwin and Paityert. They were to inform Walpert of the Wills intention to spear him (27 Apr). Coolbun, it is said, may become a tribal doctor by drinking of fresh water in the air (5 May). In May, Coolbun and a large group of Aborigines approached Barker seeking military assistance to fight the Wills men who had arrived in the area. Barker refused on the grounds that Coolbun and Tulicatwali had been responsible for the fighting by spearing Wallangoli. When Mokare explained Barker's reasons for his refusal Coolbun said he had accidentally injured Wallangoli, 'his spear had slipped' (11 May). Coolbun speared a kangaroo (19 May). Two months later he came into camp with his wife and children and Dr Uredale. A sick female child was brought to Dr Davis of the garrison (11 Jul). Coolbun's family came into camp having slept nearby. Barker commented on the interest shown in Coolbun's four month old son who was always carried by the father or mother (12 Jul). The next day they set out after breakfast to travel a long distance. Before leaving, his wife Neernanja, and daughter Tlachabert, had breakfast with Barker (13 Jul). They were absent from King George Sound for a month, returning on 12 August accompanied by Matalapin. Mokare and Pomocan arrived and joined Barker around the fire (12 Aug). In November, Barker was told that

Coolbun was to give a peace offering of spears, skins and knives to Wallangoli's cousin Paityartite as reparation for the attack earlier that year. Tulicatwali would also give gifts for his part in the murder. The gifts would be given through the services of a man at Mt Gardener (22 Nov). Two weeks later, the peace offering was still being discussed (5 Dec).

Later that day Dr Uredale's death was announced with the news that Coolbun had taken Dr Uredale's infant daughter (his full brother Taton was also to stop with him) implying that Coolbun and Taton were the sons of Dr Uredale (5 Dec). After his father's funeral, Coolbun was to travel to the north and take with him, Talwin's sister and Taton (7 Dec). Five days later, Mokare and others came into the settlement and said that Coolbun had stayed behind with Nulloch at Woolyong. Mokare said that Coolbun was not involved in the recent argument with the Wills men because he was the only man left in the family after Dr Uredale's death (12 Dec). After some days of mourning Coolbun arrived late at night. He asked Barker for food saying he was the only son left after Dr Uredale's death. The ship *The Nimrod* had arrived and a number of Aborigines went on board (20 Dec). The local Aborigines realised that the soldiers would trade food for the green ring-necked parrot they called towans, so Coolbun and Talwin arrived with several young birds (23 Dec).

1831 Coolbun was to prepare spear offerings with Tulicatwali for the Wills men (2 Jan). After Dr Uredale's death, the land at Bald Head became Coolbun's responsibility. Nakina and several others had to wait for permission to burn off the land for wallaby, if they did not burn but only forage they did not need permission.

Barker commented: 'The females never possess land being considered a kind of moveable bride by marriage they part from their native place'. He noted that it was not the custom to give land to son-in-laws. If a man died without a male heir the land became the neighbour's property. Some ground was given to sons as soon as they were born but they did not have 'possession' until they were of a certain age (13 Jan).

Coolbun arrived in camp today with his wife and children who seem very unwell. He was sent for by the Aborigines who were waiting for him to give permission to fire Bald Head to hunt wallaby. (18 Jan). The next day he went across to Bald Head with Nakina and eighteen others in the long boat. They sent a white man back in the boat to collect 'fire' and then fired the land collecting an abundance of wallaby. Nakina and Coolbun returned that evening leaving the others, except Mokare who is at Naringup. Most wallaby had been killed with the *tulaba* (stick) (19 Jan).

Coolbun was in camp when he noticed that Mokare was *quipple* (stealing), by burning for wallaby on Coolbun's land but the owner seemed unperturbed (21 Jan). The next day he reluctantly joined a large group of Aborigines going across to Bald Head by boat to hunt wallaby. Barker noted that Coolbun changed his mind about going when he saw that the group were going to hunt with or without his permission. Talwin was obliged to stay if Coolbun stayed behind. Seeing the others move into the boats, Coolbun also moved slowly toward the boat (22 Jan). Coolbun is exempted from the Wills people spearing because he is left

alone but Mokare, Tulicatwali, Tringole and Nakina are not exempt (31 Jan). He was to be put through 'the ordeal of the spear' by the Wills people. He and Tulicatwali would stand the ordeal from daylight until noon of one day and would give peace offerings of spears, skins etc and the two parties would 'shake hands' and be friends (17 Feb).

1831 Alexander Collie, the Government Resident at the Sound after the departure of the 39th Regiment, acknowledged Koolburn as a tribal doctor and the uncle of the deceased Mokare (PG, 1834). He is described by Collie as an old man whom Collie takes to task for encouraging Talwin to follow the traditional practice and abandon the settlement after the death of Mokare. Collie felt that this had contributed to Talwin's death.

COOLBUN'S WIFE see NEERNANJA

COOLBUN'S BABY F
1830 Wife, daughter and son came into camp today. The baby, a boy about four months, appears to be the centre of attention, always being carried by either Coolbun or his wife. The boy is ill. He is suffering from more than a cold as was thought yesterday. Barker comments that the boy seems to have been 'born a bit strange' (Barker, 12 Jul).

1821 **COOL-YA-RONG** M
Recorded by Phillip Parker King (King, 1827:147).

COOMBINE F
1830 A woman who came into camp very early in the morning. She and her husband (un-named) interrupted Barker while he was shaving in his room. Barker remarks on their curiosity and allowed them to stay until he was dressed. They were amazed by his dressing ritual (Barker, 7 Dec).

COOMBINE'S HUSBAND (un-named) M
1830 Came into camp with Coombine. The pair watched Barker shave and dress which, according to Barker, caused much excitement (Barker, 7 Dec).

COPRON M
1830 First recorded visit to the settlement was 1 April 1830 when he arrived with Dr Uredale and was given an issue of rice (Barker, 1 Apr). He was with Talimundi and some other Aborigines when they threw spears at Wannear and Paityert (15 Apr). Two weeks later he was back in the settlement with his young son Ayenner (30 Apr). In July he was at Woolyong with Dr Uredale and a number of other Aborigines. Mokare told Barker that Copron was in danger of being killed, the reason was not given. It was in some way connected to Yandert who was involved in an elaborate plan connected with a spear fight. When the plan was heard by Mokare's aunt, Yunghitte's wife, she told Copron who was a relative of Yandert. Copron went 'singing through the bush' that Yandert was in danger. Copron thus forewarned 'held off the attack, receiving only two spear wounds in the leg. Talimundi had acted as a peacemaker to prevent Copron being speared (13 Jul).

1831 The feud was not forgotten and seven months later Barker was told



Ardess-Walmsley Local Structure Plan



Prepared by Edge Planning & Property for Ardess 1607 Pty Ltd and Ten Year Developments Pty Ltd

www.edgeplanning.com.au

January 2018

City of Albany Local Structure Plan No. 10

ENDORSEMENT PAGE

This Structure Plan is prepared under the provisions of the *City of Albany Local Planning Scheme No. 1*.

IT IS CERTIFIED THAT THIS STRUCTURE PLAN WAS APPROVED BY RESOLUTION OF THE WESTERN AUSTRALIAN PLANNING COMMISSION ON:

..... Date

Signed for and on behalf of the Western Australian Planning Commission:

.....

an officer of the Commission duly authorised by the Commission pursuant to section 16 of the *Planning and Development Act 2005* for that purpose, in the presence of:

..... Witness

..... Date

..... Date of Expiry

TABLE OF AMENDMENTS TO LOCAL STRUCTURE PLAN			
Amendment No.	Summary of the Amendment	Amendment type	Date Approved by WAPC

PRE-LODGEMENT CONSULTATION		
Agency	Consultation	Method of consultation
City of Albany	March - December 2017	Meetings, emails and phone calls
Main Roads Western Australia	June, September and November 2017	Meetings, emails and phone calls
Department of Education	June and November 2017	Emails and phone calls
Department of Water and Environmental Regulation	June and November 2017	Emails and phone calls
Department of Planning, Lands and Heritage	June, July and December 2017	Meetings, emails and phone calls

EXECUTIVE SUMMARY

The *Ardess-Walmsley Local Structure Plan* has been prepared to facilitate new urban development, to guide subdivision and development within the Structure Plan area (to be called the 'site'), to coordinate with surrounding development and to support an amendment to the *City of Albany Local Planning Scheme No. 1*. The amendment proposes to facilitate the permissibility of the transport depot use in the Ardess Industrial Estate (Industrial Area IA1).

The site consists of the established Ardess Industrial Estate (Lot 10 Chester Pass Road, Walmsley) and Lot 521 Mercer Road, Walmsley. The site is strategically significant to Albany given its location, size, identification in the *Albany Local Planning Strategy* as Future Urban, opportunities to create jobs, provide housing and connect roads and infrastructure to other development areas.

The Structure Plan proposes:

- significant residential development, an expanded light industrial area (employment land), a primary school and public open space (POS);
- substantial new residential lots, a range of densities, lot sizes and housing;
- retaining valuable native vegetation in the east-west bush corridor as POS along with two additional large areas of POS;
- improved vehicle, pedestrian and cycling connections and permeability through extending the surrounding road and pathway network including the extension of Range Road;
- safe and convenient access for pedestrians, cyclists and motorists; and
- coordinating with existing and proposed development.

The Structure Plan recognises the importance of the key environmental and landscape attributes of the area, and incorporates these in an urban form that will create environmentally responsive urban development.

Structure Plan summary table		
Item	Data	Structure Plan reference (section number)
Total area covered by the Structure Plan	178.3348 hectares	Part Two, section 1.2.2
Area of each land use: ¹		
Residential	94.24 hectares	Part Two, section 3.3
Light Industry	58.4648 hectares	Part Two, section 3.7
Public open space	21.63 hectares	Part Two, section 3.2
Primary school	4 hectares	Part Two, section 3.6
Estimated lot yield		
Residential	1320	Part Two, section 3.3
Light Industry	30 lots	Part Two, section 3.7
Total	1350 lots	
Estimated number of dwellings	1320 dwellings	Part Two, section 3.3
Estimated residential density	14 dwellings per hectare	Part Two, section 3.3
Estimated population ²	3300	Part Two, section 3.3
Number of primary schools	1	Part Two, section 3.6
Number of high schools	0	Part Two, section 3.6

Notes: (1) Roads not included in above area calculations. (2) Assumes 2.5 persons per dwelling.

This Structure Plan comprises two parts. Part One is the implementation section, while Part Two is the explanatory section with associated technical appendices.

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ARDESS-WALMSLEY LOCAL STRUCTURE PLAN

PART ONE - IMPLEMENTATION

1. Structure Plan area

This Structure Plan shall apply to Lot 10 Chester Pass Road, Walmsley and Lot 521 Mercer Road, Walmsley being the land contained within the inner edge of the line denoting the Structure Plan boundary on the Structure Plan map (Plan 1).

2. Structure Plan content

This Structure Plan comprises:

- a) Part 1 - Implementation section - This section contains the Structure Plan map and statutory planning provisions and requirements.
- b) Part 2 – Non-statutory (explanatory) section - This section to be used as a reference guide to interpret and justify the implementation of Part One.
- c) Appendices – Technical reports and supporting plans and maps.

3. Interpretation and Scheme relationship

Unless otherwise specified in this part, the words and expressions used in this Structure Plan shall have the respective meanings given to them in the *City of Albany Local Planning Scheme No. 1* (the Scheme) including any amendments gazetted thereto.

The Scheme prevails over the Structure Plan in the case of any inconsistency.

4. Operation

The date the Structure Plan comes into effect is the date the Structure Plan is approved by the Western Australia Planning Commission (WAPC).

5. Land use and subdivision requirements

The Structure Plan map (Plan 1) outlines land use, zones and reserves applicable within the Structure Plan area.

5.1 Land Use Permissibility

Land use permissibility within the Structure Plan area shall be in accordance with the corresponding zone or reserve under the Scheme.

The land uses, zones and reserves designated under the Structure Plan map (Plan 1) are to plan for the co-ordination of future subdivision and development of the Structure Plan area.

The Structure Plan shall be given due regard by the local government when assessing development applications. Once incorporated into the Scheme, the use and development controls of the Structure Plan will have force and effect.

The Structure Plan map (Plan 1) provides designations guiding the preferred locations for future land uses and future key infrastructure including roads. The designations are indicative and will be refined through detailed investigations and design at the time of rezoning, subdivision and/or development as appropriate.

Land within the Structure Plan area that is zoned 'General Agriculture' requires rezoning to 'Future Urban' via an amendment to the Scheme.

It is expected that the expanded light industrial area will be rezoned to 'Light Industry' while the land east of Range Road will be rezoned to 'Future Urban'.

5.2 Residential

Plan 1 identifies residential density codes for the Structure Plan area.

A range of R-Codes will apply to residential areas shown on the Structure Plan. This will provide flexibility, allowing the final R Code to be applied closer to the time when the land will be subdivided.

On average, the Structure Plan area could accommodate approximately 14 dwellings per hectare. There are opportunities to create additional lots subject to market demand.

5.3 Light industry

The main access to the Ardess Industrial Estate is via a single entry road onto Chester Pass Road. Secondary access is permitted between the estate and Terry Road for as-of-right vehicles.

5.4 Public open space

A minimum of 10 per cent public open space (POS) will be provided in residential areas in accordance with WAPC policy. POS is to be provided generally in accordance with Plan 1. The POS will provide a range of opportunities suitable for sporting activities, nature space, playgrounds and other facilities.

There may also be opportunities for joint community/school recreational use of the primary school oval.

5.5 Subdivision

Subdivision of the land shall generally be in accordance with the Structure Plan (Plan 1), approved by the WAPC with any minor variations approved by the WAPC.

The minimum lot size is 1 hectare in the area classified and then zoned as 'Light Industry'.

For land zoned 'General Agriculture', other than the creation of super lots, further subdivision will not be supported prior to rezoning to the 'Future Urban' zone.

5.6 Conditions of subdivision approval

At the time of subdivision the following conditions may be recommended, as applicable, requiring the preparation and/or implementation of the following:

- a) Urban Water Management Plan.
- b) Bushfire Management Plan.
- c) A Local Development Plan to address matters in section 6.2.
- d) Revegetation/landscaping plan.
- e) Preventing direct vehicular access between lots and Range Road/Terry Road.

- f) All residential lots being connected to the reticulated sewerage system.
- g) Notification on titles advising that reticulated sewerage is not provided to light industrial lots and setting out that uses need to be 'dry industries'.

6. Development requirements

6.1 General

Development will be controlled by the Scheme and will be guided by the Structure Plan (Plan 1), the *Residential Design Codes* (for residential development), any approved Local Development Plan and any relevant Local Planning Policies.

The proposed predominant land use within the Structure Plan area will be residential development. It is also proposed to further develop and expand the Ardess Industrial Estate as a key employment area.

6.2 Residential development

The orientation and design of buildings should be sympathetic to existing landform.

6.3 Light industrial development

Development in the area classified as 'Light Industry' will be serviced with on-site wastewater disposal. Existing and proposed industries will be 'dry-type' light industrial uses. Development is required to have low wastewater generation and low volume of process water for disposal. Development shall comply with the *State Government Sewerage Policy*.

On-site waste water disposal shall utilise alternative treatment effluent disposal systems unless the applicant can provide advice to the local government that soil conditions are conducive to the operation of septic tanks and leach drains and will not result in unacceptable loss of nutrients to surrounding waterways, or create a risk to public health.

The local government will require stormwater disposal measures to be implemented to ensure that maximum

retention and infiltration occurs on site through the use of individual soakwells, retention basins or other measures as deemed necessary. Oil and grease traps are to be provided within each building site to the satisfaction of the local government to ensure that nutrient export off the site is kept to a minimum.

The landowner shall retain and manage the landscaping strip adjoining the Chester Pass Road boundary of the site.

Industrial uses are required to meet industrial buffer standards (including as relevant risk, noise, dust, emissions and other potential nuisances) and to not create detrimental impact on surrounding land uses.

Development that incorporates restricted access vehicles will be advised that there is no guarantee that restricted access vehicles will be permitted to use Chester Pass Road between Menang Drive and the main roundabout (intersection with Albany Highway, North Road and Hanrahan Road) following the Albany Ring Road being completely constructed and operational to the Port of Albany. Associated development approvals may also contain conditions or advice relating to future limitations of access for restricted access vehicles.

6.4 Local Development Plans

Local Development Plans will be required to support applications for subdivision and development relating to the following:

- a) Residential development adjoining Range Road to address access, car

parking, built form, possible mixed uses and landscaping.

- b) Lots located between Terry Road and the bush corridor to address access, built form, bushfire management and landscaping.
- c) Lots adjoining Mercer Road, if there is no service road, to address access, built form and landscaping.
- d) Where residential lot sizes are 260m² or less.

7. Other requirements

7.1 Developer contributions

The local government will have due regard to a Contribution Plan prepared for the site and area.

7.2 Staging

The Ardess Industrial Estate is long established industrial estate. It is initially proposed to expand the industrial area eastwards to the extension of Range Road.

The Structure Plan proposes a substantial residential area east of Range Road. It is likely that the development will be staged over the next couple of decades. The staging will be flexible and should adapt to competing development fronts and the varying attractivity and cost of subdividing other development.

Lot 521 is zoned 'General Agriculture'. Accordingly, it will need to be rezoned prior to residential subdivision and development proceeding.



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D	ADD EMERGENCY A. WAY.	171118
C	MINOR MODIFICATIONS	171023
B	MINOR MODIFICATIONS	171022
A	LOCAL STRUCTURE PLAN	171012
REV	DESCRIPTION	YYMMDD
DRAWING NUMBER	REV	SCALE 1:7500
EP 170520 06	D	SHEET A3

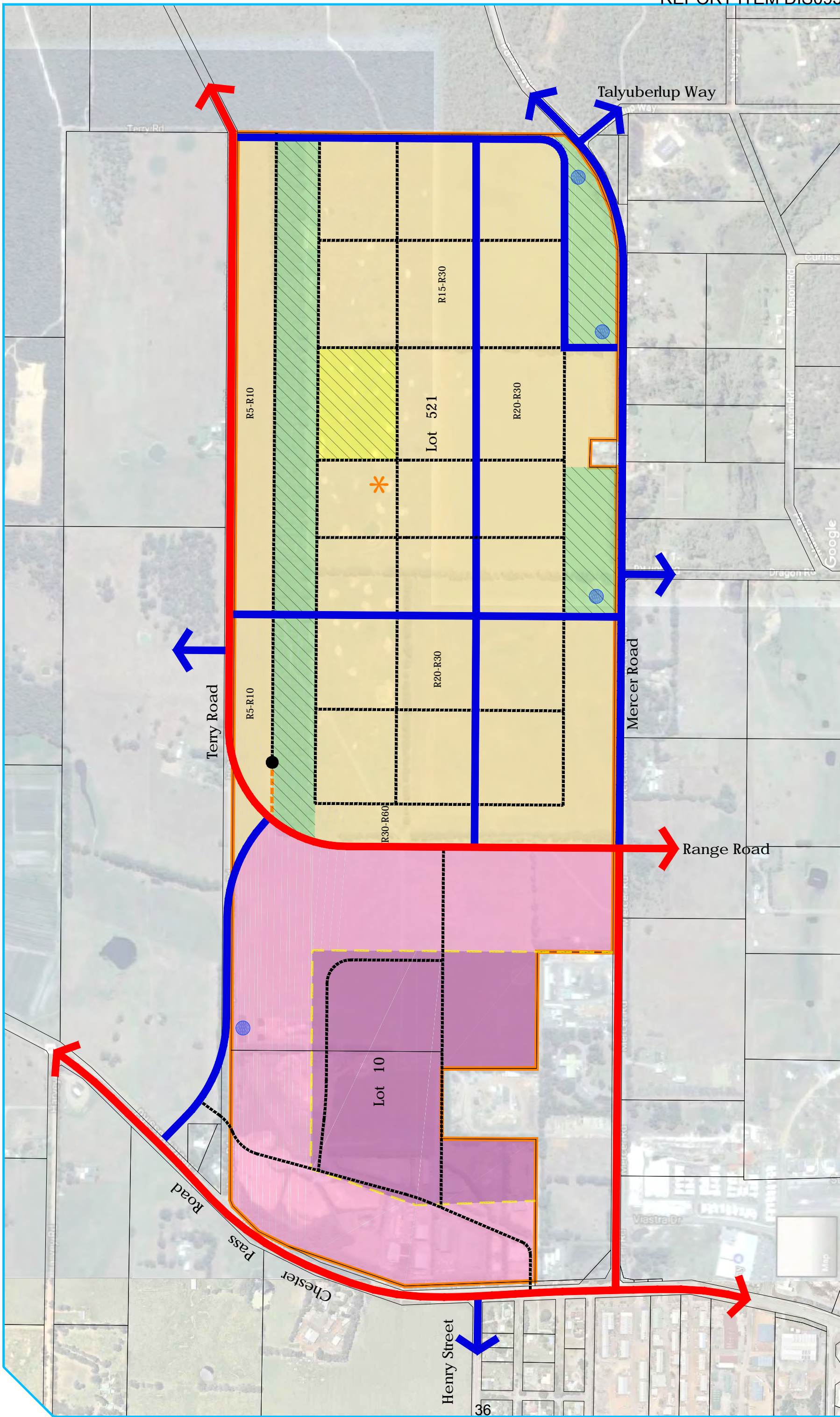


- Light Industry Precinct A
- Light Industry Precinct B
- Community Purpose Site
- 200m Buffer to Sensitive Uses
- Emergency Access Way

- Parks and Recreation
- Public Use - School
- Residential
- Drainage

- Local Structure Plan Boundary
- Integrator Arterial Road
- Neighbourhood Connector Road
- Local Road

LOCAL STRUCTURE PLAN
Lot 10 Chester Pass Road and
Lot 521 Mercer Road
Walmsley



PART TWO - EXPLANATORY SECTION

1. PLANNING BACKGROUND

1.1 Introduction and purpose

The purpose of the Structure Plan is to:

- create new urban development which is characterised by its setting, range of views and conservation of environmental/landscape character;
- provide a statutory land use plan for the area;
- provide a comprehensive framework for land use to facilitate future subdivision and development;
- facilitate an urban form that provides for housing, light industry, other uses and infrastructure that is responsive to the character of the site and locality;
- provide additional industrial lots and employment opportunities;
- provide for fully serviced residential development, ranging from low to higher density development;
- provide a range of public parkland catering for recreation, and nature activities by the local community;
- provide an integrated water management system that minimises risk to public health and enhances the quality of water flowing to Oyster Harbour; and
- protect, enhance and manage the environmental values of the site including native vegetation and fauna.

In order to proceed to the subdivision and development of the land, it is necessary to prepare a Local Structure Plan in accordance with the *Planning and Development (Local Planning Schemes) Regulations 2015*.

The Structure Plan, provided in Plan 1, shows how the site can be broadly subdivided and developed. The Structure Plan seeks to provide for the orderly and proper planning of the site in terms of land use, servicing and design.

The Structure Plan allocates land uses which are complementary to the surrounding area and within the site. More

detailed planning and investigations will occur at the scheme amendment, subdivision and development application stages.

The Structure Plan proposes an extension of the established Ardess Industrial Estate, a significant residential development with a range of residential densities, a primary school and three POS areas.

The proposed light industrial area will require on-site effluent disposal, while the residential area will be developed once reticulated sewerage has been established in the area.

The site is strategically significant to Albany given:

- the *Albany Local Planning Strategy* identifies Lot 10 as 'Industry' and Lot 521 as 'Future Urban', while it is understood the draft *Albany Local Planning Strategy* will show an expanded light industrial area along with a future urban area for the site;
- it is located 5km from the Albany central area, near an activity centre, employment areas and other facilities;
- it is surrounded by existing or planned urban development;
- it is critically important in providing connections to planned urban development and the extension of Range Road;
- it is a large land parcel unlike most land in the adjacent *Yakamia-Lange Structure Plan* area;
- it is an ideal site for residential and employment uses; and
- it is well connected to the State, regional and district road network.

1.2 Land description

1.2.1 Location

The Structure Plan area is located approximately 5 kilometres north of the Albany central area in the locality of Walmsley (see Appendix 1). The site is generally bordered by Chester Pass Road, Terry Road, Reserve 27179 and Mercer Road (Appendix 2). It is well located with

respect to the State and regional road network, providing easy and convenient vehicular access between the site and Albany and other parts of the Great Southern.

The site adjoins and is near various uses as outlined on the Context Plan including a transport depot, City depot and dog pound, industry, commercial, rural and other urban uses (Appendix 3). To the east of Lot 521 is Reserve 27179 which contains remnant vegetation.

From a spatial and geographical perspective, the site provides a logical location for urban development including residential and employment uses.

1.2.2 Area and land use

The site is 178.3348 hectares in area. Lot 10 Chester Pass Road is 25.7335 hectares in area and Lot 521 is 152.6013 hectares in area. This compares with the smaller and more fragmented land ownership to the south of Mercer Road and within the Yakamia-Lange Structure Plan area.

The site consists of multiple land uses. Lot 10 Chester Pass Road comprises the Ardess Industrial Estate and cleared land used to

keep current and old farm machinery and sand/gravel piles. The industrial area comprises of sheds, office buildings, car parks, an internal road network and cleared areas for future development. Businesses within the industrial area include Albany Freight Lines, Designer Dirt (landscaping supplies) and Ardess Nursery.

The Ardess Industrial Estate is subject to various leases.

Lot 521 Mercer Road encompasses the majority of the site and comprises predominantly cleared rural land used for grazing cattle. There are no dwellings on Lot 521 Mercer Road. There are two small to medium sized sheds (one used to store hay and farm machinery and the other an old shearing shed), a set of cattle yards and a strip of remnant vegetation in the northern part of Lot 521.

A variety of land uses surround the Structure Plan area (refer to Appendix 3).

1.2.3 Legal description and ownership

Copies of the Certificate of Titles are provided in Appendix 4. The Structure Plan consists of two lots which are summarised in Table 1:

Table 1 – Legal Description					
Lot	Deposited Plan	Volume	Folio	Area	Ownership
Lot 10 Chester Pass Road, Walmsley	99325	2192	1	25.7335ha	Ardess 1607 Pty Ltd
Lot 521 Mercer Road, Walmsley	76829	2822	563	152.6013ha	Ten Year Developments Pty Ltd

1.3 Planning framework

1.3.1 Zoning and reservations

The City of Albany Local Planning Scheme No. 1 (LPS1) zones Lot 10 Mercer Road as 'Light Industry' with the land identified as Industrial Area 'IA1'. Site specific controls are set out in Schedule 11 – Industry Area for Area No. IA1. Lot 521 Mercer Road is zoned 'General Agriculture'. The current zoning is shown in Appendix 5, while provisions relating to the Ardess Industrial Estate are outlined in Appendix 6.

1.3.2 Regional and sub-regional structure plan

There are no regional or sub-regional structure plans that apply to the Local Structure Plan area.

1.3.3 Planning strategies

Strategic planning for the area identifies the site in providing housing, employment and facilities to support the district and support employment growth.

The *Albany Local Planning Strategy (ALPS)* sets the vision and long term land use planning direction for the City of Albany. The Strategic Plan: Urban, shown in Appendix 7, classifies the site as 'Industry' and 'Future Urban'.

The site is given a 'Priority 3' designation which is described in ALPS as follows:

'Priority 3 areas are logical extensions of the Priority 2 areas locations and/or existing urban areas and include parts of McKail, Gledhow, Warrenup, Walmsley and Big Grove. Priority 3 areas are expected to be rezoned with local structure planning undertaken in the near future. These areas are capable of producing lots within the medium term.'

ALPS sets a number of strategic objectives, principles and actions which include:

- To provide for a range of easily accessible community services and facilities.
- Facilitate a diversity of housing to align with the future population and social needs.
- Facilitate opportunities for local employment and economic growth by providing appropriate locations for establishing and growing business.
- To maintain an adequate supply and range of serviced industrial land in appropriate locations.
- To maintain the sustainable use of existing industrial sites.
- To integrate transport and land use planning in the City.

Page 155 of ALPS in part states 'The ALPS also supports the ongoing development of the existing Milpara and Terry (Hooper) Road Estates' (Ardess Industrial Estate).

The Structure Plan is consistent with the strategic direction set by ALPS.

1.3.4 State and regional strategies and policies

The Structure Plan is consistent with the State and regional planning framework including:

- *State Planning Strategy 2050* – this has a vision of sustained growth and prosperity. Page 20 states 'The vision of sustained growth and prosperity envisages a future where Western Australians enjoy high standards of living, improved public health and an excellent quality of life for present and future generations';
- *State Planning Policy 1 State Planning Framework Policy (Variation No. 2)*;
- *State Planning Policy 2 Environment and Natural Resources Policy*;
- *State Planning Policy No. 2.9 Water Resources*;
- *State Planning Policy 3.7 Planning in Bushfire Prone Areas*;
- *State Planning Policy No. 3 Urban Growth and Settlement* – promotes a sustainable settlement pattern, job creation, building on and within existing communities and the cost-effective use of infrastructure;
- *State Planning Policy 4.1 State Industrial Buffer Policy*;
- *Liveable Neighbourhoods* – promotes connected communities and a walkable community (further outlined below);
- *Development Control Policy 2.2 Residential Subdivision* – lots are required to be both suitable and capable of residential development;
- *Development Control Policy 4.1 Industrial Subdivision* – the location and configuration of the site and the development are consistent with DC4.1 including lot design, servicing and the efficient movement of traffic;
- *Guidelines for Planning in Bushfire Prone Areas*;
- *Visual Landscape Planning in Western Australia Manual*;
- *EPA Guidance Statement No 3 Separation Distances Between Industrial and Sensitive Land Uses*;
- *Guidelines for Separation of Agriculture and Residential Land Uses*;

- *Environmental Protection Bulletin 13 Guidance for the use of the Albany Regional Vegetation Survey in Environmental Impact Assessment*;
- *Great Southern Regional Planning and Infrastructure Framework* - identifies Albany as a regional centre. An initiative to support economic development is to 'Make land available to facilitate the establishment of new industries in designated estates or precincts in Albany' (page 9); and
- *Lower Great Southern Strategy 2016*.

Liveable Neighbourhoods is the State Government's key policy for the design and assessment of Structure Plans for new urban development. The Policy sets out a wide number of objectives and planning requirements relating to neighbourhood structure, roads and access, POS, commercial and shopping areas, schools and management of stormwater.

The Structure Plan is consistent with the aims of *Liveable Neighbourhoods* including it:

- facilitates ease of access in particular walking and cycling, through a network of connected streets that are safe, efficient and pleasant;
- fosters a sense of community, place and local identity through the creation of an urban village in a bush setting, bordered by open spaces (bush corridor on Lot 521, Reserve 27179 and proposed POS adjoining Mercer Road);
- supports public transport system, when feasible in Albany, through higher residential densities near Range Road and adjoining employment uses;
- provides a variety of lot sizes and housing types to cater for diverse housing needs at housing densities that support provision of local services;
- conserves and incorporates key environmental areas into designs including native vegetation;
- integrates the design of POS and stormwater management systems; and

- maximises the use of land for housing relevant for the site's context and setting.

1.3.5 Local planning policies

The Council has endorsed a number of Local Planning Policies and various policies are of relevance to future development on the site.

1.3.6 Other approvals and decisions

The existing *Ardess Service Industry Estate Development Plan* is provided in Appendix 8. This plan has largely been implemented through the formation of civil works and associated development of the Ardess Industrial Estate. Following WAPC approval of the Structure Plan, the Development Plan will be rescinded.

The local government has issued various development and associated approvals in the Ardess Industrial Estate.



View from the Ardess Industrial Estate access way towards Chester Pass Road

2. SITE CONDITIONS AND CONSTRAINTS

2.1 Biodiversity and natural area assets

2.1.1 Overview

Bio Diverse Solutions (Environmental Consultants) prepared an *Environmental Assessment Report and Land Capability Assessment* to guide future environmental management and guide the formation of the Structure Plan (see Appendix 9). The assessments identify the measures proposed to mitigate and manage the environmental features of the site and focus on the natural areas to be retained within the site. The assessment concluded that the site has no significant environmental constraints to facilitate urban development.

The Structure Plan recognises the importance of the key environmental and landscape attributes of the area. It incorporates these in an urban form that creates an environmentally responsive urban development that meets the EPA, WAPC and local government environmental requirements. Consequently, the environmental outcomes of the Structure Plan are considerable. It is expected that future subdivision/development will have negligible environmental impacts given:

- the site is largely cleared;
- existing native vegetation will be conserved in POS;
- there are opportunities to undertake environmental repair through replanting;
- there are appropriate buffers to sensitive land uses;
- subdivision will be appropriately serviced including residential lots will be connected to reticulated sewerage;
- stormwater will be appropriately managed; and
- noise, dust and stormwater will be effectively managed.

2.1.2 Native vegetation

The majority of the site has been cleared. The main area containing native vegetation is in the north of Lot 521 where it is proposed to retain the vegetation as POS. There are no Ramsar listed sites, Wetlands of National Importance or Declared Rare or Priority species of vegetation. Nevertheless, the remaining native vegetation has value and it is proposed to retain these areas where possible.

There are two areas of remnant vegetation within the site. A broad scale vegetation survey of these two areas was conducted by Bio Diverse Solutions on 29 August 2017. The strip of vegetation running parallel with the northern boundary of the site (approximately 13 hectares in size) comprises Low Open Jarrah/Marri/Sheoak Forest in good condition. The small area of remnant vegetation in the south-east corner comprises mixed Eucalypt Forest in a degraded condition.

A search of publicly available databases through WA Atlas, Nature Map, and EPBC Protected Matter Search Tool indicates that no threatened, priority or declared rare flora is present on the site, or within the surrounding Nature Reserves and remnant vegetation.

A key element in preserving biodiversity is connectivity, largely based on connecting natural areas through retaining and/or enhancing native vegetation. Environmental corridors can be for ecological, recreational or utilitarian purposes or for multiple purposes (City of Albany: 2002).

Considerable work has been undertaken to identify and manage environmental corridors. This includes *Albany Greenways* (2002). Appendix 10 shows greenways in and around Albany including the bush corridor on Lot 521 Mercer Road. There are opportunities to connect the bush corridor on Lot 521 Mercer Road to the north and west. This includes planting native vegetation on the western section of Terry Road adjoining the site and opportunities through the *Warrenup-Walmsley Local*

Structure Plan to provide revegetation in drainage lines, as part of POS and within relevant road reserves.

Bio Diverse Solutions advise 'all efforts should be made to conserve existing native vegetation. There is support however to clear, as required, replanted vegetation which is Blue gums given they are generally unsuitable in an urban area.'

The following management measures are proposed to reduce the likelihood of impacts to vegetation and flora and to retain the key existing biological values of the site:

- remnant vegetation will be retained within the vegetation strip in the north-east of the site and in the south-east corner of the site. Inclusion of the native vegetation within POS will provide the most effective way of managing the conservation values of the native vegetation;
- access crossings within the vegetation strip will be limited to facilitate retention and natural regeneration of vegetation and to prevent adverse impacts particularly for transient fauna;
- there will be revegetation using native species, where currently there is very little native species and diversity, in the two southern areas of POS along with other areas to promote fauna habitat, flora diversity and biodiversity;
- rehabilitating waterways/drainage lines to create a 'living stream' through revegetation and as required fencing; and
- develop a greening strategy to increase green canopy and green spaces.

2.1.3 Fauna

The majority of the site has been cleared. As a result, fauna habitat has largely been removed. The only potentially significant fauna habitat on site is within the two areas of remnant vegetation.

Within the bush corridor, in the northern section of Lot 521, there is the potential for black cockatoo foraging, roosting and

breeding habitat, , and any impacts on these habitats should be minimised,. Biodiverse Solutions supports this area being conserved as POS.

The Department of Biodiversity Conservation and Attractions have recently advised that vegetation in this bush corridor will support roosting Black Cockatoos species that are listed as threatened under the *State Wildlife Conservation Act 1950* and the Commonwealth's *Environmental Protection and Biodiversity Conservation Act 1999*. Additionally, significant areas of native vegetation are located in Crown reserves to the east of the site that provide habitat for cockatoo and other threatened and non-threatened species along with landscape connectivity. The Department of Biodiversity Conservation and Attractions encourage the retention of as much of the strip of vegetation as possible on Lot 521 to support roosting habitat and landscape connectivity in the form of 'stepping stones'.

To reduce likely impacts to native fauna, the bush corridor will be retained through maintaining the strip of remnant vegetation in the north of the site and the native vegetation in the south-east corner as POS. Additionally, native vegetation species will be used in areas of POS to promote habitat for native fauna species.

2.2 Landform and soils

2.2.1 Landform

Overall, the site has a gentle to moderate gradient. Topography over the site is undulating ranging from a high point of 51m AHD in the central northern portion of the site to a low point of 22m AHD in the southern central portion of the site. There is a ridge that runs from the central northern portion of the site to the south-west corner.

2.2.2 Geology and soils

Regolith of WA (Department of Mining, 2009) mapping indicates that soils across the site are classified as sandplain, mainly

Aeolian and include some residual deposits.

A Geotechnical Investigation was conducted on the 29 August 2017 by Great Southern Geotechnics under later winter conditions. The Geotechnical Investigation is included in Appendix 9. The investigation included both soil analysis and measuring of water table. The soil testing was conducted to assess the suitability of the site for the proposed residential and light industrial development including onsite effluent disposal for the extension of the industrial area.

Soil testing showed that soils across the site comprised predominately of a silty sand topsoil, over sandy gravel (with a layer depth varying from 200 - 700mm), over sandy clay to the depth of the hole.

Permeability testing was conducted by Liquid Labs WA as part of the Geotechnical Investigation. Permeability at both borehole site TP3 and TP10 is considered to be extremely low this is consistent with the soil type (sandy clay) encountered at these locations.

Phosphorous Retention Index (PRI) results across the site varied consistent with soil type. The sandy clays found across the majority of the site were found to have a very high PRI and therefore a very high ability to fix nutrients and heavy metals. The sandy gravel found at TP1 also had an extremely high PRI, particularly for a sand, whereas the light grey sand found at TP6 had a low PRI and therefore a low ability of fixing nutrients and heavy metals.

Ten boreholes were constructed within the site to a depth of 2.3 metres and left open for a minimum of 1 hour to identify water table present. No groundwater was encountered.

2.2.3 Land capability

As set out in Appendix 9, a Land Capability Assessment of the site was conducted by Bio Diverse Solutions. The overall capability of the site supporting the Urban Development land use was rated as highly

capable for Mapping Unit 1 and very highly capable for Mapping Unit 2. The overall capability of the site supporting the Light Rural Industrial is rated as highly capable for Mapping Unit 1. Mapping Unit 2 was not encountered at the location of the proposed Light Rural Industrial land use. The degree of limitations for both Urban Development and Light Rural Industry for Mapping Unit 1 and Mapping Unit 2 is low to very low.

Accordingly, the site is capable of supporting urban development and has similar soil types and hydrology to the surrounding urban areas. The soils have good foundation stability and any inconsistencies (e.g. lateritic cap rock) can be managed via design and normal construction techniques.

2.2.4 Acid Sulphate Soils

Acid Sulphate Soil (ASS) mapping indicates the site is not situated on any known ASS. There is however a section of high to moderate risk of ASS occurring within 3m of natural soil surface to the south of the site on Mercer Road.

The final fill levels and excavation requirements of the future subdivision will determine if an ASS and Dewatering Management Plan is required to be prepared prior to subdivision. If required, the management plan will be prepared to satisfy the Department of Water and Environmental Regulation and will outline the soil management measures, the groundwater and dewatering effluent monitoring measures and the contingency management measures required to minimise any environmental impacts.

2.2.5 Landscape impact

The western boundary of the site adjoins Chester Pass Road which is a tourist route connecting Albany to attractions including the Stirling Ranges and the Porongurup's. The site also forms part of the 'gateway' into Albany.

The site has mature planting adjoining the Chester Pass Road boundary which is

managed by the landowner. The mature planting, combined with the flat topography and the existing development adjoining Chester Pass Road, will ensure there will be manageable landscape impacts of new development when viewed from Chester Pass Road.

At the residential subdivision stage, a revegetation/landscape strategy will be formulated to provide a framework for the development of POS and the landscape within the public realm. The strategy will address matters including the landscape and design context, protection of remnant vegetation, rejuvenation of habitat and ecological linkages and water sensitive urban design (WSUD).

2.3 Groundwater and surface water

2.3.1 Overview

There are no significant waterways, wetlands or groundwater resources within the site or within the vicinity of the site. Accordingly, surface water or groundwater are not considered constraints to future urban development.

2.3.2 Surface water hydrology

There are no major naturally existing drainage networks or water bodies within the site. There is one minor waterway situated in the north-western section of Lot 10. This area will need to be managed sensitively in relation to stormwater planning within the site.

Hydrographic Sub-catchments (DoW, 2008) show the site to be within two surface water sub-catchments; with the northern and western portion of the site discharging to Willyung Creek to the north of the site and the central and southern portion of the site discharging to Yakamia Creek to the south of the site. Both the Willyung Creek and Yakamia Creek sub-catchments form part of the Oyster Harbour/Kalgan/King Catchment ultimately discharging to Oyster Harbour.

There are several man-made dams across the site, which are surface water fed and used for livestock drinking water.

2.3.3 Groundwater hydrology and hydrogeology

Australian Geoscience Mapping and Department of Water 250K Hydrogeological mapping places the site within the; 'Tertiary - Cainozoic - Phanerozoic (TPw) period: Plantagenet Group - siltstone, spongolite; minor sandstone, peat, and conglomerate.' The aquifer is a 'sedimentary aquifer with intergranular porosity – extensive aquifers, major groundwater resources.' (DoW, 2015).

As set out in section 2.2.2, a Geotechnical Investigation was conducted on the 29 August 2017 by Great Southern Geotechnics under late winter conditions. The investigation included measuring of water table. Ten boreholes were constructed within the site to a depth of 2.3 metres. Groundwater was not observed in any of the boreholes indicating there is no likely groundwater present beneath the site to a depth of 2.3 metres. The geotechnical investigation was undertaken in accordance with Australian Standards.

The site is not located within a Public Drinking Water Source Protection Area.

2.4 Bushfire hazard

The publicly released Bushfire Prone Area Mapping (DFES, 2017) shows that the majority of the site is located within a Bushfire Prone Area (situated within 100m of >1 ha of bushfire prone vegetation).

Bio Diverse Solutions have assessed bushfire risks and have prepared a BAL Contour Plan for the site (Appendix 9). The plan addresses *State Planning Policy 3.7 Planning in Bushfire Prone Areas* and the *Guidelines for Planning in Bushfire Prone Areas*. The plan has informed the Structure Plan and its design.

Based on the Bio Diverse Solutions assessment, the Structure Plan meets the

'Acceptable Solutions' of each Element of the bushfire mitigation measures as per the *Guidelines for Planning in Bushfire Prone Areas* (WAPC, 2017). Table 2 summarises the Bio Diverse Solutions assessment of the

site and the Structure Plan against the bushfire protection criteria Acceptable Solutions for Elements A1, A2, A3 and A4.

Table 2 – Assessment against Acceptable Solutions

Element	Acceptable Solution	Applicable or not Yes/No	Meets Acceptable Solution
Element 1: Location	A1.1 Development Location	Yes	Compliant - BAL 29 or less applied to lots
Element 2: Siting and Design	A2.1 Asset Protection Zone	Yes	Compliant, APZ in BAL 29 or less
Element 3: Vehicular Access	A3.1 Two Access Routes	Yes	Compliant two access to 2 destinations - Compliant
	A3.2 Public Road	Yes	Compliant with EAW
	A3.3 Cul-de-sacs	Yes	Compliant
	A3.4 Battle axes	N/A	Compliant
	A3.5 Private driveways	Yes	N/A
	A3.6 Emergency Access Ways	Yes	Compliant on parent lot
	A3.7 Fire Service Access Ways	N/A	N/A
	A3.8 Firebreaks	Yes	Complaint
Element 4: Water	A4.1 Reticulated areas	Yes	Compliant
	A4.2 Non-reticulated areas	N/A	N/A
	A4.3 Individual lots in non-reticulated areas	N/A	N/A

Based on Appendix 9, the site and the proposed subdivision/development will have acceptable bush fire risks. Future development can be designed to achieve a maximum BAL rating of BAL-29, appropriate access and egress will be provided, new lots and development will be connected to reticulated water and hydrants will be installed.

Future dwellings within the Bushfire Prone Area will be constructed to the required standard that correspond to their assessed BAL, as set out in *AS 3959-2009 Construction of Buildings in Bushfire-Prone Areas*.

A detailed Bushfire Management Plan will be required if any industry is defined as 'High Risk'. A Bushfire Management Plan and a Bushfire Emergency Evacuation Plan are required to support a future Development Application for the primary school. Additionally, a detailed Bushfire Management Plan may be required to support the staged development of the subdivision.

2.5 Heritage

There is no registered Aboriginal heritage site within the Structure Plan area as set out on the Department of Planning, Lands and Heritage inquiry system. Proponents are however required to address the Department of Planning, Lands and Heritage's *Cultural Heritage Due Diligence Guidelines* and meet the provisions of the *Aboriginal Heritage Act 1972*.

The site does not contain any structure or place of heritage significance on the *City of Albany Municipal Heritage Inventory*.

2.6 Servicing

2.6.1 Overview

The Ardess Industrial Estate is provided with standard 'hard' infrastructure with the exception of reticulated sewerage. An internal access road, which is privately owned, provides vehicular access between the estate and Chester Pass Road. A sealed emergency access way,

with an associated approved crossover, connects the internal access road with Terry Road.

2.6.2 Wastewater

There is currently no reticulated sewerage provided to the site. Given this, the expanded light industrial area will be serviced with on-site sewerage disposal consistent with the draft *Government Sewerage Policy*.

All residential lots will be connected to the reticulated sewerage system.

2.6.3 Water

Future lots will be serviced with reticulated water. There are also opportunities for development to capture rainfall into water tanks for reuse within both industrial/commercial operations and on residential lots.

2.6.4 Stormwater

The western and northern portions of the site drain towards the north, while the central and eastern sections drain to the south. Stormwater drainage will be managed through on-site reuse, detention and connection. Further details are outlined in section 3.5 and Appendix 11.

2.6.5 Telecommunications and electricity

Future lots will be serviced with underground power.

2.6.6 Vehicular Access

The site has good access to the State and regional road network. Restricted Access Vehicles (RAVs) are permitted on Chester Pass Road and to enter/leave the Ardess Industrial Estate via the private road.

2.7 Context and other land use constraints and opportunities

2.7.1 Context

The site is located approximately 5 kilometres north of the Albany central area.

The site is surrounded by a wide range of land uses including those outlined on Appendix 3. The site is surrounded by rural properties to the north, west and south and remnant vegetation (Reserve 27179) to the east. The land to the north and west is zoned 'Future Urban'. To the south-west of the site along Chester Pass Road is Albany's main light industrial area which includes a range of businesses. To the south of Mercer Road is a shopping centre and a lifestyle village.

The Ardess Industrial Estate is a well-established industrial area which contains a number of sheds used for industrial, commercial and warehouse purposes along with uses such as transportation/logistics.

An internal access road, which is privately owned, provides access to the estate. A well-established landscape buffer is provided on the estate's western boundary adjoining Chester Pass Road.

The site is bordered by significant areas of remnant vegetation on its eastern boundary (Reserve 27179) which is reserved as 'Parks and Recreation' within LPS1. The vegetated reserve contributes significantly to the character and amenity of the area.

2.7.2 Rational for Structure Plan design

Major influences of the Structure Plan design include:

- designation of the site in ALPS as 'Future Urban' and 'Industry' and local government support to expand the Ardess Industrial Estate in the draft ALPS;
- design principles in *Liveable Neighbourhoods*;
- investigations and recommendations from Biodiverse Solutions;
- advice from the local government and State Government agencies;
- retaining native vegetation including the bush corridor;
- creating an urban village in a bush setting;

- promoting employment opportunities including facilitating transport depots and logistic operations;
- the *Ardess Service Industry Estate Development Plan*, existing development in the Ardess Industrial Estate and likely future development;
- extending Range Road; and
- draft *Warrenup-Walmsley Local Structure Plan*.

The Structure Plan responds to the site's context, opportunities, constraints and the planning framework. The rationale behind the Structure Plan (Plan 1) includes to:

- address land use compatibility with adjoining/nearby uses and coordinate with surrounding development;
- provide light industrial development and employment in the western section and residential development in the central and eastern sections;
- provide a range of residential lot densities, sizes and housing which contribute to a greater choice of housing and at densities that are marketable and make efficient use of land and infrastructure;
- comply with *Guidelines for Planning in Bushfire Prone Areas*;
- have regard to topographic and other natural features along with required servicing;
- foster a sense of identity that reflects the natural character of the area and creates a sense of community;
- create an urban village in a bush setting, bordered by open spaces (bush corridor on Lot 521, Reserve 27179 and proposed POS adjoining Mercer Road);
- minimise the impact of development on sensitive environmental values;
- facilitate the safe and efficient movement of traffic and promote a connective and permeable walking and cycling network;
- provide POS that conserves native vegetation, treats stormwater along with providing opportunities for a range of recreation;
- enhance the area through the provision of a primary school and a community purpose site;

- recognise there is increasingly a move away from manufacturing operations towards transportation logistics and storage, warehousing and distribution centres. The Ardess Industrial Estate is well suited to assisting with transportation logistics with its excellent road access and as demonstrated by current development in the estate;
- provide an opportunity to create a high quality extension of Albany's urban area which maximises the views to surrounding features including Willyung Hill, Porongurup, Stirling Ranges, Mount Manypeaks, Mount Clarence, Mount Melville and the coast; and
- provide additional retail catchment to the existing Chester Pass Mall activity centre.

2.7.3 Structure Plan key proposals

The Structure Plan has been developed to guide the subdivision and development of the site. The Structure Plan proposes:

- light industrial development;
- residential development with densities ranging between R5 – R60;
- POS in three sections of the site;
- a primary school site;
- community purpose site; and
- new roads and opportunities for walking and cycling.

Light industry is shown as Precinct A and Precinct B. This relates to a separate scheme amendment request to LPS1 to facilitate the permissibility of the transport depot use in the Ardess Industrial Estate (Industrial Area IA1). The amendment proposes:

- Precinct A - the transport depot use is an 'A' use (land located within the '<200 metre' buffer'); and
- Precinct B - the transport depot use is an 'D' use (land located within the '>200 metre' buffer').

3. LAND USE AND SUBDIVISION REQUIREMENTS

3.1 Land use

3.1.1 Overview

The Structure Plan (Plan 1) provides guidance for future subdivision and development. The Structure Plan proposes additional light industrial development, low and medium density housing development, POS, a primary school site and a community purpose site. The Structure Plan outlines a range of residential densities to promote a variety of densities, lot sizes and types of housing.

Associated roads are identified including part of Range Road which connects central Albany with Oyster Harbour/Lower King and road widening for Terry Road (eastern section).

The Structure Plan summary table, in the Executive Summary, outlines key statistics and planning outcomes.

3.1.2 Suitability of proposed land uses

The site is suitable and capable of accommodating light industrial and residential development.

The western portion of the site is suitable for light industrial development to complement the existing Ardess Industrial Estate. Expanding the Ardess Industrial Estate will create considerable employment and economic activity.

The central and eastern portions of the site are suitable for residential subdivision/development consistent with ALPS. *Liveable Neighbourhoods* promotes the concept of 'walkable catchments'. The residential area is generally within 400 metres (equivalent of 5 minutes walking time) to an area of POS.

3.1.3 Integration with surrounding land use

The Structure Plan is compatible and integrated with surrounding land uses. The Structure Plan has considered the site's

context, including adjoining and nearby land uses, and considered the compatibility of future development. In summary, the proposed light industry and residential uses are compatible with adjoining and nearby land uses/development given:

- the long established Ardess Industrial Estate is well-buffered to sensitive uses given it adjoins industrial and rural land. Additionally, Chester Pass Road is wide adjoining the site. This combined with the established planting provides a buffer to uses on the western side of Chester Pass Road;
- it is likely that there are greater noise and associated impacts from Chester Pass Road than from the Ardess Industrial Estate;
- the Structure Plan proposes light industry rather than general industry. Effectively managed light industry can be located adjoining residential development;
- Range Road will have a 30 metre reserve width incorporating street trees and landscaping;
- development conditions can further assist to minimise off-site impacts; and
- a requirement for industrial operators to appropriately manage their operation and control their impacts on their own property in accordance with standard practice and legal principles.

3.2 Public open space

3.2.1 Overview

The design of the POS system responds to a wide number of opportunities presented by the site, namely:

- retaining key environmental features such as remnant vegetation;
- integrating surface water management measures into POS;
- providing well-distributed and generous sized POS that provide a range of recreational opportunities;
- fostering a sense of community, place and local identity through the creation of an urban village in a bush setting, bordered by open spaces (bush

- corridor on Lot 521, Reserve 27179 and POS adjoining Mercer Road); and
- providing an attractive entry frontage to Mercer Road that enhances the site's sense of place.

3.2.2 POS provision

The Structure Plan provides the following POS:

- a vegetated bush corridor containing remnant vegetation in the north-east section;
- two generous sized neighbourhood parks incorporating an incidental drainage function; and
- a community centre site located near the proposed primary school.

A schedule of POS for the Structure Plan Area is shown in Table 3.

Table 3 – POS Schedule	
Land use allocations	Hectares
Total Structure Plan area	178.3348
Less – Unrestricted POS not included in POS contribution	10.728ha
Total – Net site area	167.6068ha
Deductions	
Primary school	4ha
Light industry	58.4648ha
Arterial roads:	
Range Road (30m reserve width)	2.67ha
Terry Road – eastern section (5m widening within Structure Plan area)	0.675ha
Gross subdivisible area	101.797ha
Required POS @ 10 per cent	10.1797ha
POS contribution	
May comprise: minimum 80% unrestricted POS	7.59ha
May comprise: maximum 20% restricted POS – bush corridor total area 13.41ha	2.682ha
Unrestricted POS sites	
Neighbourhood Park No. 1, central-south 3.2ha (take 0.7ha for drainage basin)	2.5ha
Neighbourhood Park No. 2, south-east 5.15ha (take 0.46ha for drainage basin)	4.69ha
Community purpose site	0.4ha
Restricted use POS	
Restricted use POS - bushland	2.682ha
POS provision	10.272ha

In addition to the above, there are opportunities for community use of the primary school oval under a shared access agreement with the Department of Education.

The amount of POS has been calculated to meet the minimum 10% requirement under *Liveable Neighbourhoods* and to provide for stormwater management systems. The allocation of POS will be further refined during the subdivision stage as the detail of the stormwater management system is further determined through the Urban Water Management Plan. This will result in opportunities to improve dwelling yield and planning outcomes, while continuing to balance ecological and recreational needs within the minimum 10% requirement of *Liveable Neighbourhoods*.

The Structure Plan aims to provide wide ranging recreational opportunities while contributing to the unique identity of the locality. The Structure Plan recognises that well designed POS contributes to a community's better quality of life.

The provision of POS assists to create a distinctive sense of place, conserve important natural areas, provide active and passive recreational areas and provide convenient access to residential areas. Portions of the POS are also proposed to integrate with managing stormwater.

3.2.3 Nature space

While the majority of the site has been cleared there are areas of remnant vegetation that will be retained within the POS. Retention of the native vegetation in public ownership will facilitate the effective management of the area for its conservation value.

The bush corridor contains native species or communities in a relatively natural state and hence contains biodiversity. The Department of Biodiversity Conservation and Attractions have recently advised that the vegetation in this bush corridor will support roosting Black Cockatoos species that are listed as threatened under the

State Wildlife Conservation Act 1950 and the Commonwealth's Environmental Protection and Biodiversity Conservation Act 1999. Significant areas of native vegetation are located in Crown reserves to the east of the site that provide habitat for cockatoo and other threatened and non-threatened species and landscape connectivity. The Department of Biodiversity Conservation and Attractions encourage the retention of as much of the strip of vegetation as possible on Lot 521 to support roosting habitat and landscape connectivity in the form of 'stepping stones'.

The role of the bush corridor is significant in enhancing the area's natural assets to the benefit of the community. The bush corridor is expected to be of high value to residents. The POS will be bordered by public roads to assist with management of the POS.

Passive, conservation style POS is consistent with the desired character and lifestyle of the area. There will be opportunities for low-key recreation within the bush corridor, with details be addressed at the subdivision stage.

3.2.4 Neighbourhood parks

Two large neighbourhood parks are proposed on Lot 521 in the central-south and south-east sections. The central-south POS is 3.2 hectares and is expected to incorporate a drainage basin of around 0.7 hectare. The south-eastern POS is 5.15 hectares and is expected to incorporate a drainage basin of around 0.46 hectare.

Their location provides an opportunity to create an attractively landscaped entry statement to the area. There is an opportunity to provide attractively designed areas of POS which will be overlooked by the surrounding residential areas. The POS should be maintained to a high standard to be appealing to the community.

It is expected that the neighbourhood parks will be used for active recreation, passive recreation, nature space and

unstructured active play. These sites could be developed for active recreational use such as playgrounds, exercise facilities, half-court basketball courts along with passive facilities such as picnic/barbecue areas and seating.

Drainage areas for the one in 100 year event within POS near Mercer Road have the potential to combine passive recreation and unstructured active play opportunities through WSUD. Where drainage basins remain dry for most of the year, they can be designed to enable them to be used for recreational purposes.

3.2.5 Community purpose site

A community purpose site is proposed near the primary school. While details will be addressed at the subdivision stage, including its ownership or vesting, it is envisaged the site will be around 4000m² in area. The community purpose site will be an asset to the area and will complement the primary school.

3.3 Residential

The Structure Plan provides R5 to R60 coded areas to facilitate a mix of densities lot sizes and housing types. Increasing population in Albany, a designated regional centre, adds to its overall viability, vitality and prosperity and the range of services that can be sustained.

Future subdivision will meet the minimum lot size and will comply with the average lot size requirements of the *Residential Design Codes* for the specified density coding.

Approximately 94.24 ha has been identified as gross residential development land.

ALPS recommends that urban residential densities of approximately R20 are to be achieved in 'Future Urban' areas. The R20 density code is the equivalent to an urban density of approximately 14 dwellings per hectare of gross urban land. It is estimated approximately 1320 residential lots will be created, based on 14 dwellings per hectare of gross urban land. Final yields will be determined at the subdivision design

stage. Over the life of the project, there is an opportunity to achieve an increased overall density, subject to market demand.

As previously outlined, it is intended to foster a sense of community, place and local identity through the creation of an urban village in a bush setting, bordered by open spaces (bush corridor on Lot 521, Reserve 27179 and POS adjoining Mercer Road). Based on land use allocation, street block pattern and associated lot orientation, the Structure Plan seeks to promote views and outlooks.

Residential development should respond to the unique character of the area and be sympathetic to existing landform. Consideration should be made to formulating Building and Landscaping Guidelines supported by restrictive covenants.

The proposed higher density near Range Road will maximise opportunities for future access to public transport.

3.4 Movement networks

3.4.1 Current situation

The site has excellent access to the National and State highway network and the regional road network. Additionally the site is highly accessible by road with convenient access to the Albany central area and the Albany urban area. This will ensure convenient vehicular access that meets safety and amenity objectives.

Vehicular access between the site and Chester Pass Road is via an existing sealed access way (private road). There are appropriate sight distances in both directions where the access way intersects with Chester Pass Road (which is four lane dual carriageway adjoining the site) which facilitates safety for road users.

The City has previously approved a crossover from the site onto Terry Road. In comparison to the main and direct access between the Ardess Industrial Estate and Chester Pass Road, the crossover to Terry Road is used only occasionally. Terry Road

is not a classified Restricted Access Vehicles (RAV) route, so all RAVs are required to enter and leave the Ardess Industrial Estate via the main Ardess Industrial Estate access way. **No RAV's are permitted to access or leave the Ardess Industrial Estate via Terry Road. 'As of right' vehicles are however able to use Terry Road.**

Chester Pass Road is an approved road train route and it has a speed zoning of 60kph where the Ardess Industrial Estate access road intersects with Chester Pass Road. MRWA are supportive of RAVs to RAV Category 7 entering and leaving the site from the Ardess Industrial Estate access road. RAV Category 7 relates to vehicles (prime mover towing a semi-trailer and B Double or a B Double towing a dog trailer) that have a maximum length of 36.5 metres and a maximum mass of 107.5 tonnes.

Given the site adjoins Chester Pass Road, the impact of RAVs on general traffic on the Structure Plan area is minimised. RAVs will enter and leave the site in a forward gear.



Chester Pass Road looking towards Chester Pass Mall with Ardess Industrial Estate on the left

3.4.2 Proposed movement system

Various traffic impact studies have been prepared for the locality. In summary, these studies conclude that the road network and intersections have sufficient capacity to address traffic generation from the development.

The Structure Plan proposes:

- a movement network that maximises permeability and legibility. New connections provide access to surrounding areas;
- key roads on a north-south and east-west grid to promote permeability including connecting the Ardess Industrial Estate with Range Road;
- an extension of Range Road will provide an alternative north-south route to Chester Pass Road and Lower King Road/Ulster Road;
- road reserve widths of 30 metres on Range Road/Terry Road to cater for eventual four lanes, stormwater management, services and street trees;
- no direct vehicular access between lots and Terry Road/Range Road. There will be limited or no access between lots and Mercer Road with this matter to be addressed at the subdivision stage; and
- no cul-de-sacs in the general industry estate and only one cul-de-sac in the residential area (between Terry Road and the bush corridor POS, which will be provided with an emergency access way).

The Structure Plan will ensure convenient vehicular access that meets safety and amenity objectives. The Structure Plan is guided by the appropriate road types from *Liveable Neighbourhood*. Neighbourhood connector roads are proposed as the key access and egress connectors for the Structure Plan area.

The final design will be subject to detailed civil engineering design at the subdivision stage. Roads will be designed and constructed in accordance with local government requirements.

3.4.3 Key issues

In time, it is expected that the western section of Terry Road will be realigned. The existing intersection of Terry Road/Chester Pass Road is expected to be closed and the intersection relocated northwards to provide appropriate vehicular sight distances in both directions. This is being separately considered via the *Warrenup-Walmsley Local Structure Plan*.

MRWA is seeking changes to the realignment of Terry Road including connecting it with Harvey Road to create a 4 leg roundabout. MRWA advise the advantage to the design is safety. A 4 way roundabout is more effective than a 3 leg, the land to build the roundabout already resides in the Harvey Road truncations and it reduces the number of conflict points.

MRWA prefers a flow through two way arrangement for transport depots, including at the Ardess Industrial Estate, to allow for increased flow options.

Chester Pass Road will continue to act as part of the Restricted Access Vehicle (RAV) Class 7 Network until the Albany Ring Road is finalised.

Development in the light industrial area that incorporates RAVs will be advised that there is no guarantee that RAVs will be permitted to use Chester Pass Road between Menang Drive and the main roundabout (intersection with Albany Highway, North Road and Hanrahan Road) following the Albany Ring Road being completely constructed and operational to the Port of Albany. Associated development approvals may also contain conditions or advice relating to future limitations of access for RAVs.

Given there is existing light industrial development adjoining Chester Pass Road, there are no traffic noise implications from Chester Pass Road on future development on the site.

In the future, the owners of Lot 10 Chester Pass Road and the City will review whether

the private road becomes vested with the City as a public road.

3.4.4 Vehicle manoeuvring and parking

Vehicle parking and manoeuvring areas for industrial/commercial development will be contained on site and all vehicles will be able to enter and leave the site in a forward gear. Vehicular access, parking and manoeuvring areas will be constructed, drained and where necessary sealed to the satisfaction of the local government.

3.4.5 Pedestrian and cyclist movements

The site's location and the Structure Plan design provide considerable opportunities for walking and cycling. A strong pedestrian network is promoted in the Structure Plan to enable connectivity, access and recreational opportunities.

There are various opportunities to promote walking and cycling to/from the site which will be considered in more detail in future planning and design stages. Dual use paths and footpaths will be provided in the residential area in accordance with *Liveable Neighbourhoods*.

3.4.6 Public transport

The site is not currently serviced by public transport. It is expected that Range Road/Terry Road and Chester Pass Road will be identified as future public transport routes connecting the Albany central area with localities including Oyster Harbour, Lower King, Warrenup and Pendeen.

3.5 Water management

A Local Water Management Strategy (LWMS) has been prepared in support of the Structure Plan as required by *State Planning Policy 2.9 Water Resources* and *Better Urban Water Management* (WAPC 2008). Refer to Appendix 11.

The LWMS outlines there are opportunities to enhance water quality and quantity onsite before being discharged offsite. Accordingly, stormwater management from the site is required be effectively

designed, constructed and managed to the satisfaction of the local government and Department of Water and Environmental Regulation to meet publications such as *State Planning Policy 2.9 Water Resources*, *Better Urban Water Management*, *Stormwater Management Manual for Western Australia*.

The LWMS details the integrated water management strategies to facilitate future urban water management planning. The LWMS will achieve integrated water management.

The LWMS sets out a number of management/design measures to be implemented to reduce the impact of the proposed development on surface water and groundwater flows, levels and quality, the function and environmental values of the site, or its interconnected areas.

Stormwater management is required to ensure there are limited off-site impacts through adopting WSUD. This recognises that water is a valuable resource. WSUD aims to reduce stormwater runoff, remove nutrients and contaminants, protect receiving environments, minimise water use, maximise water conservation, promote fit-for-purpose use and promote re-use.

In particular, the subdivision/development is required to ensure that stormwater is designed to ensure that post development run-off rates are no greater than pre-development run-off rates.

The LWMS confirms that there are no significant constraints or sensitive features which would preclude implementation of WSUD.

Based on geotechnical investigations, land capability assessed and the proposed management measures, it is not expected that any changes to groundwater flows, levels or quality will have an adverse impact on the function and environmental values of the site.

There are limited water management risks associated with development of the site.

Based on the geotechnical investigations (see section 2.2.3), there is no requirement to undertake pre-development groundwater monitoring. Overall, the soil types enable stormwater infiltration at source.

Based on geotechnical investigations (Appendix 9), it is expected that lots can support on-site reuse and/or detention.

The LWMS includes indicative locations of stormwater basins at each low point within the catchments. These basins will be fully integrated with the POS and designed and landscaped to become a significant feature of the development.

3.6 Education facilities

The estimated lot yield of 1320 residential lots and a population of approximately 3300 people will generate demand for one primary school.

Liaison with the Department of Education confirms that one primary school will be required within the Structure Plan area to service the site and a catchment extending outside of the Structure Plan area. Provision for a high school is not required.

A four hectare primary school site, rectangular in shape, is set aside for education facilities within the Structure Plan area. The school is central to the residential area and accessible to the future school catchment north of Terry Road.

The school site is bordered on four sides by roads to assist with access and parking. There will be effective circulation for traffic around the school site which will assist to reduce traffic congestion and illegal parking issues at peak school periods. This in turn will assist to reduce congestion in the local streets as traffic moves to and from the school site.

The site has minimal physical constraints, is gently sloping, is well drained and is capable of supporting school buildings.

There are opportunities for community use of the school oval under a shared access agreement with the Department of Education. If agreed, it will satisfy the requirement for an active sporting area in the northern portion of the site and provide another public recreational asset.

3.7 Activity centres and employment

The City and the WAPC (via documents such as *Liveable Neighbourhoods*) promote employment and economic growth which will be assisted by the proposed expansion of the Ardess Industrial Estate to Range Road.

The Structure Plan will have various economic benefits including supporting local employment, supporting local services and strengthening the local economy which is consistent with the planning framework. For instance, implementation of the Structure Plan will:

- provide a range of opportunities and choices for businesses, most which are expected to be small to medium sized operations;
- assist in the economic sustainability and strength of Albany and contributes to the local and regional economy. Development of the site will contribute to job creation (direct and indirect jobs) and it will assist in the growth and diversify of the City's economic base and add to the overall vitality and prosperity of Albany;
- support a growing and more diverse industrial and logistics sector which will provide an important foundation for the future economic growth of Albany;
- create employment close to where people live; and
- assist with employment self-sufficiency in the district.

Other employment generators within the Structure Plan area include the primary school and home businesses.

3.8 Infrastructure coordination, servicing and staging

3.8.1 Overview

Background servicing information is set out in section 2.6. Future subdivision and development will be appropriately serviced in accordance with local government and WAPC requirements.

The subdivision/development of the site, as advocated by the Structure Plan, will require the extension and upgrading of essential civil infrastructure. There will be a need for more detailed investigations and design to ensure there is capacity of these services for the subdivision. The capacity of existing infrastructure to service future subdivision will need to be determined prior to the issue of titles.

3.8.2 Wastewater

Biodiverse Solutions assessed the proposed expanded light industrial area being serviced with on-site effluent disposal against the draft *Government Sewerage Policy*. The assessment found that the proposed light industrial area is appropriate for on-site sewage disposal. In addition, the low permeability and high PRI of the soils in the location of the proposed industrial area will allow for slow draining assisting the process of being fixed by soil microbes.

As the light industrial area is located in a sewerage sensitive area, a secondary waste water treatment system with nutrient removal should be used. The provision of on-site sewage disposal systems including calculation of land application area will be in accordance with minimum site requirements contained in Schedule 3 of the draft *Government Sewerage Policy* (DoP, 2016) and must be approved for use in Western Australia by the Department of Health. LPS1 requirements for the current Light Industrial area require 'dry industry' and 'alternative treatment effluent disposal systems'.

Based on geotechnical investigations, on-site wastewater disposal is appropriate for future light industrial lots/development. This

reflects the expected generous lot sizes, the intended land uses, the expected low wastewater generation and anticipated low volume of process water.

All residential lots will be connected to the reticulated sewerage system. To service residential lots, waste water pumping stations (WWPS) will be required. It is expected that the northern portion of the site will be serviced with a WWPS located outside the site in the northeast corner of Lot 4925 Terry Road. South of the ridge line on Lot 521, the majority of the site is expected to be serviced with a WWPS located outside the site on Mason Road within the *Yakamia-Lange Structure Plan* area. Both WWPS's eventually discharge into the WWPS on the corner of Albany Highway and Le Grande Avenue.

While the permanent WWPS and their pressure mains are ultimately funded by the Water Corporation, pre-funding of those works by developers is likely to be required to enable subdivision to proceed. These costs can be shared between developers both within and outside of the Structure Plan area.

3.8.3 Reticulated water

Proposed lots will be connected to the reticulated (scheme) water system. This will require an extension and upgrading of the water main, plus advancing the programmed enlargement of a supply main to ensure proposed lots have sufficient pressure to meet Water Corporation's licence conditions and its Customer Charter. Hydrants will be installed based on Water Corporation guidelines.

The reticulated water supply should be complemented with rainwater capture and storage, with landowners/operators required to install rainwater tanks as a condition of development approval.

3.8.4 Power supply and telecommunications

All proposed lots will be serviced with underground power and required telecommunication infrastructure.

Electrical trenching within the site will also be used for communications cabling as well.

Existing HV power supplies are available in adjacent commercial and industrial areas and can be extended in a staged program to service the site. While no significant offsite infrastructure upgrades are anticipated, this will need to be confirmed closer to the subdivision stage.

3.8.5 Gas

Albany has an LPG reticulated gas network operated by Atco Gas. While the current system is limited and there is no network in the Walmsley locality, upgrades currently being carried out may extend the system.

The options at present are an individual household/commercial premise bottled supply or the establishment of a centralised 'bullet' for reticulated gas to each household and commercial premise.

3.8.6 Staging

A staged development will occur, with the initial stages being the expansion of the Ardess Industrial Estate to the east. The formulation of future stages will consider the location of services, demand and feasibility considerations. Residential subdivision will only be feasible and environmentally sustainable once reticulated sewerage has been established in the area.

3.9 Developer contributions arrangements

Developer contributions are to be made in accordance with the WAPC's *State Planning Policy 3.6 Development Contributions for Infrastructure* and any Local Planning Policy adopted by the local government.

A Contribution Plan is provided in Appendix 12. This sets out the key infrastructure, community facilities and land requirements to be provided by subdividers with and outside the Structure Plan area.

Some of the key infrastructure and facilities that are covered by the Contribution Plan include:

- Terry Road widening and upgrading;
- Range Road construction;
- Mercer Road/Range Road intersection;
- Mercer Road/neighbourhood connector intersections;
- primary school site; and
- POS.

Subdividers should refer to section 7.1 of Part One - Implementation section for developer contribution responsibilities.

3.10 Implementation

Implementation of the Structure Plan will be through application of the provisions of Part One - Implementation of the Structure Plan through scheme amendment, subdivision and/or development processes.

4.0 CONCLUSION

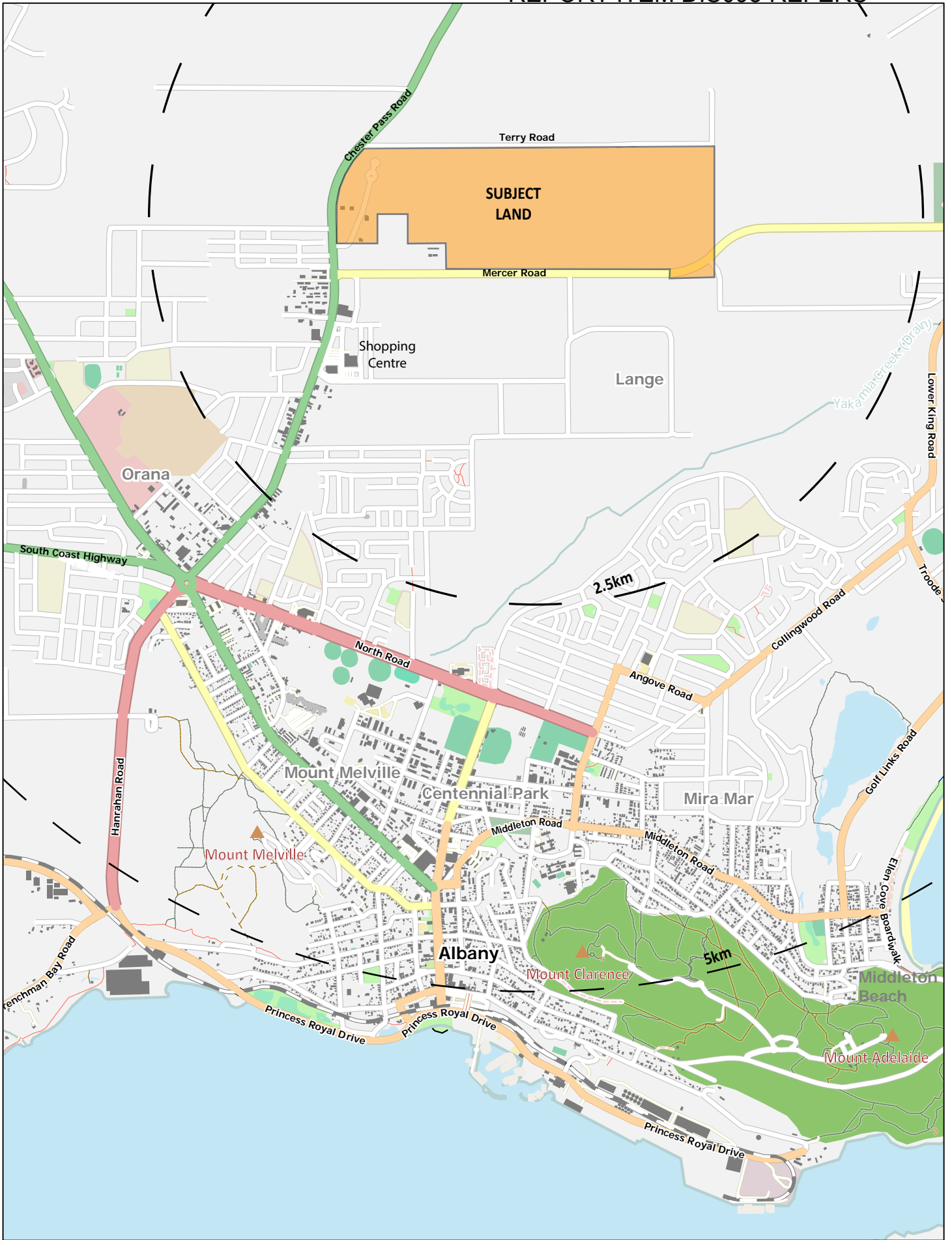
The *Ardess-Walmsley Local Structure Plan* coordinates and facilitates a strategically significant development area as identified in ALPS. Its relative proximity to the Albany central area, retail, commercial and industrial activity provides an opportunity to consolidate development which maximises access to employment and services.

The Structure Plan recognises the importance of the key environmental and landscape attributes of the area, and incorporates these in an urban form, that creates an environmentally responsive urban development that meets the EPA, WAPC and City of Albany's environmental requirements.



View of Ardess Industrial Estate and surrounding area

APPENDIX 1



LOCATION PLAN
 Lot 10 Chester Pass Road
 and Lot 521 Mercer Road
 Walmsley, City of Albany

 SUBJECT LAND



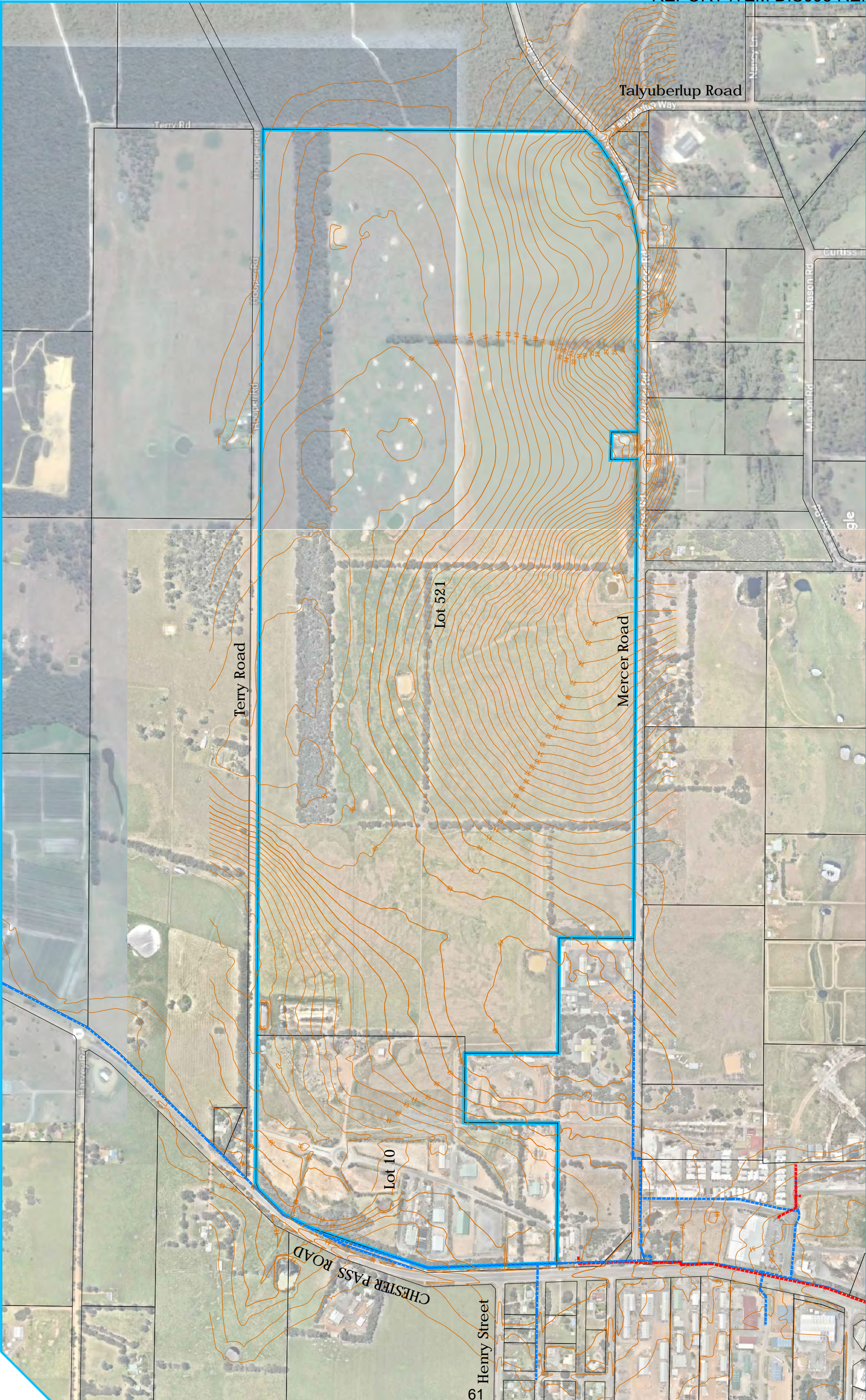
edge
 PLANNING & PROPERTY

Edge Planning & Property
 134 Hare Street, Mount Clarence
 ALBANY WA 6330
 W www.edgeplanning.com.au
 E steve@edgeplanning.com.au
 M 0409 107 336

scale 1 : 30,000 @ A4



APPENDIX 2

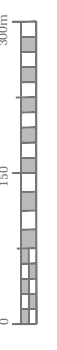


Edge Planning & Property
124 Hume Street, Mount Clarence
AUBURN WA 6230
M 0409 107 334






DRAWING NUMBER
EP 170520 01

REV A
A CONTEXT PLAN
REV DESCRIPTION YNMMDD DRAWNAPPRVD

SCALE 1:7500
SHEET A3

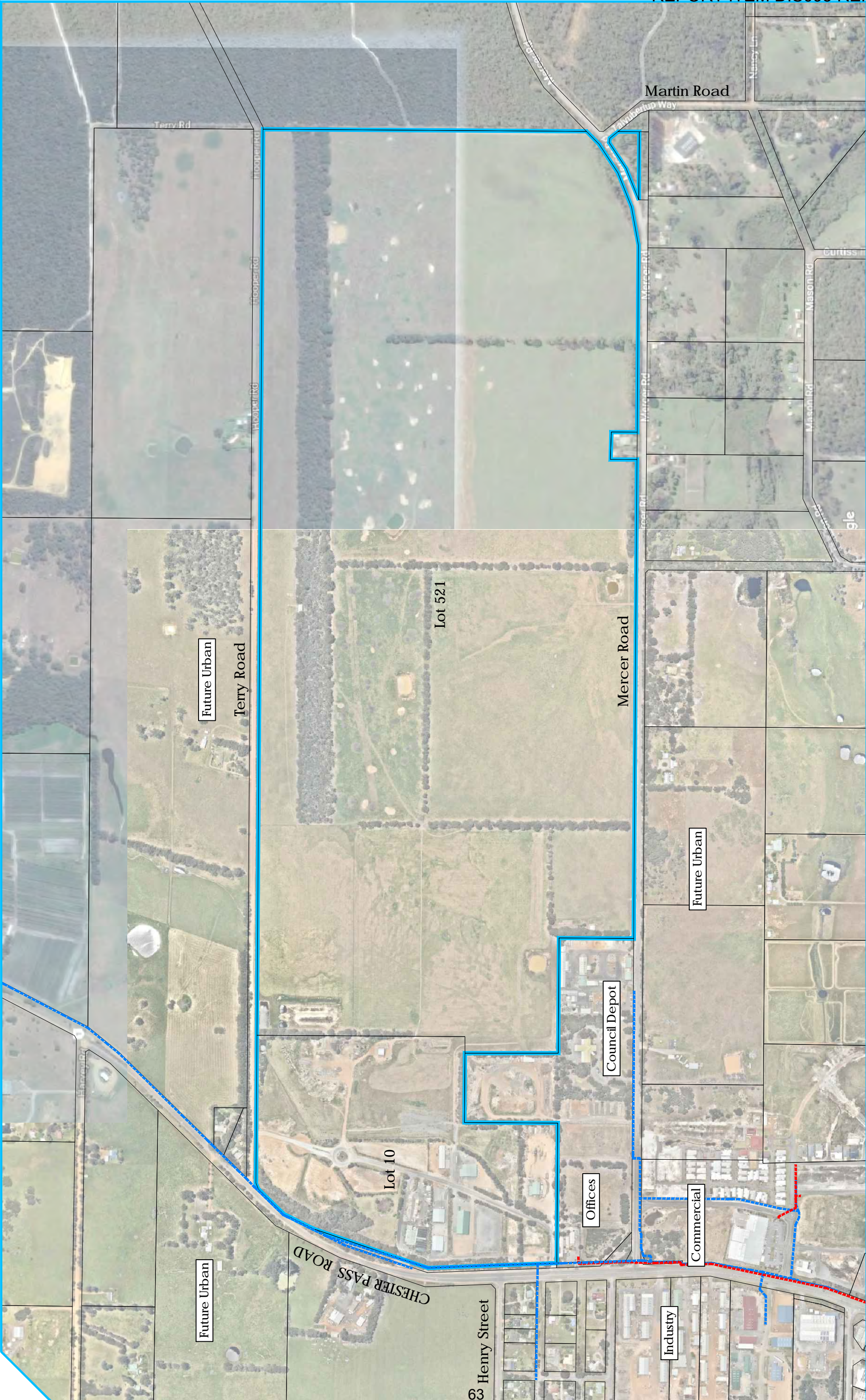


Legend

-  Structure Plan Boundary
-  Existing u/ground Water Pipe
-  Existing u/ground Sewer Pipe
-  Existing Lot Boundary
-  Contours

SITE PLAN
Lot 10 Chester Pass Road
and Lot 521 Mercer Road
Walmsley

APPENDIX 3

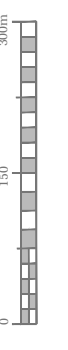


Edge Planning & Property
124 Hulse Street, Mount Clarence
AUBURN WA 6230
M 0409 107 334





DRAWING NUMBER
EP 170520 03

REV A
A CONTEXT PLAN
170522 SJ ST
REV DESCRIPTION YMMDD DRAWN/APP/VD

SCALE 1:7500
SHEET A3



Legend

-  Structure Plan Boundary
-  Existing Lot Boundary
-  Existing u/ground Water Pipe
-  Existing u/ground Sewer Pipe

CONTEXT PLAN
Lot 10 Chester Pass Road
and Lot 521 Mercer Road
Walmsley

APPENDIX 4

ORIGINAL: Not to be removed from the Department of Land Administration.

Application H436981

VOLUME FOLIO

Volume 1575 Folio 458

WESTERN



AUSTRALIA

2192 1

IN THE REGISTER

CERTIFICATE OF TITLE

UNDER THE "TRANSFER OF LAND ACT, 1893" AS AMENDED



The person described in the First Schedule hereto is the registered proprietor of the undermentioned estate in the undermentioned land subject to the easements, encumbrances and notices shown in the Second Schedule hereto.

J. Doyle
REGISTRAR OF TITLES

Dated 5th May, 2000

ESTATE AND LAND REFERRED TO

Estate in fee simple in portion of Plantagenet Location 392 and being Lot 10 on Diagram 99325, delineated on the map in the Third Schedule hereto.

FIRST SCHEDULE (continued overleaf)

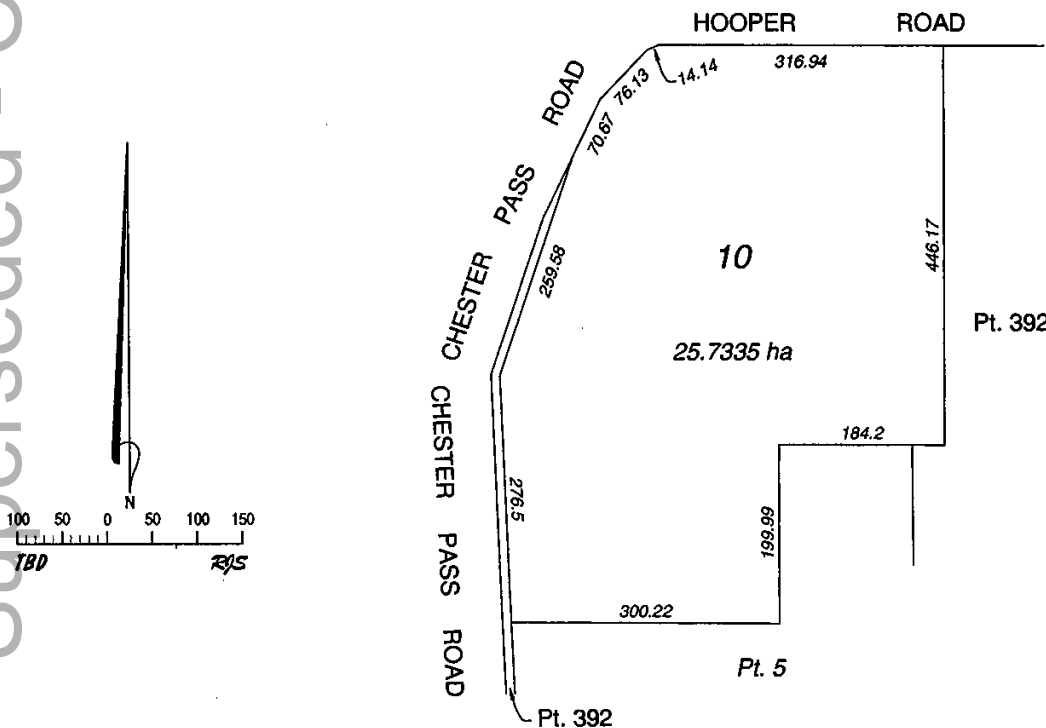
Ten Year Developments Pty Ltd of 51 Collie Street, Albany.



SECOND SCHEDULE (continued overleaf)

- EASEMENT for Drainage purposes created on Diagram 99325 under Section 27A TP&D Act.
- MORTGAGE H436984 to Ten Year Developments Pty. Ltd. of 51 Collie Street, Albany. Registered 5.5.00 at 11.19 hrs.

THIRD SCHEDULE



NOTE: Entries may be affected by subsequent endorsements.

ORIGINAL CERTIFICATE OF TITLE

ORIGINAL CERTIFICATE OF TITLE

ORIGINAL CERTIFICATE OF TITLE

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ORIGINAL CERTIFICATE OF TITLE

VOLUME FOLIO
2192 1
 IN THE REGISTER

REPORT ITEM DIS093 REFERS

Page 2 (of 2 pages)

FIRST SCHEDULE (continued) NOTE : ENTRIES MAY BE AFFECTED BY SUBSEQUENT ENDORSEMENTS

PARTICULARS
 Address 1607 Pty. Ltd. of Lot 52 Lower Denmark Road, Albany.

INSTRUMENT
 NATURE NUMBER
 Transfer H436983

REGISTERED
 5.5.00

TIME
 11.19

SEAL & INITIAL


SECOND SCHEDULE (continued)

REGISTERED or LODGED	TIME	SEAL & INITIAL	CANCELLATION		REGISTERED or LODGED	SEAL & INITIAL
			NATURE	NUMBER		

REPORT ITEM DIS093 REFERS



REGISTER NUMBER 521/DP76829	
DUPLICATE EDITION N/A	DATE DUPLICATE ISSUED N/A

RECORD OF CERTIFICATE OF TITLE UNDER THE TRANSFER OF LAND ACT 1893

VOLUME **2822** FOLIO **563**

The person described in the first schedule is the registered proprietor of an estate in fee simple in the land described below subject to the reservations, conditions and depth limit contained in the original grant (if a grant issued) and to the limitations, interests, encumbrances and notifications shown in the second schedule.



REGISTRAR OF TITLES

LAND DESCRIPTION:

LOT 521 ON DEPOSITED PLAN 76829

REGISTERED PROPRIETOR: (FIRST SCHEDULE)

TEN YEAR DEVELOPMENTS PTY LTD OF 51 COLLIE STREET, ALBANY

(AF M485739) REGISTERED 5/12/2013

LIMITATIONS, INTERESTS, ENCUMBRANCES AND NOTIFICATIONS: (SECOND SCHEDULE)

Warning: A current search of the sketch of the land should be obtained where detail of position, dimensions or area of the lot is required.
* Any entries preceded by an asterisk may not appear on the current edition of the duplicate certificate of title.
Lot as described in the land description may be a lot or location.

-----END OF CERTIFICATE OF TITLE-----

STATEMENTS:

The statements set out below are not intended to be nor should they be relied on as substitutes for inspection of the land and the relevant documents or for local government, legal, surveying or other professional advice.

SKETCH OF LAND: DP76829
PREVIOUS TITLE: 2795-990
PROPERTY STREET ADDRESS: NO STREET ADDRESS INFORMATION AVAILABLE.
LOCAL GOVERNMENT AUTHORITY: CITY OF ALBANY

NOTE 1: M485739 THIS LOT/TITLE CREATED AFTER CROWN LAND INCLUDED INTO THE FREEHOLD ESTATE WITHOUT PRODUCTION OF THE DUPLICATE CERTIFICATE OF TITLE. CURRENT DUPLICATE FOR THE WITHIN LAND IS STILL VOLUME 2795 FOLIO 990 EDITION 1

REPORT ITEM DIS093 REFERS

WESTERN



AUSTRALIA

REGISTER NUMBER 10/D99325	
DUPLICATE EDITION 2	DATE DUPLICATE ISSUED 21/7/2014

RECORD OF CERTIFICATE OF TITLE UNDER THE TRANSFER OF LAND ACT 1893

VOLUME
2192

FOLIO
1

The person described in the first schedule is the registered proprietor of an estate in fee simple in the land described below subject to the reservations, conditions and depth limit contained in the original grant (if a grant issued) and to the limitations, interests, encumbrances and notifications shown in the second schedule.

REGISTRAR OF TITLES



LAND DESCRIPTION:

LOT 10 ON DIAGRAM 99325

REGISTERED PROPRIETOR: (FIRST SCHEDULE)

ARDESS 1607 PTY LTD OF LOT 52 LOWER DENMARK ROAD, ALBANY
(T H436983) REGISTERED 5 MAY 2000

LIMITATIONS, INTERESTS, ENCUMBRANCES AND NOTIFICATIONS: (SECOND SCHEDULE)

- *L643182 CAVEAT BY ANNE WALMSLEY AS TO PORTION ONLY LODGED 2.6.2011.
- *L643183 CAVEAT BY GORDON WALMSLEY AS TO PORTION ONLY LODGED 2.6.2011.
- *L643184 CAVEAT BY PETER WALMSLEY AS TO PORTION ONLY LODGED 2.6.2011.
- *L643185 CAVEAT BY RHODA WALMSLEY, GEORGE WALMSLEY AS TO PORTION ONLY LODGED 2.6.2011.
- M685117 EASEMENT TO CITY OF ALBANY FOR DRAINAGE PURPOSES - SEE DEPOSITED PLAN 76833 REGISTERED 26.6.2014.

Warning: A current search of the sketch of the land should be obtained where detail of position, dimensions or area of the lot is required.
* Any entries preceded by an asterisk may not appear on the current edition of the duplicate certificate of title.
Lot as described in the land description may be a lot or location.

-----END OF CERTIFICATE OF TITLE-----

STATEMENTS:

The statements set out below are not intended to be nor should they be relied on as substitutes for inspection of the land and the relevant documents or for local government, legal, surveying or other professional advice.

SKETCH OF LAND: 2192-1 (10/D99325).
PREVIOUS TITLE: 1575-458.
PROPERTY STREET ADDRESS: 230 CHESTER PASS RD, WALMSLEY.
LOCAL GOVERNMENT AREA: CITY OF ALBANY.

NOTE 1: M498174 DEPOSITED PLAN (INTEREST ONLY) 76833 LODGED.

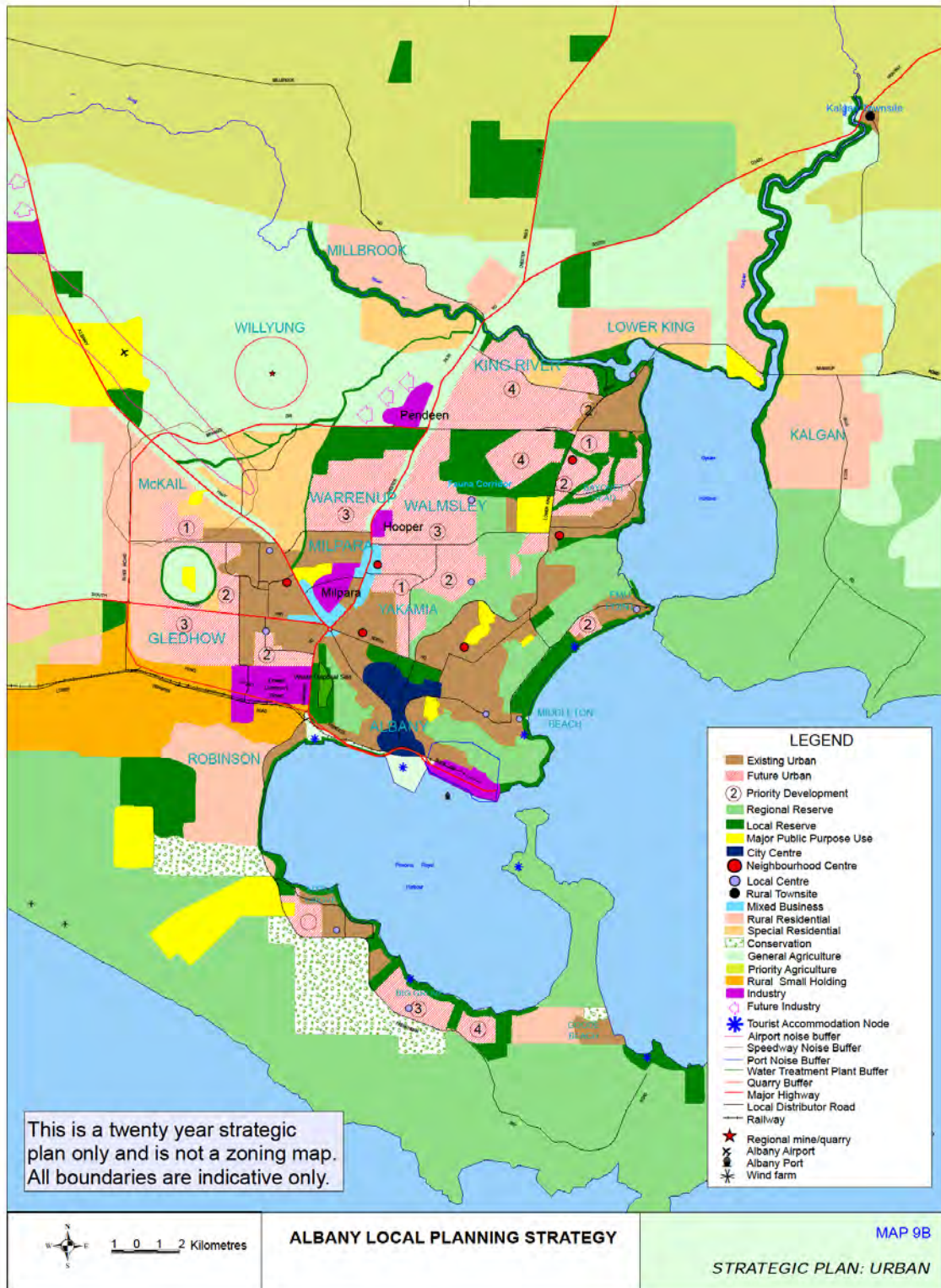
APPENDIX 5

APPENDIX 6

REPORT ITEM DIS093 REFERS

No.	Industrial Area	Special Conditions Applying to Industrial Area
IA1	Ardess Light Industrial Estate, Chester Pass Road and Terry Road, Walmsley	<ol style="list-style-type: none"> 1. Subdivision <ol style="list-style-type: none"> 1.1 Subdivision of the land shall generally be in accordance with Development Guide Plan IA1 endorsed by the CEO, with any minor variations approved by the Western Australian Planning Commission. 2. Land Use <ol style="list-style-type: none"> 2.1 Notwithstanding any other requirements of the Zoning Table, the following land use restrictions shall apply - <ol style="list-style-type: none"> (i) All industrial uses within the zone shall comply with the definition of a 'Dry Industry' as follows: <p style="margin-left: 20px;"><i>Dry Industry means an industrial land use which can demonstrate to the satisfaction of the Local Government that the quality/quantity and volume of wastes produced from its operations can be successfully disposed of on-site without creating any adverse environmental or health effects.</i></p> 2.2 The Local Government may permit a maximum of 16 dry industries (industries which do not have significant effluent or waste disposal requirements) on the lot (average density = 1.62 hectares per industry). 3. Site and Building Requirements <ol style="list-style-type: none"> 3.1 All buildings and structures are to have minimum setback as follows: <ol style="list-style-type: none"> (i) Internal Road: 9 metres; and (ii) Revegetation Areas: 10 metres. 3.2 The setback from the internal road can be used for landscaping, car parking or trade display. 4. Access to Ardess Industrial Estate <ol style="list-style-type: none"> 4.1 Access to the estate will be via a single entry road onto Chester Pass Road. 4.2 All internal roads and crossovers will be required to be sealed to the satisfaction of the Local Government. The minimum road pavement width for the internal road(s) should be 10 metres with 2 metre shoulders to allow the passage of two passing vehicles past a further vehicle parked at the verge. Minor roads are to be constructed to at least 5 metres pavement width. 5. Stormwater Management <ol style="list-style-type: none"> 5.1 The Local Government will require stormwater disposal measures to be implemented to ensure that maximum retention and infiltration occurs on site through the use of individual soakwells, retention basins or other measures as deemed necessary. Oil and grease traps are to be provided within each building site to the satisfaction of the Local Government to ensure that nutrient export off the site is kept to a minimum. 6. Effluent Disposal <ol style="list-style-type: none"> 6.1 On-site effluent disposal shall utilise alternative treatment effluent disposal systems unless the applicant can provide advice to the Local Government that soil conditions are conducive to the operation of septic tanks and leach drains and will not result in unacceptable loss of nutrients to surrounding waterways, or create a risk to public health.

APPENDIX 7



APPENDIX 8

ARDESS SERVICE INDUSTRY ESTATE - DEVELOPMENT PLAN

Legend

- Existing fences
- Strategic firebreaks / emergency access routes
Gravel to 2WD all weather standard
- Proposed Main Roads,
10m 2 coat seal
- Proposed Access Roads,
5m 2 coat seal
- Constructed drainage lines,
additional retention basins in positions shown if needed
- Retention and swirl basins to ameliorate water flows across site.
- Potential industrial sites. Final siting to be determined by landowner and Council depending upon industry requirements. Hatch areas shown are approximately 2500m².
- Landscape Protection Zone (dimensions as shown)

Major contour interval 2.0m, minor contour interval 0.5m, heights approx. AHD., Map Datum Local - Albany Grid

TOWN PLANNING INFORMATION

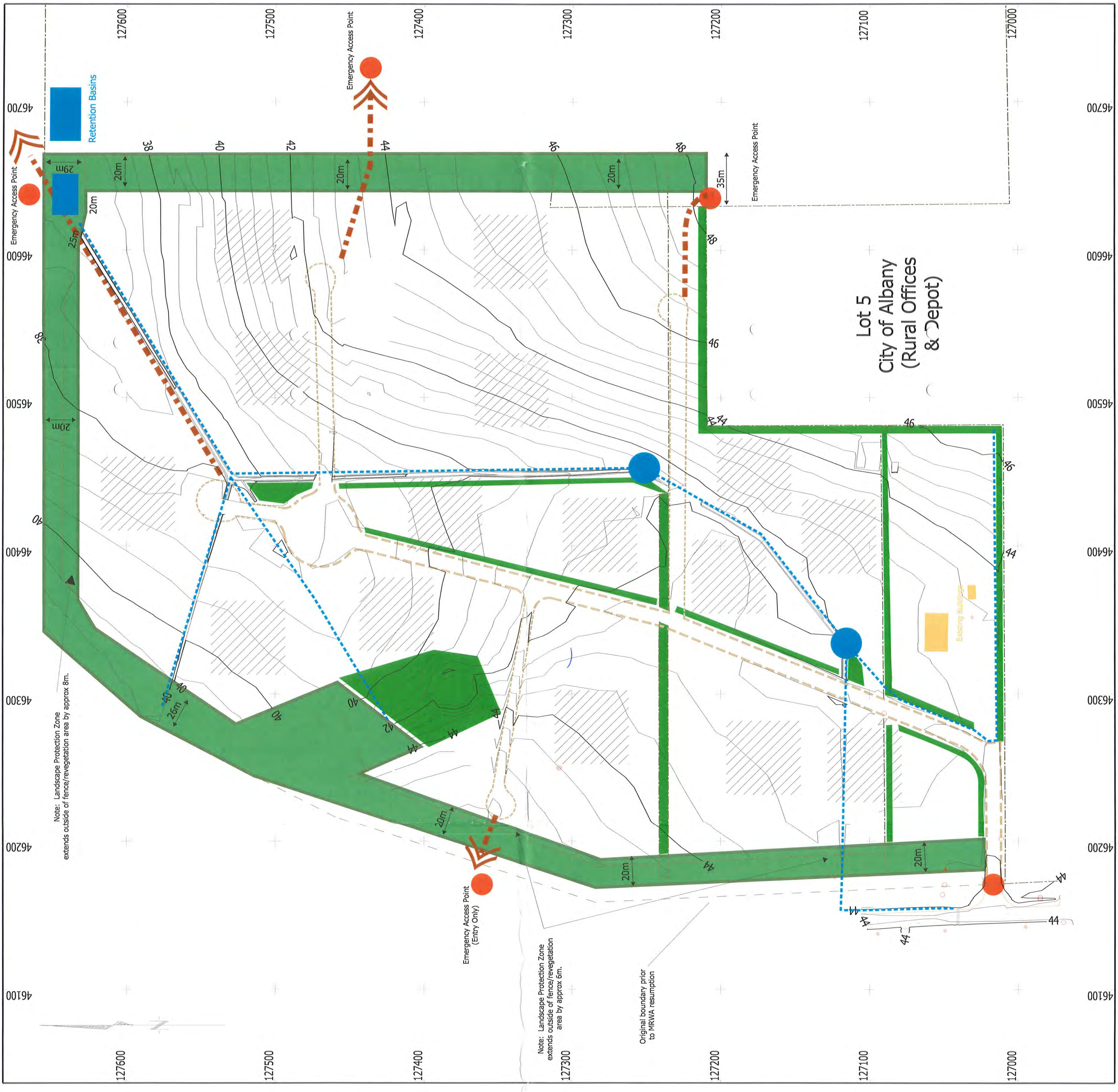
To be read in conjunction with the City of Albany Town Planning Scheme No. 3

Service Industry Zone:

- i) Council shall not permit an industrial use unless it can be demonstrated that by application of buffer standards in place at the time the industry can be accommodated without detrimental impact upon surrounding land uses and that the industry will perform as a "Dry Industry".
- ii) The landowner will be required to demonstrate that prospective industries will be able to meet environmental guidelines in terms of risk, noise, dust, emissions or other potential nuisance and be able to be accommodated on the site without the need for a buffer distance of greater than 50m.
- iii) The landowner shall be required to plant and maintain suitable revegetation areas to maintain visual amenity of the site and to assist in nutrient assimilation. Council may require additional plantings as a condition of Planning Scheme Consent or allow a variation to any revegetation plan if an area of the same or greater extent is planted elsewhere within the site to Council's satisfaction. The choice of species shall be the responsibility of the landowner but at least 50% of the trees must be capable of growing to a height of 3m within 5 years, with preference given to species endemic to the region.
- iv) Applications for Planning Scheme Consent shall be required for all uses as listed in Table 1 for the Service Industry Zone and any change of use. The Application for Planning Scheme Consent shall require the submission of a completed 'Application for Planning Scheme Consent', three copies of the plan showing the exact location of any buildings or displays proposed and three copies of scaled elevation plans for any buildings or displays showing colours and materials to be used.
- v) Uses not specifically listed in Table 1 may be permitted if, in the opinion of Council, they will fulfil the objectives of the zone. Such uses will be regarded as "AA" uses for the purposes of public consultation and advertising. Any additional requirements for individual areas are to be listed in Schedule 6 - Service Industry zone.

Extract from Schedule VI "Special provisions relating to the Ardess Service Industry Zone"

- i) Council may permit a maximum of 16 dry industries on the lot (average density = 1.625ha per industry). The area allotted to each industry will be dependent upon individual industry requirements in terms of area, internal buffers and land capability. Any requests by the landowners to increase the maximum number of industries shall be made in the manner of Scheme Policy or Scheme Amendment to be decided upon by Council and dependent upon the scale and nature of the proposed changes.
- ii) All buildings and structures shall be set back a minimum of 20 metres from the internal road and 10 metres from any revegetation area. The 20m setback from the internal road can be used for landscaping, carparking or trade display in a similar manner to the standards set by provisions 5.7 to 5.9 inclusive or any alterations to these provisions by way of a Town Planning Scheme Policy or Amendment.
- iii) Council may vary the setback requirements for any setback if the landowner can demonstrate that it will not adversely impact upon adjoining industries, revegetation or access for firefighting purposes and may require further screening within the reduced setback area to compensate for any perceived or actual loss of amenity.
- iv) All entrance to the estate will be via a single entry onto Chester Pass Road.
- v) Advertising signs for individual businesses shall not be visible from Chester Pass Road although a sign stack approved by and to the specifications of the Main Roads Department may be erected upon Chester Pass Road at the entry statement.
- vi) A single entry statement may be erected at the Chester Pass Road entrance subject to advice and approval from Council and the Main Roads Department.
- vii) All internal roads and crossovers will be required to be sealed to the satisfaction of Council. The minimum standard proposed is for the main internal road to have a pavement width of 10m with 2m shoulders to allow the passage of two using vehicles, just a further vehicle parked on the verge. Minor roads are to be constructed to at least 5m pavement width.
- viii) Council will require stormwater disposal measures to be taken to ensure that maximum retention and infiltration occurs on site through the use of individual soakwells, retention basins or other measures as deemed necessary. Oil and grease traps are to be provided within each building site to the satisfaction of Council to ensure that nutrient export off the site is kept to a minimum.
- ix) On site effluent disposal shall utilise amended soil systems unless the proponent can provide advice to Council that soil conditions are conducive to the operation of septic tanks and leach drains and will not result in unacceptable loss of nutrients to surrounding waterways, or risk to public health.
- x) The landowner shall be directly responsible for the maintenance of amenity in those areas surrounding individual industries and shall take necessary means to rectify unsightly displays or unkempt land as directed by Council.
- xi) Carparking bays shall be provided in accordance with relevant standards as directed by Council.
- xii) The landowner shall provide a copy of these Special provisions to prospective tenants and provision shall be made to the satisfaction of Council to prove that this has occurred and that the prospective tenant has read and understood their content.



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Lot 5
City of Albany
(Rural Offices
& Depot)

APPENDIX 9

**Lot 10 Chester Pass Road &
Lot 521 Mercer Road,
Walmsley WA 6330**

Environmental Assessment and Land Capability Assessment Report



21/11/2017

Kathryn Kinnear

Bio Diverse Solutions

DOCUMENT CONTROL

Title: Environmental Assessment Report – Lot 10 Chester Pass Road and Lot 521 Mercer Road, Walmsley WA

Author (s): Chiquita Burges

Reviewer(s): Kathryn Kinnear & Steve Thompson

Job Number: EPP 004

Client: Ardess 1607 Pty Ltd

REVISION RECORD

Revision	Summary	Revised By	Date
Draft Id 26/09/2017	Internal QA Review	Kathryn Kinnear	26/09/2017
Draft Id 29/09/2017	Issued to client for review	K. Kinnear	29/9/2017
Draft Id 26/10/2017	Updated as per client review	B. Theyer	26/10/2017
Draft Id 13/11/2017	Issued to Client	K. Kinnear	13/11/2017
Final Id 21/11/2017	Final updates and Issued to Client	K. Kinnear	21/11/2017

The recommendations and measures contained in this assessment report are based on the requirements of the Australian Standards 3959 – Building in Bushfire Prone Areas, WAPC SPP3.7, Guidelines for Planning in Bushfire Prone Areas (WAPC, 2017) and CSIRO’s research into Bushfire behaviour. 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.



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Appendix A: Draft Local Structure Plan (Edge Planning & Property, 2017).

Appendix B – Geotechnical Investigation (Great Southern Geotechnics, 2017)

Appendix C – Phosphorous Retention Index Test Results (CSBP Laboratory, 2017)

Appendix D - BAL Contour Plan (Bio Diverse Solutions, 2017)

1. Executive Summary

Ardess 1607 Pty Ltd commissioned Bio Diverse Solutions (Environmental Consultants) to prepare an Environmental Assessment Report (EAR) and Land Capability Assessment (LCA) to guide all future environmental management for the proposed subdivision of Lot 10 Chester Pass Road and Lot 521 Mercer Road, Albany WA.

This EAR and LCA describes the relevant environmental characteristics of the site and presents management and mitigation strategies in response to potential environmental impacts. These management and mitigation strategies aim to minimise the potential impact on the environmental values within the site.

The Local Structure Plan (LSP) has been developed to guide the subdivision and development of the Subject Site (Appendix A). The LSP for the site proposes an extension of the adjacent light industrial area, a residential zone which includes a range of residential densities, a primary school and three POS areas. The proposed light industrial area will require on-site effluent disposal, whereas the residential area will be developed once reticulated sewerage has been established in the area. This EAR and LCA identifies the measures proposed to mitigate and manage the environmental features of the site, and focuses on the natural areas to be retained within the LSP.

The Subject Site was found to have no significant environmental constraints. A geotechnical investigation conducted by Great Southern Geotechnics (2017) under late winter conditions did not encounter groundwater to depth of 2.3m across the site. Soil type across the majority of the site was found to be sandy gravel over sandy clay with low permeability and high PRI. A small area in the southern central portion of the site was found to have silty sand over gravelly sand with a low PRI. There is no significant waterways, wetlands or groundwater resources within the Subject Site or within the vicinity of the Subject Site.

The vegetation across the Subject Site and surrounding areas is consistent with rural farmland, with the majority of the site and surrounds comprising of heavily grazed pasture dominated by pasture grass species. There are two areas of remnant vegetation within the Subject Site. A broad scale vegetation survey of these two areas was conducted with the strip of vegetation running parallel with the northern boundary of the site (approximately 12 ha in size) found to comprise of Low Open Jarrah/Marri/Sheoak Forest in good condition and the small area of remnant vegetation in the south-east corner comprising of mixed Eucalypt Forest in a degraded condition.

A BAL Contour Plan was prepared by Bio Diverse Solutions to identify the bushfire risks associated with the site (Appendix D) and guide the Structure Plan development. The Subject Site was assessed as having internal areas of Grassland Type G consistent with rural farmland, low fuel/non-vegetated areas (associated with the industrial area, tracks/roads and buildings) and an area of Forest Type A (being the strip of remnant vegetation in the north). External bushfire risks are mostly associated with the Forest Type A (CoA Reserve) directly to the east and south-east of the Subject Site and Forest Type A and Woodland Type B along the Mercer Road Reserve. BAL contouring across the Subject Site has allocated BAL 29 or less shall apply to any buildings within the lots. All future buildings (through subdivision designs) can achieve an APZ area associated with a BAL allocation of BAL 29, BAL 19 or BAL 12.5. A detailed Bushfire Management Plan has not been prepared for the site. The publicly released Bushfire Prone Area Mapping (DFES, 2017) shows that the majority of the Subject Site is located within a Bushfire Prone Area (situated within 100m of >1 ha of bushfire prone vegetation). Where “High risk” or “Vulnerable land uses” (Primary school), as defined by SPP 3.7 are proposed, detailed Bushfire Management Plans are to be prepared.

A Land Capability Assessment (LCA) of the site was conducted in accordance with the State Planning Commission’s (1989) Land Capability Assessment for Local Rural Strategies (note these definitions are as per this policy for the purposes of this report and not any other planning instrument/policy). The overall capability of the Subject Site supporting the Urban Development land use was rated as highly capable for Mapping Unit 1 and very highly capable for Mapping Unit 2. The overall capability of the Subject Site supporting the Light

Rural Industrial (as per WAPC, 1989) land use is rated as highly capable for Mapping Unit 1. Mapping Unit 2 was not encountered at the location of the proposed Light Rural Industrial land use. The degree of limitations for both Urban Development and Light Rural Industry for Mapping Unit 1 and Mapping Unit 2 is low to very low.

This EAR and LCA report provides details of the ASS, Water, Waste Water, Flora, Fauna and Fire Management strategies proposed to be implemented across the site as it is developed to ensure adequate protection of environmental, life, property and biodiversity assets.

The proposed LSP recognises the importance of the key environmental and landscape attributes of the area, and incorporates these in an urban form, that creates an environmentally responsive urban development that meets the EPA and City of Albany's environmental requirements. Consequently, the environmental outcomes of the proposed LSP are considerable and include:

- Providing an improvement in groundwater and surface water quality through residential and industrial development and implementation of water sensitive urban design and best stormwater drainage management practices.
- Revegetation using native species (where currently there is very little native species and diversity) in areas of POS to promote fauna habitat and flora diversity. Landscaped urban areas to promote biodiversity using native plants.
- Maintaining areas of remnant vegetation and limiting access points through these areas to the subdivision to prevent adverse impacts particularly for transient fauna.
- The Local Structure Plan is required to meet the "Acceptable Solutions" of each Element of the bushfire mitigation measures (WAPC, 2017).
- As Light industrial land use is proposed in the west of the Structure Plan, a detailed Bushfire Management Plan will be required to guide developers if any industry is defined as "High Risk".
- A detailed Bushfire Management Plan jointly endorsed by DFES and CoA will be required for any Primary School proposed in the Structure Plan area, at the Development Application stage. A Bushfire Emergency Evacuation Plan (BEEP) will be required at Development Approval Stages.
- The proposed light industrial area is deemed appropriate for effluent disposal and meets the state's minimum requirements for on-site sewage disposal systems as outlined in the *Draft Government Sewerage Policy* (Department of Planning, 2016). Where on-site sewage disposal is to be provided by a secondary treatment system, the WAPC will require a notification on title pursuant Section 70A of the *Transfer of Land Act 1893* (as amended) advising that an on-site secondary treatment sewage disposal system and unencumbered area to which treated sewage is to be distributed are required.
- Provide vegetated buffer and / or other management techniques between industrial areas to sensitive land uses (such as residential) in accordance with the EPA's (2015) Draft Guidance Statement No. 3 *Separation Distances Between Industrial and Sensitive Land Uses*.

2. Introduction

Ardess 1607 Pty Ltd commissioned Bio Diverse Solutions (Environmental Consultants) to prepare an Environmental Assessment Report (EAR) and Land Capability Assessment (LCA) to guide all future environmental management for the proposed subdivision of Lot 10 Chester Pass Road and Lot 521 Mercer Road, Walmsley WA.

This EAR and LCA describes the relevant environmental characteristics of the site and presents management and mitigation strategies in response to potential environmental impacts. These management and mitigation strategies aim to minimise the potential impact on the environmental values within the site.

2.1. Location

Lot 10 Chester Pass Road and Lot 521 Mercer Road, Walmsley WA (herein referred to as the Subject Site) is 178ha and located approximately 6km north of the Albany CBD. The Subject Site is bound by Chester Pass Road to the west, Mercer Road to the south, Terry Road to the north and a City of Albany (CoA) reserve to the east. The location of the Subject Site is shown on Figure 1.

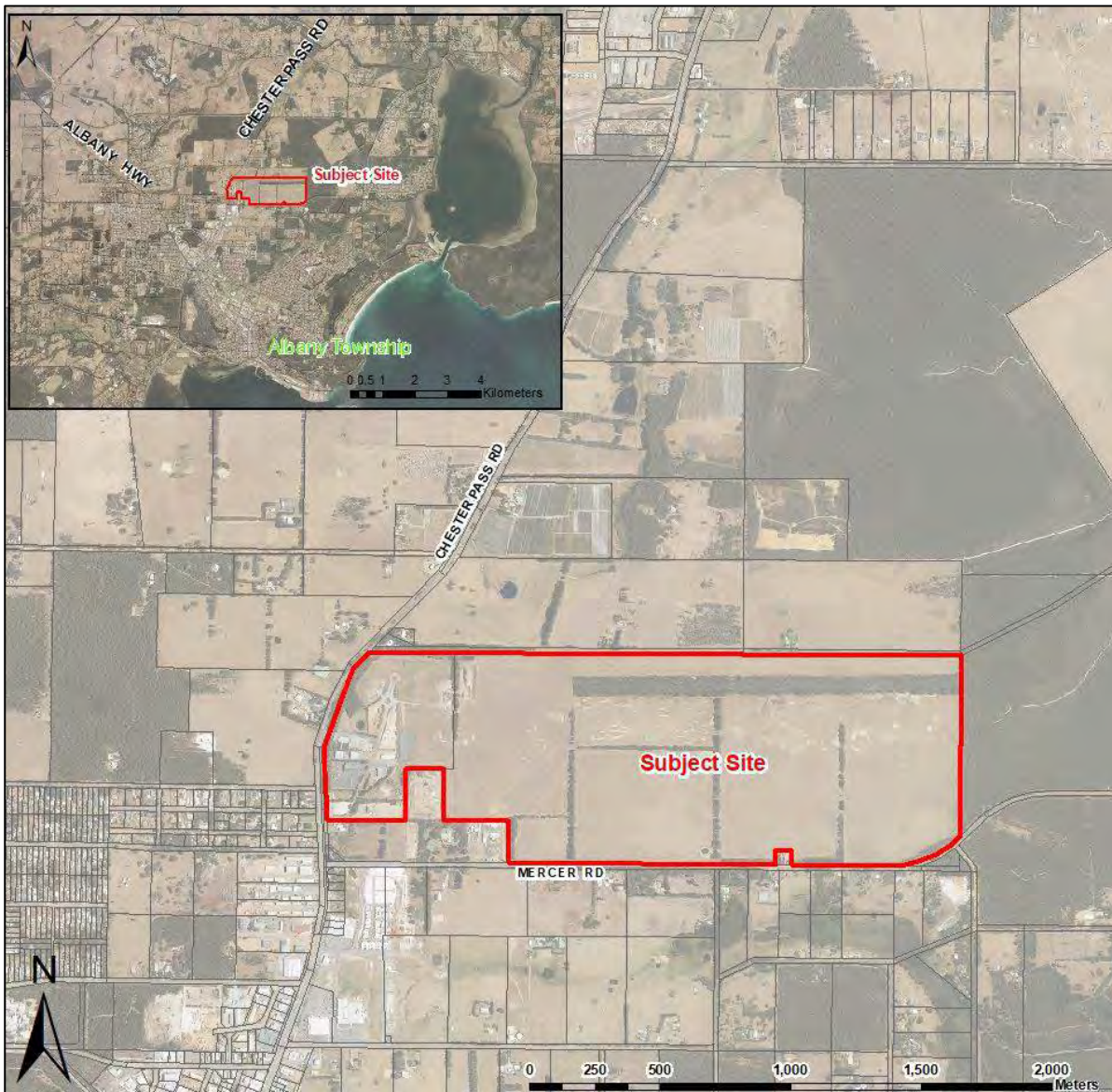


Figure 1: Location Plan

2.2. Local Structure Plan

The Local Structure Plan (LSP) has been developed to guide the subdivision and development of the Subject Site, the Draft LSP for the site has been included as Appendix A.

The proposed LSP includes the following land uses:

- Residential (R30-R60);
- Residential (R20-R30);
- Residential (R15-R25);
- Primary School Site;
- Public Open Space (POS); and
- Light Industrial.

There is no current staging plan for the LSP however the initial stage/s of the subdivision will include the extension of the existing light industrial area within the Subject Site (Ardess Industrial Estate) further to the north and east. There is currently no reticulated sewerage at the location of the Subject Site and as such the lots within the proposed Light Industrial Area will require on-site sewerage disposal and a minimum lot size of 1ha consistent with guidelines set out in the Draft Government Sewerage Policy (Gov. of WA, 2016).

Subsequent stage/s of the subdivision will include the development of the central and eastern portion of the site into a residential zone, including a Primary School and two areas of POS. Residential densities within the residential zone will range from R15 to R60. The residential zone of the subdivision will only be feasible and environmentally sustainable once reticulated sewerage has been established in the area. Therefore, there will be no on-site sewerage disposal within this area.

This EAR and LCA identifies the measures proposed to mitigate and manage the environmental features of the site, and focuses on the natural areas to be retained within the LSP.

2.3. Statutory Framework

Development within the site is required to comply with relevant environmental legislation, policy and guidelines. This document and the recommendations contained within are aligned to the following key state and Commonwealth legislation and regulations;

- *Environmental Protection Act 1986;*
- *Environmental and Protection and Biodiversity Conservation Act 1999 (EPBC Act);*
- *Environment Protection and Biodiversity Conservation Regulations 2000;*
- *Conservation and Land Management Act 1984;*
- *Conservation and Land Management Regulations 2002;*
- *Environmental Protection (Noise) Regulations 1997;*
- *State Legislation Aboriginal Heritage Act 1972;*
- *Heritage of Western Australia Act 1950;*
- *Land Administration Act 1997;*
- *Planning and Development Act 2005;*
- *Rights in Water and Irrigation Act 1914;*
- *Contaminated Sites Act 2003;*
- *Wildlife Conservation Act 1950;*
- Draft Government Sewerage Policy – Consultation Draft 2016;
- DER Acid Sulphate Soils Assessment Guidelines;
- Western Australian State Planning Policy (SPP) 3.7; and
- Guidelines for Planning in Bushfire Prone Areas 2017.

2.4. Suitably Qualified Environmental Consultants

This EAR and LCA has been prepared by suitable qualified personnel from Bio Diverse Solutions. The three qualified personnel responsible for delivery of this assessment include; Chiquita Burges (Senior Hydrologist/Environmental Consultant), Bianca Theyer (Conservation and Wildlife Biologist/Environmental Consultant) and Kathryn Kinnear (Level 2 BPAD Accredited 30794 Bushfire Consultant).

Chiquita Burges

The existing environment and general environmental management section of this report has been prepared by Chiquita Burges. Chiquita has the following Tertiary Qualifications:

- B.Sc. Natural Resource Management; and
- Graduate Certificate in Hydrogeology

Chiquita has over 8 years of experience working as a hydrologist and senior hydrologist, her experience includes preparation of local and urban water management strategies, surface water and groundwater monitoring programs and hydrogeological reports. Tasks undertaken by Chiquita include report writing, mapping, field work including installation and monitoring of groundwater bores, modelling of stormwater and groundwater and liaising with clients, sub-consultants and approving agencies. Since joining Bio Diverse Solutions in early 2017 Chiquita has diversified her skills and knowledge to include more general environmental consultancy work.

Bianca Theyer

The flora and fauna component of this assessment has been prepared by Bianca Theyer. Bianca has the following Tertiary Qualifications:

- B.Sc. Conservation and Wildlife Biology; and
- Honours Conservation Biology.

Bianca has experience in biodiversity management with direct experience including: biodiversity surveys, fauna surveys, monitoring and trapping programs (invertebrates, mammals, amphibians, and reptiles); flora surveys and vegetation assessments. Bianca has been responsible for several projects during her time at Bio Diverse Solutions, these include multiple flora (including threatened) and vegetation surveys; fauna habitat survey at Frenchman Bay, Albany; Environmental Assessment Reports for a proposed liquid waste facility, a pastured egg farm and a proposed gravel extraction project; Foreshore Management Plans for projects in South Moorlands, Bunbury and Frenchman Bay Albany; a Mosquito Management Plan for Meadowbrook Lifestyle Villages in Boyanup, and development of an Environmental Management Plan for a proposed Solar Station in Kalbarri.

Kathryn Kinnear

The bushfire assessment and management component of the assessment has been prepared by Kathryn Kinnear. 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) 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 has also worked in environmental management for 20 years within that time she has worked on a vast range of environmental projects and has developed specialist skills in field operations, reporting and project management.

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 is a suitably qualified Bushfire Practitioner to assess the bushfire risks and management strategies.

3. Existing Environment

3.1. Existing Land use

The Subject Site currently consists of multiple land uses; Lot 10 Chester Pass Road (Lot to the west) comprises of an industrial area and cleared land used to keep current and old farm machinery and sand/gravel piles. The industrial area comprises of sheds, office building, car parks, an internal road network and cleared areas for future development. Businesses within the industrial area include; Albany Freight Lines, Designer Dirt (landscaping supplies) and Ardess Nursery.

Lot 521 Mercer Road (Lot to the east) encompasses the majority of the Subject Site and comprises of predominantly cleared rural land used for grazing cattle. There are no existing dwellings on Lot 521 Mercer Road, there are two small to medium sized sheds (one used to store hay and farm machinery and the other an old shearing shed), a set of cattle yards and a strip of remnant vegetation in the north-east of the Subject Site. Land use within the Subject Site is shown on Photographs 1 to 4.



Photograph 1 – View of cleared rural land within Lot 521 Mercer Road.



Photograph 2 – View of old farm machinery within Lot 10 Chester Pass Road.



Photograph 3 – View of hay and machinery shed located in the north of Lot 521 Mercer Road.



Photograph 4 – View of internal road and roundabout within industrial area in Lot 10 Chester Pass Road.

3.2. Surrounding land uses

The Subject Site is surrounded by rural properties to the north, west and south and remnant vegetation (CoA reserve) to the east. To the south-west of the Subject Site along Chester Pass Road and adjacent to the western most section of Mercer Road is Albany’s light industrial area which includes a range of businesses and a lifestyle village and on the western side of Chester Pass Road is a residential area. The surrounding areas are shown on Photographs 5 to 8.



Photograph 5 – View of Albany Business Centre along Chester Pass Road to the south-west of Subject Site.



Photograph 6 – View of rural property to the north of Subject Site.



Photograph 7 – View of City of Albany holding facilities along Mercer Road to the south of Subject Site.



Photograph 8 – View of remnant vegetation directly east of the Subject Site.

3.3. Climate

The Albany area is characterised by a Mediterranean climate with warm dry summers and cool wet winters. Rainfall data is from the nearby Bureau of Meteorology (BoM) Albany Station (Site No. 9500).

The long-term average annual rainfall is 929 mm (1877 to 2016). This average has decreased between 2000 to present, to an average annual rainfall of 879 mm, reflecting a 5% reduction compared to the long-term average, consistent with a general trend in the South West of WA. The total rainfall distribution has also altered, with a reduction of average winter monthly rainfall, but no significant reduction in average summer monthly rainfall.

The average annual pan evaporation for the Albany area is approximately 1397 mm (Luke *et al*, 1988).

3.4. Topography

Topography over the Subject Site is undulating ranging from a high point of 51m AHD in the central northern portion of the site to a low point of 22m AHD in the southern central portion of the site. There is a ridge that runs from the central northern portion of the site to the south-west corner with topography decreasing in a radial manner from the ridge. Topographic contours (1 metre contours are shown on Figure 2).

The effective slopes (measured as per AS3959-2009) for the Subject Site are flat/upslope to low ranging from 0 to 5 degrees. The effective slopes for the Subject Site and surrounding areas are shown in the BAL Contour Plan Report included as Appendix D.

3.5. Acid Sulphate Soils

Acid sulphate soils (ASS) are naturally occurring soils and sediments containing sulphide minerals, predominantly pyrite (an iron sulphide). When undisturbed below the water table, these soils are benign and not acidic (potential acid sulphate soils). However, if the soils are drained, excavated or exposed by lowering of the water table, the sulphides will react with oxygen to form sulphuric acid (EPA 2008). Acid Sulphate Soil (ASS) Risk Mapping (Figure 2) indicates the Subject Site does not sit within any known areas of ASS.



Figure 2: Topography and ASS Risk Mapping

3.6. Geology and Soils

Regolith of WA (Department of Mining, 2009) mapping indicates that soils across the Subject Site are classified as sandplain, mainly Aeolian and include some residual deposits.

A Geotechnical Investigation was conducted on the 29th of August 2017 by Great Southern Geotechnics under later winter conditions, the Geotechnical Investigation is included as Appendix B. The investigation included both soil analysis and measuring of water table. The soil testing was conducted to assess the suitability of the site for the proposed development including onsite effluent disposal for the extension of the industrial area.

Ten boreholes were constructed within the Subject Site to a depth of 2.3 metres and left open for a minimum of 1hr to identify water table present. The location of the boreholes are shown on Figure 3, lithological logs of the boreholes are shown in Appendix B.



Figure 3: Borehole Locations

Soil Type

Soil testing showed that soils across the site comprised predominately of a silty sand topsoil, over sandy gravel (with a layer depth varying from 200 - 700mm), over sandy clay to the depth of the hole. This soil profile was encountered at each borehole location except TP6 and TP10. The soil profile at TP6 comprised of a silty sand topsoil, over silty sand (200 - 700mm depth), over gravelly sand (700 to 1500mm depth), over sandy gravel (1500 - 2300mm depth). The soil profile at TP10 comprised of a silty sand topsoil, over silty sand (200 - 400mm), over sandy clay (400 – 2300mm) (Great Southern Geotechnics, 2017).

Permeability

Permeability testing was conducted on TP3 (400 – 1100mm BGL) and TP10 (400 – 2300mm BGL) by Liquid Labs WA as part of the Geotechnical Investigation. TP3 recorded a permeability of 0.0035 m/day whilst TP10 recorded a permeability of 0.0015 m/day (refer to Liquid Labs WA Laboratory testing in Appendix B). Permeability at both TP3 and TP10 is considered to be extremely low this is consistent with the soil type (sandy clay) encountered at these locations.

Phosphorous Retention Index

Phosphorous retention Index (PRI) is the ability of soils to absorb nutrients and heavy metals within the soil (i.e. Soil microbe disinfecting ability). Soils with a PRI less than 1 have a very poor ability to retain nutrients and heavy metals, whilst soils with a PRI of >5 having a high ability to retain nutrients and heavy metals. PRI testing was conducted by CSBP Laboratory on soil samples from TP1, TP3, TP6 and TP10. The PRI results are shown in Table 1 and Appendix C.

Table 1: Phosphorus Retention Index Results

Borehole	Depth (mm)	Soil Type	Phosphorus Retention Index
TP1	200-900	Sand with gravel	2414.5
TP3	400-1100	Sandy clay	2387.4
TP6	200-700	Silty sand	0.8
TP10	400-2300	Sandy clay	608.0

PRI results across the site varied consistent with soil type. The sandy clays found across the majority of the site (as seen at TP3 and TP10) were found to have a very high PRI and therefore a very high ability to fix nutrients and heavy metals. The sandy gravel found at TP1 also had an extremely high PRI, particularly for a sand, whereas the light grey sand found at TP6 had a low PRI and therefore a low ability of fixing nutrients and heavy metals.

3.7. Surface Water Hydrology

There are no major naturally existing drainage networks or water bodies within the Subject Site. There is one minor waterway situated in the north-western extent of Lot 10. This area will need to be managed sensitively in relation to stormwater planning within the site. Surface water generally runs off the central and eastern portions of the site in a southerly and south-easterly direction towards Mercer Road. The western portion of the site generally drains in a north westerly direction towards Terry Road and Chester Pass Road.

Hydrographic Sub-catchments (DoW, 2008) show the Subject Site to be within two surface water sub-catchments; with the northern and western portion of the site discharging to Willyung Creek to the north of the Subject Site and the central and southern portion of the site discharging to Yakamia Creek to the south of the site. Both the Willyung Creek and Yakamia Creek sub-catchments form part of the Oyster Harbour/Kalgan/King Catchment ultimately discharging to Oyster Harbour.

There are several man-made dams across the site, which are surface water fed and used for livestock drinking water. The majority of the Subject Site drains towards a dam in the central southern portion of the site, whilst the eastern rural areas drain to a large dam located in the north-east corner of Lot 521 Mercer Road.

3.8. Groundwater Hydrology and Hydrogeology

Australian Geoscience Mapping and Department of Water 250K Hydrogeological mapping places the Subject Site within the; '*Tertiary - Cainozoic - Phanerozoic (TPw) period: Plantagenet Group - siltstone, spongolite; minor sandstone, peat, and conglomerate.*' The aquifer is a '*sedimentary aquifer with intergranular porosity – extensive aquifers, major groundwater resources.*' (DoW, 2015).

A Geotechnical Investigation was conducted on the 29th of August 2017 by Great Southern Geotechnics under late winter conditions. The investigation included both soil analysis and measuring of water table. Ten boreholes were constructed within the Subject Site to a depth of 2.3 metres, the location of the boreholes is shown on Figure 3. Groundwater was not observed in any of the boreholes indicating there is no likely groundwater present beneath the Subject Site to a depth of 2.3 metres. The Geotechnical Investigation (Great Southern Geotechnics, 2017) was undertaken in accordance with Australian Standards and has been included as Appendix B.

The subject site is not located within a Public Drinking Water Source Protection Area (DoW 2001).

3.9. Wetlands

There are no significant wetlands within or within the vicinity of the Subject Site.

3.10. Sewerage Sensitive Area

The Subject Site is located in a Sewerage Sensitive Area according to the Department of Planning's Sewerage Sensitive Area Mapping (DoP, 2017). The draft Government Sewerage Policy (2016) describes Sewerage Sensitive Areas, as areas; '*within 10 kilometres of Wilson Inlet, Torbay Inlet, Manarup Lagoon, Lake Powell, Princess Royal Harbour and Oyster Harbour*'.

3.11. Flora and Vegetation

The Subject Site lies within the Jarrah Forest IBRA bioregion. Hearn et al (2002) describes the bioregion as; '*Duricrusted plateau of Yilgarn Craton characterised by Jarrah-Marri forest on laterite gravels and, in the eastern part, by Wandoo - Marri woodlands on clayey soils. Eluvial and alluvial deposits support Agonis shrublands. In areas of Mesozoic sediments, Jarrah forests occur in a mosaic with a variety of species-rich shrublands.*'

The vegetation has been mapped on a broad scale by J.S. Beard (Shepherd et al 2002) in the 1970's, where a system was devised for state-wide mapping and vegetation classification based on geographic, geological, soil, climate structure, life form and vegetation characteristics (Sandiford and Barrett 2010). A GIS search of J.S. Beards (DEC, 2005) vegetation classification places the Subject Site within one System and Vegetation Association (Source DEC Pre-European Vegetation GIS dataset, 2005):

- **System Association Name:** Albany.
- **Vegetation Association Number:** 3.
- **Vegetation Description:** Low forest; jarrah, *Eucalyptus staeri* & *Allocasuarina fraseriana*.

The Albany Regional Vegetation Survey (ARVS) undertaken by Sandiford and Barret in 2010 identified the vegetation within the Subject Site as belonging to the Jarrah/Marri/Sheoak Laterite Forest unit. This unit is described as occurring on well drained shallow loamy/sandy soil with outcropping laterite (Sandiford and Barret, 2010). Key defining features of this vegetation type are a canopy of *Eucalyptus marginata* and *Allocasuarina fraseriana* over a relatively open and diverse understorey. The understorey is dominated by *Bossiaea linophylla*, *Agonis theiformis* and *Xanthosia rotundifolia*. *Banksia grandis* is often present within this vegetation type as a tall shrub. Common identifying species of the open sedge component of this vegetation type are *Tetraria octandra*, *Tetraria capillaris*, *Desmocladus fasciculatus* and *Anarthria prolifera* (Sandiford and Barret, 2010). Furthermore, this vegetation type has been assessed as having a modified condition (Thackway and Leslie, 2006) (equivalent to "good to very good" on the Keighrey (1994) Condition Scale) whereby the native vegetation community structure, composition and regenerative capacity is intact, but is perturbed by land use / land management practices (Thackway and Lesslie 2006). ARVS Mapping within the Subject Site and its vicinity is shown on Figure 4.

A search of publicly available databases through WA Atlas, Nature Map, and EPBC Protected Matter Search Tool indicates that no threatened, priority or declared rare flora is present on the site, or within the surrounding Nature Reserves and remnant vegetation.

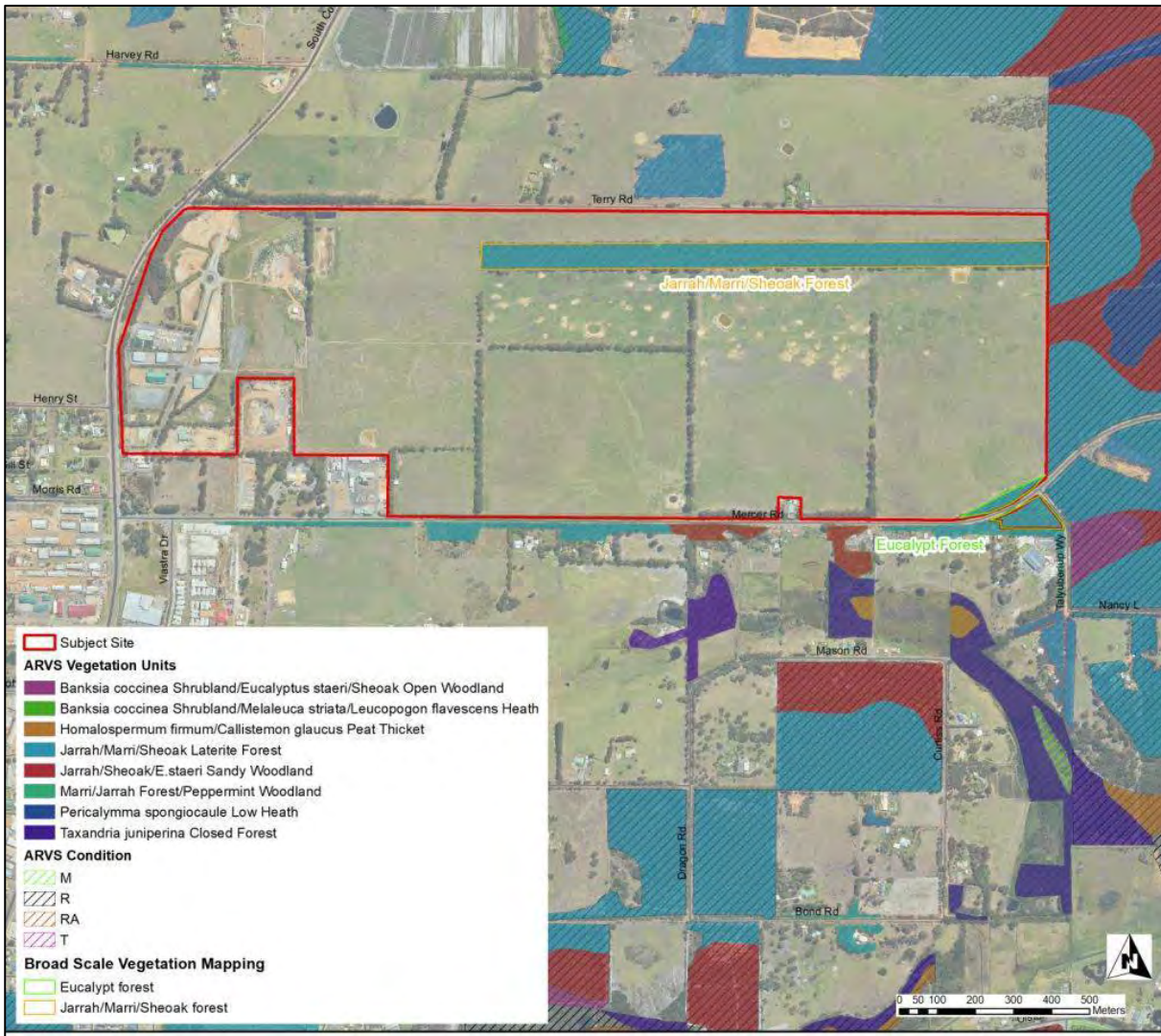


Figure 4: ARVS & Broad Scale Vegetation Survey Mapping

3.12. Vegetation Survey

The vegetation across the Subject Site and surrounding areas is consistent with rural farmland, with the majority of the site and surrounds comprising of heavily grazed pasture dominated by pasture grass species. There are two areas of remnant vegetation within the Subject Site, a strip of vegetation running parallel with the northern boundary of the site (approximately 12 ha) and a small area in the south-eastern corner of the site on either side of Mercer Road.

As part of this EAR a broad scale vegetation survey was conducted on the 29 August 2017 on the two areas of remnant vegetation. Two vegetation types were identified; the strip of vegetation in the north was identified as Jarrah/Marri Sheoak Forest and the vegetation in the south-east corner was identified as Eucalypt Forest. Broad scale Vegetation Mapping is shown on Figure 4. As per the Draft Structure Plan the internal remnant vegetation is to be retained as Public Open Space (POS).

Jarrah/Marri/Sheoak Forest

This area was previously described as being Jarrah/Marri/Sheoak Laterite Forest by Sandiford and Barrett (2010). The species identified during this survey are consistent with the ARVS vegetation type. The overstorey composition consisted of *Eucalyptus marginata*, *Allocasuarina fraseriana*, *Corymbia calophylla* and occasional patches of *Eucalyptus cornuta* and *Banksia grandis*. Midstorey species identified were *Agonis flexuosa*, *Bossiaea linophylla*, *Beaufortia decussata*, *Hakea amplexicaulis*, *Persoonia longifolia*, *Leucopogon verticillatus*, *Xanthorrhoea platyphylla*, *Bossiaea dentata*, *Hakea ruscifolia*, *Xanthosia rotundifolia*, *Tetratheca setigera*, *Sphaerolobium alatum* (?), *Hovea chorizemifolia*, *Hibbertia* sp., and *Pimelea* sp. Understorey species

identified included natives such as *Chamaescilla corymbosa* var. *corymbosa*, *Dampiera* sp., *Lomandra* sp., and *Conostylis* sp., as well as weed species such as **Cirsium* sp., **Oxalis* sp., **Cenchrus clandestinus*, and **Hypochaeris* sp. (* Denotes weed species). Based on the species composition observed during the survey this vegetation type is still consistent with ARVS.

The condition of this strip of vegetation varied throughout its extent with condition improving closer to the fenced remnant vegetation to the east. The western half of the strip was quite open, with very few midstorey species and a high proportion of sedges and grasses with areas of bare ground. This is likely due to grazing pressures from cattle. There was evidence of cattle activity throughout this area with cattle tracks, hoof prints and cow dung detected. There were areas where midstorey and understorey vegetation increased with fewer signs of disturbance present. Vegetation in this unit is considered to be in very good condition as there are obvious signs of disturbance to the vegetation structure from cattle grazing, weeds and human disturbances (Keighrey, 1994). Photographs 9 to 12 show images of Jarrah/Marri/Sheoak Forest within Subject Site.



Photograph 9 to 12 – View of Jarrah/Marri/Sheoak Forest within Subject Site

Eucalypt Forest

This area of vegetation was mapped in the ARVS as Jarrah/Marri/Sheoak Laterite Forest, however during this survey few species associated with this vegetation type were identified, there were also a high proportion of weed species were identified. The overstorey composition consists of *E. marginata*, *Eucalyptus gomphocephala*, *A. fraseriana*, *C. calophylla*, *Eucalyptus megacarpa*, **Acacia longifolia*, **Acacia dealbata*, *Eucalyptus* sp., and **Pinus radiata* (* Denotes weed species). The midstorey composition was far less diverse than the northern strip of vegetation. Species identified included *Callistemon* sp., *Beaufortia decussata*, *Leucopogon verticillatus*, *Leucopogon* sp., *Pimelea* sp., *Hibbertia* sp., *Adenanthos cuneatus*, *Hemiandra pungens*, and *Chamelaucium ciliatum*. There were very few understorey species present, with most of the area covered with plant litter, of the groundcover/understorey species present these were weed species such as *Kikuyu* and *Watsonia* sp.

Vegetation condition within this area is considered to be degraded as the basic vegetation structure has been severely impacted by multiple disturbances such as aggressive weed species and clearing activities (Keighrey, 1994). Evidence of clearing was observed during this survey as several trees and larger shrubs had been cut down. Photographs 13 to 16 show images of Eucalypt Forest within Subject Site.



Photograph 13 to 16 – View of Eucalypt Forest within Subject Site.

3.13. Fauna

The majority of the site has been historically and extensively cleared and as a consequence significant fauna habitat has been removed. Opportunistic Fauna sightings were recorded during the Broad Scale Vegetation Survey on the two areas of remnant vegetation within the Subject Site.

3.13.1. Opportunistic Fauna Sightings

During the Broad Scale Vegetation Survey of the strip of remnant vegetation in the north of the Subject Site various birds were observed and heard within the Jarrah/Marri/Sheoak Forest such as Red-Capped Parrot (*Purpleicephalus spurius*), Galah (*Eolophus roseicapillus*), Willie Wagtail (*Rhipidura leucophrys*), New Holland Honeyeater (*Phylidonyris novaehollandiae*), Yellow rumped Thornbill (*Acanthiza chrysorrhoa*), Western Gerygone (*Gerygone fusca*), Rufous Whistler (*Pachycephala rufiventris*) and Magpie (*Cracticus tibicen*). A flock of 6-10 Forest Red-tailed Black Cockatoos (*Calyptorhynchus banksii naso*) were observed feeding in the adjacent remnant vegetation to the east of the Subject Site. A potential Quenda (*Isoodon obesulus fusciventer*) runnel was identified within the understorey of the Jarrah/Marri/Sheoak Forest (Photograph 17). Western Grey Kangaroos (*Macropus fuliginosus*) were also observed.



Photograph 17 – Potential Quenda Runnel within Subject Site remnant vegetation.

3.14. Contaminated Sites

A review of the DER’s Contaminated Sites Database determined there are no registered contaminated sites within the Subject Site. However, prior to subdivision further investigations may be required to confirm there is no potential contamination on the site.

3.15. Heritage

A search of the Department of Aboriginal Affairs’ Aboriginal Heritage Inquiry System was conducted and no matches were recorded for the Subject Site or within the vicinity of the Subject Site.

A search of the Heritage Council’s inHerit database and the City of Albany’s Municipal Heritage Inventory (City of Albany 2000) was conducted with no matches found for the Subject Site or its surroundings.

3.16. Bushfire Risks and Bushfire Assessment

The publicly released Bushfire Prone Area Mapping (DFES, 2017) shows that the majority of the Subject Site is located within a Bushfire Prone Area (situated within 100m of >1 ha of bushfire prone vegetation). Bushfire Prone Area Mapping is shown on Figure 5.



Figure 5: Bushfire Prone Area Mapping

A BAL Contour plan has been prepared for the site by Level 2 Bushfire Practitioner K. Kinnear (BPAD 30794). The BAL Contour Plan has been included as Appendix D. All vegetation within 150m of the site boundary/ proposed development was classified in accordance with Clause 2.3 and Exclusions as per Clause 2.2.3.2 of AS 3959-2009. Each distinguishable vegetation plot with the potential to determine the Bushfire Attack Level is identified in the BAL Contour document. Each plot is representative of the Vegetation Classification to AS3959-2009 Table 2.3 and shown on the Vegetation Classification Mapping (Appendix D).

The Subject Site was assessed as having internal areas of Grassland Type G consistent with rural farmland, low fuel/non- vegetated areas (associated with the industrial area, tracks/roads and buildings) and an area of Forest Type A (being the strip of remnant vegetation in the north). External bushfire risks are mostly associated with the Forest Type A (CoA reserve) directly to the east and south-east of the Subject Site and Forest Type A and Woodland Type B along Mercer Road (Bio Diverse Solutions, Appendix D).

The Guidelines for Planning in Bushfire Prone Areas (WAPC, 2017) outlines bushfire protection criteria which subdivision and development proposals are assessed for compliance. The bushfire protection criteria

(Appendix 4, WAPC, 2017) are performance based criteria utilised to assess bushfire risk management measures and they outline four elements, being:

- Element 1: Location
- Element 2: Siting and Design of Development;
- Element 3: Vehicle Access; and
- Element 4: Water.

(WAPC, 2017)

The Local Structure Plan is required to meet the “Acceptable Solutions” of each Element of the bushfire mitigation measures (WAPC, 2017). The proposal will be assessed against the bushfire protection criteria Acceptable Solutions for Elements A1, A2, A3 and A4.

Acceptable Solution A1- Location

It is recommended to guide the development of the LSP that the minimum separation apply to achieve BAL 29 or less on the future dwellings (as shown on the BAL Contour Plan):

- 21-27m Forest Type A;
- 14-17m Woodland Type B;
- 13-15m Scrub Type D; and
- 8-9m Grassland Type G.

This will ensure that Acceptable Solution 1 is achieved by setbacks to BAL 29 applied through the design and layout of the road reserves and (if required) building setbacks.

Acceptable Solution A2 – Siting and design

All buildings within the Structure plan shall have an Asset Protection Zone (APZ) area associated with BAL 29 or less. Setbacks for dwellings associated with the BAL Contours can be applied through the road design from external and internal bushfire risks. Future landscaped areas (internal shall below fuel in nature and maintained areas. The internal POS area in the north shall remain as native vegetation and the internal road design will ensure BAL 29 or less prevails over the proposed dwellings.

Any future plantings in POS areas (excepting the northern POS) are to be to a APZ standard as per WAPC requirements. The developer will be responsible for implementing revegetation standards as per APZ standards. New lot owners are to conform to any planting on their lot for revegetation, screening or windbreaks to APZ standards.

Staged construction is to ensure that separation distances to residential areas are maintained, as a guide 100m from any residential building should be maintained as low fuel areas (i.e. maintained by the Developer) to ensure that BAL does not apply from current land management practises to the proposed residential areas.

Acceptable Solution A3 – Vehicular Access

The internal road layout should ensure that every lot has the ability to exit the Structure Plan in two separate directions to a minimum of two destinations. Cul-de-sacs and battle axes are not recommended. The minimum technical requirements for public roads are shown in Table 9.

Table 9: Vehicular Access Technical Requirements (WAPC, 2017)

Technical requirements	Public Road
Minimum trafficable surface (m)	*6
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
Maximum Length	N/A

Fire Service Access and Emergency Access Way will be along the internal road network and will not be required separately. Staged development should include road network construction to ensure that no one-way or dead-end streets occur. Firebreaks are to be maintained on the parent lot according to CoA Fire Management Notice (annually updated). Compliance to these issues will ensure the Acceptable Solution A3 (1-8) can be achieved.

Acceptable Solution A4 – Water Supply

The development will be provided with reticulated scheme water in accordance with the specifications of the relevant water supply authority (Water Corporation WA (WCWA)) and DFES requirements. This will be detailed in the detailed engineering drawings and be subject to approval from WCWA and DFES at subdivision condition stages, meeting the Acceptable Solution. Fire hydrant (street) outlets are required, these must be installed to WCWA standards installed in accordance with the *Water Corporation's No 63 Water Reticulation Standard* and are to be identified by standard pole and/or road markings and installed by the Developer.

The Structure Plan is deemed compliant to this Acceptable Solution 4.1.

Overall Fire Management for the site

BAL contouring across the Subject Site has allocated BAL 29 or less to apply to any buildings and can be guided by the Structure Plan design. Setbacks from bushfire risks is to be maintained through road reserves and building setbacks. The inherent bushfire risks for the site is the internal strip of vegetation in the north and the remnant vegetation contained in CoA reserve to the east. Minimum setbacks to achieve BAL 29 in these areas is 21m (northern strip of remnant vegetation) and 27m (eastern CoA reserve). All future buildings can achieve an APZ area associated with a BAL allocation of BAL 29, BAL 19 or BAL 12.5.

Vehicle access standards can be achieved through the Structure Plan design. The minimum technical requirements for Public Roads is to meet Table 9. No Battle axes are proposed and FSA will be along the public road network. One Cul-de-sac is proposed near the intersection of Range and Terry Road, as the CoA seek to minimise new intersections to Range Road and the eastern extents of Terry Road. Where the cul-de-sac is present, an EAW is shown connecting to Range Road ensuring compliance to Element A3.3 of Acceptable Solution A3. Reticulated water will be provided water in accordance with the specifications of the relevant water supply authority WCWA and DFES requirements, meeting A4.1.

A detailed Bushfire Management Plan will be required if any industry is defined as "High Risk" or to support a future Development Application for the Primary School. Additionally, a detailed Bushfire Management Plan may be required to support the staged development of the subdivision.

High Risk Land use and Vulnerable Land Uses

The LSP contemplates potential "High Risk" land use (light industry) and "Vulnerable Land Use" as per the definitions of SPP 3.7. As defined by the Guidelines for Planning in Bushfire Prone areas Vers1.2 (2017):

“High-risk land uses may include, but are not limited to: service stations, landfill sites, bulk storage of hazardous materials, fuel depots and certain heavy industries as well as military bases, power generating land uses, saw-mills, highways and railways, among other uses meeting the definition.

Proposals for non-residential, high-risk land uses in bushfire prone areas are to comply with policy measure 6.6 which requires a Bushfire Management Plan jointly endorsed by the local government and the Department of Fire and Emergency Services. This may include establishing an appropriate Asset Protection Zone or Hazard Separation Zone, and should be supported by a risk management plan that addresses bushfire risk management measures for any flammable on-site hazards.”

As Light industrial land use is proposed in the west of the Structure Plan, a detailed Bushfire Management Plan will be required to guide developers if any industry is defined as “High risk”.

Policy measure 6.6 of SPP 3.7 applies to vulnerable land uses, and refers specifically to subdivision and development applications. However, if a scheme amendment or structure plan identifies a site for a vulnerable land use, then the policy requirements should be addressed. Typically, vulnerable land uses are those where persons may be less able to respond in a bushfire emergency. A detailed Bushfire Management Plan jointly endorsed by DFES and CoA will be required for any Primary School proposed in the Structure Plan area at the Development Application stage. A Bushfire Emergency Evacuation Plan (BEEP) will be required at Development Approval Stages.

4. Land Capability Assessment

Land capability is the ability of the land to sustain a specified land use without resulting in significant onsite or offsite degradation or damage to land resources. The Land Capability Assessment of the Subject Site is completed in accordance with the State Planning Commission’s (1989) Land Capability Assessment for Local Rural Strategies. The assessment is a three-stage process and includes:

Stage 1 – Land Use Requirements

- Specify and define the proposed land use;
- Determine the specific land use requirements of that use;
- List the relevant land qualities to fulfil the land use requirements; and
- List the relevant land characteristics which determine each land quality.

Stage 2 – Land Resource Survey

- Divide the study area into mapping units which have a measurable difference in the land characteristics listed above and may be expected to influence the land quality attributes and land capabilities.

Stage 3 – Land Capability Analysis

- For each mapping unit rate each individual land quality; and
- For each mapping unit determine its overall capability to sustain the land use by comparing its land quality ratings in the capability rating table.

The WAPC (1989) utilises a five-class system of assessing Land Capability, these five classes rate the degree of physical limitations associated with land use and management needed for these. The land capability classes are shown in Table 2.

Table 2: Land Capability Classes

Capability Class	Degree of Limitation	General Description
I	Very low	Areas with a very high capability for the proposed activity or use. Very few physical limitations to the specified use are present or else they are easily overcome. Risk of land degradation under the proposed use is negligible.
II	Low	Areas with a high capability for the proposed activity or use. Some physical limitations to the use do occur affecting either its productive use or the hazard of land degradation. These limitations can however, be overcome through careful planning.
III	Moderate	Areas with a fair capability for the proposed activity or use. Moderate physical limitations to the land use do occur which will significantly affect its productive use or result in moderate risk of land degradation unless careful planning and conservation measures are undertaken.
IV	High	Areas with a low capability for the proposed activity or use. There is a high degree of physical limitations which are either not easily overcome by standard development techniques or which result in a high risk of land degradation without extensive conservation requirements.
V	Very High	Areas with a very poor capability for the proposed activity or use and the severity of physical imitations is such that its use is usually prohibitive in terms of either development costs or the associated risk of land degradation.

4.1. Land Use Requirements

There are two land uses proposed for the Subject Site as defined by the State Planning Commission (1989) Urban Development and Light Rural Industry (note these definitions are as per this policy for the purposes of this report and not any other planning instrument/policy). The location of the two proposed land uses is shown on the LSP in Appendix A, with “Urban Development” shown as “Residential” and “Light Rural Industry” shown as “Light Industry”.

4.1.1. Urban Development

The WAPC Land Capability Assessment for Rural Strategies Guideline defines Urban Development areas as follows;

‘Urban use consists of mostly residential development, but includes the use of land for extensive building complexes (such as shopping centres and offices). Urban development is an intensive form of land use which requires a high level of servicing and site disturbance.

Services include sealed and kerbed roads and carparks, storm water drainage and underground services (including reticulated water, gas and telephone connections) to cater for single housing allotments in the order of 500-700m² but also up to 2000 m².

The Water Authority’s Country Sewerage Policy indicates that deep sewerage should be provided where it is already provided within the town, or where soil, land and environmental factors specifically indicate it should be provided. Deep sewerage may not need to be provided if there are no environmental or public health problems arising from the operation of on-site septic tanks.’

The WAPC Land Capability Assessment for Rural Strategies Guideline identifies land use requirements for Urban Development areas as follows;

- Availability of extensive flat to gently sloping areas (preferably 0-2% but up to 8%);
- Deep well drained soils which are easy to excavate and provide a stable foundation for building;
- Disposal of liquid effluent via a treatment plant or from onsite septic tanks should not result in pollution of surface water bodies or groundwater resources;
- Urban stormwater is often highly polluted (high in BOD, nutrients, heavy metals and hydrocarbons) and may need to be treated to prevent point source pollution at the disposal site; and
- Urban development results in increased stormwater runoff which may raise the level of the unconfined water table or result in soil instability where steep slopes occur. The land should therefore not be subject to slumping/ landslips, water logging or water erosion.

Table 3 outlines the land qualities to fulfil the Urban Development land use requirements. The land characteristics for each land quality are shown in the guideline document (WAPC 1989).

Table 3: Land Qualities to fulfil Urban Development Land Use Requirements

Land Qualities	Rating				
	Very high	High	Moderate	Low	Very Low
Ease of excavation, x	Very high	High	Moderate	Low	Very Low
Foundation stability, b	Very high	High	Moderate	Low	Very Low
Water logging hazard, i	Low		Moderate	High	Very high
Water erosion hazard, e	Low		Moderate	High	Very high
Soil salinity, y	Very Low	Low	Moderate	High	
Soil absorption ability, a	High	Moderate	Low	Very Low	
Wind erosion hazard, w			Low	Moderate	High-Very high
Bushfire hazard, z	Very Low	Low	Moderate	High	Very high
Wave erosion hazard, u					High – Very high
Flood hazard, f	Very low				High -Very high
Water pollution hazard, s			Low	Moderate	High
Water availability, g	High			Moderate	Low
Overall capability rating	I	II	III	IV	V

4.1.2. Light Rural Industry

The WAPC Land Capability Assessment for Rural Strategies Guideline defines Light Rural Industry areas as follows;

‘This land use comprises mixed industrial uses (such as light industry, agriculture support industries) often with showroom/warehouse developments along major roads on the periphery of towns. These industries are generally controllable. The activities are mostly undertaken in warehouses or factories, while the external area, being used for traffic circulation, storage and display purposes, is generally cleared of all vegetation and compacted or sealed. Lot sizes may vary considerably but are often about 2000 m². These areas may be deep sewerred (especially if the town is sewerred) but this is generally not a requirement. A reticulated water supply is provided to each lot.’

The WAPC Land Capability Assessment for Rural Strategies Guideline identifies land use requirements for Light Rural Industrial areas as follows:

- Availability of extensive flat to gently sloping areas (0 - 8%);
- Deep to moderately deep well drained soils which are easy to excavate and provide a stable foundation for building. Moderately well drained soils with a slight susceptibility to waterlogging may be tolerated;
- The land should not be susceptible to flooding; and
- Disposal of septic effluent or other waste waters should not result in water pollution.

Table 4 outlines the land qualities to fulfil the Light Rural Industry land use requirements. The land characteristics for each land quality are shown in the guideline document (WAPC 1989).

Table 4: Land Qualities to fulfil Light Rural Industry Land Use Requirements

Land Qualities	Rating				
	I	II	III	IV	V
Ease of excavation, x	Very high-high		Moderate	Low	Very Low
Foundation stability, b	Very high-high		Moderate	Low	Very Low
Water logging hazard, i	Low	Moderate	High	Very High	
Water erosion hazard, e	Low	Moderate	High	Very High	
Soil absorption ability, a	High	Moderate	Low	Very Low	
Flood hazard, f	Nil		High		Very high
Water pollution hazard,s	Very low	Low	Moderate	High	
Water availability, g	High		Moderate		Low
Overall capability rating	I	II	III	IV	V

4.2. Land Resource Survey

The land characteristics have been analysed to determine mapping units at the Subject Site for assessing land capability. The mapping units were determined using the following land characteristics:

- Soils, including: soil type, texture, depth, PRI and permeability;
- Slope;
- Depth to groundwater;
- Land use; and
- Vegetation type.

The two distinguishable Mapping Units are defined in Table 5.

Table 5: Mapping Units

Map Unit	Characteristics within the Subject Site
Map Unit 1	<p>Silty sand topsoil over sandy gravel over sandy clay or silty sand topsoil over sandy clay.</p> <p>Soils have low permeability.</p> <p>Soils have high PRI.</p> <p>Groundwater > 2.3m BGL.</p> <p>Slope <0 to 5%.</p> <p>Predominately cleared land with pasture grasses.</p> <p>Rural land use.</p>
Map Unit 2	<p>Silty sand topsoil over gravelly sand over sandy gravel.</p> <p>Soils have low PRI.</p> <p>Groundwater > 2.3m BGL.</p> <p>Slope <0 to 5%.</p> <p>Predominately cleared land with pasture grasses.</p> <p>Rural land use.</p>

The mapping units for the Subject Site are shown on Figure 6.

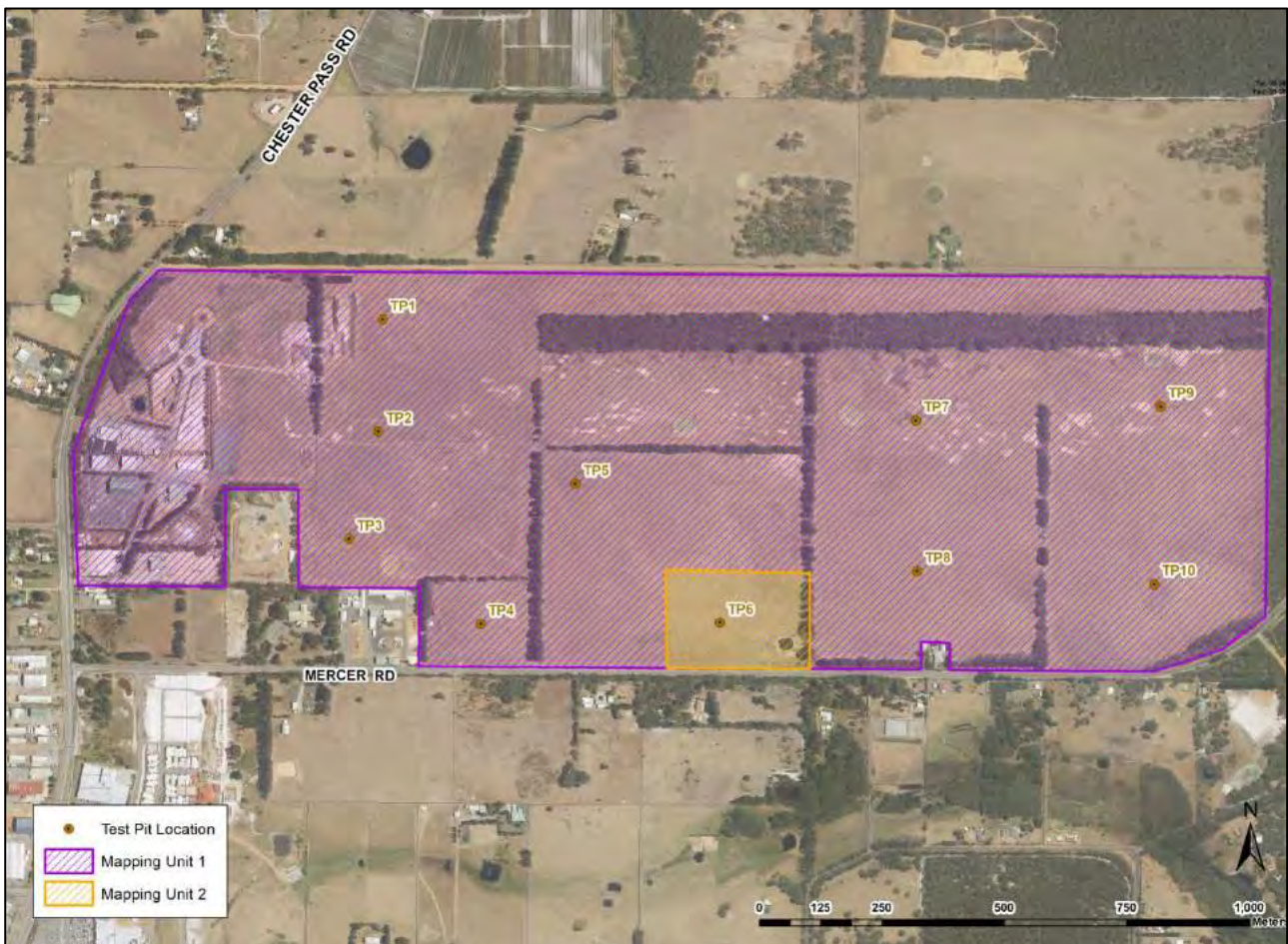


Figure 6: Land Capability Mapping Units

4.3. Land Capability Analysis

4.3.1. Urban Development

The land capability assessment for the Urban Development portion of the Subject Site is presented in Table 6. Two mapping units (Mapping Unit 1 and 2) are present in the location of the proposed Urban Development.

Table 6: Land Capability Assessment for Urban Development

Land Qualities	Mapping Unit 1	Mapping Unit 2
Ease of excavation, x	High	Very high
Foundation stability, b	High	Very high
Water logging hazard, i	Moderate	Low
Water erosion hazard, e	Low	Low
Soil salinity, y	Very Low	Very Low
Soil absorption ability, a	Moderate	Very Low
Wind erosion hazard, w	Low	Low
Bushfire hazard, z	Moderate	Moderate
Wave erosion hazard, u	Nil	Nil
Flood hazard, f	Nil	Nil
Water pollution hazard, s	Low	Moderate
Water availability, g	High (scheme water)	High (scheme water)
Overall capability rating	II	IV

The overall capability of the Subject Site supporting the Urban Development land use is rated as highly capable for Mapping Unit 1 and low capability for Mapping Unit 2 (refer to Table 2 for full description of capability rating).

4.3.2. Light Rural Industry

The land capability assessment for the Light Rural Industry portion of the Subject Site is presented in Table 7. Only Mapping Unit 1 is present in the location of the proposed Light Rural Industrial area.

Table 7: Light Rural Industry Land Capability Rating

Land Qualities	Mapping Unit 1
Ease of excavation, x	High
Foundation stability, b	High
Water logging hazard, i	Moderate
Water erosion hazard, e	Low
Soil absorption ability, a	Moderate
Flood hazard, f	Nil
Water pollution hazard, s	Low
Water availability, g	High (scheme water)
Overall capability rating	II

The overall capability of the Subject Site supporting the Light Rural Industry land use is rated as highly capable (refer to Table 2 for full description of capability rating).

5. Potential Environmental Impacts and Management Measures

5.1. Acid Sulphate Soils

Acid Sulphate Soils (ASS) are stable when left undisturbed, but when they are exposed to air, during excavation or dewatering, this can set off a reaction resulting in acidity (sulfuric acid) being produced. The potential impacts relate to the potential for oxidation of excavated or in situ ASS generating acidic conditions, and possibly releasing metals into groundwater or surface water catchments. ASS mapping indicates the Subject Site is not situated on any known Acid Sulphate Soils (Figure 2). There is however a section of high to moderate risk of ASS occurring within 3m of natural soil surface to the south of the Subject Site on Mercer Road.

The final fill levels and excavation requirements of the proposed subdivision will determine if an ASS and Dewatering Management Plan (ASSDMP) is required to be prepared prior to subdivision. If required, the ASSDMP will be prepared to satisfy the DER and will outline the soil management measures, the groundwater and dewatering effluent monitoring measures and the contingency management measures required to minimise any environmental impacts.

5.2. Water Management

Findings outlined in Sections 3.7 and 3.8 indicate there are limited water management risks associated with development of the Subject Land. Based on the investigations, there is no requirement to undertake pre-development groundwater monitoring. Overall, the soil types enable stormwater infiltration at source.

The water management objectives are to maintain the quantity of surface water and groundwater so that existing and potential environmental values are protected and to ensure that the quality of water emissions (surface and ground) do not adversely affect environmental values or the health, welfare and amenity of people and land uses, and meets statutory requirements and acceptable standards.

A number of management/design measures will be implemented to reduce the impact of the proposed development on surface water and groundwater flows, levels and quality, the function and environmental values of the site, or its interconnected areas. Management measures relevant to construction and the development will be identified in a Local Water Management Strategy (LWMS).

The LWMS details the integrated water management strategies to facilitate future urban water management planning. The LWMS will achieve integrated water management through the following design objectives:

- Effectively manage the risk to human life, property damage and environmental degradation from water contamination, flooding and waterlogging.
- Maintain and if possible improve water quality (surface and groundwater) within the development in relation to pre-development water quality.
- Reduce potable water consumption within both public and private spaces using practical and cost-effective measures.
- Promote infiltration of surface water on site to minimise the risk of further water quality degradation in the Catchment.
- Implement best management practices in regards to stormwater management.
- Incorporate where possible, low maintenance, cost-effective landscaping and stormwater treatment systems.

The LWMS will incorporate the following structural Best Management Practices (BMPs) to address water quantity and quality for the LSP:

- A conceptual drainage strategy demonstrating that the land is capable of retaining the 100 ARI event, while providing an indicative location of stormwater detention.

- Structural and non-structural controls will be used to improve stormwater quality, as compared to a development that does not actively manage stormwater.
- Rainfall from the 1 year 1-hour ARI (Annual Recurrence Interval) events will be retained and infiltrated as close to the source as possible.
- All residential lots will confine run-off from roofs and paving within the property boundary.
- Large rainfall events (10 ARI to 100 ARI) will be conveyed and retained through a network of roads, drainage reserves and POS within each catchment.
- It is anticipated that there will be no impacts from stormwater run-off to downstream ecosystems.

It is expected that development of the site will have a positive impact on groundwater and stormwater quality through BMPs and the treatment of stormwater prior to infiltration. Based on the site assessment and the management measures proposed, it is not expected that any changes to groundwater flows, levels or quality will have an adverse impact on the function and environmental values of the site.

5.3. Waste Water Management

The Subject Site is situated in a Sewerage Sensitive Area that does not have access to deep or reticulated sewerage. It is proposed the initial stage/s of the subdivision will involve the extension of the Light Industrial Area (similar to the existing Industrial Area) and on-site effluent disposal will be required for this area. All residential subdivision will be connected to reticulated sewerage.

The draft Government Sewerage Policy (DoP, 2016) outlines that on-site effluent disposal may be considered for non-residential subdivision that:

- Are remote from existing or proposed sewerage schemes and the proposed development cannot be connected to reticulated sewerage;
- Utilise secondary treatment systems with nutrient removal if in a sewage sensitive area or a public drinking water source area; and
- Where the proponent has demonstrated, to the satisfaction of the Western Australian Planning Commission on the advice of the Department of Health and the Department of Water that there is sufficient capacity to treat and dispose of sewage and contain associated buffers on-site. Consideration will be given to the maximum hydraulic load that can be contained within the lot and the potential impacts on waterways and wetlands.

The minimum lot size for non-residential lots is determined on a case-by-case basis. Residential lots with on-site effluent disposal in sewerage sensitive areas must be at least 1 hectare in size (DoP, 2016).

The proposed industrial area as shown on the LSP was assessed against the requirements for lots with on-site effluent disposal as outlined in the draft Government Sewerage Policy (DoP, 2016). The requirements and assessment to each requirement is shown in Table 8.

Table 8: Assessment to On-site Effluent Disposal Lot Requirements

Lot Requirement (DoP, 2016)	Assessment to Requirement
Adequate separation from groundwater – the discharge point of the on-site sewage disposal system should be at least 1.2 to 1.5 metres, depending on soil type, in sewerage sensitive areas.	Groundwater was not encountered to 2.3 metres depth (Great Southern Geotechnics, 2017).
An on-site sewage disposal system should not be located within 30 metres of a private bore used for household/drinking water purposes.	There are no private bores registered within the Subject Site or with in the vicinity of the proposed Industrial Area (DoW Water Register, 2017).

Table 8 continued over page.

Lot Requirement (DoP, 2016)	Assessment to Requirement
An on-site sewage disposal system should not be located within 100 metres of a waterway.	No waterways located within the Subject Site or within 100m of the proposed Industrial Area (Site inspection conducted 29/8/2017)
An on-site sewage disposal system should not be located within 100m of a significant wetland.	No significant wetlands located within the Subject Site or within the vicinity of proposed Industrial Area (DEC and CoA 2017 database search)
An on-site sewage disposal system should not be located within 100 metres of a surface or subsurface drainage system that discharges directly into a downstream waterway or waterbody.	No surface or subsurface drainage systems located within the Subject Site or within 100m of the proposed Industrial Area (Site inspection conducted 29/8/2017 and DoW database search)
An on-site sewage disposal system should not be located within any area subject to inundation and/or flooding in a 10 per cent Annual Exceedance Probability (AEP) rainfall event.	Given the relatively higher topography in the area and gradual slopes of the land inundation in the location of the proposed Industrial area is unlikely.

The assessment found that the proposed light industrial area is appropriate for effluent disposal and meets the stated minimum requirements for on-site sewage disposal systems as outlined in the *Draft Government Sewerage Policy* (Department of Planning, 2016). In addition, the low permeability and high PRI of the soils in the location of the proposed industrial area will allow for slow draining assisting the process of being fixed by soil microbes.

As the industrial area is in a sewerage sensitive area a secondary waste water treatment system with nutrient removal should be used. The provision of on-site sewage disposal systems including calculation of land application area shall be in accordance with minimum site requirements contained in Schedule 3 of the draft Government Sewerage Policy (DoP, 2016) and must be approved for use in Western Australia by the Department of Health. The Local Planning Scheme requirements for the current Light Industrial area require 'dry industry' and 'alternative treatment effluent disposal systems'.

Where on-site sewage disposal is to be provided by a secondary treatment system, the WAPC will require a notification on title pursuant to Section 70A of the *Transfer of Land Act 1893* (as amended) advising that an on-site secondary treatment sewage disposal system and unencumbered area to which treated sewage is to be distributed are required.

5.4. Flora and Vegetation

The aim of the flora and vegetation management strategy is to maintain the abundance, diversity, geographic distribution and productivity of flora at the species and ecosystem levels through the avoidance or management of adverse impacts and through improvement in knowledge.

The site's historical use for agriculture and grazing has degraded the vegetation on site and reduced the native vegetation cover to a strip of remnant vegetation in the north of the site and a small area in the south-east corner of the site. Consequently, it is anticipated that the proposed development would have very little impact on native vegetation. All efforts should be made to conserve existing native vegetation. There is support however to clear, as required, replanted vegetation which is Bluegums given they are generally unsuitable in an urban area.

The following management measures have been developed and incorporated into the LSP to reduce the likelihood of impacts to vegetation and flora. These measures have been developed with the aim of retaining the key existing biological values of the site:

- Remnant vegetation will be retained within the vegetation strip in the north of the Subject Site and in the south-east corner of the site (inclusion within POS will provide the most effective way of managing the conservation values of the native vegetation).
- Access crossings within the vegetation strip will be limited to facilitate retention and natural regeneration of vegetation.
- Use of native vegetation species in areas of POS and revegetation areas to maintain local biodiversity.

5.5. Fauna

The aim of the fauna management strategy is to maintain the abundance, diversity, geographic distribution and productivity of native fauna at the species and ecosystem levels through the avoidance or management of adverse impacts and improvement in knowledge.

As the majority of the site has been historically cleared and as a result, fauna habitat has largely been removed. The only potentially significant fauna habitat on site is within the two areas of remnant vegetation.

The following management measures have been developed and incorporated into the LSP to reduce the likelihood of impacts to native fauna:

- Regional fauna corridor will be retained through maintaining the strip of remnant vegetation in the north of the Subject Site and the vegetation in the south-east corner.
- Use of native vegetation species in areas of POS to promote habitat for native fauna species.

5.6. Fire Management

The Local Structure Plan is required to meet the “Acceptable Solutions” of each Element of the bushfire mitigation measures (WAPC, 2017). The proposal has been assessed against the bushfire protection criteria Acceptable Solutions for Elements A1, A2, A3 and A4, as per the Guidelines for Planning in Bushfire Prone Areas (WAPC, 2017).

The Subject Site was assessed against the bushfire protection criteria Acceptable Solutions for Elements A1, A2, A3 and A4. Please refer to the summary table below.

Table 9: 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	Compliant BAL 29 or less applied to lots
Element 2 – Siting and Design	A2.1 Asset Protection Zone	Yes	Compliant, APZ in BAL 29 or less N/A
Element 3 – Vehicular Access	A3.1 Two Access Routes	Yes	Compliant two access to 2 destinations
	A3.2 Public Road	Yes	Compliant
	A3.3 Cul-de-sacs	Yes	Compliant with EAW
	A3.4 Battle axes	N/A	N/A
	A3.5 Private driveways	Yes	Compliant
	A3.6 Emergency Access Ways	Yes	Compliant
	A3.7 Fire Service Access Ways	N/A	N/A
	A3.8 Firebreaks	Yes	Compliant on parent lot
Element 4 – Water	A4.1 Reticulated areas	Yes	Compliant
	A4.2 Non-reticulated areas	N/A	N/A
	A4.3 Individual lots in non-reticulated areas	N/A	N/A

5.7. Light Industrial Area and Associated Buffers

The EPA Draft Guidance Statement No. 3 *Separation Distances Between Industrial and Sensitive Land Uses* (EPA, 2015) provides generic separation distances from particular industries to sensitive land uses. Sensitive land uses are land uses applied to places where people live or regularly spend time and which are therefore sensitive to emissions from industry.

The EPA's hierarchy for the management of emissions is:

- Avoid or minimise the creation and discharge of emissions through design and operation of the facility;
- Ensure environmental impacts from emissions are acceptable and meet the relevant regulations and health criteria at the boundary of the site; and
- Implement separation distances to ensure that any residual emissions and unintended emissions do not impact adversely on sensitive land uses.

The generic separation distances are based on the consideration of typical emissions that may affect the amenity of nearby sensitive land uses. These include:

- Gaseous and particulate emissions;
- Noise;
- Dust; and
- Odour.

The only 'Sensitive Land Use' within the vicinity of the proposed Light Industrial area is the proposed Residential area. According to the EPA (2015) the general minimum vegetated setback of 200m is required to private residences, however the *Guidance Number 3 Separation Distances between Industrial and Sensitive Land Uses - Appendix 1* (EPA, 2015) must be consulted for the industry types proposed within the development area and their associated separation to distance to sensitive land use prior to development.

6. Management Commitments and Conclusions

The proposed LSP recognises the importance of the key environmental and landscape attributes of the area, and incorporates these in an urban form, that creates an environmentally responsive urban development that meets the EPA and City of Albany's environmental requirements. Consequently, the environmental outcomes of the proposed LSP are considerable and include:

- Providing an improvement in groundwater and surface water quality through residential and industrial development and implementation of water sensitive urban design and best stormwater drainage management practices.
- Revegetation using native species (where currently there is very little native species and diversity) in areas of POS to promote fauna habitat and flora diversity. Landscaped urban areas to promote biodiversity using native plants.
- Maintaining areas of remnant vegetation and limiting access points through these areas to the subdivision to prevent adverse impacts particularly for transient fauna.
- The Local Structure Plan is required to meet the "Acceptable Solutions" of each Element of the bushfire mitigation measures (WAPC, 2017).
- As Light industrial land use is proposed in the west of the Structure Plan, a detailed Bushfire Management Plan will be required to guide developers if any industry is defined as "High Risk".
- A detailed Bushfire Management Plan jointly endorsed by DFES and CoA will be required for any Primary School proposed in the Structure Plan area at the Development Application stage. A Bushfire Emergency Evacuation Plan (BEEP) will be required at Development Approval Stages.
- The proposed light industrial area is deemed appropriate for effluent disposal and meets the state's minimum requirements for on-site sewage disposal systems as outlined in the *Draft Government Sewerage Policy* (Department of Planning, 2016). Where on-site sewage disposal is to be provided by a secondary treatment system, the WAPC will require a notification on title pursuant Section 70A of the *Transfer of Land Act 1893* (as amended) advising that an on-site secondary treatment sewage disposal system and unencumbered area to which treated sewage is to be distributed are required.
- Provide vegetated buffer and/or other management techniques between industrial areas to sensitive land uses (such as residential) in accordance with the EPA's (2015) Guidance Statement No. 3 *Separation Distances Between Industrial and Sensitive Land Uses*.

7. References

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- Western Australian State Planning Commission (1989) *Land Capability Assessment for Local Rural Strategies*, State Planning Commission Western Australia.

Appendices

Appendix A – Draft Local Structure Plan (Edge Planning & Property, 2017)

Appendix B – Geotechnical Investigation (Great Southern Geotechnics, 2017)

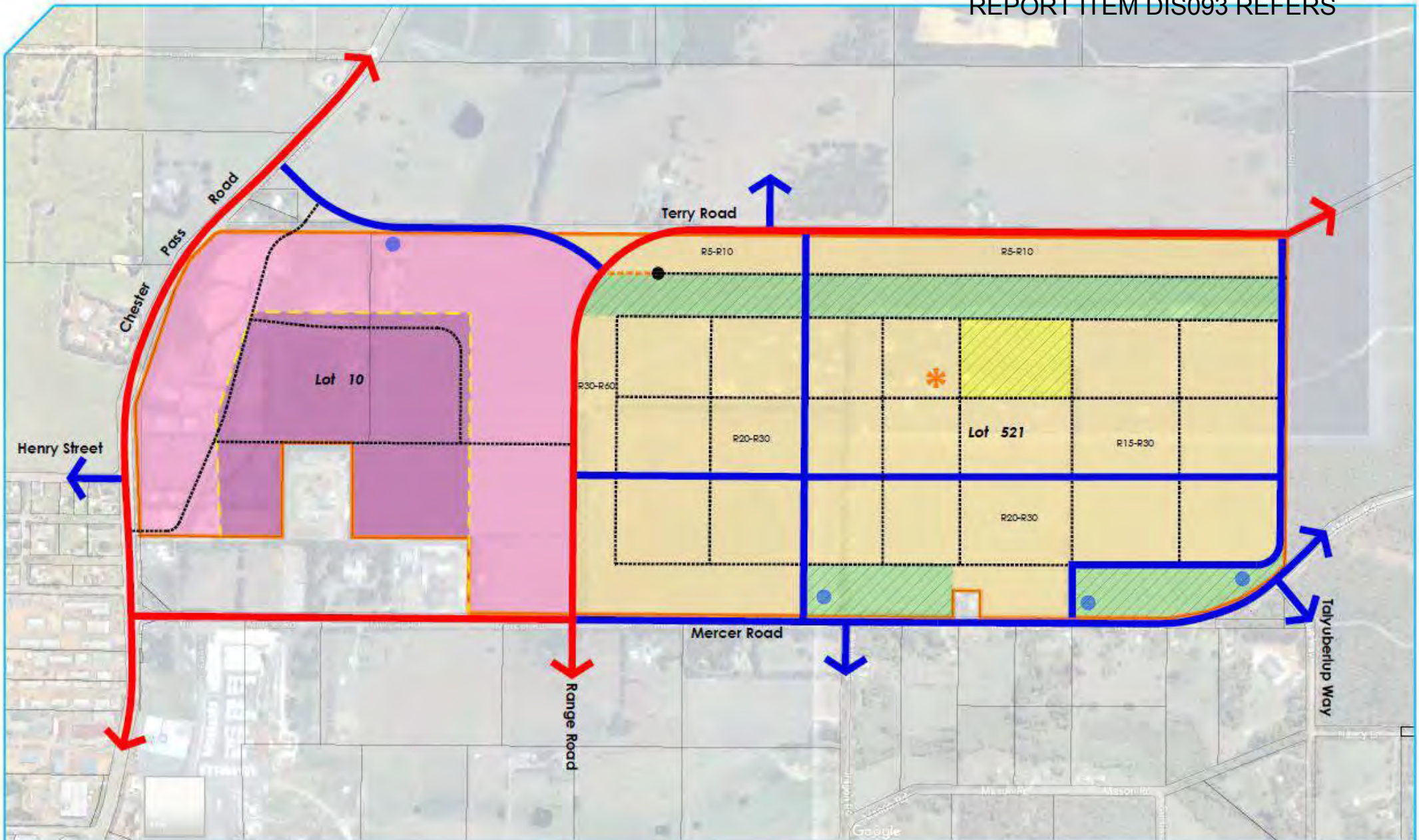
Appendix C – Phosphorous Retention Index Test Results (CSBP Laboratory, 2017)

Appendix D – BAL Contour Plan (Bio Diverse Solutions, 2017)



Appendix A

Draft Local Structure Plan (Edge Planning & Property, 2017)



LOCAL STRUCTURE PLAN

Lot 10 Chester Pass Road and
Lot 521 Mercer Road
Walmsley

LEGEND

- Local Structure Plan Boundary
- Integrator Arterial Road
- Neighbourhood Connector Road
- Local Road
- Parks and Recreation
- Public Use - School
- Residential
- Drainage 115
- Light Industry Precinct A
- Light Industry Precinct B
- ✱ Community Purpose Site
- 200m Buffer to Sensitive Uses
- Emergency Access Way

D	ADD EMERGENCY A. WAY.	171118
C	MINOR MODIFICATIONS	171023
B	MINOR MODIFICATIONS	171022
A	LOCAL STRUCTURE PLAN	171012
REV	DESCRIPTION	YYMMDD
DRAWING NUMBER	REV	SCALE 1:2500
EP 170820/06	D	SHEET A/3

edge
PLANNING & PROPERTY

edge Planning & Property
124 Howe Street, Mount Clarence
Adelaide SA 5032
P: 08 8363 9333
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Appendix B

Geotechnical Investigation (Great Southern Geotechnics, 2017)

VERSION 1

Report No 104/1

SEPTEMBER 17, 2017



GEOTECHNICAL INVESTIGATION

BIO DIVERSE SOLUTIONS

LOT 10 CHESTER PASS RD & LOT 521 MERCER RD, MILPARA WA 6330

PRESENTED BY: M.COFFEY

GREAT SOUTHERN GEOTECHNICS
5A 209 CHESTER PASS RD, ALBANY WA

ACN: 613 485 644 ABN: 77 613 485 644
Info@gsgeotechnics.com

1.0 INTRODUCTION

As authorised by Kathryn Kinnear of Bio Diverse Solutions, a site investigation for the proposed development of Lot 10 Chester Pass Rd & Lot 521 Mercer Rd, Milpara WA 6330 was performed on the 29th of August, 2017.

2.0 GENERAL

This purpose of the investigation was to determine the following:

- Surface site conditions
- Subsurface soil profiles & characteristics
- Depth of ground water tables .

3.0 SITE INVESTIGATION

The site is approximately 5.0kms North of the Albany CBD and is located on the Northern side of Mercer Road spanning over 2kms West to East.

Established trees border the fence lines of grassy paddocks and natural bushland can be found adjacent to the eastern boundary.

Site conditions and Test pit locations were recorded and are shown in Appendix 2

The field investigation consisted of ten test pits excavated on-site to depths of up to 2.3m using a Kubota KX41-3V Mini Excavator with a 300mm wide Hydraulic open flight auger attachment.


All soil layers encountered were visually assessed and classified on-site

The subsurface soil profiles are shown on the Test pit logs located in Appendix 1

IMPORTANT NOTE: We have endeavoured to locate the test pits so that they are representative of the subsurface materials across the site. However, soil conditions may change dramatically over short distances and our investigations may not locate all soil variations across the site.

This report and associated documentation was undertaken for the specific purpose described in the report and shall not be relied on for other purposes. This report was prepared solely for the use by Bio Diverse Solutions and any reliance assumed by other parties on this report shall be at such parties own risk.





COLOURS

	BLACK - BROWN (bk)		BLUE (bl)		ORANGE (or)
	BROWN (br)		BLUE - GREEN (bl/gr)		RED (rd)
	GREY - BROWN (gy/br)		GREEN (gr)		RED - BROWN (rd/br)
	GREY (gy)		YELLOW (yl)		PINK (pk)
	BLUE - GREY (bl/gy)		YELLOW - BROWN (yl/br)		PURPLE (pr)

MOISTURE CONDITION OF SOIL

TERM	DESCRIPTION
Dry	Cohesive soils; hard and friable or powdery, well dry of plastic limit. Granular soils; cohesionless and free-running.
Moist	Soil feels cool, darkened in colour. Cohesive soils can be moulded. Granular soils tend to cohere.
Wet	Soil feels cool, darkened in colour. Cohesive soils usually weakened and free water forms on hands when handling. Granular soils tend to cohere and free water forms on hands when handling.

PARTICLE SHAPES

ANGULAR	SUB-ANGULAR	SUB-ROUNDED	ROUNDED
			

PARTICLE SIZES

BOULDERS	COBBLES	COARSE GRAVEL	MEDIUM GRAVEL	FINE GRAVEL	COARSE SAND	MEDIUM SAND	FINE SAND	SILT	CLAY
>200mm	63-200mm	20-63mm	6-20mm	2.36-6mm	0.6-2.36mm	0.2-0.6mm	0.075-0.2mm	0.002-0.075mm	<0.002mm

GRAIN SIZE

SOIL TYPE (ABBREV.)	CLAY (CL)	SILT (SI)	SAND (SA)			GRAVEL (GR)		COBBLES (CO)	
SIZE	< 2µm	2-75µm	Fine 0.075-0.2mm	Medium 0.2-0.6mm	Coarse 0.6-2.36mm	Fine 2.36-6mm	Medium 6-20mm	Coarse 20-63mm	63-200mm
SHAPE & TEXTURE	Shiny	Dull	← angular or subangular or subrounded or rounded →						
FIELD GUIDE	Not visible under 10x	Visible under 10x	Visible by eye	Visible at < 1m	Visible at < 3m	Visible at < 5m	Road gravel	Rail ballast	Beaching

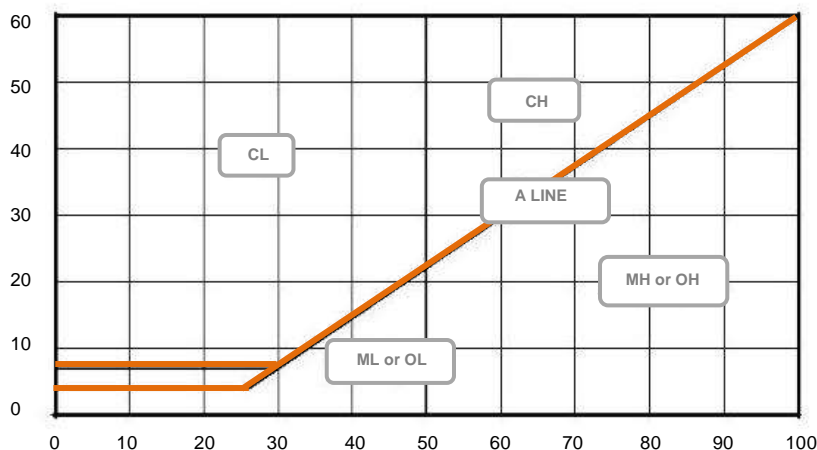
CLASSIFICATION CHART

Explanatory Notes

FIELD IDENTIFICATION PROCEDURES (Excluding particles larger than 60mm and basing fractions on estimated mass)				GROUP SYMBOLS	TYPICAL NAMES	
COARSE GRAINED SOILS More than 50% of material less than 63 mm is larger than 0.075 mm	GRAVELS More than 50% of coarse fraction is larger than 2.36mm	CLEAN GRAVELS (Little or no fines)	Wide range in grain size and substantial amounts of all intermediate sizes, not enough fines to bind coarse grains, no dry strength	GW	Well graded gravels, gravel-sand mixtures, little or no fines	
		GRAVELS WITH FINES (Appreciable amount of fines)	Predominantly one size or range of sizes with some intermediate sizes missing, not enough fines to bind coarse grains, no dry strength	GP	Poorly Graded gravels and gravel-sand mixtures, little or no fines, uniform gravels	
			'Dirty' materials with excess of non-plastic fines, zero to medium dry strength	GM	Silty gravels, gravel-sand-silt mixtures	
		SANDS More than 50% of coarse fraction is smaller than 2.36mm	CLEAN SANDS (Little or no fines)	Wide range in grain size and substantial amounts of all intermediate sizes, not enough fines to bind coarse grains, no dry strength	SW	Well graded sands, gravelly sands, little or no fines
	SANDS WITH FINES (Appreciable amount of fines)		Predominantly one size or range of sizes with some intermediate sizes missing, not enough fines to bind coarse grains, no dry strength	SP	Poorly graded sands and gravelly sands; little or no fines, uniform sands	
			'Dirty' materials with excess of non-plastic fines, zero to medium dry strength	SM	Silty sands, sand-silt mixtures	
			'Dirty' materials with excess of plastic fines, medium to high dry strength	SC	Clayey sands, sand-clay mixtures	
	FINE GRAINED SOILS More than 50% of material less than 63 mm is smaller than 0.075 mm	IDENTIFICATION PROCEDURES ON FRACTIONS <0.2mm				
SILTS AND CLAYS Liquid limit less than 50		DRY STRENGTH	DILATANCY	TOUGHNESS		
		None to low	Quick to slow	None	ML	Inorganic silts and very fine sands, rock flour, silty or clayey fine sands with low plasticity. Silts of low to medium Liquid Limit.
		Medium to high	None to very slow	Medium	CL, CI	Inorganic clays of low to medium plasticity, gravelly clays, sandy clays, silty clays.
SILTS AND CLAYS Liquid limit greater than 50		Low to medium	Slow	Low	OL	Organic silts and organic silt-clays of low to medium plasticity.
		Low to medium	Slow to none	Low to medium	MH	Inorganic silts, micaceous or diatomaceous fine sandy or silty soils, silts of high Liquid Limit.
		High to very high	None	High	CH	Inorganic clays of high plasticity.
		Medium to high	None to very slow	Low to medium	OH	Organic clays of high plasticity
HIGHLY ORGANIC SOILS		Readily identified by colour, odour, spongy feel and frequently by fibrous texture		Pt	Peat and other highly organic soils	

PLASTICITY CHART

For laboratory classification of fine grained soils



PLASTICITY

DESCRIPTIVE TERM	OF LOW PLASTICITY	OF MEDIUM PLASTICITY	OF HIGH PLASTICITY
Range Of Liquid Limit (%)	≤ 35	> 35 ≤ 50	> 50

DESCRIPTION OF ORGANIC OR ARTIFICIAL MATERIALS

PREFERRED TERMS	SECONDARY DESCRIPTION
Organic Matter	Fibrous Peat/ Charcoal/ Wood Fragments/ Roots (greater than approximately 2mm diameter)/ Root Fibres (less than approximately 2mm diameter)
Waste Fill	Domestic Refuse/ Oil/ Bitumen/ Brickbats/ Concrete Rubble/ Fibrous Plaster/ Wood Pieces/ Wood Shavings/ Sawdust/ Iron Filings/ Drums/ Steel Bars/ Steel Scrap/ Bottles/ Broken Glass/ Leather

CONSISTENCY - Cohesive soils

TERM	VERY SOFT	SOFT	FIRM	STIFF	VERY STIFF	HARD
Symbol	VS	S	F	St	VSt	H
Undrained Shear Strength (kPa)	< 12	12 - 25	25 - 50	50 - 100	100 - 200	> 200
SPT (N) Blowcount	0 - 2	2 - 4	4 - 8	8 - 15	15 - 30	> 30
Field Guide	Exudes between the fingers when squeezed	Can be moulded by light finger pressure	Can be moulded by strong finger pressure	Cannot be moulded by fingers. Can be indented by thumb nail	Can be indented by thumb nail	Can be indented with difficulty with thumb nail

CONSISTENCY - Non-cohesive soils

TERM	VERY LOOSE	LOOSE	MEDIUM DENSE	DENSE	VERY DENSE	COMPACT
Symbol	VL	L	MD	D	VD	CO
SPT (N) Blowcount	0 - 4	4 - 10	10 - 30	30 - 50	50 - 100	> 50/150 mm
Density Index (%)	< 15	15 - 35	35 - 65	65 - 85	85 - 95	> 95
Field Guide	Ravels	Shovels easily	Shovelling very difficult	Pick required	Pick difficult	Cannot be picked

MINOR COMPONENTS

TERM	TRACE	WITH
% Minor Component	Coarse grained soils: < 5% Fine grained soils: <15%	Coarse grained soils: 5 - 12% Fine grained soils: 15 - 30%
Field Guide	Presence just detectable by feel or eye, but soil properties little or no different to general properties of primary components	Presence easily detectable by feel or eye, soil properties little different to general properties of primary component

GEOLOGICAL ORIGIN

	TYPE	DETAILS
TRANSPORTED SOILS	Aeolian Soils	Deposited by wind
	Alluvial Soils	Deposited by streams and rivers
	Colluvial Soils	Deposited on slopes
	Lacustrine Soils	Deposited by lakes
	Marine Soils	Deposited in ocean, bays, beaches and estuaries
FILL MATERIALS	Soil Fill	Describe soil type, UCS symbol and add 'FILL'
	Rock Fill	Rock type, degree of weathering, and word 'FILL'.
	Domestic Fill	Percent soil or rock, whether pretrucible or not.
	Industrial Fill	Percent soil, whether contaminated, particle size & type of waste product, i.e. brick, concrete, metal

STRENGTH OF ROCK MATERIAL


TERM	SYMBOL	IS(50)	(MPA)	FIELD GUIDE TO STRENGTH
Extremely Low	EL	≤0.03		Easily remoulded by hand to a material with soil properties.
Very Low	VL	>0.03	≤0.1	Material crumbles under firm blows with sharp end of pick; can be peeled with knife; too hard to cut a triaxle sample by hand. Pieces up to 3 cm thick can be broken by finger pressure.
Low	L	>0.1	≤0.3	Easily scored with a knife; indentations 1 mm to 3 mm show in the specimen with firm blows of the pick point; has dull sound under hammer. A piece of core 150 mm long by 50 mm diameter may be broken by hand. Sharp edges of core may be friable and break during handling.
Medium	M	>0.3	≤1.0	Readily scored with a knife; a piece of core 150 mm long by 50 mm diameter can be broken by hand with difficulty.
High	H	>1	≤3	A piece of core 150 mm long by 50 mm diameter cannot be broken by hand but can be broken by a pick with a single firm blow; rock rings under hammer.
Very High	VH	>3	≤10	Hand specimen breaks with pick after more than one blow; rock rings under hammer.
Extremely High	EH	>10		Specimen requires many blows with geological pick to break through intact material; rock rings under hammer.

ROCK MATERIAL WEATHERING CLASSIFICATION

TERM	SYMBOL	DEFINITION
Residual Soil	RS	Soil developed on extremely weathered rock; the mass structure and substance fabric are no longer evident; there is a large change in volume but the soil has not been significantly transported
Extremely Weathered Rock	XW	Rock is weathered to such an extent that it has 'soil' properties, i.e. it either disintegrates or can be remoulded, in water.
Distinctly Weathered Rock	DW	Rock strength usually changed by weathering. Rock may be highly discoloured, usually be ironstaining. Porosity may be increased by leaching or may be decreased due to deposition of weathering products in pores.
Slightly Weathered Rock	SW	Rock is slightly discoloured but shows little or no change of strength from fresh rock.
Fresh Rock	FR	Rock shows no sign of decomposition or staining.


Appendix 1


Test Pit Logs


		Report No. 104/1	Job No. 104	Sheet 1 of 10				
Client: Bio Diverse Solutions Project: Proposed Light Industrial Area Project No.: n/a Location: Lot 10 Chester Pass Rd & Lot 521 Mercer Rd, Milpara WA Test Pit No.: TP1 Sample No.: 17G288			Operator/Contractor: GSG Equipment type: Kubota KX41-3V Excavation Method : 300mm Auger Position: 50 H 580601 6128901 Elevation:					
Date Commenced: 29.08.2017 Date Completed: 29.08.2017		Logged By: M.Coffey Checked By: M.Coffey		Excavation Dimensions: Depth 2.3 (m) Width 0.3 (m)				
Depth Below Surface (mm)	Layer Depth (mm)	Material Description <small>SOIL TYPE, Plasticity, Colour, Particle characteristics, Secondary and other minor components</small>	Moist. Condition	Consistency / Strength	Cementation	Water Table	Classification Symbol	Sample/Test
0 - 200	200	(Topsoil) SAND with silt: Dark grey, fine to medium grained. Roots & root fibres.	M	L		Water table not encountered		
200 - 900	700	Sandy GRAVEL: Brown, fine to coarse grained, sub-rounded to sub-angular. Fine to medium grained sand.	M	D-VD				
900 - 2300	1400	Sandy CLAY: Low to medium plasticity, Light brown/orange. Fine to medium grained sand.	M	S / F				
Comments:			Pit Terminated at:		(mm) below ground level			
			✓ or ✗					
			Target Depth	✓	2300			
			Cave In					
			Refusal					
			Near Refusal					
			Flooding					
			Lack of Reach					
Materials Consistency/Strength		Rock	Cementation		▼ Water			
Cohesive	Non-Cohesive	EL - Extremely Low	IN - Indurated		Water first Encountered			
VS - Very Soft	VL - Very Loose	VL - Very Low	PC - Poorly Cemented		Moisture			
S - Soft	L - Loose	L - Low	MC - moderately Cemented		D - Dry M - Moist W - Wet			
F - Firm	MD - Medium Dense	M - Medium	WC - Well Cemented		General			
St - Stiff	D - Dense	H - High			N/A - Not Applicable			
VSt - Very Stiff	VD - Very Dense	VH - Very High			N/D - Not Determined			
H - Hard	CO - Compact	EH - Extremely High						

REPORT ITEM DIS093 REFERS

Test Pit Report

		Report No. 104/1	Job No. 104	Sheet 2 of 10				
Client: Bio Diverse Solutions Project: Proposed Light Industrial Area Project No: n/a Location: Lot 10 Chester Pass Rd & Lot 521 Mercer Rd, Milpara WA Test Pit No.: TP2 Sample No.: 17G289			Operator/Contractor: GSG Equipment type: Kubota KX41-3V Excavation Method : 300mm Auger Position: 50 H 580560 6128698 Elevation:					
Date Commenced: 29.08.2017 Date Completed: 29.08.2017		Logged By: M.Coffey Checked By: M.Coffey		Excavation Dimensions: Depth 2.3 (m) Width 0.3 (m)				
Depth Below Surface (mm)	Layer Depth (mm)	Material Description <small>SOIL TYPE, Plasticity, Colour, Particle characteristics, Secondary and other minor components</small>	Moist. Condition	Consistency / Strength	Cementation	Water Table	Classification Symbol	Sample/Test
0 - 100	100	(Topsoil) SAND with silt: Dark grey, fine to medium grained. Roots & root fibres.	M	L		Water table not encountered		
100 - 300	200	Sandy GRAVEL: Brown, fine to coarse grained, sub-rounded to sub-angular. Fine to medium grained sand.	W	L				
300 - 700	400	Sandy CLAY: Low to medium plasticity, Light brown/orange. Fine to medium grained sand.	M	S				
700 - 2300	1600	Sandy CLAY: Low to medium plasticity, Grey mottled orange/red. Fine to medium grained sand.	M	S-F				
Comments:			Pit Terminated at: (mm) below ground level					
			✓ or ✗					
			Target Depth	✓	2300			
			Cave In					
			Refusal					
			Near Refusal					
			Flooding					
			Lack of Reach					
Materials Consistency/Strength		Rock	Cementation		▼ Water			
Cohesive	Non-Cohesive				Water first Encountered			
VS - Very Soft	VL - Very Loose	EL - Extremely Low	IN - Indurated		Moisture			
S - Soft	L - Loose	VL - Very Low	PC - Poorly Cemented		D - Dry M - Moist W - Wet			
F - Firm	MD - Medium Dense	L - Low	MC - moderately Cemented		General			
St - Stiff	D - Dense	M - Medium	WC - Well Cemented		N/A - Not Applicable			
VSt - Very Stiff	VD - Very Dense	H - High			N/D - Not Determined			
H - Hard	CO - Compact	VH - Very High						
		EH - Extremely High						


		Report No. 104/1	Job No. 104	Sheet 4 of 10				
Client: Bio Diverse Solutions Project: Proposed Light Industrial Area Project No: n/a Location: Lot 10 Chester Pass Rd & Lot 521 Mercer Rd, Milpara WA Test Pit No.: TP4 Sample No.: 17G291			Operator/Contractor: GSG Equipment type: Kubota KX41-3V Excavation Method : 300mm Auger Position: 50 H 580829 6128337 Elevation:					
Date Commenced: 29.08.2017 Date Completed: 29.08.2017		Logged By: M.Coffey Checked By: M.Coffey		Excavation Dimensions: Depth 2.3 (m) Width 0.3 (m)				
Depth Below Surface (mm)	Layer Depth (mm)	Material Description <small>SOIL TYPE, Plasticity, Colour, Particle characteristics, Secondary and other minor components</small>	Moist. Condition	Consistency / Strength	Cementation	Water Table	Classification Symbol	Sample/Test
0 - 200	200	(Topsoil) SAND with silt: Dark grey, fine to medium grained. Roots & root fibres.	M	L		Water table not encountered		
200 - 550	350	Sandy GRAVEL: Brown, fine to coarse grained, sub-rounded to sub-angular. Cobbles up to 100mm. Fine to medium grained sand.	M-W	D-VD				
550 - 900	350	Sandy CLAY: Low to medium plasticity, Light brown mottled red/orange. Fine to medium grained sand.	M	S-F				
900 - 2300	1400	Sandy CLAY: Low to medium plasticity, Grey mottled red/brown. Fine to medium grained sand.	M	F				
Comments:			Pit Terminated at:		(mm) below ground level			
			✓ or ✗					
			Target Depth	✓	2300			
			Cave In					
			Refusal					
			Near Refusal					
			Flooding					
			Lack of Reach					
Materials Consistency/Strength		Rock	Cementation		Water			
Cohesive	Non-Cohesive	EL - Extremely Low	IN - Indurated		Water first Encountered			
VS - Very Soft	VL - Very Loose	VL - Very Low	PC - Poorly Cemented		Moisture			
S - Soft	L - Loose	L - Low	MC - moderately Cemented		D - Dry M - Moist W - Wet			
F - Firm	MD - Medium Dense	M - Medium	WC - Well Cemented		General			
St - Stiff	D - Dense	H - High			N/A - Not Applicable			
VSt - Very Stiff	VD - Very Dense	VH - Very High			N/D - Not Determined			
H - Hard	CO - Compact	EH - Extremely High						


		Report No. 104/1	Job No. 104	Sheet 5 of 10				
Client: Bio Diverse Solutions Project: Proposed Light Industrial Area Project No: n/a Location: Lot 10 Chester Pass Rd & Lot 521 Mercer Rd, Milpara WA Test Pit No.: TP5 Sample No.: 17G292			Operator/Contractor: GSG Equipment type: Kubota KX41-3V Excavation Method : 300mm Auger Position: 50 H 580977 6128666 Elevation:					
Date Commenced: 29.08.2017 Date Completed: 29.08.2017		Logged By: M.Coffey Checked By: M.Coffey		Excavation Dimensions: Depth 2.3 (m) Width 0.3 (m)				
Depth Below Surface (mm)	Layer Depth (mm)	Material Description <small>SOIL TYPE, Plasticity, Colour, Particle characteristics, Secondary and other minor components</small>	Moist. Condition	Consistency / Strength	Cementation	Water Table	Classification Symbol	Sample/Test
0 - 200	200	(Topsoil) SAND with silt: Dark grey/brown, fine to medium grained. Roots & root fibres.	M	L		1200mm below existing ground level		
200 - 500	300	Sandy GRAVEL: Brown, fine to coarse grained, sub-rounded to sub-angular. Fine to medium grained sand.	M-W	MD				
500 - 1000	500	Sandy GRAVEL: Brown, fine to coarse grained, sub-rounded to sub-angular. Cobbles & Boulders up to 200mm. Fine to medium grained sand.	M	VD				
1000 - 1200	200	Sandy CLAY: Low to medium plasticity, Light brown/orange. Fine to medium grained sand.	M	F				
1200 - 2300	1100	Sandy CLAY: Low to medium plasticity, Red mottled grey. Fine to medium grained sand.	M	F				
Comments: <i>Water table measured 1200mm below existing ground level 3hrs 55mins after achieving full depth of test pit.</i> <i>Water noted seeping into test pit at 500mm below surface level.</i>			Pit Terminated at: (mm) below ground level ✓ or ✗			Target Depth <input checked="" type="checkbox"/> 2300 Cave In <input type="checkbox"/> Refusal <input type="checkbox"/> Near Refusal <input type="checkbox"/> Flooding <input type="checkbox"/> Lack of Reach <input type="checkbox"/>		
Materials Consistency/Strength		Rock	Cementation		Water			
Cohesive	Non-Cohesive				Water first Encountered			
VS - Very Soft	VL - Very Loose	EL - Extremely Low	IN - Indurated		Moisture			
S - Soft	L - Loose	VL - Very Low	PC - Poorly Cemented		D - Dry M - Moist W - Wet			
F - Firm	MD - Medium Dense	L - Low	MC - moderately Cemented		General			
St - Stiff	D - Dense	M - Medium	WC - Well Cemented		N/A - Not Applicable			
VSt - Very Stiff	VD - Very Dense	H - High			N/D - Not Determined			
H - Hard	CO - Compact	VH - Very High						
		EH - Extremely High						


REPORT ITEM DIS093 REFERS

Test Pit Report


		Report No. 104/1	Job No. 104	Sheet 6 of 10				
Client: Bio Diverse Solutions Project: Proposed Light Industrial Area Project No.: n/a Location: Lot 10 Chester Pass Rd & Lot 521 Mercer Rd, Milpara WA Test Pit No.: TP6 Sample No.: 17G293			Operator/Contractor: GSG Equipment type: Kubota KX41-3V Excavation Method : 300mm Auger Position: 50 H 581324 6128351 Elevation:					
Date Commenced: 29.08.2017 Date Completed: 29.08.2017		Logged By: M.Coffey Checked By: M.Coffey		Excavation Dimensions: Depth 2.3 (m) Width 0.3 (m)				
Depth Below Surface (mm)	Layer Depth (mm)	Material Description <small>SOIL TYPE, Plasticity, Colour, Particle characteristics, Secondary and other minor components</small>	Moist. Condition	Consistency / Strength	Cementation	Water Table	Classification Symbol	Sample/Test
0 - 200	200	(Topsoil) SAND with silt: Dark grey/brown, fine to medium grained. Roots & root fibres.	M	L		1700mm below existing ground level		
200 - 400	200	SAND with silt: Grey, fine to medium grained.	M	L				
400 - 700	300	SAND with silt: Light grey, fine to medium grained.	M	L				
700 - 1500	800	Gravelly SAND with silt: Brown, fine to medium grained. Fine to medium grained, sub-rounded to sub-angular gravel.	M	MD				
1500 - 2300	800	Sandy GRAVEL: Brown, fine to coarse grained, sub-rounded to sub-angular. Fine to medium grained sand.	M	MD				
Comments: <i>Water table measured 1700mm below existing ground level 1hr 55mins after achieving full depth of test pit.</i>			Pit Terminated at: (mm) below ground level ✓ or ✗		Target Depth <input checked="" type="checkbox"/> 2300 Cave In <input type="checkbox"/> Refusal <input type="checkbox"/> Near Refusal <input type="checkbox"/> Flooding <input type="checkbox"/> Lack of Reach <input type="checkbox"/>			
Materials Consistency/Strength		Rock	Cementation		Water Water first Encountered			
Cohesive VS - Very Soft S - Soft F - Firm St - Stiff VSt - Very Stiff H - Hard	Non-Cohesive VL - Very Loose L - Loose MD - Medium Dense D - Dense VD - Very Dense CO - Compact	EL - Extremely Low VL - Very Low L - Low M - Medium H - High VH - Very High EH - Extremely High	IN - Indurated PC - Poorly Cemented MC - moderately Cemented WC - Well Cemented		Moisture D - Dry M - Moist W - Wet			
					General N/A - Not Applicable N/D - Not Determined			

		Report No. 104/1	Job No. 104	Sheet 7 of 10				
Client: Bio Diverse Solutions Project: Proposed Light Industrial Area Project No: n/a Location: Lot 10 Chester Pass Rd & Lot 521 Mercer Rd, Milpara WA Test Pit No.: TP7 Sample No.: 17G294			Operator/Contractor: GSG Equipment type: Kubota KX41-3V Excavation Method : 300mm Auger Position: 50 H 581693 6128729 Elevation:					
Date Commenced: 29.08.2017 Date Completed: 29.08.2017		Logged By: M.Coffey Checked By: M.Coffey		Excavation Dimensions: Depth 2.3 (m) Width 0.3 (m)				
Depth Below Surface (mm)	Layer Depth (mm)	Material Description <small>SOIL TYPE, Plasticity, Colour, Particle characteristics, Secondary and other minor components</small>	Moist. Condition	Consistency / Strength	Cementation	Water Table	Classification Symbol	Sample/Test
0 - 200	200	(Topsoil) SAND with silt: Dark grey, fine to medium grained. Roots & root fibres.	M	L		900mm below existing ground level		
200 - 800	600	Sandy GRAVEL: Brown, fine to coarse grained, sub-rounded to sub-angular. Cobbles & boulders up to 200mm. Fine to medium grained sand.	M-W	L-MD				
800 - 1200	400	Sandy CLAY: Low to medium plasticity, Brown/orange. Fine to medium grained sand.	M	S-F				
1200 - 2300	1100	Sandy CLAY: Low to medium plasticity, Red mottled grey. Fine to medium grained sand.	M	F				
Comments: <i>Water table measured 900mm below existing ground level 3hrs 55mins after achieving full depth of test pit.</i> <i>Water noted seeping into test pit at 700mm below surface level.</i>			Pit Terminated at: (mm) below ground level ✓ or ✗			Target Depth <input checked="" type="checkbox"/> 2300 Cave In <input type="checkbox"/> Refusal <input type="checkbox"/> Near Refusal <input type="checkbox"/> Flooding <input type="checkbox"/> Lack of Reach <input type="checkbox"/>		
Materials Consistency/Strength		Rock	Cementation		Water			
Cohesive	Non-Cohesive				Water first Encountered			
VS - Very Soft	VL - Very Loose	EL - Extremely Low	IN - Indurated		Moisture			
S - Soft	L - Loose	VL - Very Low	PC - Poorly Cemented		D - Dry M - Moist W - Wet			
F - Firm	MD - Medium Dense	L - Low	MC - moderately Cemented		General			
St - Stiff	D - Dense	M - Medium	WC - Well Cemented		N/A - Not Applicable			
VSt - Very Stiff	VD - Very Dense	H - High			N/D - Not Determined			
H - Hard	CO - Compact	VH - Very High						
		EH - Extremely High						

		Report No. 104/1	Job No. 104	Sheet 8 of 10				
Client: Bio Diverse Solutions Project: Proposed Light Industrial Area Project No: n/a Location: Lot 10 Chester Pass Rd & Lot 521 Mercer Rd, Milpara WA Test Pit No.: TP8 Sample No.: 17G295			Operator/Contractor: GSG Equipment type: Kubota KX41-3V Excavation Method : 300mm Auger Position: 50 H 581720 6128505 Elevation:					
Date Commenced: 29.08.2017 Date Completed: 29.08.2017		Logged By: M.Coffey Checked By: M.Coffey		Excavation Dimensions: Depth 2.3 (m) Width 0.3 (m)				
Depth Below Surface (mm)	Layer Depth (mm)	Material Description <small>SOIL TYPE, Plasticity, Colour, Particle characteristics, Secondary and other minor components</small>	Moist. Condition	Consistency / Strength	Cementation	Water Table	Classification Symbol	Sample/Test
0 - 200	200	(Topsoil) SAND with silt: Dark grey, fine to medium grained. Roots & root fibres.	M	L		Water table not encountered		
200 - 800	600	Sandy GRAVEL: Brown, fine to coarse grained, sub-rounded to sub-angular. Fine to medium grained sand.	M	D-VD				
800 - 1000	200	Sandy CLAY with gravel: Low to medium plasticity, Light brown mottled red/orange. Fine to medium grained sand. Fine to medium grained, angular to sub-angular gravel.	M	F				
1000 - 1900	900	Sandy CLAY: Low to medium plasticity, Red mottled light brown/orange. Fine to medium grained sand. (VSt between depth 1700mm to 1900mm)	M	F-VSt				
1900 - 2300	400	Sandy CLAY: Low plasticity, orange mottled red/cream. Fine to medium grained sand.	M	S-F				
Comments:			Pit Terminated at: (mm) below ground level					
			✓ or ✗					
			Target Depth	✓	2300			
			Cave In					
			Refusal					
			Near Refusal					
			Flooding					
			Lack of Reach					
Materials Consistency/Strength		Rock	Cementation		▼ Water			
Cohesive	Non-Cohesive				Water first Encountered			
VS - Very Soft	VL - Very Loose	EL - Extremely Low	IN - Indurated		Moisture			
S - Soft	L - Loose	VL - Very Low	PC - Poorly Cemented		D - Dry M - Moist W - Wet			
F - Firm	MD - Medium Dense	L - Low	MC - moderately Cemented		General			
St - Stiff	D - Dense	M - Medium	WC - Well Cemented		N/A - Not Applicable			
VSt - Very Stiff	VD - Very Dense	H - High			N/D - Not Determined			
H - Hard	CO - Compact	VH - Very High						
		EH - Extremely High						

		Report No. 104/1	Job No. 104	Sheet 9 of 10				
Client: Bio Diverse Solutions Project: Proposed Light Industrial Area Project No: n/a Location: Lot 10 Chester Pass Rd & Lot 521 Mercer Rd, Milpara WA Test Pit No.: TP9 Sample No.: 17G296			Operator/Contractor: GSG Equipment type: Kubota KX41-3V Excavation Method: 300mm Auger Position: 50 H 582184 6128769 Elevation:					
Date Commenced: 29.08.2017 Date Completed: 29.08.2017		Logged By: M.Coffey Checked By: M.Coffey		Excavation Dimensions: Depth 2.3 (m) Width 0.3 (m)				
Depth Below Surface (mm)	Layer Depth (mm)	Material Description <small>SOIL TYPE, Plasticity, Colour, Particle characteristics, Secondary and other minor components</small>	Moist. Condition	Consistency / Strength	Cementation	Water Table	Classification Symbol	Sample/Test
0 - 200	200	(Topsoil) SAND with silt: Dark grey, fine to medium grained. Roots & root fibres.	M	L		Water table not encountered		
200 - 800	600	Sandy GRAVEL: Brown, fine to coarse grained, sub-rounded to sub-angular. Fine to medium grained sand.	M	MD				
800 - 1100	300	Sandy CLAY: Low to medium plasticity, brown/orange. Fine to medium grained sand.	M	S-F				
1100 - 2300	1200	Sandy CLAY: Low to medium plasticity, Red mottled grey. Fine to medium grained sand.	M	F				
Comments:			Pit Terminated at: (mm) below ground level		✓ or ✗ Target Depth ✓ 2300 Cave In Refusal Near Refusal Flooding Lack of Reach			
Materials Consistency/Strength		Rock	Cementation		Water			
Cohesive	Non-Cohesive				Water first Encountered			
VS - Very Soft	VL - Very Loose	EL - Extremely Low	IN - Indurated		Moisture			
S - Soft	L - Loose	VL - Very Low	PC - Poorly Cemented		D - Dry M - Moist W - Wet			
F - Firm	MD - Medium Dense	L - Low	MC - moderately Cemented		General			
St - Stiff	D - Dense	M - Medium	WC - Well Cemented		N/A - Not Applicable			
VSt - Very Stiff	VD - Very Dense	H - High			N/D - Not Determined			
H - Hard	CO - Compact	VH - Very High						
		EH - Extremely High						

REPORT ITEM DIS093 REFERS Test Pit Report

		Report No. 104/1	Job No. 104	Sheet 10 of 10					
Client: Bio Diverse Solutions Project: Proposed Light Industrial Area Project No.: n/a Location: Lot 10 Chester Pass Rd & Lot 521 Mercer Rd, Milpara WA Test Pit No.: TP10 Sample No.: 17G297			Operator/Contractor: GSG Equipment type: Kubota KX41-3V Excavation Method : 300mm Auger Position: 50 H 582184 6128441 Elevation:						
Date Commenced: 29.08.2017 Date Completed: 29.08.2017		Logged By: M.Coffey Checked By: M.Coffey		Excavation Dimensions: Depth 2.3 (m) Width 0.3 (m)					
Depth Below Surface (mm)	Layer Depth (mm)	Material Description <small>SOIL TYPE, Plasticity, Colour, Particle characteristics, Secondary and other minor components</small>	Moist. Condition	Consistency / Strength	Cementation	Water Table	Classification Symbol	Sample/Test	
0 - 200	200	(Topsoil) SAND with silt: Dark grey, fine to medium grained. Roots & root fibres.	M	L		Water table not encountered			
200 - 400	200	SAND with silt: Grey/brown, fine to coarse grained sub-rounded to sub-angular. <small>(Contains some cobbles up to 150mm)</small>	M	L-MD					
400 - 2300	1900	Sandy CLAY: Low to medium plasticity, Light brown/orange. Fine to medium grained sand. <small>(Contains pockets of yellow/cream fine to medium grained sand).</small>	M	L				✓	
Comments:			Pit Terminated at:		(mm) below ground level				
			✓ or ✗						
			Target Depth	✓	2300				
			Cave In						
			Refusal						
			Near Refusal						
			Flooding						
			Lack of Reach						
Materials Consistency/Strength		Rock	Cementation		▼ Water				
Cohesive	Non-Cohesive				Water first Encountered				
VS - Very Soft	VL - Very Loose	EL - Extremely Low	IN - Indurated		Moisture				
S - Soft	L - Loose	VL - Very Low	PC - Poorly Cemented		D - Dry	M - Moist	W - Wet		
F - Firm	MD - Medium Dense	L - Low	MC - moderately Cemented		General				
St - Stiff	D - Dense	M - Medium	WC - Well Cemented		N/A - Not Applicable				
VSt - Very Stiff	VD - Very Dense	H - High			N/D - Not Determined				
H - Hard	CO - Compact	VH - Very High							
		EH - Extremely High							

Appendix 2

Site Map & Test Pit Locations

The fieldwork was carried out on the 29th of August 2017 and comprised the following:
 Ten test pits were excavated using a Kubota KX41-3V Mini Excavator with a 300mm wide Auger attachment to achieve depths of up to 2.3m to visually assess subsurface conditions and monitor any ground water present. Approximate Test Pit locations are shown on **Figure 2**.



Figure 1 - Site Location



Figure 2 - Lot 10 Chester Pass Rd & Lot 521 Mercer Rd, Milpara WA 6330



Test Pit No. 1 Excavation



Test Pit No. 1 Spoil



Test Pit No. 2 Excavation



Test Pit No. 2 Spoil



Test Pit No. 3 Excavation



Test Pit No. 3 Spoil



Test Pit No. 4 Excavation



Test Pit No. 4 Spoil



Test Pit No. 5 Excavation



Test Pit No. 5 Spoil



Test Pit No. 6 Excavation



Test Pit No. 6 Spoil



Test Pit No. 7 Excavation



Test Pit No. 7 Spoil



Test Pit No. 8 Excavation



Test Pit No. 8 Spoil



Test Pit No. 9 Excavation



Test Pit No. 9 Spoil



Test Pit No. 10 Excavation



Test Pit No. 10 Spoil



Appendix 3

Test Results



5a 209 Chester Pass Road, Milpara WA 6330
 Mobile: 0407 903 297 Email: Info@gsgotechnics.com

Dry Density / Moisture Content Relationship Test Report

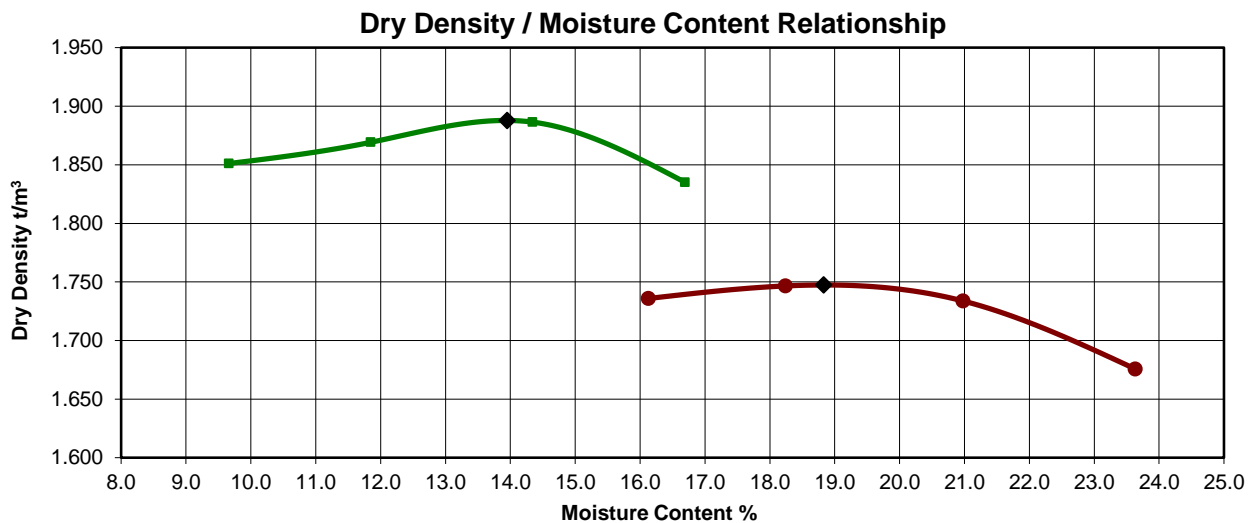
Sheet 1 of 1

Report No. 104/1

Job No. 104

Client: Bio Diverse Solutions
 Project: Proposed Light Industrial Area
 Road: Lot 10 Chester Pass Rd & Lot 521 Mercer Rd, Milpara WA 6330
 Section: N/A

Sample No.	Sample Location	Field Description
17G298	Test Pit 3	Sandy CLAY
17G299	Test Pit 10	Sandy CLAY



Sample Number	17G298 ●	17G299 ●	●
Depth	400mm - 1100mm	400mm to 2300mm	
Stabiliser Used			
Stabiliser Added %			
Curing Period	Water (Days)	Field	Field
	Stabiliser (Hrs)		
Moisture Content Method used	AS 1289.2.1.1	AS 1289.2.1.1	
Sampling Method	AS 1289.1.2.1 Proc 6.5	AS 1289.1.2.1 Proc 6.5	
Date Sampled	29.08.2017	29.08.2017	
Date Received	29.08.2017	29.08.2017	
Date Tested	02.09.2017	02.09.2017	
Test Method	AS 1289.5.2.1	AS 1289.5.2.1	
Maximum Dry Density t/m ³	1.75	1.89	
Optimum Moisture Content %	19.0	14.0	
Adjusted Maximum Dry Density t/m ³			
Adjusted Optimum Moisture Content %			
Percentage Retained % 37.5 mm	0	0	
Percentage Retained % 19.0 mm	0	0	

<p>Comments: N/a</p> <p>Distribution: Laboratory File / Kathryn Kinnear</p>	<p>Approved Signatory: </p> <p>Name: M.Coffey Function: Laboratory Manager Date: 17.09.2017</p>
-------------------------------------------------------------------------------------------	---------------------------------------------------------------------------------------------------------------------------------------------------



Falling Head Permeability Report		Test Method: AS 1289.6.7.2	
Client:	Bio Diverse Solutions	Ticket No:	S812
Project:	Lot 10 Chester Pass Rd & Lot 521 Mercer Road	Report No:	LLS17/2133_2
Location:	Milpara, WA 6339	Sample No:	LLS17/2133
Sample ID:	TP3 400-1100mm (17G298)	Issue Date:	14-September-2017

Sampling Procedure: Tested as Received

Laboratory Moisture Ratio (%) 100.5

Laboratory Density Ratio (%) 95.0

Compactive Effort Modified

Surcharge (kPa) 3

% Retained on 19mm Sieve 0

Coefficient of Permeability (m / sec) 4.1×10^{-8}

Client Address: 5a 209 Chester Pass Road, Albany WA 6330

Comments: MMDD and OMC Values supplied by Great Southern Geotechnics



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 Accreditation No. 19872

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Approved Signature: 

Name: Matt van Herk
Function: Laboratory Manager
Date: 14-September-2017



Falling Head Permeability Report		Test Method: AS 1289.6.7.2	
Client:	Bio Diverse Solutions	Ticket No:	S812
Project:	Lot 10 Chester Pass Rd & Lot 521 Mercer Road	Report No:	LLS17/2134_2
Location:	Milpara, WA 6339	Sample No:	LLS17/2134
Sample ID:	TP10 400-2300mm (17G299)	Issue Date:	14-September-2017

Sampling Procedure: Tested as Received

Laboratory Moisture Ratio (%) 98.5

Laboratory Density Ratio (%) 95.0

Compactive Effort Modified

Surcharge (kPa) 3

% Retained on 19mm Sieve 0

Coefficient of Permeability (m / sec) 1.8×10^{-8}

Client Address: 5a 209 Chester Pass Road, Albany WA 6330

Comments: MMDD and OMC Values supplied by Great Southern Geotechnics



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Approved Signature: 

Name: Matt van Herk
Function: Laboratory Manager
Date: 14-September-2017

Appendix C

Phosphorous Retention Index Test Results (CSBP Laboratory, 2017)



Customer Bio Diverse Solutions
Job Chiquita Burgers
Date Rec'd 1/09/2017

Lab Number	Name	Code	Customer	Depth	Phosphorus Retention Index
2ZS17085	Test Pit 3	01/09/17	Bio Diverse Solutions	40-110	2387.4
2ZS17086	Test Pit 6	01/09/17	Bio Diverse Solutions	20-70	0.8
2ZS17087	Test Pit 10	01/09/17	Bio Diverse Solutions	40-230	608.0
2ZS17088	Test Pit 1	01/09/17	Bio Diverse Solutions	20-90	2414.5

Appendix D

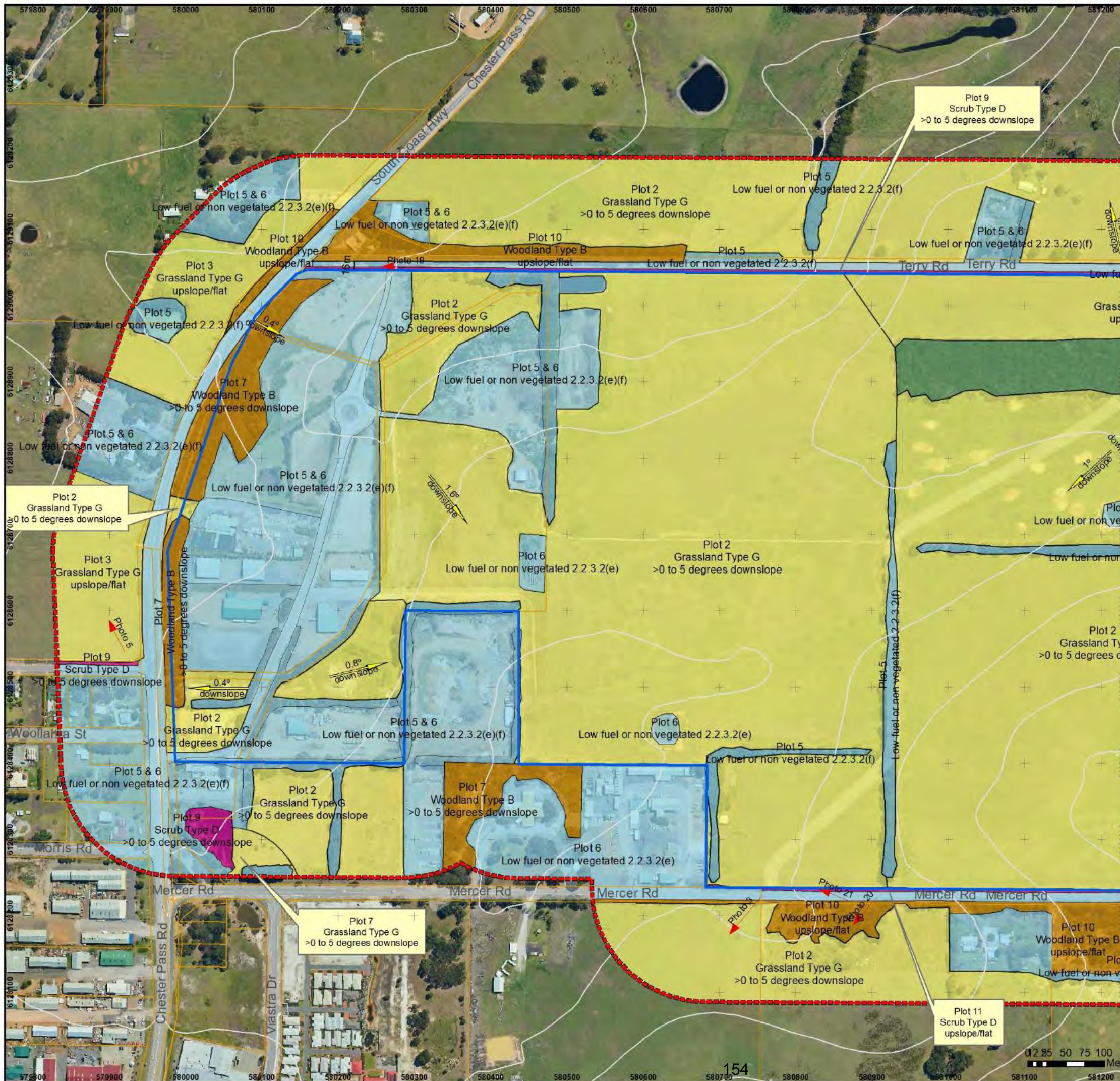
BAL Contour Plan (Bio Diverse Solutions, 2017)

AS 3959 Bushfire Attack Level (BAL) Contour Plan Report

Site Details			
Address:	Lot 10 Chester Pass Road and Lot 521 Mercer Road		
Suburb:	Walmsley	State:	W.A.
Local Government Area:	City of Albany		
Description of Building Works:	N/A		
Stage of WAPC Planning	Structure Plan		

BAL Contour Plan Details			
Report / Job Number:	EPP 004	Report Version:	Final
Assessment Date:	29/8/2017	Report Date:	25/10/2017
Practitioner	Kathryn Kinnear	Accreditation No.	BPAD 30794





REPORT ITEM DIS093 REFERS

This BAL Plan was prepared by:
 Kathryn Kinnear, Bio Diverse Solutions
 Accreditation No: BPAD30794
 Jurisdiction: Level 2 - WA



29 Hercules Crescent
 Albany, WA 6330
 Australia
 Tel: 08 9842 1575
 Fax: 08 9842 1575



Overview Map Scale 1:100,000

Legend

- Subject Site
 - 150m Assessment Boundary
 - Cadastre
 - 5m Contours
 - ↘ Slope Degrees
 - Separation Distance
 - ▶ Photo ID
- ### Site Vegetation
- Forest Type A
 - Grassland Type G
 - Low fuel or non vegetated 2.2.3.2
 - Scrub Type D
 - Woodland Type B



Scale
 1:5,000 @ A3
 GDA MGA 94 Zone 50

Data Sources
 Aerial Imagery: SLIP Virtual Mosaic WMS Service, Landgate 2017
 Cadastre, Relief Contours and Roads: Landgate 2017
 IRIS Road Network: Main Roads Western Australia 2017
 Overview Map: World Topographic map service, ESRI 2012

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 Edge Planning & Property
 Steve Thompson
 Lot 10 Chesterpass Road
 Ardess Warreanup, WA 6330

Figure 1.1. Vegetation Classes

BAL Assessor	QA Check	Drawn by
KK	KK	SA
STATUS	FILE	DATE
FINAL	EPP004	28/09/2017



REPORT ITEM DIS093 REFERS

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BPAD
 Bushfire
 Planning & Design
 Accredited Practitioner
 Level 2



**BIO
 DIVERSE
 SOLUTIONS**

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Overview Map Scale 1:100,000

Legend

- Subject Site
 - 150m Assessment Boundary
 - Cadastre
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 - ↘ Slope Degrees
 - ↔ Separation Distance
 - ▲ Photo ID
- Site Vegetation**
- Forest Type A
 - Grassland Type G
 - Low fuel or non vegetated 2.2.3.2
 - Scrub Type D
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 Scale
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 GDA MGA 94 Zone 50

Data Sources
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Figure 1.2. Vegetation Classes

BAL Assessor KK	QA Check KK	Drawn by SA
STATUS FINAL	FILE EPP004	DATE 28/09/2017



SECTION 1 - Vegetation Classification

All vegetation within 150m of the site / proposed development was classified in accordance with Clause 2.2.3 of AS 3959-2009. Each distinguishable vegetation plot with the potential to determine the Bushfire Attack Level is identified below.

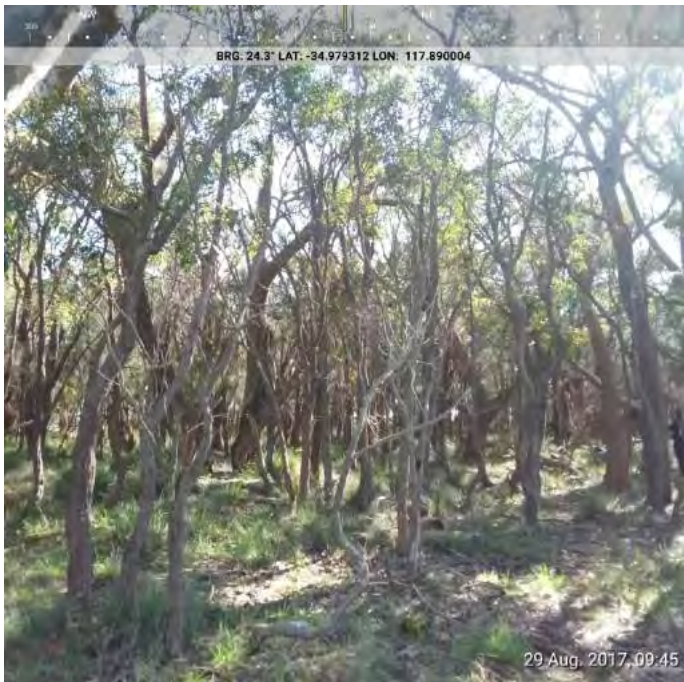
Plot	1	Classification or Exclusion Clause	Forest Type A
			<p>Location: internal to the site in proposed POS in the north east of the structure Plan.</p> <p>Separation distance: 0m.</p> <p>Dominant species & description: Jarrah, Marri, <i>Casuarina</i>, <i>Leucopogon</i>, <i>Acacia</i> and grasses. Presents in some areas as low amount of multilayering (borderline Woodland Type B), however once grazing ceases could re-grow to Forest Type A.</p> <p>Average vegetation height: 8m.</p> <p>Vegetation Coverage: >30-70%.</p> <p>Available fuel loading: 25-35t/ha.</p> <p>Effective slope: Flat.</p>

Photo Id 1: View of Forest Type A internal to the site. View from south to north.

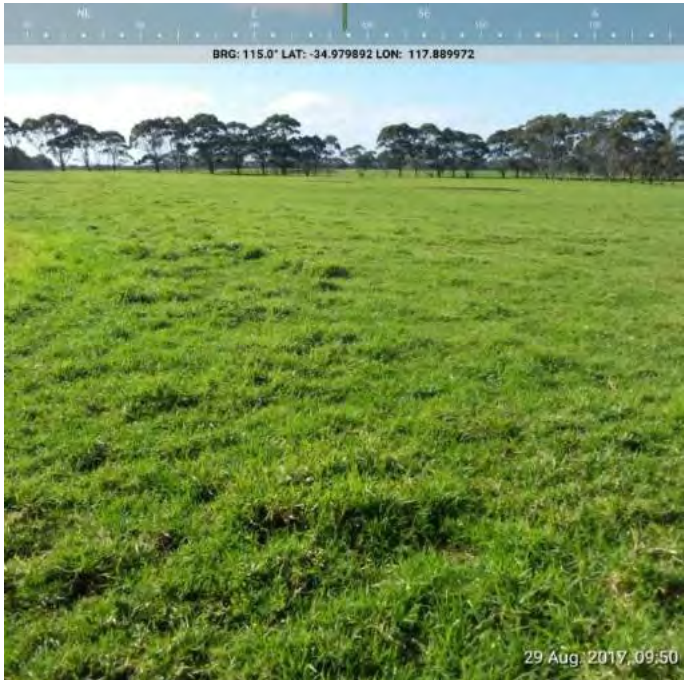
Plot	2	Classification or Exclusion Clause	Grassland Type G
			<p>Location: Internal to the site in grazed paddocks. Southern areas, north east and western paddocks.</p> <p>Separation distance: 0m.</p> <p>Dominant species & description: Kikuyu, ryegrasses, clovers and Capeweed.</p> <p>Average vegetation height: 120mm.</p> <p>Vegetation Coverage: <10% trees.</p> <p>Available fuel loading: 4.5t/ha.</p> <p>Effective slope: Downslope >0-5 degrees.</p>

Photo Id 2: View to the east of internal Grasslands Type G. Grazed by cattle.

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Plot	2	Classification or Exclusion Clause	Grassland Type G
			<p>Location: Located to the north and south of the subject site (north of Terry Road) and south of Mercer Road in grazed paddocks.</p> <p>Separation distance: 0m (north east boundary) and between 15-20m (established road reserves separation).</p> <p>Dominant species & description: Kikuyu, ryegrasses, clovers and capeweed.</p> <p>Average vegetation height: 120mm.</p> <p>Vegetation Coverage: <10% trees.</p> <p>Available fuel loading: 4.5t/ha.</p> <p>Effective slope: Downslope >0-5 degrees.</p>

Photo Id 3: View to the south west (south of Mercer Road) of grasslands Type G. Grazed by cattle.

Plot	3	Classification or Exclusion Clause	Grassland Type G
			<p>Location: Located in the north of the subject site in grazed paddocks.</p> <p>Separation distance: 0m.</p> <p>Dominant species & description: Kikuyu, ryegrasses, clovers and Capeweed.</p> <p>Average vegetation height: 120mm.</p> <p>Vegetation Coverage: 120mm.</p> <p>Available fuel loading: 4.5t/ha.</p> <p>Effective slope: Flat to upslope.</p>

Photo Id 4: View internal of the subject site to the north of grazed paddocks.

REPORT ITEM DIS093 REFERS

Plot	3	Classification or Exclusion Clause	Grassland Type G
			<p>Location: Located adjacent to the subject site to the west in adjacent grazed paddocks</p> <p>Separation distance: 20m (Chester Pass Road Reserve).</p> <p>Dominant species & description: Kikuyu, ryegrasses, clovers and Capeweed.</p> <p>Average vegetation height: 120mm.</p> <p>Vegetation Coverage: 120mm.</p> <p>Available fuel loading: 4.5t/ha.</p> <p>Effective slope: Flat to upslope.</p>
<p><i>Photo Id 5: View of adjacent paddocks to the west of Chester Pass Road, view to the north, northwest.</i></p>			
Plot	4	Classification or Exclusion Clause	Forest Type A
			<p>Location: To the east of the subject site in City of Albany Reserve.</p> <p>Separation distance: 4-6m (firebreak, traversable)</p> <p>Dominant species & description: Jarrah, <i>Acacia</i>, <i>Melaleuca</i>, <i>Banksia</i>, Tea Tree, sedges and grasses. Multilayered vegetation structure.</p> <p>Average vegetation height: 6-10m.</p> <p>Vegetation Coverage: >30-70%.</p> <p>Available fuel loading: 12 35t/ha.</p> <p>Effective slope: Downslope >0-5 degrees.</p>
<p><i>Photo Id 6: View to east-south east of Forest Type A in adjacent City of Albany Reserve.</i></p>			

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Plot	4	Classification or Exclusion Clause	Forest Type A
			<p>Location: To the south east in adjacent private property, south of Mercer Road.</p> <p>Separation distance: 20m (<Mercer Road reserve).</p> <p>Dominant species & description: Jarrah, <i>Acacia</i>, <i>Melaleuca</i>, <i>Banksia</i>, Tea Tree, sedges and grasstrees. Multilayered vegetation structure.</p> <p>Average vegetation height: 6-10m.</p> <p>Vegetation Coverage: >30-70%.</p> <p>Available fuel loading: 12 35t/ha.</p> <p>Effective slope: Downslope >0-5 degrees.</p>

Photo Id 7: View to east-south east of Forest Type A in adjacent property south of Mercer Road.

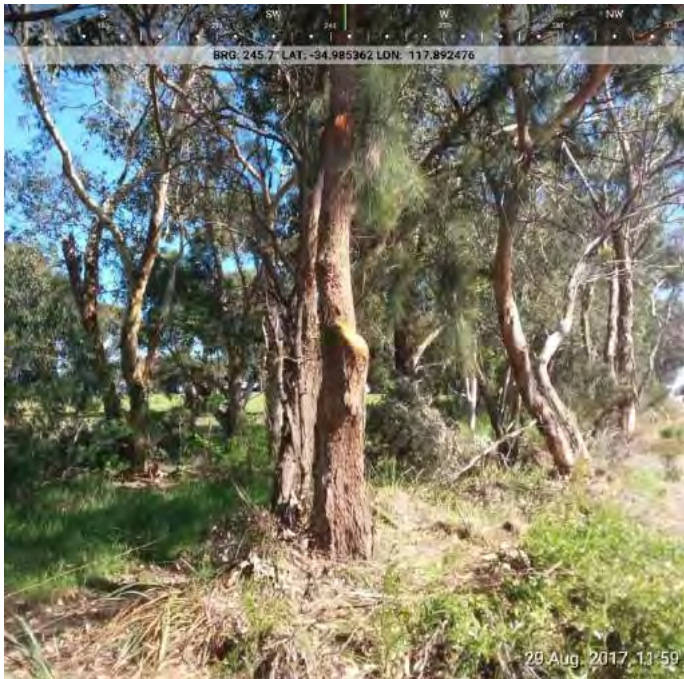
Plot	4	Classification or Exclusion Clause	Forest Type A
			<p>Location: To the south in adjacent private property, south of Mercer Road and Mercer Road reserve.</p> <p>Separation distance: 15-20m (<Mercer Road reserve).</p> <p>Dominant species & description: Jarrah, <i>Acacia</i>, <i>Melaleuca</i>, <i>Banksia</i>, Tea Tree, sedges and grasstrees. Multilayered vegetation structure.</p> <p>Average vegetation height: 6-10m.</p> <p>Vegetation Coverage: >30-70%.</p> <p>Available fuel loading: 12 35t/ha.</p> <p>Effective slope: Downslope >0-5 degrees.</p>

Photo Id 8: View to south west of Forest Type A in road reserve and in private property south of Mercer Road.


Plot	5	Classification or Exclusion Clause	Exclusion 2.2.3.2 (f)
			<p>Location: Lawns, managed gardens, windbreaks and other low-threat vegetation. As per exclusion clause 2.2.3.2 (f) of AS3959-2009. Located internal and external to the site.</p> <p>Separation distance: NA.</p> <p>Dominant species & description: Mixed Eucalypts planted windbreaks. Single rows.</p> <p>Average vegetation height: 16m.</p> <p>Vegetation Coverage: NA.</p> <p>Available fuel loading: <2t/ha.</p> <p>Effective slope: NA.</p>

Photo Id 9: View to south east of planted windbreak internal (south) central of the site.


Plot	5	Classification or Exclusion Clause	Exclusion 2.2.3.2 (f)
			<p>Location: Lawns, managed gardens, windbreaks and other low-threat vegetation. As per exclusion clause 2.2.3.2 (f) of AS3959-2009. Located internal and external to the site.</p> <p>Separation distance: NA.</p> <p>Dominant species & description: Mixed Eucalypts planted windbreaks. Single rows.</p> <p>Average vegetation height: 16m.</p> <p>Vegetation Coverage: NA.</p> <p>Available fuel loading: <2t/ha.</p> <p>Effective slope: NA.</p>

Photo Id 10: View to east of planted windbreak to the north of the site (external).

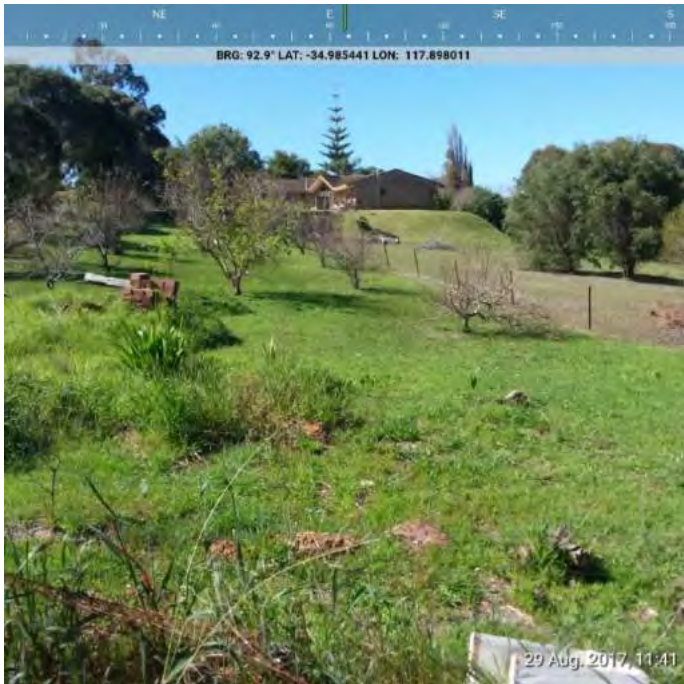
Plot	5	Classification or Exclusion Clause	Exclusion 2.2.3.2 (f)
			<p>Location: Lawns and managed gardens associated with APZ areas, windbreaks and other low-threat vegetation. As per exclusion clause 2.2.3.2 (f) of AS3959-2009. Located internal and external to the site.</p> <p>Separation distance: NA.</p> <p>Dominant species & description: Mixed Eucalypts planted windbreaks. Single rows.</p> <p>Average vegetation height: 16m.</p> <p>Vegetation Coverage: NA.</p> <p>Available fuel loading: <2t/ha.</p> <p>Effective slope: NA.</p>

Photo Id 11: View to the east of low fuel orchard and mowed managed lawns (background).


Plot	6	Classification or Exclusion Clause	Exclusion 2.2.3.2 (e)
			<p>Location: Roads, driveways, buildings, mineral earth, dams and other non-vegetated areas. As per AS3959-2009 exclusion clause 2.2.3.2 (e).</p> <p>Separation distance: NA.</p> <p>Dominant species & description: NA.</p> <p>Average vegetation height: NA.</p> <p>Vegetation Coverage: NA.</p> <p>Available fuel loading: NA.</p> <p>Effective slope: NA.</p>

Photo Id 12: View of dam internal to the site (south central). View from north to south.

REPORT ITEM DIS093 REFERS


Plot	6	Classification or Exclusion Clause	Exclusion 2.2.3.2 (e)
			<p>Location: Roads, driveways, buildings, mineral earth, dams and other non-vegetated areas. As per AS3959-2009 exclusion clause 2.2.3.2 (e).</p> <p>Separation distance: NA.</p> <p>Dominant species & description: NA.</p> <p>Average vegetation height: NA.</p> <p>Vegetation Coverage: NA.</p> <p>Available fuel loading: NA.</p> <p>Effective slope: NA.</p>

Photo Id 13: View of Talybenup Road (South of Mercer Road). View from north to south.

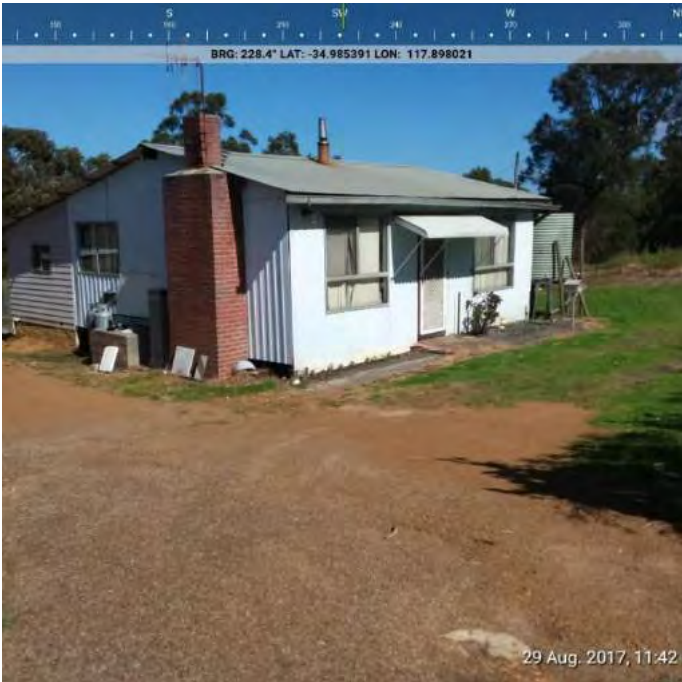
Plot	6	Classification or Exclusion Clause	Exclusion 2.2.3.2 (e)
			<p>Location: Roads, driveways, buildings, mineral earth, dams and other non-vegetated areas. As per AS3959 exclusion clause 2.2.3.2 (e).</p> <p>Separation distance: NA.</p> <p>Dominant species & description: NA.</p> <p>Average vegetation height: NA.</p> <p>Vegetation Coverage: NA.</p> <p>Available fuel loading: NA.</p> <p>Effective slope: NA.</p>

Photo Id 14: View of building located south along Mercer Road. View from north east to south west.

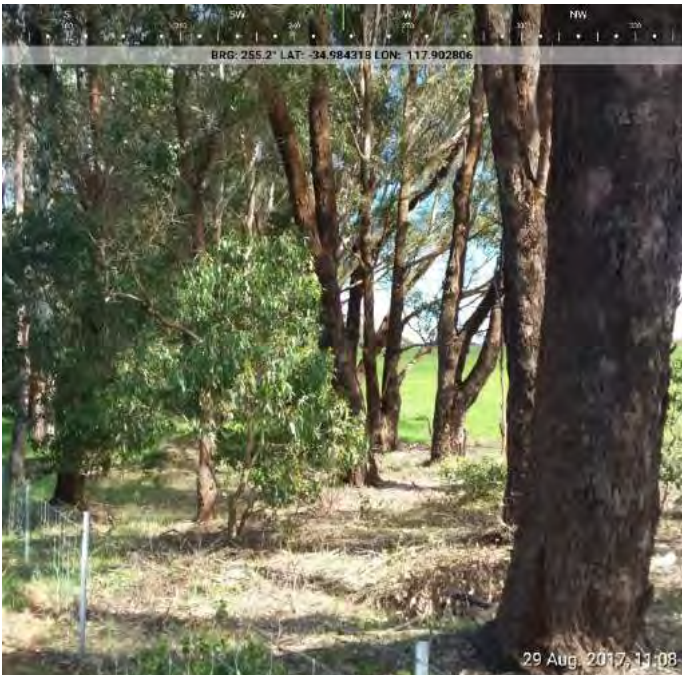
Plot	7	Classification or Exclusion Clause	Woodland Type B
			<p>Location: Located internal to the site in the south east.</p> <p>Separation distance: 0m</p> <p>Dominant species & description: Mixed planted eucalypts in south east area of site (internal).</p> <p>Average vegetation height: 18m.</p> <p>Vegetation Coverage: 10-30%.</p> <p>Available fuel loading: 15-25%</p> <p>Effective slope: Downslope >0-5 degrees.</p>

Photo Id 15: View of planted eucalypt trees south east of the subject site.


Plot	7	Classification or Exclusion Clause	Woodland Type B
			<p>Location: Located external to the site (north) in adjacent private properties.</p> <p>Separation distance: 33.5m.</p> <p>Dominant species & description: Jarrah and Marri open woodland, not multilayered.</p> <p>Average vegetation height: 18m.</p> <p>Vegetation Coverage: 10-30%.</p> <p>Available fuel loading: 15-25%</p> <p>Effective slope: Downslope >0-5 degrees.</p>

Photo Id 16: View of to the north from Terry Road to plot of Woodland in paddocks to the north.


Plot	8	Classification or Exclusion Clause	Forest Type A
			<p>Location: to the east in CoA managed reserve.</p> <p>Separation distance: 4-6m along trafficable firebreak.</p> <p>Dominant species & description: Jarrah, <i>Acacia</i>, <i>Melaleuca</i>, <i>Banksia</i>, Tea Tree, sedges and Grasstrees.</p> <p>Average vegetation height: 8m.</p> <p>Vegetation Coverage: >30-70%.</p> <p>Available fuel loading: 25-35t/ha.</p> <p>Effective slope: Upslope.</p>

Photo Id 17: View of Forest Type A to the east in CoA Managed Reserve.

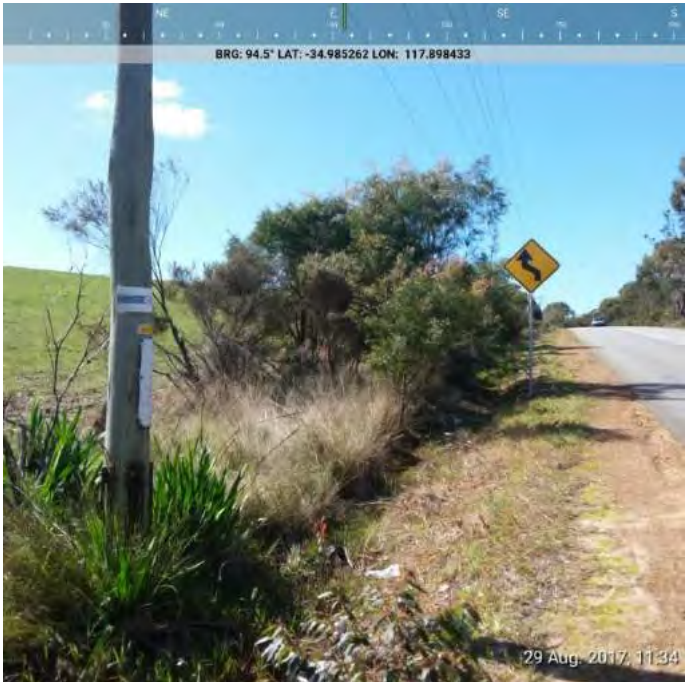
Plot	9	Classification or Exclusion Clause	Scrub Type D
			<p>Location: Along public road reserves under western powerlines where vegetation is trimmed to 3-4m.</p> <p>Separation distance: 0-15m depending on road reserve and side of road.</p> <p>Dominant species & description: <i>Casuarina</i>, Teatree, trimmed Eucalypts and Peppermints.</p> <p>Note: Vegetation trimmed under powerline.</p> <p>Average vegetation height: 3m.</p> <p>Vegetation Coverage: >30%.</p> <p>Available fuel loading: 25t/ha.</p> <p>Effective slope: Downslope >0-5 degrees.</p>

Photo Id 18: View along northern edge of Mercer Road Reserve. Trimmed vegetation under powerline.


Plot	9	Classification or Exclusion Clause	Scrub Type D
			<p>Location: Along public road reserves under western powerlines where vegetation is trimmed to 3-4m.</p> <p>Separation distance: 0-15m depending on road reserve and side of road.</p> <p>Dominant species & description: <i>Casuarina</i>, Teatree, trimmed Eucalypts and Peppermints.</p> <p>Note: Vegetation trimmed under powerline.</p> <p>Average vegetation height: 3m.</p> <p>Vegetation Coverage: >30%.</p> <p>Available fuel loading: 25t/ha.</p> <p>Effective slope: Downslope >0-5 degrees.</p>

Photo Id 19: View along northern edge of Terry Road Reserve. Trimmed vegetation under powerline (note tall trees in background associated with different plot).


Plot	10	Classification or Exclusion Clause	Woodland Type B
			<p>Location: Located in private properties to the south and north west of the subject site.</p> <p>Separation distance: 20m.</p> <p>Dominant species & description: Jarrah, Marri, Peppermints and <i>Casuarina</i> low open Woodlands, fuel reduced through grazing. Not multilayered.</p> <p>Average vegetation height: 10m.</p> <p>Vegetation Coverage: 10-30%.</p> <p>Available fuel loading: 15-25t/ha.</p> <p>Effective slope: Upslope.</p>

Photo Id 20: View of to the south west off Mercer road into adjacent property to the south. Eucalypt trees grazed by stock.


Plot	11	Classification or Exclusion Clause	Scrub Type D
		<p>Location: Along public road reserves under western powerlines where vegetation is trimmed to 3-4m.</p> <p>Separation distance: 0m.</p> <p>Dominant species & description: <i>Casuarina</i> trimmed under the powerline, not exceeding 3m.</p> <p>Note: Vegetation trimmed under powerline</p> <p>Average vegetation height: 3m.</p> <p>Vegetation Coverage: >30%.</p> <p>Available fuel loading: 25t/ha.</p> <p>Effective slope: Upslope.</p>	

Photo Id 21: View of trimmed casuarina trees along Mercer Road.

COMMENTS ON VEGETATION CALCULATIONS:

- Distances from vegetation were made based on surface fuels to edge of lot (subject site) boundary;
- Effective slopes were measured in the field using a Nikon Forestry Pro and represented on the respective plots;
- Method 1 (AS3959-2009) Simplified procedure was used for vegetation classification and BAL Assessment process;
- All vegetation was classified within the subject site and within 150m of the lot boundaries to AS3959 Table 2.3; and
- The perimeter of the vegetation was measured using field GPS and notations on field GIS maps.

COMMENTS ON BAL CALCUALTIONS

- Method 1 (AS3959-2009) Simplified procedure was used for the BAL Assessment process;
- The BAL Contour Plan was prepared by an Accredited Level 2 Bushfire Planning Practitioner (BPAD30794); and
- The BAL Contour Map has been prepared in accordance with Department of Planning (WAPC) Guidelines for Planning in Bushfire Prone areas Vers 1.2 August 2017
- Assessment based on draft Local Structure Plan as supplied by Edge Planning & Property dated 23/10/2017.
- Subject site is located in a Bushfire Prone Area, See Appendix 2 (Slip, 2016 & 2017).
- APZ areas will be maintained in a Low Fuel state as per AS3959-2009 Exc Clause 2.2.3.2 (f). Grasses <100mm in height and forest areas fuel reduced to <2T/ha. Refer to Appendix 3.
- Buildings are to be placed in BAL 12.5, BAL 19 and BAL 29 zones.



REPORT ITEM DIS093 REFERS

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 Kathryn Kinnear, Bio Diverse Solutions
 Accreditation No: BPAD30794
 Jurisdiction: Level 2 - WA



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 Australia
 Tel: 08 9842 1575
 Fax: 08 9842 1575



Overview Map Scale 1:100,000

- Legend**
- Subject Site
 - 150m Assessment Boundary
 - Cadastre
 - 5m Contours
 - BAL29 Separation Distance
- BAL Contours**
- BAL-FZ
 - BAL-40
 - BAL-29
 - BAL-19
 - BAL-12.5
 - BAL-LOW

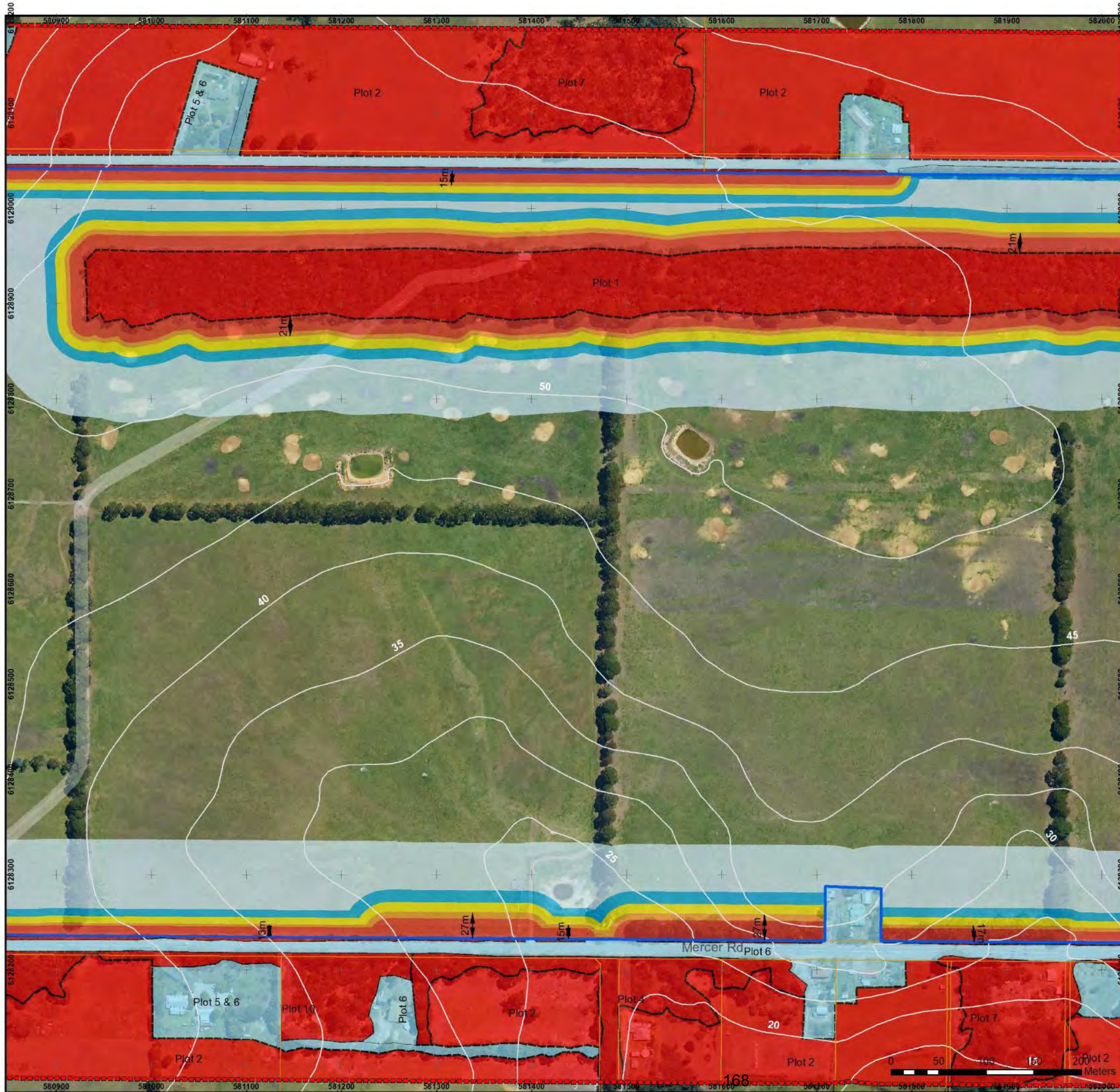
Scale
 1:4,000 @ A3
 GDA MGA 94 Zone 50

Data Sources
 Aerial Imagery: SLIP Virtual Mosaic WMS Service, Landgate 2017
 Cadastre, Relief Contours and Roads: Landgate 2017
 IRIS Road Network: Main Roads Western Australia 2017
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CLIENT Edge Planning & Property
 Steve Thompson
 Lot 10 Chesterpass Road & Lot 521 Mercer Road
 Ardess Warrenup, WA 6330

Figure 2.1. BAL Contour Plan

BAL Assessor KK	QA Check KK	Drawn by SA
STATUS FINAL	FILE EPP004	DATE 28/09/2017



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Legend

- Subject Site
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- BAL-19
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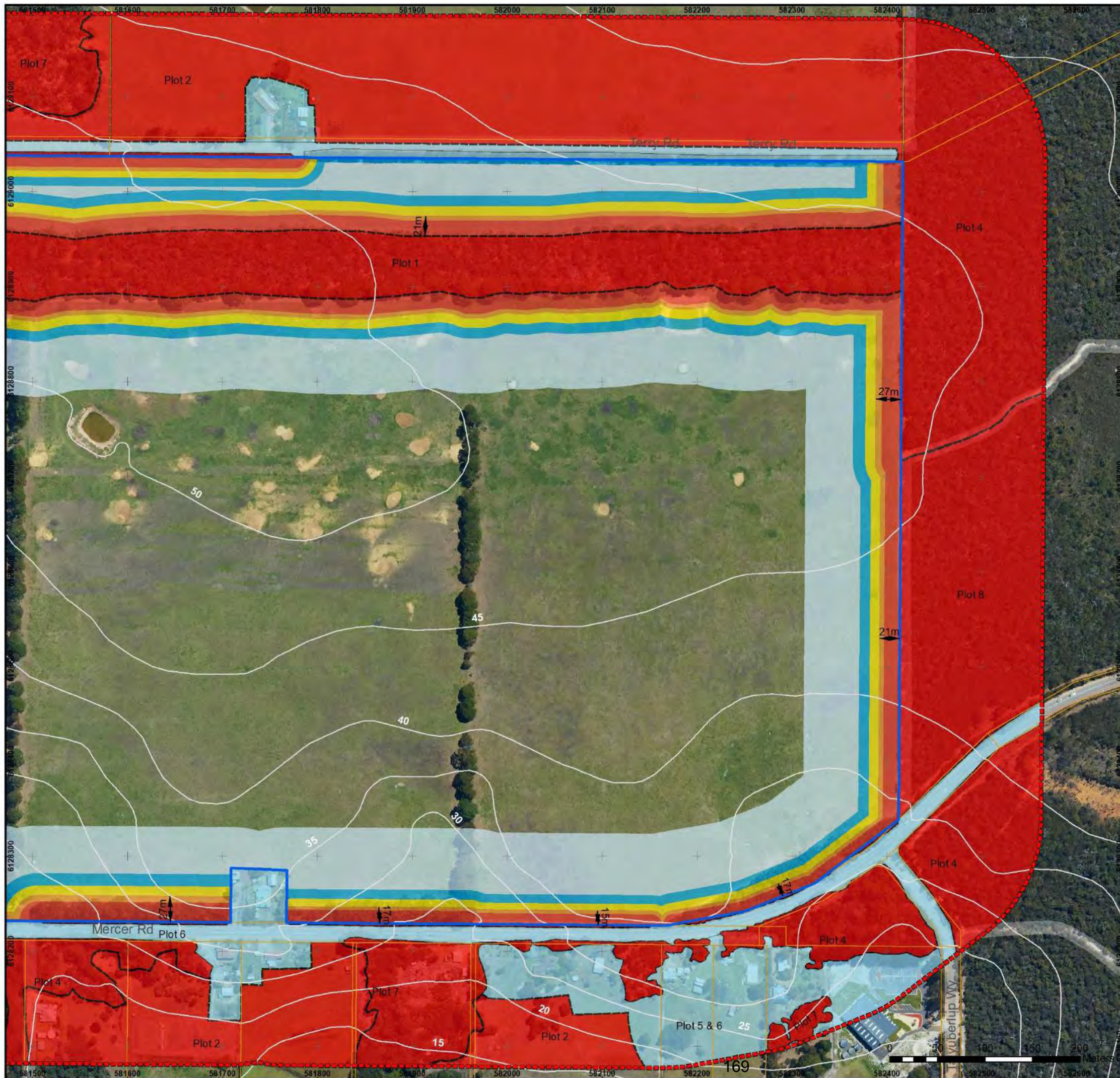
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 GDA MGA 94 Zone 50

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 Overview Map: World Topographic map service, ESRI 2012

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Figure 2.2. BAL Contour Plan

BAL Assessor KK	QA Check KK	Drawn by SA
STATUS FINAL	FILE EPP004	DATE 28/09/2017



REPORT ITEM DIS093 REFERS

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Legend

- Subject Site
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 - BAL-12.5
 - BAL-LOW



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CLIENT Edge Planning & Property
 Steve Thompson
 Lot 10 Chesterpass Road & Lot 521 Mercer Road
 Ardress Warrenup, WA 6330

Figure 2.3. BAL Contour Plan

BAL Assessor KK	QA Check KK	Drawn by SA
STATUS FINAL	FILE EPP004	DATE 28/09/2017

SECTION 3: DISCLAIMER

The recommendations and measures contained in this assessment report are based on the requirements of the Australian Standards 3959-2009 – Building in Bushfire Prone Areas, WAPC State Planning Policy 3.7 (WAPC, 2015), WAPC Guidelines for Planning in Bushfire Prone Areas (WAPC, 2015), and CSIRO’s research into Bushfire behaviour. 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.

AS3959-2009 disclaimer: It should be borne in mind that the measures contained within this Standard (AS3959-2009) cannot guarantee that a building will survive a bushfire event on every occasion. This is substantially due to the unpredictable nature and behavior of fire and extreme weather condition.

(AS3959, 2009)

Building to AS3959-2009 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.

SECTION 5: Certification

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 3959-2009 (Incorporating Amendment Nos 1, 2 and 3) and the Guidelines for Planning in Bushfire Prone Areas Ver 1.2 (WAPC, 2017).

SIGNED, ASSESSOR:  DATE:

Kathryn Kinnear, Bio Diverse Solutions
 Accredited Level 1 BAL Assessor
 Accredited Level 2 Bushfire Practitioner (Accreditation No: BPAD30794)



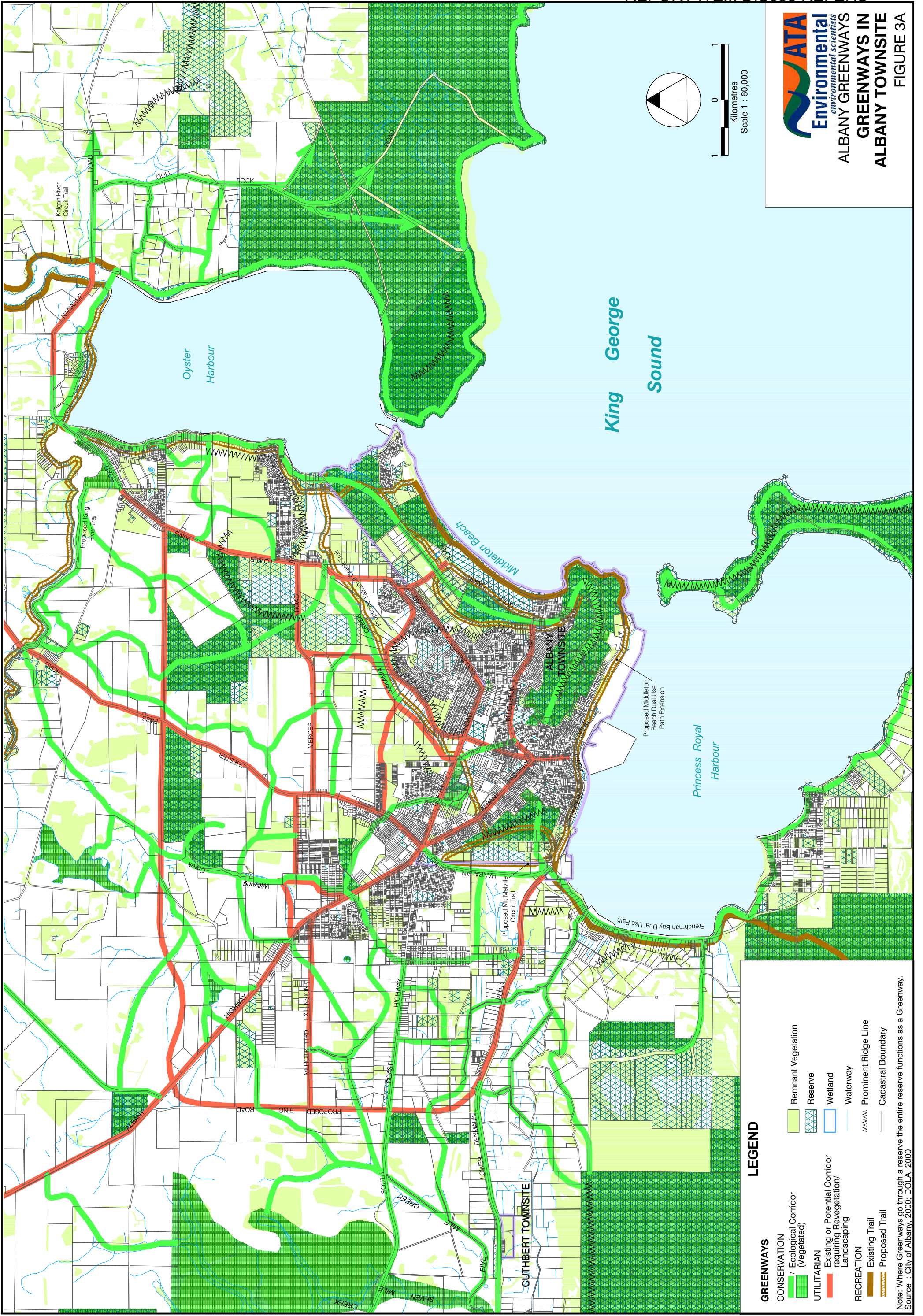
References

Western Australian Planning Commission (WAPC) (2015) Guidelines for Planning in Bushfire Prone Areas. Western Australian Planning Commission and Department of Planning WA, Government of Western Australia.

Western Australian Planning Commission (WAPC) (2017) State Planning Policy 3.2 Planning in Bushfire Prone Areas Vers 1.2. Department of Planning WA and Western Australian Planning Commission.

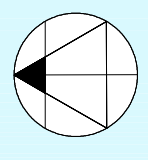
State Land Information Portal (SLIP) (2016, 2017) map of Bushfire Prone Areas. Office of Bushfire Risk management (OBRM) data retrieved from:
<https://maps.slip.wa.gov.au/landgate/bushfireprone/>

APPENDIX 10



ATA
Environmental
environmental scientists
ALBANY GREENWAYS IN
ALBANY TOWNSITE

FIGURE 3A



1
 0
 1
 Kilometres
 Scale 1 : 60,000

LEGEND

- | | |
|-------------------------------------------------------------------|----------------------|
| GREENWAYS | Remnant Vegetation |
| CONSERVATION | Reserve |
| Ecological Corridor (Vegetated) | Welland |
| UTILITARIAN | Waterway |
| Existing or Potential Corridor requiring Revegetation/Landscaping | Prominent Ridge Line |
| RECREATION | Cadastral Boundary |
| Existing Trail | |
| Proposed Trail | |

Note: Where Greenways go through a reserve the entire reserve functions as a Greenway.
 Source : City of Albany, 2000; DOLA, 2000

APPENDIX 11



Local Water Management Strategy
Supporting the Ardess-Walmsley Local Structure Plan

Prepared by Edge Planning & Property for Ardess 1607 Pty Ltd and Ten Year Developments Pty Ltd

www.edgeplanning.com.au

January 2018

REPORT ITEM DIS093 REFERS

Local Water Management Strategy - Lot 10 Chester Pass Road & Lot 521 Mercer Road, Walmsley

Executive Summary

This Local Water Management Strategy (LWMS) has been prepared to support the *Ardess-Walmsley Local Structure Plan* and the associated Scheme Amendment No. 26 to the *City of Albany Local Planning Scheme No. 1 (LPS1)*. The Structure Plan provides a planning framework to Lot 10 Chester Pass Road, Walmsley and Lot 521 Mercer Road, Walmsley (the 'site') to facilitate proposed residential, light industrial, education/community and public open space (POS) uses. Amendment 26 proposes a planning rule change to permit transport depots in the Ardess Industrial Estate (Lot 10 Chester Pass Road). The Structure Plan site is shown in Attachment 1.

This LWMS is intended to:

- inform the planning and design process;
- provide an overview of water resources on the site; and
- present a recommended approach for total water cycle management with an emphasis placed on water sensitive urban design (WSUD) which is appropriate for the site's context, the site's characteristics, risk, available and expected servicing and the downstream environment.

The development is considered a low risk to water resources given the site's location, environmental characteristics, proposed servicing and the approach to development. The LWMS concludes that the site is capable of supporting residential and light industry subdivision/development and is able to achieve appropriate water management outcomes. An Urban Water Management Plan (UWMP) is required to support residential subdivision, however not UWMP is required to support light industrial subdivision. There will however be a requirement for engineering drawings and specifications to be submitted for the light industrial subdivision and approved by the City which are generally consistent with the LWMS which adopt WSUD.

Key strategies and initiatives proposed for the subdivision/development are summarised below:

Water sustainability initiatives

- Provision of awareness raising material on water saving measures and benefits for new residents and business occupants including Waterwise and nutrient wise gardens.
- Conservation of potable water through utilising water-efficient fixtures and fittings and encouraging water wise practices by households.
- Encouraging all new dwellings, larger outbuildings and light industrial operations to be provided with a rainwater tank.
- Promoting greywater for non-edible garden irrigation.
- Connecting all lots to the reticulated water supply.
- Capturing stormwater and reusing it to irrigate POS.

Stormwater management

Managing stormwater for the site includes both structural and non-structural measures. These include:

- adopting WSUD which maintain the existing water balance, promotes retention, at source infiltration and treatment of stormwater before it is discharged to receiving water bodies;
- post development flows to be as close as possible to the pre-development flow;
- treating stormwater on lots for storm events up to the 1 in 1 year, 1 hour average recurrence interval (ARI) event including through rainwater tanks and soakwells;
- treating stormwater in road reserves at or near to the source for the 1 in 5 year ARI event through swales;
- creating detention basins to intercept and store flows from major storm events;
- leaving the seasonal watercourse undeveloped and not obstructed;
- accommodating major storm events in road reserves and POS;
- ensuring that buildings are setback from the seasonal watercourse, with buildings raised above the natural ground level and where possible above roads;
- integrating stormwater treatment into the landscape;

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Local Water Management Strategy - Lot 10 Chester Pass Road & Lot 521 Mercer Road, Walmsley

- creating a 'living stream' adjoining the seasonal watercourse on the site;
- providing suitable conditions for urban development (dwellings and light industry);
- adopting a Waterwise and nutrient wise approach to gardens;
- undertaking sediment and litter control and construction management; and
- providing educational material to prospective purchasers of lots and to builders.

Groundwater management

- Residential development to be connected to reticulated sewerage.
- Suitably designed and located on-site effluent disposal systems for light industrial development.
- Adopting a treatment train approach to runoff and infiltration through the use of WSUD.
- Promoting nutrient wise gardens and minimising the use of fertilisers.

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Local Water Management Strategy - Lot 10 Chester Pass Road & Lot 521 Mercer Road, Waalmsley

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1. INTRODUCTION

1.1 Purpose

For the site shown in Attachments 1 and 2, this LWMS is intended to:

- inform the planning and design process;
- provide an overview of water resources on the site; and
- present a recommended approach for total water cycle management with an emphasis placed on water sensitive urban design (WSUD) which is appropriate for the site's context, the site's characteristics, risk, available and expected servicing and the downstream environment.

The objective of this LMWS is to achieve water management outcomes which are consistent with State and local requirements.

1.2 Total water cycle management – principles and objectives

State Planning Policy 2.9 Water Resources outlines the key principles of integrated water cycle management as:

- consideration of all water resources, including wastewater, in water planning;
- integration of water and land use planning;
- the sustainable and equitable use of all water sources, having consideration of the needs of all water users, including the community, industry and the environment;
- integration of human water use and natural water processes; and
- a whole of catchment integration of natural resource use and management.

Total water cycle management 'recognises that water supply, stormwater and sewage services are interrelated components of catchment systems and therefore must be dealt with using a holistic water management approach that reflects the principles of ecological sustainability' (Department of Water: 2007).

WSUD objectives set out in *State Planning Policy 2.9 Water Resources* are to:

- manage a water regime;
- maintain and, where possible, enhance water quality;
- encourage water conservation;
- enhance water-related environmental values; and
- enhance water-related recreational and cultural values.

The objectives for managing stormwater as stated in the *Stormwater Manual for Western Australia* (Department of Water: 2007) are:

- Water Quality: to maintain or improve the surface and groundwater quality within the development areas relative to predevelopment conditions.
- Water Quantity: to maintain the total water cycle balance within the development areas relative to the predevelopment conditions.
- Water Conservation: to maximise the reuse of stormwater.
- Ecosystem Health: to retain natural drainage systems and protect ecosystem health.
- Economic Viability: to implement stormwater management systems that are economically viable in the long term.
- Public Health: to minimise the public risk, including risk from injury or loss of life, to the community.
- Protection of Property: to protect the built environment from flooding and waterlogging.
- Social Values: to ensure that social, aesthetic and cultural values are recognised and maintained when managing stormwater.
- Development: to ensure the delivery of best practice stormwater management through planning and development of high quality developed areas in accordance with sustainability and precautionary principles.

1.3 Planning framework

There are a number of State, regional and local documents that set the framework for land and water planning including *State Planning Policy 2 Environment and Natural Resources Policy* (2003), *State Planning Policy 2.9 Water Resources* (2006), *State Water Plan* (2007), *Better Urban Water Management* (2008), *Stormwater Management Manual for Western Australia* (2007), *Liveable Neighbourhoods* (2007), *Great Southern Water Strategy* (2014) and LPS1. Further details are set out in the Structure Plan report. The LWMS has been prepared to address the objectives outlined in the planning framework.

Of particular significance to the site is LPS1 where the site is zoned 'Light Industry' and 'General Agriculture'. The *Albany Local Planning Strategy* allocates Lot 521 Mercer Road as 'Future Urban'.

1.4 Previous studies

No district water management strategy has been prepared for the area. A LWMS was prepared for the adjoining *Warrenup-Walmsley Local Structure Plan*.

In support of the LWMS, Bio Diverse Solutions prepared an Environmental Assessment Report and Land Capability Assessment to guide future environmental management for the Structure Plan and future subdivision/development of the site (see Attachment 3).

2. PROPOSED DEVELOPMENT

2.1 Ardess-Walmsley Local Structure Plan

A Structure Plan has been prepared (see Attachment 4) to provide a framework for the site and to guide the subdivision and development. The Structure Plan proposes an extension of the Ardess Industrial Estate, a residential area which includes a range of residential densities, a primary school and three POS areas. The proposed light industrial area will require on-site effluent disposal, where-as the residential area will be developed once reticulated sewerage has been established in the area.

The Structure Plan responds to the site's context, opportunities and constraints and the planning framework. The rationale behind the Structure Plan includes to take account of site characteristics, soil types, conserve **the site's** remnant native vegetation, and to provide lots that are capable and suitable of accommodating residential and light industrial development.

The development will be staged. The first stage is expected to be adjoining the existing Ardess Industrial Estate to reduce upfront servicing costs. The timing, location and configuration of lot releases will consider demand, feasibility and the location and capacity of services.

The Structure Plan provides context to Amendment 26.

2.2 Scheme Amendment No. 26

Scheme Amendment No. 26 proposes a planning rule change to permit transport depots in the Ardess Industrial Estate (Lot 10 Chester Pass Road).

3. DESIGN CRITERIA

3.1 Overview

The LWMS set out the approach to managing and conserving the total water cycle for this development and to integrate water and land use planning. The design criteria adopted for this LWMS is based on the design objectives outlined in *Better Urban Water Management* (2008). The design criteria are set out under the headings of water conservation, water quantity management, water quality management, and commitment to best management practice. Strategies to address the design criteria are set out later in this report.

The LWMS is used to provide information on the potential impact of development on water resources. The LWMS will consider the management of stormwater for the development for different ARI events.

3.2 Water conservation

The LWMS considers water resources related to the site and the development and seeks to achieve the sustainable management of all aspects of the water cycle. This includes minimising potable water in and outside the home/businesses and using reticulated potable water as efficiently as possible. The principles are:

- minimising total water use to address *State Water Plan* targets; and
- substituting drinking quality water with fit-for-purpose water for non-drinking water uses.

3.3 Water quantity management

The principle is that post development stormwater discharge volumes and peak flows are to be maintained relative to the existing conditions. This will be achieved through:

- ecological protection - the post development discharge volume and peak flow rates will be maintained relative to pre-development conditions on the site for the 1 in 1 year ARI event;
- flood management - manage the catchment run-off for up to the 1 in 100 year ARI event in the development area to pre-development peak flows; and
- protect infrastructure and assets from inundation and flooding – residential and light industry subdivision/development can increase impervious areas without appropriate management, and development can result in increased volumes and flows of surface runoff. This in-turn has the potential to contribute to localised flooding and inundation. The location of development, detailed engineering design and the construction of buildings are to suitably address localised flooding and inundation.

3.4 Water quality management

The principles are to:

- maintain surface and groundwater quality at pre-development levels through adopting WSUD; and
- restore environmental assets where possible and practical.

3.5 Commitment to best management practice

The planning framework sets out a requirement to address WSUD and strive towards best management practice. There are opportunities ranging from a structure plan scale to an individual lot scale along with structural and non-structural strategies. A combination of strategies is required to achieve required outcomes. Additionally, best management practice strategies will vary based on matters including site characteristics and the development proposal. Adopting WSUD and best management practice strategies will reduce risks of localised flooding on development and infrastructure while maximising the potential for stormwater to be treated as a resource.

The principles are:

- implement controls at or near the source to prevent pollutants entering the system and/or treat stormwater;
- installing in-transit measures to treat stormwater and mitigate pollutants that have entered the conveyance system; and
- implement 'end-of-system' controls to treat stormwater, addressing any remaining pollutants prior to discharging to receiving environments.

4. EXISTING ENVIRONMENT

4.1 Study area

The Structure Plan area is located approximately 5 kilometres north of the Albany central area in the locality of Waalmsley (see Attachment 2). The site is generally bordered by Chester Pass Road, Terry Road, Reserve 27179 and Mercer Road. Attachment 5 shows the context plan.

The site (see Attachment 1) is 178.3348 hectares in area. Lot 10 Chester Pass Road is 25.7335 hectares in area and Lot 521 is 152.6013 hectares in area.

The site consists of multiple land uses. Lot 10 Chester Pass Road comprises the Ardess Industrial Estate and cleared land used to keep current and old farm machinery and sand/gravel piles. The industrial area comprises of sheds, office buildings, car parks, an internal road network and cleared areas for future development. Businesses within the industrial area include Albany Freight Lines, Designer Dirt (landscaping supplies) and Ardess Nursery. The Ardess Industrial Estate is subject to various leases.

Lot 521 Mercer Road encompasses the majority of the site and comprises predominantly cleared rural land used for grazing cattle. There are no dwellings on Lot 521 Mercer Road. There are two small to medium sized sheds (one used to store hay and farm machinery and the other an old shearing shed), a set of cattle yards and a strip of remnant vegetation in the northern part of Lot 521.

4.2 Climate

The Albany area is characterised by a Mediterranean climate with warm dry summers and cool wet winters. Rainfall data is from the nearby Bureau of Meteorology (BoM) Albany Station (Site No. 9500).

The long-term average annual rainfall is 929 mm (1877 to 2016). This average has decreased between 2000 to present, to an average annual rainfall of 879 mm, reflecting a 5% reduction compared to the long-term average, consistent with a general trend in the South West of WA. The total rainfall distribution has also altered, with a reduction of average winter monthly rainfall, but no significant reduction in average summer monthly rainfall.

Based on the climatic characteristics of the district, climate is not considered to be a limiting factor to development.

4.3 Landform and topography

Overall, the site has a gentle to moderate gradient. Topography over the site is undulating ranging from a high point of 51m AHD in the central northern portion of the site to a low point of 22m AHD in the southern central portion of the site. There is a ridge that runs from the central northern portion of the site to the south-west corner.

4.4 Aboriginal heritage sites

The Department of Planning, Lands and Heritage's database has no known sites of Aboriginal cultural significance on the site. While noting this, land developers have an obligation under the *Aboriginal Heritage Act 1972* to protect places and objects in Western Australia that are important to Aboriginal people because of the connections to their culture.

4.5 Environmental assets

A) Overview

To inform the LWMS, an environmental assessment was carried out by Biodiverse Solutions (Attachment 3).

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It is expected the development will have a limited environmental impact given the site is generally cleared, remnant native vegetation will be conserved, residential lots will be connected to reticulated sewerage, light industrial subdivision will 1 hectare and above with effluent disposal systems to be appropriately designed and located, and stormwater will be appropriately managed. There are also opportunities for revegetation including enhancing the seasonal watercourse on the site.

B) Vegetation and flora

There are two areas of remnant vegetation within the site. A broad scale vegetation survey of these two areas was conducted by Bio Diverse Solutions on 29 August 2017 (see Attachment 3). The strip of vegetation running parallel with the northern boundary of the site (approximately 13 hectares in size) comprises Low Open Jarrah/Marri/Sheoak Forest in good condition. The small area of remnant vegetation in the south-east corner comprises mixed Eucalypt Forest in a degraded condition.

A search of publicly available databases through WA Atlas, Nature Map, and EPBC Protected Matter Search Tool indicates that no threatened, priority or declared rare flora is present on the site, or within the surrounding Nature Reserves and remnant vegetation. There are no Ramsar listed sites, Wetlands of National Importance or Declared Rare or Priority species of vegetation. Nevertheless, the remaining native vegetation has value and it is proposed to retain these areas.

There are opportunities to connect the bush corridor on Lot 521 Mercer Road to the north and west. This includes planting native vegetation on the western section of Terry Road adjoining the site and opportunities through the adjoining *Warrenup-Walmsley Local Structure Plan* to provide revegetation in drainage lines, as part of POS and within relevant road reserves.

Bio Diverse Solutions advise 'all efforts should be made to conserve existing native vegetation. There is support however to clear, as required, replanted vegetation which is Blue gums given they are generally unsuitable in an urban area.'

The following management measures are proposed to reduce the likelihood of impacts to vegetation and flora and to retain the key existing biological values of the site:

- remnant vegetation will be retained within the vegetation strip in the north-east of the site and in the south-east corner of the site. Inclusion of the native vegetation within POS will provide the most effective way of managing the conservation values of the native vegetation;
- access crossings within the vegetation strip will be limited to facilitate retention and natural regeneration of vegetation and to prevent adverse impacts particularly for transient fauna;
- there will be revegetation using native species, where currently there is very little native species and diversity, in the two southern areas of POS along with other areas to promote fauna habitat, flora diversity and biodiversity;
- rehabilitating waterways/drainage lines to create a 'living stream' through revegetation and as required fencing; and
- develop a greening strategy to increase green canopy and green spaces.

C) Fauna and habitat

The majority of the site has been cleared. As a result, fauna habitat has largely been removed. The only potentially significant fauna habitat on site is within the two areas of remnant vegetation.

Within the bush corridor, in the northern section of Lot 521, there is the potential for black cockatoo foraging, roosting and breeding habitat, and any impacts on these habitats should be minimised.

The Department of Biodiversity Conservation and Attractions have recently advised that vegetation in this bush corridor will support roosting Black Cockatoos species that are listed as threatened under the *State Wildlife Conservation Act 1950* and the *Commonwealth's Environmental Protection and Biodiversity Conservation Act 1999*. Additionally, significant areas of native vegetation are located in Crown reserves to the east of the site that provide habitat for cockatoo and other threatened and non-threatened species along with landscape connectivity. The Department of Biodiversity Conservation and Attractions encourage the retention of as much of the strip of vegetation as possible on Lot 521 to support roosting habitat and landscape connectivity in the form of 'stepping stones'.

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To reduce likely impacts to native fauna, the bush corridor will be retained through maintaining the strip of remnant vegetation in the north of the site and the native vegetation in the south-east corner as POS. Additionally, native vegetation species will be used in areas of POS to promote habitat for native fauna species.

D) Wetlands and lakes

There are no protected wetlands or Environmental Protection Policy Lakes within the site.

E) Acid sulphate soils

Acid Sulphate Soil (ASS) mapping indicates the site is not situated on any known ASS. There is however a section of high to moderate risk of ASS occurring within 3m of natural soil surface to the south of the site on Mercer Road.

There is a low risk of acid sulphate soils on the site. This is confirmed by the geotechnical investigation undertaken by Great Southern Geotechnics who conclude that the risk of exposing or disturbing potential acid sulfate soil is negligible given soil types.

The final fill levels and excavation requirements of the future subdivision will determine if an ASS and Dewatering Management Plan is required to be prepared prior to subdivision. If required, the management plan will be prepared to satisfy the Department of Water and Environmental Regulation (DWER) and will outline the soil management measures, the groundwater and dewatering effluent monitoring measures and the contingency management measures required to minimise any environmental impacts.

F) Contamination

A search of the DWER's Contaminated Sites Database was conducted to determine locations of any known or suspected contaminated sites in the vicinity of the site. The search revealed that no known or suspected contaminated sites occur within the site.

G) Sedimentation and erosion

There is limited evidence of erosion on the site.

4.6 Surface water and drainage

There are no major naturally existing drainage networks or water bodies within the site. There is one minor seasonal watercourse situated in the north-western section of the site. This area will need to be managed sensitively in relation to stormwater planning within the site.

Hydrographic Sub-catchments (DoW, 2008) show the site to be within two surface water sub-catchments; with the northern and western portion of the site discharging to Willyung Creek to the north of the site and the central and southern portion of the site discharging to Yakamia Creek to the south of the site (see Attachment 7). Both the Willyung Creek and Yakamia Creek sub-catchments form part of the Oyster Harbour/Kalgan/King Catchment ultimately discharging to Oyster Harbour. These catchments are not proclaimed surface water areas.

There are several man-made dams across the site, which are surface water fed and used for livestock drinking water.

4.7 Geology and soils

Regolith of WA (Department of Mining, 2009) mapping indicates that soils across the site are classified as sandplain, mainly Aeolian and include some residual deposits.

A Geotechnical Investigation was conducted on the 29 August 2017 by Great Southern Geotechnics under later winter conditions. The Geotechnical Investigation is included in Attachment 3. The investigation included both soil analysis and measuring of water table. The soil testing was conducted to assess the

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suitability of the site for the proposed residential and light industrial development including onsite effluent disposal for the extension of the industrial area.

Soil testing showed that soils across the site comprised predominately of a silty sand topsoil, over sandy gravel (with a layer depth varying from 200 - 700mm), over sandy clay to the depth of the hole.

Permeability testing was conducted by Liquid Labs WA as part of the Geotechnical Investigation. Permeability at both borehole site TP3 and TP10 is considered to be extremely low this is consistent with the soil type (sandy clay) encountered at these locations.

Phosphorous Retention Index (PRI) results across the site varied consistent with soil type. The sandy clays found across the majority of the site were found to have a very high PRI and therefore a very high ability to fix nutrients and heavy metals. The sandy gravel found at TP1 also had an extremely high PRI, particularly for a sand, whereas the light grey sand found at TP6 had a low PRI and therefore a low ability of fixing nutrients and heavy metals.

Ten boreholes were constructed within the site to a depth of 2.3 metres and left open for a minimum of 1 hour to identify water table present. No groundwater was encountered.

As set out in Attachment 3, a Land Capability Assessment of the site was conducted by Bio Diverse Solutions. The overall capability of the site supporting the Urban Development land use was rated as highly capable for Mapping Unit 1 and very highly capable for Mapping Unit 2. The overall capability of the site supporting the Light Rural Industrial is rated as highly capable for Mapping Unit 1. Mapping Unit 2 was not encountered at the location of the proposed Light Rural Industrial land use. The degree of limitations for both Urban Development and Light Rural Industry for Mapping Unit 1 and Mapping Unit 2 is low to very low.

Accordingly, the site is capable of supporting urban development and has similar soil types and hydrology to the surrounding urban areas. The soils have good foundation stability and any inconsistencies (e.g. lateritic cap rock) can be managed via design and normal construction techniques.

4.8 Groundwater

Australian Geoscience Mapping and Department of Water 250K Hydrogeological mapping places the site **within the; 'Tertiary - Cainozoic - Phanerozoic (TPw) period: Plantagenet Group - siltstone, spongolite; minor sandstone, peat, and conglomerate.'** The aquifer is a **'sedimentary aquifer with intergranular porosity – extensive aquifers, major groundwater resources.'** (DoW, 2015).

As set out in section 4.7, a Geotechnical Investigation was conducted on the 29 August 2017 by Great Southern Geotechnics under late winter conditions. The investigation included measuring of water table. Ten boreholes were constructed within the site to a depth of 2.3 metres. Groundwater was not observed in any of the boreholes indicating there is no likely groundwater present beneath the site to a depth of 2.3 metres. The geotechnical investigation was undertaken in accordance with Australian Standards.

The site is not located within a Public Drinking Water Source Protection Area. The site is within an unproclaimed groundwater area under the *Rights in Water and Irrigation Act 1914*.

4.9 Existing infrastructure and constraints to design

A) Servicing overview

The subdivision/development of the site as advocated by the Structure Plan will require the extension and upgrading of essential civil infrastructure including reticulated water and reticulated sewerage to residential development. There is a need for more detailed investigations and design to ensure there is capacity of these services for the subdivision/development. The capacity of infrastructure to service future subdivision will need to be determined prior to the issue of titles.

B) Wastewater disposal

The site is located in a Sewerage Sensitive Area as set out in in the draft *Government Sewerage Policy*.

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Residential development will be serviced with reticulated sewerage. Existing and future light industrial the subdivision/development will be serviced by on-site effluent disposal, with a minimum lot size of 1 hectare. The geotechnical assessment (Attachment 3) confirms site capability for onsite effluent disposal. There is a need for the development to comply with the draft *Government Sewerage Policy*. Any on-site wastewater disposal system is required to be located and designed to the satisfaction of the Department of Health and the City. This is given statutory backing through LPS1.

C) Water supply

Lot 10 Chester Pass Road is connected to the reticulated (scheme) water network.

Proposed residential and light industrial lots will be connected to the reticulated water system.

At the subdivision stage, the developer's consulting engineer will approach the Water Corporation for information about system capacity and constraints. Proposed lots are required to have sufficient pressure to meet Water Corporation's licence conditions and it's Customer Charter.

In addition to the reticulated water scheme, there are opportunities for additional water supply provision such as future landowner's installing rainwater tanks. The use of rainwater tanks is supported and this will complement the reticulated water supply.

D) Fire hydrants

Fire hydrants will be installed on the site at the subdivision stage.

E) Stormwater

Current drainage conditions are limited to the Ardess Industrial Estate which include open drains. It is proposed that stormwater drainage will be managed through on-site reuse, detention and treatment in accordance with WSUD principles which are outlined in section 6.

4.10 Existing environment conclusions

As outlined in section 4, the site has minimal environmental assets and is considered suitable and capable of accommodating residential and light industry subdivision/development. Key considerations, as part of future detailed design, include:

- conserving remnant native vegetation;
- effectively managing stormwater using WSUD;
- there is a need to extend services including reticulated water; and
- enhancing the seasonal watercourse in the north-west section of the site.

5. WATER SUSTAINABILITY INITIATIVES

5.1 Overview

It is desirable to reduce water demand in general and scheme water demand in particular for the development where possible and practical. The *State Water Plan (2007)* has set a target to reduce annual household use of scheme water in Perth to less than 100 kilolitres (kL) per person (page 61), while *Better Urban Water Management* has a target of not more than 40-60 kL per person per year for scheme water. These targets have been adopted for the development.

The *Perth Residential Water Use Study 2008/09* (Water Corporation: 2010) found that the average Perth household (2.4 people) water use was 255kL per annum.

The target water usage per household for use inside and outside dwellings is to 240kL per annum. The domestic irrigation demand could be reduced further if landscaping was redesigned and if the amount of lawn is minimised.

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A range of water savings can be made by adopting Waterwise practices as part of future development as outlined below.

The main water use initiatives rely on individual landholders. The best way is not to mandate the water saving devices but rather to encourage prospective purchasers on water sustainability opportunities.

5.2 Drinking water

Reticulated water will be supplied to all lots. The reticulated water scheme will be operated by Water Corporation. Accordingly, scheme water will be from existing water sources which will provide the development with a potable water supply.

Water efficiency is part of Water Corporation's 'business as usual' approach and is enabled through the use of technology and by changing behaviour to use less water. The Western Australian Government has introduced a range of measures to ensure that new houses built in Western Australia meet minimum standards for energy and water efficiency. The 5 Star Plus building standards, introduced in September 2007, are based around two new building codes, the *Energy Use in Houses Code* and the *Water Use in Houses Code* and help to improve the energy and water efficiency of new homes. The *Water Use in Houses Code* requires:

- all tap fittings must be a minimum 4 stars Water Efficiency Labelling and Standards scheme (WELS) rated;
- all showerheads must be a minimum 3 stars WELS rated; and
- all sanitary flushing systems must be a minimum 4 stars WELS rated dual flush.

These ratings should be reviewed as more efficient appliances become available.

5.3 Fit-for purpose use

A) Rainwater

While noting the development will be connected with scheme water, rainwater tanks will be encouraged to be installed on all lots with water available for internal and external use. It is highlighted that the installation of rainwater tanks is the responsibility of the land owner.

Rainwater tanks provide a range of benefits including reducing use of the reticulated water supply and managing stormwater across the site (by detaining or retaining roof runoff). Captured rainwater can be used to supply in-house requirements and/or used outdoors including on gardens.

Landowners and business operators will be encouraged to install rainwater tanks to reduce the amount of water consumption from the water mains. Additionally, owners will be encouraged to install fittings to ensure the captured rainwater can service indoor and/or outdoor purposes. For instance, the installation of a 3,000 litre rainwater tank could potentially capture approximately 29kL per annum for each household's usage.

Water quality from rainwater tanks is generally considered to be of a high standard if regular maintenance is undertaken. This includes the installation of first flush diverters, prevention of access to any vermin or disease vectors, filters to minimise the entry of large particles and leaves, regular de-sludging to avoid a build-up of sediments at the base of the tank and regular inspection and maintenance of gutters and downpipes.

With appropriate maintenance, it is considered that the water quality from rainwater tanks should be of a sufficient standard to be used for non-potable in-house use without further treatment. With further treatment, and subject to City approval, rainwater is expected to be suitable for potable use.

B) Groundwater

Groundwater abstraction is generally the easiest and usually most cost effective method of providing an alternative to scheme water for irrigation in domestic gardens.

Groundwater is predominantly used externally for non-potable purposes. The use of groundwater presents a small risk in terms of water quality. With respect to irrigation, the presence of significant iron concentrations,

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hardness, alkalinity or nutrients can impact upon the receiving vegetation and soils and/or contribute to scaling or scour of irrigation pipework.

It is generally acknowledged that the consumption of groundwater by individual households owning a private bore is greater than for those households irrigating from scheme water. Accordingly, it is considered that encouraging private bore use on the site would not lead to achievement of the water conservation objectives. However, if available and cost effective, it will reduce the use of scheme water.

Subject to availability and water quality, the use of groundwater for private lot irrigation will be the decision of the landowner. There is no requirement for DWER to licence groundwater on the site.

C) Stormwater

There are various options to utilise stormwater as a resource which include promoting rainwater tanks for each dwelling, larger outbuildings and business premises and directing stormwater from roads and driveways into detention basins for re-use.

D) Domestic greywater

At the household or business scale, treated greywater is suitable for garden irrigation or infiltration in accordance with the *Code of Practice for the Reuse of Greywater in Western Australia*. Greywater can generally only be stored for up to 24 hours after which time there are significant impacts to water quality and subsequent risks to public health.

Households choosing to install a greywater system for garden irrigation or appropriate non-potable indoor use will be responsible for adhering to the *Code of Practice for Greywater Reuse in Western Australia* along with associated costs for operation and maintenance of the greywater system.

If greywater is used for domestic garden use, the supply may be greater than the demand during the winter months. Alternative uses or disposal to the sewerage network may have to be made during the winter months. However, during the summer months greywater could provide approximately 60% of the supply for domestic irrigation (Loh and Coghlan: 2003).

E) Wastewater

As outlined in section 4.9, residential subdivision/development will be serviced with reticulated sewerage, while light industrial subdivision will be serviced through appropriate on-site effluent disposal systems. It is not expected that treated wastewater will be reused on this site other than for irrigating open space.

The draft *Government Sewerage Policy* outlines that on-site effluent disposal may be considered for non-residential subdivision that:

- a) Are remote from existing or proposed sewerage schemes and the proposed development cannot be connected to reticulated sewerage;
- b) Utilise secondary treatment systems with nutrient removal if in a sewage sensitive area or a public drinking water source area; and
- c) Where the proponent has demonstrated, to the satisfaction of the Western Australian Planning Commission on the advice of the Department of Health and the Department of Water that there is sufficient capacity to treat and dispose of sewage and contain associated buffers on-site. Consideration will be given to the maximum hydraulic load that can be contained within the lot and the potential impacts on waterways and wetlands.

The minimum lot size for non-residential lots is determined on a case-by-case basis.

The proposed industrial area was assessed by Biodiverse Solutions against the requirements for lots with on-site effluent disposal as outlined in the draft *Government Sewerage Policy* (DoP, 2016). The requirements and assessment to each requirement is shown below.

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Lot Requirement (DoP, 2016)	Assessment to Requirement
Adequate separation from groundwater – the discharge point of the on-site sewage disposal system should be at least 1.2 to 1.5 metres, depending on soil type, in sewage sensitive areas.	Groundwater was not encountered to 2.3 metres depth (Great Southern Geotechnics, 2017).
An on-site sewage disposal system should not be located within 30 metres of a private bore used for household/drinking water purposes.	There are no private bores registered within the Site or with in the vicinity of the proposed Industrial Area (DoW Water Register, 2017).
Lot Requirement (DoP, 2016)	Assessment to Requirement
An on-site sewage disposal system should not be located within 100 metres of a waterway.	No waterways located within the Site or within 100m of the proposed Industrial Area (Site inspection conducted 29/8/2017)
An on-site sewage disposal system should not be located within 100m of a significant wetland.	No significant wetlands located within the Site or within the vicinity of proposed Industrial Area (DEC and CoA 2017 database search)
An on-site sewage disposal system should not be located within 100 metres of a surface or subsurface drainage system that discharges directly into a downstream waterway or waterbody.	No surface or subsurface drainage systems located within the Site or within 100m of the proposed Industrial Area (Site inspection conducted 29/8/2017 and DoW database search)
An on-site sewage disposal system should not be located within any area subject to inundation and/or flooding in a 10 per cent Annual Exceedance Probability (AEP) rainfall event.	Given the relatively higher topography in the area and gradual slopes of the land inundation in the location of the proposed Industrial area is unlikely.

The assessment by Biodiverse Solutions concluded that the proposed light industrial area is appropriate for effluent disposal and meets the stated minimum requirements for on-site sewage disposal systems as outlined in the draft *Government Sewerage Policy*. In addition, the low permeability and high PRI of the soils in the location of the proposed industrial area will allow for slow draining assisting the process of being fixed by soil microbes.

As the industrial area is in a sewerage sensitive area, a secondary waste water treatment system with nutrient removal should be used. The provision of on-site sewage disposal systems including calculation of land application area shall be in accordance with minimum site requirements contained in Schedule 3 of the draft *Government Sewerage Policy* and must be approved for use in Western Australia by the Department of Health. LPS1 requirements for the current Light Industrial area require 'dry industry' and 'alternative treatment effluent disposal systems'.

Where on-site sewage disposal is to be provided by a secondary treatment system, the WAPC will require a notification on title pursuant to Section 70A of the *Transfer of Land Act 1893* (as amended) advising that an on-site secondary treatment sewage disposal system and unencumbered area to which treated sewage is to be distributed are required.

5.4 Water balance modelling

The adoption of the initiatives set out in the LWMS have the potential to significantly reduce water demands. Key opportunities include the use of rainwater tanks; all dwellings having Waterwise fittings, infiltrated runoff through soakwells on each lot and grassed or vegetated swales as part of future roads.

5.5 Waterwise landscaping and irrigation

As outlined above, there are opportunities for domestic gardens and industrial/commercial landscaping to be irrigated by non-scheme water (including rainwater tanks, groundwater and greywater).

Waterwise gardens

The water savings from planning and implementing Waterwise gardens and implementing other outdoor Waterwise techniques can be in the order of 50kL per household per annum. This includes reducing the amount of lawn and planting water wise species which are generally endemic to the region or appropriate water-wise exotic plant species.

To achieve the necessary target of 240kL per household per annum, an achievable target of 84kL (approximately 35%) per annum has been allocated to gardens and other outside usages. The installation of a rainwater tank can be used to supplement for the use of mains potable water for usage on garden and other outdoor requirements.

Public open space

The Structure Plan proposes considerable POS. In particular, the Structure Plan provides the following POS:

- a vegetated bush corridor containing remnant vegetation in the north-east section;
- two generous sized neighbourhood parks incorporating an incidental drainage function; and
- a community centre site located near the proposed primary school.

The design of the POS system responds to a wide number of opportunities presented by the site, namely:

- retaining key environmental features such as remnant vegetation;
- integrating surface water management measures into POS;
- providing well-distributed and generous sized POS that provide a range of recreational opportunities;
- fostering a sense of community, place and local identity through the creation of an urban village in a bush setting, bordered by open spaces (bush corridor on Lot 521, Reserve 27179 and POS adjoining Mercer Road); and
- providing an attractive entry frontage to Mercer Road that enhances the site's sense of place.

Two large neighbourhood parks are proposed on Lot 521 in the central-south and south-east sections. The central-south POS is 3.2 hectares and is expected to incorporate a drainage basin of around 0.7 hectare. The south-eastern POS is 5.15 hectares and is expected to incorporate a drainage basin of around 0.46 hectare.

The POS location provides an opportunity to create an attractively landscaped entry statement to the area. There is an opportunity to provide attractively designed areas of POS which will be overlooked by the surrounding residential areas. The POS should be maintained to a high standard to be appealing to the community.

It is expected that the neighbourhood parks will be used for active recreation, passive recreation, nature space and unstructured active play. These sites could be developed for active recreational use such as playgrounds, exercise facilities, half-court basketball courts along with passive facilities such as picnic/barbecue areas and seating.

Drainage areas for the one in 100 year event within POS near Mercer Road have the potential to combine passive recreation and unstructured active play opportunities through WSUD. Where drainage basins remain dry for most of the year, they can be designed to enable them to be used for recreational purposes.

There are opportunities to captured stormwater from the detention basins to irrigate the POS.

5.6 Water source recommendations

A key component of achieving water sustainability measures is adopting an educational approach. To assist in achieving this, the developer will provide relevant information to prospective purchasers and builders regarding the range of measures and household products that can be utilised to harvest rainwater and reduce scheme water use. This includes providing information on the following:

- promoting rainwater tanks for each dwelling, larger outbuildings and industrial premises for external and/or internal use;
- promoting Waterwise gardens including relevant Water Corporation's publications;
- promoting the use of Waterwise practices including water efficient fixtures and fittings (e.g. taps, showerheads, toilets); and
- maximising on-site retention of stormwater and associated re-use.

6. STORMWATER MANAGEMENT STRATEGY

6.1 Overview

The stormwater management strategy for the site is to maintain pre-development flows while maintaining and/or improving water quality. The stormwater system is required to adequately manage small, minor and major storm events.

In order to meet the design criteria, it is necessary to use a combination of appropriate stormwater management strategies that are suitable for the development and site characteristics. They include structural and non-structural measures. Structural measures include those undertaken on a lot, street and estate scale. Non-structural measures include educational material and interpretive signage.

Key components of managing stormwater for the development are shown on the Strategy Plan (Attachment 8). The strategies and initiatives are intended to meet the principles and objectives (section 1.2) and the design criteria (section 3).

Stormwater infrastructure will be designed to ensure stormwater discharges and volumes do not exceed pre-development levels for the 1 in 1 ARI year, 1 in 5 ARI year and the 1 in 100 year ARI storm events in relation to volume and rate.

Development of the site will increase the amount of impervious surfaces through dwellings, outbuildings, light industry, driveways and roads. The total hard surface for the subdivision/development will vary depending on land use and lot size. There should be space on each lot for appropriate stormwater attenuation/detention. The degree of attenuation required to address the design criteria will be addressed during the detailed civil engineering phase of the project.

6.2 Surface water quantity management

A) Stormwater retention/detention on each lot

Stormwater for the 1 in 1 year, 1 hour ARI event will be retained on each lot predominantly through rainwater tanks and soakwells, possibly other than for medium density development e.g. R60. Excess stormwater from major rainfall events will flow onto the ground for infiltration over a broad area. This can be readily accommodated given the soil types which are overall suitable for infiltration.

B) Stormwater retention/detention in road reserves

Roads will be sealed, designed and constructed in accordance with City requirements which are expected to be the *Local Government Guidelines for Subdivision Development* and *Austroads Design Guidelines*. Detailed design will accommodate topography, drainage and possible erosion requirements etc.

The design of the road drainage is expected to include:

- stormwater from roads will be through overland flow, via shallow open channels (swales) where possible rather than via pipes. The swales will collect and slowly channel stormwater (to act as

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detention areas) towards the discharge point. There will be culverts as required including at crossovers;

- swales on at least one side of the road especially if the detailed road design has one way cross-fall;
- likely detention features to slow run-off and minimise erosion in portions of the site;
- possible concrete covered sumps to collect stormwater and sediment where required; and
- various shallow vegetated detention basins in low points.

Erosion risk from the development is expected to be low given the gentle to moderate slopes, soil types and mitigation measures to reduce run-off volumes and reduce flow rates.

C) 1 in 1 year, 1 hour ARI event

The intent of managing the 1 in 1 year, 1 hour ARI storm event is source control. In particular, to capture or prevent runoff from constructed impervious surfaces and to manage water quality. Adopting WSUD will result in stormwater harvesting (including rainwater tanks), detaining and slowing down peak flows that especially address the 'first flush' run-off.

Stormwater from minor storm events up to the 1 in 1 year, 1 hour ARI event will be retained as close to source as possible. The strategy is to:

- require that lots retain the 1 in 1 year, 1 hour ARI event with water then re-used (through rainwater tanks) or slowly recharged into the groundwater (including soakwells and rain gardens);
- encourage future lot owners to direct run-off from their dwelling, large outbuilding or industrial premise into rainwater tanks to reduce stormwater runoff. The City will apply appropriate development conditions to address stormwater management for the 1 in 1 year, 1 hour ARI event at the Development Application and/or Building Permit stages; and
- ensure that road reserves retain the 1 in 1 year, 1 hour ARI event as close to source as possible through grassed or vegetated swales.

D) 1 in 5 year ARI event

The intent of managing the 1 in 5 year ARI storm event is runoff control. In particular, it is to retain, detain and convey stormwater, to manage water quantity for serviceability and to prevent erosion. The strategy is to:

- require that soakage devices such as soakwells are provided with an overflow outlet for major storm events;
- provide open swales within road reserves which are designed to collect, treat (through the planting of nutrient stripping vegetation to promote bioretention or the filtration of stormwater) and slowly channel stormwater towards the discharge point;
- require the swales to be sized to adequately store up to the 1 in 5 year ARI event with a controlled outflow to match pre-development flow rates; and
- consider directing stormwater to the existing dam or future dams for on-site use as part of the detailed design.

E) 1 in 100 year ARI event

The intent of managing the 1 in 100 year ARI storm event is the safe conveyance and discharge of stormwater and to protect buildings and lots from flooding.

There is a minor seasonal watercourse in the north-west section. The site is not within an identified flood risk area. While noting this, the strategy is to:

- ensure that the watercourse is left undeveloped and unobstructed to not compromise upstream surface-water flows;
- maintain existing or provide alternative overland flow paths and drainage discharge points in order to preserve predevelopment conditions. Flows are to be conveyed along roads, road verges/swales, drainage lines and the floodway (seasonal watercourse);
- provide appropriate building setbacks from drainage lines;
- require that roads are designed to cater for the surface overflow for major storms;

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- require that buildings should be at least 0.3 metre above the ground level and where possible above the road level to address the potential for localised flooding from roads; and
- require that swale profiles and culvert sizes for lot crossovers and intersections are designed to mitigate the flows and protect lots from flood levels in road reserves.

6.3 Surface water quality management

The impacts from the proposed development are expected to have minimal impact on water quality. Correspondingly, there are a number of ways in which surface water quality can be maintained or enhanced. The strategy is to:

- accommodate the 1 in 1 year ARI event which will treat around 99% of annual run-off volume which helps to protect ecological values;
- improve water quality via soil and vegetation filtration;
- adopt a treatment train to stormwater including in road reserves through the use of WSUD including vegetated roadside swales, detention basins and as required sediment traps and gross pollutant traps. This will assist to remove and treat sediments, phosphorous, nitrogen, suspended solids and other contaminants;
- implement controls at or near the source to prevent pollutants entering the system and/or treat stormwater;
- install in-transit measures to treat stormwater and mitigating pollutants that have entered the conveyance system. Appropriate native or possibly suitable non-native plant species that have fibrous roots to filter nutrients will be planted as required within the swales. The plants will be constructed according to the latest *FAWB Adoption Guidelines for Filter Media in Biofiltration Systems* and the *Stormwater Management Manual for WA* design guidelines in consultation and to the satisfaction of the City;
- implement 'end-of-system' controls to treat stormwater, addressing any remaining pollutants prior to discharging to receiving environments. This could include that surface run off from roads is directed to shallow vegetated detention basins prior to emptying to the seasonal watercourse;
- encourage all lot purchasers to practice Waterwise and nutrient wise practices including minimising the area of lawn established or possible alternatives to lawn;
- undertaken appropriate sediment and erosion control during construction;
- provide a suitable buffer between development and the watercourse;
- restore/revegetate the seasonal watercourse on the site to create a 'living stream' which will enhance the watercourse's ecological functions; and
- undertake additional revegetation and replanting in other parts of the site.

Water quality treatment systems and WSUD structures should be designed in accordance with the *Stormwater Management Manual for Western Australia* (Department of Water: 2007) and *Australian runoff quality: a guide to water sensitive urban design* (Engineers Australia: 2007).

6.4 Impact on water dependent ecosystems

The main water dependent ecological systems influenced by the development are groundwater and the watercourse. Stormwater and groundwater will be managed so that post development receiving hydrological regimes are comparable to pre-development. Accordingly, there should be minimal impact on water-dependent ecosystems.

There are a number of ways in which water quality can be maintained or enhanced. The strategy is to:

- undertake those measures set out in section 6.3;
- require that all lots have an appropriately designed and located on-site effluent disposal system;
- encourage appropriate fertiliser use including minimising where possible, not exceeding application rates, using low water soluble fertiliser, only fertilising when symptoms of nutrient deficiency occur and applying at the appropriate time of the year (spring or early autumn); and
- encourage appropriate weed management, spot spraying and general maintenance on the site.

6.5 Non-structural controls

A number of non-structural controls have been set out in this LWMS which include promoting education and undertaking Waterwise practices. Further non-structural controls are set out in the *Stormwater Management Manual of WA* (2007).

6.6 Stormwater management strategy conclusions

The proposed development has minimal limitations for effectively managing stormwater given the proposed lot sizes, the generous provision of POS and there are appropriate soil conditions for stormwater infiltration.

Environmentally sensitive stormwater management at the site is considered feasible by assisting recharge into the soils. Physical enhancement of the ground profile, by way of swales will contain runoff, facilitating sediment control and recharge to groundwater at the road side. Treatment of overflow stormwater resulting from major storm events that cannot otherwise recharge to groundwater can be addressed by contouring and planting detention basins prior to discharge into the seasonal water course.

The approach to managing stormwater includes:

- accommodating small, minor and major storm events;
- detention and gradual conveyance of stormwater rather than instantaneous rapid conveyance;
- on-site infiltration/groundwater recharge;
- localised stormwater harvesting; and
- promoting replanting to enhance water quality.

7. GROUNDWATER MANAGEMENT STRATEGY

7.1 Overview

As outlined in Attachment 3, it was determined there would be minimal impact on groundwater from the development given the depth of groundwater.

Biodiverse Solutions advise 'there are limited water management risks associated with development of the Subject Land. Based on the investigations, there is no requirement to undertake pre- development groundwater monitoring. Overall, the soil types enable stormwater infiltration at source.'

Biodiverse Solutions advise:

'It is expected that development of the site will have a positive impact on groundwater and stormwater quality through BMPs and the treatment of stormwater prior to infiltration. Based on the site assessment and the management measures proposed, it is not expected that any changes to groundwater flows, levels or quality will have an adverse impact on the function and environmental values of the site.'

As set out in section 4.8, impacts on groundwater will be further minimised with dwellings being raised at least 0.3 metre above the natural ground level.

7.2 Groundwater levels

As set out in Attachment 3 and section 4.8, no test pit encountered groundwater.

It is expected that post-development groundwater levels will be similar to pre-development levels. The site's soil types will assist infiltration and groundwater recharge close to the source.

7.3 Groundwater quality management

The environmental values of groundwater within and surrounding the site are required to be retained given groundwater is an important environmental asset. Implementation of WSUD is expected to result in maintaining or where possible improving groundwater quality. An example is the planting of fibrous rooted plants incorporated into the base of the roadside bioretention swales in portions of the site. This will provide

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treatment of surface water runoff collected within the drainage network prior to infiltration into the groundwater. These products bind nutrients and other contaminants that are mobile.

Where fill is installed, it may be associated with a sub soil drainage system in order to maintain ground water levels at, or close to, that which currently exists. Subsoil drains should have 'open' outlets.

7.4 Impact on water dependent ecosystems

Overall, the development is expected to have minimal impacts on groundwater quantity and quality and according there are expected to be limited impacts on water dependent ecosystems. The recommended management practices will maximise the quality of the infiltration. This includes encouraging new residents to install nutrient wise gardens and to minimise the amount of lawn.

7.5 Implications for fill

There will be filling on various residential lots which will be addressed at the subdivision stage. Considerations include:

- ensuring there is sufficient clearance to the highest groundwater levels;
- filling for house pads will be required on some lots to increase heights above the adjacent road and/or ground level. In particular, it is recommended that all buildings are raised by 0.3 metre above the ground level; and
- where required, clean sand fill will be imported to the site to provide an appropriate clearance from subsoil drains.

8. MONITORING AND ADDITIONAL INVESTIGATIONS

8.1 Overview

An UWMP should be prepared to support residential subdivision.

Based on the development's site characteristics, the proposed generous lot sizes (1 hectare minimum) and the low level of risk of impacting water resources, it is considered unnecessary to prepare an UWMP for the light industrial subdivision. Engineering design drawings submitted to the City for approval at the subdivision stage and building plans submitted to the City at the Building Permit stage provide appropriate opportunities to implement the LWMS.

While noting the above, there are various matters to be addressed in progressing from conceptual designs and strategies to detailed civil engineering designs. Amongst matters, the detailed civil engineering design will address road, swale and detention basin design. Matters to address include:

- plans to be generally consistent with the LWMS including its objectives and design criteria including adopting WSUD principles;
- demonstration of compliance with regulatory requirements, including required licences and approvals, *Building Code of Australia* and *Plumbing Code of Australia*;
- ensuring that the construction and development works suitably address sediment and erosion control; and
- operational and maintenance responsibilities and liabilities.

The consulting engineer will incorporate any conditions and changed circumstances into the subdivision design and provide the detailed design drawings of the road network and drainage. At that time, detailed calculations will be made to confirm and design the drainage system including flow rates and attenuation.

There will be a need for a site classification report to determine in more detail soil conditions at the Building Permit stage.

8.2 Monitoring

No pre-development or post-development groundwater monitoring is required for the development due to the groundwater depth, soil types and the expected minimal impact of the development on groundwater.

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While noting this, there is a need for routine inspection of WSUD elements by the developer, or developer's appointed consulting engineer/project manager, for a minimum of 12 months after the completion of works or for an agreed upon time between the developer and the City.

There is a need for cost effective methods to evaluate the adequacies of the operation and performance of WSUD elements. It will be assumed that if the WSUD elements operate in accordance to the designs then they are delivering the desired key management objectives. The WSUD elements should only require minimal routine maintenance and these are generally of a landscape maintenance nature, with the most common maintenance being the removal of debris and siltation.

9. IMPLEMENTATION

9.1 Developer commitments

Implementation will only occur at the construction stage following the full engineering calculations for the roads and stormwater management.

The developer, or the developer's appointed consulting engineer/project manager, is committed to the following:

- designing and constructing a reticulated water supply services for all lots;
- residential subdivision being connected to the reticulated sewerage system;
- designing and constructing the stormwater management system based on WSUD principles;
- providing lot owners and builders with information regarding Waterwise practices inside and outside the dwelling including promoting rainwater tanks, Waterwise appliances, Waterwise gardens, and providing information on appropriate fertiliser application;
- sediment and erosion control during construction;
- creating POS as outlined on the Structure Plan;
- creating a 'living stream' for the seasonal watercourse in the north-west of the site; and
- maintaining the stormwater system for a minimum period of 12 months from practical completion, or as agreed with the City, and ensuring that any remedial works as necessary for the upkeep of the system are undertaken.

Developer commitments would in part be set out in the conditions of subdivision.

9.2 Roles and responsibilities for implementation

The developer is responsible for the actions outlined in the LWMS until either handover to the City or until sale of the lots. Following handover, the City is then responsible for ensuring the stormwater system is maintained.

Landowners are responsible for various matters within and outside their home including the provision of stormwater tanks and adopting Waterwise and nutrient wise gardens.

9.3 Review of LWMS

There will be a need to review the LWMS given the anticipated long timeframe to implement the Structure Plan.

10. CONCLUSIONS

The development is considered a low risk to water resources given the site's location, environmental characteristics, proposed lot sizes and proposed servicing. Groundwater and surface water are not considered constraints to future development.

The LWMS concludes that the site is capable of supporting residential and light industrial subdivision/development and is able to achieve appropriate water management outcomes. Further, it is considered that an UWMP is required to support residential subdivision, however no UWMP is required to support light industrial subdivision. There will however be a requirement for engineering drawings and specifications to be submitted and approved by the City for the light industrial subdivision which are generally consistent with the LWMS and which adopt WSUD.

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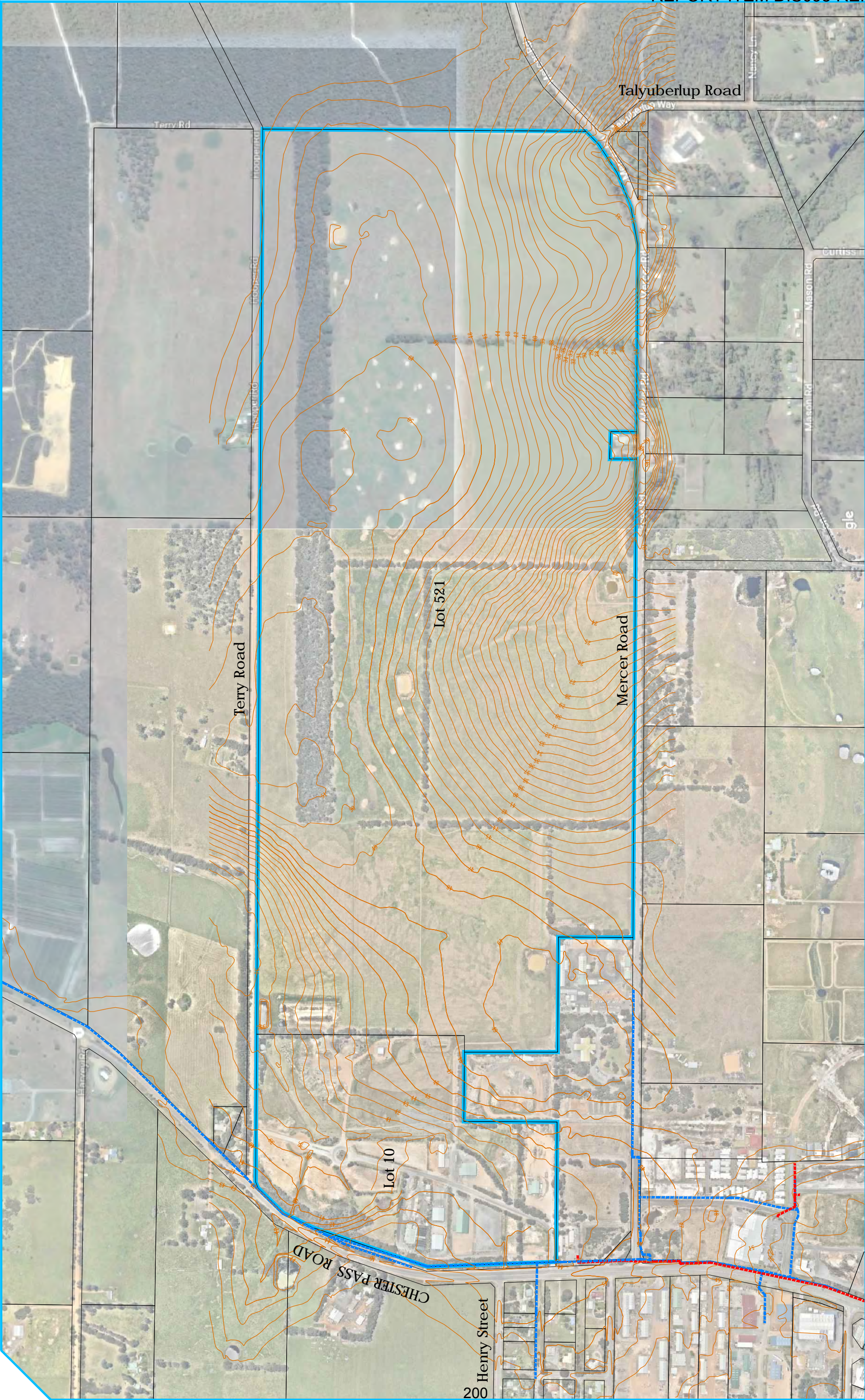
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Western Australian Planning Commission, 2006, *State Planning Policy 2.9 Water Resources*

ATTACHMENT 1



Edge Planning & Property
 124 Hare Street, Mount Clarence
 AUBURN WA 6230
 M 0409 107 334

DRAWING NUMBER
 EP 170520 01
 REV A

A CONTEXT PLAN
 REV DESCRIPTION YNMMDD DRAWNAPPRVD
 170522 SJ ST

SCALE 1:7500
 SHEET A3

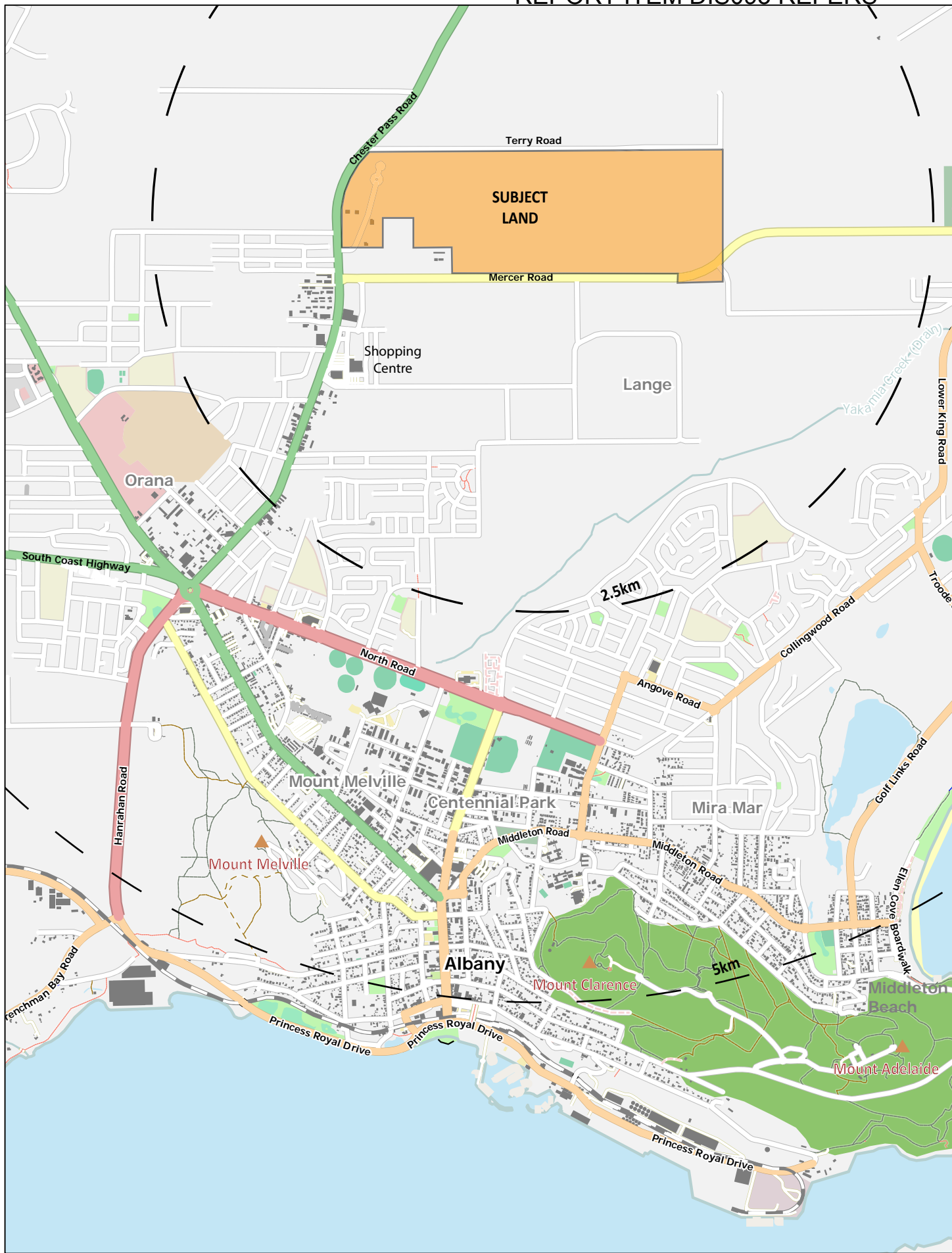


Legend

- Structure Plan Boundary
- Existing u/ground Water Pipe
- Existing u/ground Sewer Pipe
- Existing Lot Boundary
- Contours

SITE PLAN
Lot 10 Chester Pass Road
and Lot 521 Mercer Road
Walmsley

ATTACHMENT 2



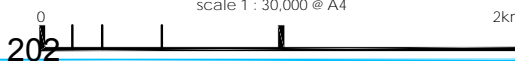
LOCATION PLAN
 Lot 10 Chester Pass Road
 and Lot 521 Mercer Road
 Walmsley, City of Albany

 SUBJECT LAND



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ATTACHMENT 3

**Lot 10 Chester Pass Road &
Lot 521 Mercer Road,
Walmsley WA 6330**

Environmental Assessment and Land Capability Assessment Report



21/11/2017

Kathryn Kinnear

Bio Diverse Solutions

DOCUMENT CONTROL

Title: Environmental Assessment Report – Lot 10 Chester Pass Road and Lot 521 Mercer Road, Walmsley WA

Author (s): Chiquita Burges

Reviewer(s): Kathryn Kinnear & Steve Thompson

Job Number: EPP 004

Client: Ardess 1607 Pty Ltd

REVISION RECORD

Revision	Summary	Revised By	Date
Draft Id 26/09/2017	Internal QA Review	Kathryn Kinnear	26/09/2017
Draft Id 29/09/2017	Issued to client for review	K. Kinnear	29/9/2017
Draft Id 26/10/2017	Updated as per client review	B. Theyer	26/10/2017
Draft Id 13/11/2017	Issued to Client	K. Kinnear	13/11/2017
Final Id 21/11/2017	Final updates and Issued to Client	K. Kinnear	21/11/2017

The recommendations and measures contained in this assessment report are based on the requirements of the Australian Standards 3959 – Building in Bushfire Prone Areas, WAPC SPP3.7, Guidelines for Planning in Bushfire Prone Areas (WAPC, 2017) and CSIRO’s research into Bushfire behaviour. 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.



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Appendix A: Draft Local Structure Plan (Edge Planning & Property, 2017).

Appendix B – Geotechnical Investigation (Great Southern Geotechnics, 2017)

Appendix C – Phosphorous Retention Index Test Results (CSBP Laboratory, 2017)

Appendix D - BAL Contour Plan (Bio Diverse Solutions, 2017)

1. Executive Summary

Ardess 1607 Pty Ltd commissioned Bio Diverse Solutions (Environmental Consultants) to prepare an Environmental Assessment Report (EAR) and Land Capability Assessment (LCA) to guide all future environmental management for the proposed subdivision of Lot 10 Chester Pass Road and Lot 521 Mercer Road, Albany WA.

This EAR and LCA describes the relevant environmental characteristics of the site and presents management and mitigation strategies in response to potential environmental impacts. These management and mitigation strategies aim to minimise the potential impact on the environmental values within the site.

The Local Structure Plan (LSP) has been developed to guide the subdivision and development of the Subject Site (Appendix A). The LSP for the site proposes an extension of the adjacent light industrial area, a residential zone which includes a range of residential densities, a primary school and three POS areas. The proposed light industrial area will require on-site effluent disposal, whereas the residential area will be developed once reticulated sewerage has been established in the area. This EAR and LCA identifies the measures proposed to mitigate and manage the environmental features of the site, and focuses on the natural areas to be retained within the LSP.

The Subject Site was found to have no significant environmental constraints. A geotechnical investigation conducted by Great Southern Geotechnics (2017) under late winter conditions did not encounter groundwater to depth of 2.3m across the site. Soil type across the majority of the site was found to be sandy gravel over sandy clay with low permeability and high PRI. A small area in the southern central portion of the site was found to have silty sand over gravelly sand with a low PRI. There is no significant waterways, wetlands or groundwater resources within the Subject Site or within the vicinity of the Subject Site.

The vegetation across the Subject Site and surrounding areas is consistent with rural farmland, with the majority of the site and surrounds comprising of heavily grazed pasture dominated by pasture grass species. There are two areas of remnant vegetation within the Subject Site. A broad scale vegetation survey of these two areas was conducted with the strip of vegetation running parallel with the northern boundary of the site (approximately 12 ha in size) found to comprise of Low Open Jarrah/Marri/Sheoak Forest in good condition and the small area of remnant vegetation in the south-east corner comprising of mixed Eucalypt Forest in a degraded condition.

A BAL Contour Plan was prepared by Bio Diverse Solutions to identify the bushfire risks associated with the site (Appendix D) and guide the Structure Plan development. The Subject Site was assessed as having internal areas of Grassland Type G consistent with rural farmland, low fuel/non-vegetated areas (associated with the industrial area, tracks/roads and buildings) and an area of Forest Type A (being the strip of remnant vegetation in the north). External bushfire risks are mostly associated with the Forest Type A (CoA Reserve) directly to the east and south-east of the Subject Site and Forest Type A and Woodland Type B along the Mercer Road Reserve. BAL contouring across the Subject Site has allocated BAL 29 or less shall apply to any buildings within the lots. All future buildings (through subdivision designs) can achieve an APZ area associated with a BAL allocation of BAL 29, BAL 19 or BAL 12.5. A detailed Bushfire Management Plan has not been prepared for the site. The publicly released Bushfire Prone Area Mapping (DFES, 2017) shows that the majority of the Subject Site is located within a Bushfire Prone Area (situated within 100m of >1 ha of bushfire prone vegetation). Where “High risk” or “Vulnerable land uses” (Primary school), as defined by SPP 3.7 are proposed, detailed Bushfire Management Plans are to be prepared.

A Land Capability Assessment (LCA) of the site was conducted in accordance with the State Planning Commission’s (1989) Land Capability Assessment for Local Rural Strategies (note these definitions are as per this policy for the purposes of this report and not any other planning instrument/policy). The overall capability of the Subject Site supporting the Urban Development land use was rated as highly capable for Mapping Unit 1 and very highly capable for Mapping Unit 2. The overall capability of the Subject Site supporting the Light

Rural Industrial (as per WAPC, 1989) land use is rated as highly capable for Mapping Unit 1. Mapping Unit 2 was not encountered at the location of the proposed Light Rural Industrial land use. The degree of limitations for both Urban Development and Light Rural Industry for Mapping Unit 1 and Mapping Unit 2 is low to very low.

This EAR and LCA report provides details of the ASS, Water, Waste Water, Flora, Fauna and Fire Management strategies proposed to be implemented across the site as it is developed to ensure adequate protection of environmental, life, property and biodiversity assets.

The proposed LSP recognises the importance of the key environmental and landscape attributes of the area, and incorporates these in an urban form, that creates an environmentally responsive urban development that meets the EPA and City of Albany's environmental requirements. Consequently, the environmental outcomes of the proposed LSP are considerable and include:

- Providing an improvement in groundwater and surface water quality through residential and industrial development and implementation of water sensitive urban design and best stormwater drainage management practices.
- Revegetation using native species (where currently there is very little native species and diversity) in areas of POS to promote fauna habitat and flora diversity. Landscaped urban areas to promote biodiversity using native plants.
- Maintaining areas of remnant vegetation and limiting access points through these areas to the subdivision to prevent adverse impacts particularly for transient fauna.
- The Local Structure Plan is required to meet the “Acceptable Solutions” of each Element of the bushfire mitigation measures (WAPC, 2017).
- As Light industrial land use is proposed in the west of the Structure Plan, a detailed Bushfire Management Plan will be required to guide developers if any industry is defined as “High Risk”.
- A detailed Bushfire Management Plan jointly endorsed by DFES and CoA will be required for any Primary School proposed in the Structure Plan area, at the Development Application stage. A Bushfire Emergency Evacuation Plan (BEEP) will be required at Development Approval Stages.
- The proposed light industrial area is deemed appropriate for effluent disposal and meets the state's minimum requirements for on-site sewage disposal systems as outlined in the *Draft Government Sewerage Policy* (Department of Planning, 2016). Where on-site sewage disposal is to be provided by a secondary treatment system, the WAPC will require a notification on title pursuant Section 70A of the *Transfer of Land Act 1893* (as amended) advising that an on-site secondary treatment sewage disposal system and unencumbered area to which treated sewage is to be distributed are required.
- Provide vegetated buffer and / or other management techniques between industrial areas to sensitive land uses (such as residential) in accordance with the EPA's (2015) Draft Guidance Statement No. 3 *Separation Distances Between Industrial and Sensitive Land Uses*.

2. Introduction

Ardess 1607 Pty Ltd commissioned Bio Diverse Solutions (Environmental Consultants) to prepare an Environmental Assessment Report (EAR) and Land Capability Assessment (LCA) to guide all future environmental management for the proposed subdivision of Lot 10 Chester Pass Road and Lot 521 Mercer Road, Walmsley WA.

This EAR and LCA describes the relevant environmental characteristics of the site and presents management and mitigation strategies in response to potential environmental impacts. These management and mitigation strategies aim to minimise the potential impact on the environmental values within the site.

2.1. Location

Lot 10 Chester Pass Road and Lot 521 Mercer Road, Walmsley WA (herein referred to as the Subject Site) is 178ha and located approximately 6km north of the Albany CBD. The Subject Site is bound by Chester Pass Road to the west, Mercer Road to the south, Terry Road to the north and a City of Albany (CoA) reserve to the east. The location of the Subject Site is shown on Figure 1.

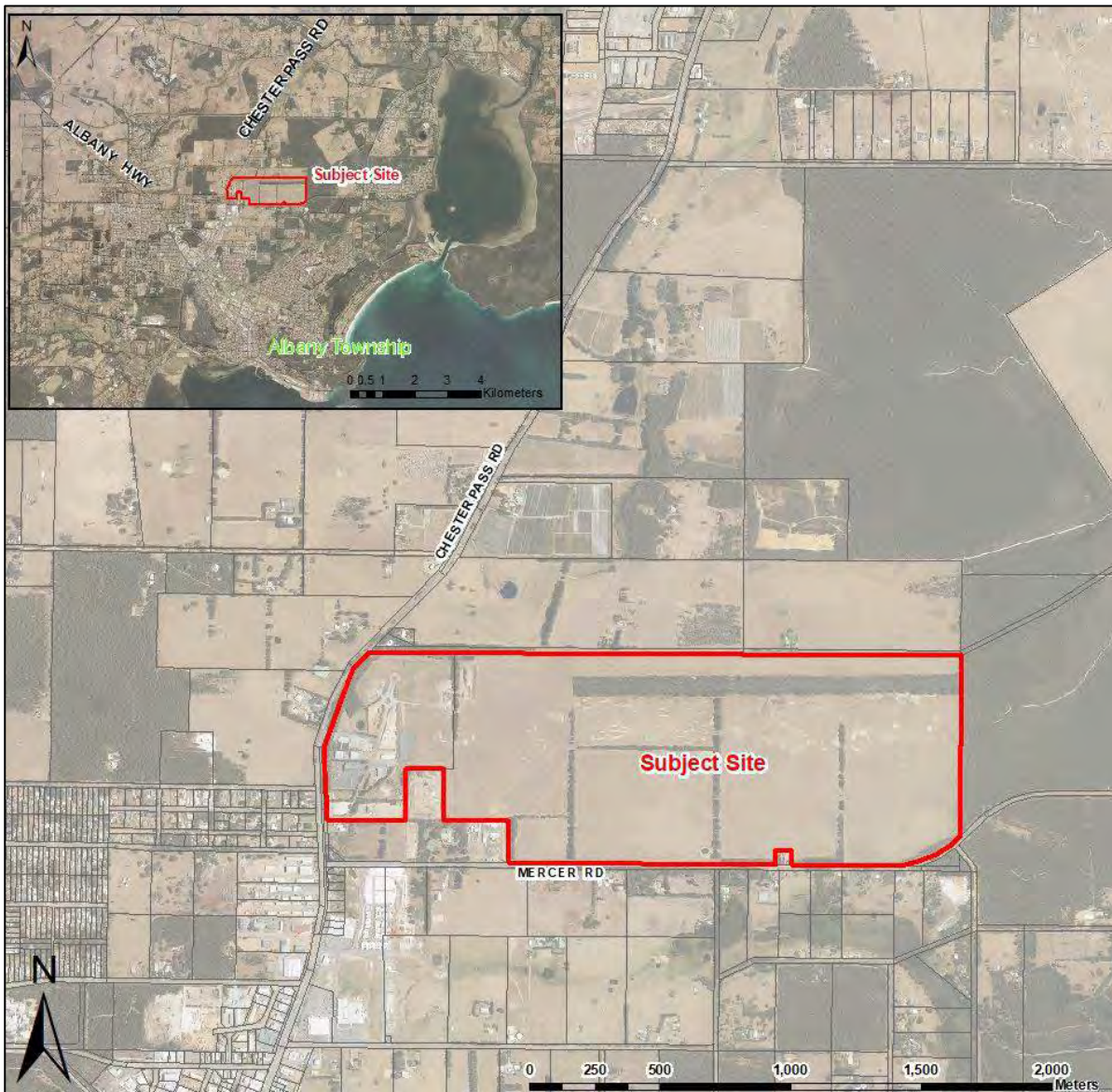


Figure 1: Location Plan

2.2. Local Structure Plan

The Local Structure Plan (LSP) has been developed to guide the subdivision and development of the Subject Site, the Draft LSP for the site has been included as Appendix A.

The proposed LSP includes the following land uses:

- Residential (R30-R60);
- Residential (R20-R30);
- Residential (R15-R25);
- Primary School Site;
- Public Open Space (POS); and
- Light Industrial.

There is no current staging plan for the LSP however the initial stage/s of the subdivision will include the extension of the existing light industrial area within the Subject Site (Ardess Industrial Estate) further to the north and east. There is currently no reticulated sewerage at the location of the Subject Site and as such the lots within the proposed Light Industrial Area will require on-site sewerage disposal and a minimum lot size of 1ha consistent with guidelines set out in the Draft Government Sewerage Policy (Gov. of WA, 2016).

Subsequent stage/s of the subdivision will include the development of the central and eastern portion of the site into a residential zone, including a Primary School and two areas of POS. Residential densities within the residential zone will range from R15 to R60. The residential zone of the subdivision will only be feasible and environmentally sustainable once reticulated sewerage has been established in the area. Therefore, there will be no on-site sewerage disposal within this area.

This EAR and LCA identifies the measures proposed to mitigate and manage the environmental features of the site, and focuses on the natural areas to be retained within the LSP.

2.3. Statutory Framework

Development within the site is required to comply with relevant environmental legislation, policy and guidelines. This document and the recommendations contained within are aligned to the following key state and Commonwealth legislation and regulations;

- *Environmental Protection Act 1986;*
- *Environmental and Protection and Biodiversity Conservation Act 1999 (EPBC Act);*
- *Environment Protection and Biodiversity Conservation Regulations 2000;*
- *Conservation and Land Management Act 1984;*
- *Conservation and Land Management Regulations 2002;*
- *Environmental Protection (Noise) Regulations 1997;*
- *State Legislation Aboriginal Heritage Act 1972;*
- *Heritage of Western Australia Act 1950;*
- *Land Administration Act 1997;*
- *Planning and Development Act 2005;*
- *Rights in Water and Irrigation Act 1914;*
- *Contaminated Sites Act 2003;*
- *Wildlife Conservation Act 1950;*
- Draft Government Sewerage Policy – Consultation Draft 2016;
- DER Acid Sulphate Soils Assessment Guidelines;
- Western Australian State Planning Policy (SPP) 3.7; and
- Guidelines for Planning in Bushfire Prone Areas 2017.

2.4. Suitably Qualified Environmental Consultants

This EAR and LCA has been prepared by suitable qualified personnel from Bio Diverse Solutions. The three qualified personnel responsible for delivery of this assessment include; Chiquita Burges (Senior Hydrologist/Environmental Consultant), Bianca Theyer (Conservation and Wildlife Biologist/Environmental Consultant) and Kathryn Kinnear (Level 2 BPAD Accredited 30794 Bushfire Consultant).

Chiquita Burges

The existing environment and general environmental management section of this report has been prepared by Chiquita Burges. Chiquita has the following Tertiary Qualifications:

- B.Sc. Natural Resource Management; and
- Graduate Certificate in Hydrogeology

Chiquita has over 8 years of experience working as a hydrologist and senior hydrologist, her experience includes preparation of local and urban water management strategies, surface water and groundwater monitoring programs and hydrogeological reports. Tasks undertaken by Chiquita include report writing, mapping, field work including installation and monitoring of groundwater bores, modelling of stormwater and groundwater and liaising with clients, sub-consultants and approving agencies. Since joining Bio Diverse Solutions in early 2017 Chiquita has diversified her skills and knowledge to include more general environmental consultancy work.

Bianca Theyer

The flora and fauna component of this assessment has been prepared by Bianca Theyer. Bianca has the following Tertiary Qualifications:

- B.Sc. Conservation and Wildlife Biology; and
- Honours Conservation Biology.

Bianca has experience in biodiversity management with direct experience including: biodiversity surveys, fauna surveys, monitoring and trapping programs (invertebrates, mammals, amphibians, and reptiles); flora surveys and vegetation assessments. Bianca has been responsible for several projects during her time at Bio Diverse Solutions, these include multiple flora (including threatened) and vegetation surveys; fauna habitat survey at Frenchman Bay, Albany; Environmental Assessment Reports for a proposed liquid waste facility, a pastured egg farm and a proposed gravel extraction project; Foreshore Management Plans for projects in South Moorlands, Bunbury and Frenchman Bay Albany; a Mosquito Management Plan for Meadowbrook Lifestyle Villages in Boyanup, and development of an Environmental Management Plan for a proposed Solar Station in Kalbarri.

Kathryn Kinnear

The bushfire assessment and management component of the assessment has been prepared by Kathryn Kinnear. 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) 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 has also worked in environmental management for 20 years within that time she has worked on a vast range of environmental projects and has developed specialist skills in field operations, reporting and project management.

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 is a suitably qualified Bushfire Practitioner to assess the bushfire risks and management strategies.

3. Existing Environment

3.1. Existing Land use

The Subject Site currently consists of multiple land uses; Lot 10 Chester Pass Road (Lot to the west) comprises of an industrial area and cleared land used to keep current and old farm machinery and sand/gravel piles. The industrial area comprises of sheds, office building, car parks, an internal road network and cleared areas for future development. Businesses within the industrial area include; Albany Freight Lines, Designer Dirt (landscaping supplies) and Ardess Nursery.

Lot 521 Mercer Road (Lot to the east) encompasses the majority of the Subject Site and comprises of predominantly cleared rural land used for grazing cattle. There are no existing dwellings on Lot 521 Mercer Road, there are two small to medium sized sheds (one used to store hay and farm machinery and the other an old shearing shed), a set of cattle yards and a strip of remnant vegetation in the north-east of the Subject Site. Land use within the Subject Site is shown on Photographs 1 to 4.



Photograph 1 – View of cleared rural land within Lot 521 Mercer Road.



Photograph 2 – View of old farm machinery within Lot 10 Chester Pass Road.



Photograph 3 – View of hay and machinery shed located in the north of Lot 521 Mercer Road.



Photograph 4 – View of internal road and roundabout within industrial area in Lot 10 Chester Pass Road.

3.2. Surrounding land uses

The Subject Site is surrounded by rural properties to the north, west and south and remnant vegetation (CoA reserve) to the east. To the south-west of the Subject Site along Chester Pass Road and adjacent to the western most section of Mercer Road is Albany’s light industrial area which includes a range of businesses and a lifestyle village and on the western side of Chester Pass Road is a residential area. The surrounding areas are shown on Photographs 5 to 8.



Photograph 5 – View of Albany Business Centre along Chester Pass Road to the south-west of Subject Site.



Photograph 6 – View of rural property to the north of Subject Site.



Photograph 7 – View of City of Albany holding facilities along Mercer Road to the south of Subject Site.



Photograph 8 – View of remnant vegetation directly east of the Subject Site.

3.3. Climate

The Albany area is characterised by a Mediterranean climate with warm dry summers and cool wet winters. Rainfall data is from the nearby Bureau of Meteorology (BoM) Albany Station (Site No. 9500).

The long-term average annual rainfall is 929 mm (1877 to 2016). This average has decreased between 2000 to present, to an average annual rainfall of 879 mm, reflecting a 5% reduction compared to the long-term average, consistent with a general trend in the South West of WA. The total rainfall distribution has also altered, with a reduction of average winter monthly rainfall, but no significant reduction in average summer monthly rainfall.

The average annual pan evaporation for the Albany area is approximately 1397 mm (Luke *et al*, 1988).

3.4. Topography

Topography over the Subject Site is undulating ranging from a high point of 51m AHD in the central northern portion of the site to a low point of 22m AHD in the southern central portion of the site. There is a ridge that runs from the central northern portion of the site to the south-west corner with topography decreasing in a radial manner from the ridge. Topographic contours (1 metre contours are shown on Figure 2).

The effective slopes (measured as per AS3959-2009) for the Subject Site are flat/upslope to low ranging from 0 to 5 degrees. The effective slopes for the Subject Site and surrounding areas are shown in the BAL Contour Plan Report included as Appendix D.

3.5. Acid Sulphate Soils

Acid sulphate soils (ASS) are naturally occurring soils and sediments containing sulphide minerals, predominantly pyrite (an iron sulphide). When undisturbed below the water table, these soils are benign and not acidic (potential acid sulphate soils). However, if the soils are drained, excavated or exposed by lowering of the water table, the sulphides will react with oxygen to form sulphuric acid (EPA 2008). Acid Sulphate Soil (ASS) Risk Mapping (Figure 2) indicates the Subject Site does not sit within any known areas of ASS.



Figure 2: Topography and ASS Risk Mapping

3.6. Geology and Soils

Regolith of WA (Department of Mining, 2009) mapping indicates that soils across the Subject Site are classified as sandplain, mainly Aeolian and include some residual deposits.

A Geotechnical Investigation was conducted on the 29th of August 2017 by Great Southern Geotechnics under later winter conditions, the Geotechnical Investigation is included as Appendix B. The investigation included both soil analysis and measuring of water table. The soil testing was conducted to assess the suitability of the site for the proposed development including onsite effluent disposal for the extension of the industrial area.

Ten boreholes were constructed within the Subject Site to a depth of 2.3 metres and left open for a minimum of 1hr to identify water table present. The location of the boreholes are shown on Figure 3, lithological logs of the boreholes are shown in Appendix B.



Figure 3: Borehole Locations

Soil Type

Soil testing showed that soils across the site comprised predominately of a silty sand topsoil, over sandy gravel (with a layer depth varying from 200 - 700mm), over sandy clay to the depth of the hole. This soil profile was encountered at each borehole location except TP6 and TP10. The soil profile at TP6 comprised of a silty sand topsoil, over silty sand (200 - 700mm depth), over gravelly sand (700 to 1500mm depth), over sandy gravel (1500 - 2300mm depth). The soil profile at TP10 comprised of a silty sand topsoil, over silty sand (200 - 400mm), over sandy clay (400 – 2300mm) (Great Southern Geotechnics, 2017).

Permeability

Permeability testing was conducted on TP3 (400 – 1100mm BGL) and TP10 (400 – 2300mm BGL) by Liquid Labs WA as part of the Geotechnical Investigation. TP3 recorded a permeability of 0.0035 m/day whilst TP10 recorded a permeability of 0.0015 m/day (refer to Liquid Labs WA Laboratory testing in Appendix B). Permeability at both TP3 and TP10 is considered to be extremely low this is consistent with the soil type (sandy clay) encountered at these locations.

Phosphorous Retention Index

Phosphorous retention Index (PRI) is the ability of soils to absorb nutrients and heavy metals within the soil (i.e. Soil microbe disinfecting ability). Soils with a PRI less than 1 have a very poor ability to retain nutrients and heavy metals, whilst soils with a PRI of >5 having a high ability to retain nutrients and heavy metals. PRI testing was conducted by CSBP Laboratory on soil samples from TP1, TP3, TP6 and TP10. The PRI results are shown in Table 1 and Appendix C.

Table 1: Phosphorus Retention Index Results

Borehole	Depth (mm)	Soil Type	Phosphorus Retention Index
TP1	200-900	Sand with gravel	2414.5
TP3	400-1100	Sandy clay	2387.4
TP6	200-700	Silty sand	0.8
TP10	400-2300	Sandy clay	608.0

PRI results across the site varied consistent with soil type. The sandy clays found across the majority of the site (as seen at TP3 and TP10) were found to have a very high PRI and therefore a very high ability to fix nutrients and heavy metals. The sandy gravel found at TP1 also had an extremely high PRI, particularly for a sand, whereas the light grey sand found at TP6 had a low PRI and therefore a low ability of fixing nutrients and heavy metals.

3.7. Surface Water Hydrology

There are no major naturally existing drainage networks or water bodies within the Subject Site. There is one minor waterway situated in the north-western extent of Lot 10. This area will need to be managed sensitively in relation to stormwater planning within the site. Surface water generally runs off the central and eastern portions of the site in a southerly and south-easterly direction towards Mercer Road. The western portion of the site generally drains in a north westerly direction towards Terry Road and Chester Pass Road.

Hydrographic Sub-catchments (DoW, 2008) show the Subject Site to be within two surface water sub-catchments; with the northern and western portion of the site discharging to Willyung Creek to the north of the Subject Site and the central and southern portion of the site discharging to Yakamia Creek to the south of the site. Both the Willyung Creek and Yakamia Creek sub-catchments form part of the Oyster Harbour/Kalgan/King Catchment ultimately discharging to Oyster Harbour.

There are several man-made dams across the site, which are surface water fed and used for livestock drinking water. The majority of the Subject Site drains towards a dam in the central southern portion of the site, whilst the eastern rural areas drain to a large dam located in the north-east corner of Lot 521 Mercer Road.

3.8. Groundwater Hydrology and Hydrogeology

Australian Geoscience Mapping and Department of Water 250K Hydrogeological mapping places the Subject Site within the; '*Tertiary - Cainozoic - Phanerozoic (TPw) period: Plantagenet Group - siltstone, spongolite; minor sandstone, peat, and conglomerate.*' The aquifer is a '*sedimentary aquifer with intergranular porosity – extensive aquifers, major groundwater resources.*' (DoW, 2015).

A Geotechnical Investigation was conducted on the 29th of August 2017 by Great Southern Geotechnics under late winter conditions. The investigation included both soil analysis and measuring of water table. Ten boreholes were constructed within the Subject Site to a depth of 2.3 metres, the location of the boreholes is shown on Figure 3. Groundwater was not observed in any of the boreholes indicating there is no likely groundwater present beneath the Subject Site to a depth of 2.3 metres. The Geotechnical Investigation (Great Southern Geotechnics, 2017) was undertaken in accordance with Australian Standards and has been included as Appendix B.

The subject site is not located within a Public Drinking Water Source Protection Area (DoW 2001).

3.9. Wetlands

There are no significant wetlands within or within the vicinity of the Subject Site.

3.10. Sewerage Sensitive Area

The Subject Site is located in a Sewerage Sensitive Area according to the Department of Planning's Sewerage Sensitive Area Mapping (DoP, 2017). The draft Government Sewerage Policy (2016) describes Sewerage Sensitive Areas, as areas; '*within 10 kilometres of Wilson Inlet, Torbay Inlet, Manarup Lagoon, Lake Powell, Princess Royal Harbour and Oyster Harbour*'.

3.11. Flora and Vegetation

The Subject Site lies within the Jarrah Forest IBRA bioregion. Hearn et al (2002) describes the bioregion as; '*Duricrusted plateau of Yilgarn Craton characterised by Jarrah-Marri forest on laterite gravels and, in the eastern part, by Wandoo - Marri woodlands on clayey soils. Eluvial and alluvial deposits support Agonis shrublands. In areas of Mesozoic sediments, Jarrah forests occur in a mosaic with a variety of species-rich shrublands.*'

The vegetation has been mapped on a broad scale by J.S. Beard (Shepherd et al 2002) in the 1970's, where a system was devised for state-wide mapping and vegetation classification based on geographic, geological, soil, climate structure, life form and vegetation characteristics (Sandiford and Barrett 2010). A GIS search of J.S. Beards (DEC, 2005) vegetation classification places the Subject Site within one System and Vegetation Association (Source DEC Pre-European Vegetation GIS dataset, 2005):

- **System Association Name:** Albany.
- **Vegetation Association Number:** 3.
- **Vegetation Description:** Low forest; jarrah, *Eucalyptus staeri* & *Allocasuarina fraseriana*.

The Albany Regional Vegetation Survey (ARVS) undertaken by Sandiford and Barret in 2010 identified the vegetation within the Subject Site as belonging to the Jarrah/Marri/Sheoak Laterite Forest unit. This unit is described as occurring on well drained shallow loamy/sandy soil with outcropping laterite (Sandiford and Barret, 2010). Key defining features of this vegetation type are a canopy of *Eucalyptus marginata* and *Allocasuarina fraseriana* over a relatively open and diverse understorey. The understorey is dominated by *Bossiaea linophylla*, *Agonis theiformis* and *Xanthosia rotundifolia*. *Banksia grandis* is often present within this vegetation type as a tall shrub. Common identifying species of the open sedge component of this vegetation type are *Tetraria octandra*, *Tetraria capillaris*, *Desmocladus fasciculatus* and *Anarthria prolifera* (Sandiford and Barret, 2010). Furthermore, this vegetation type has been assessed as having a modified condition (Thackway and Leslie, 2006) (equivalent to "good to very good" on the Keighrey (1994) Condition Scale) whereby the native vegetation community structure, composition and regenerative capacity is intact, but is perturbed by land use / land management practices (Thackway and Lesslie 2006). ARVS Mapping within the Subject Site and its vicinity is shown on Figure 4.

A search of publicly available databases through WA Atlas, Nature Map, and EPBC Protected Matter Search Tool indicates that no threatened, priority or declared rare flora is present on the site, or within the surrounding Nature Reserves and remnant vegetation.

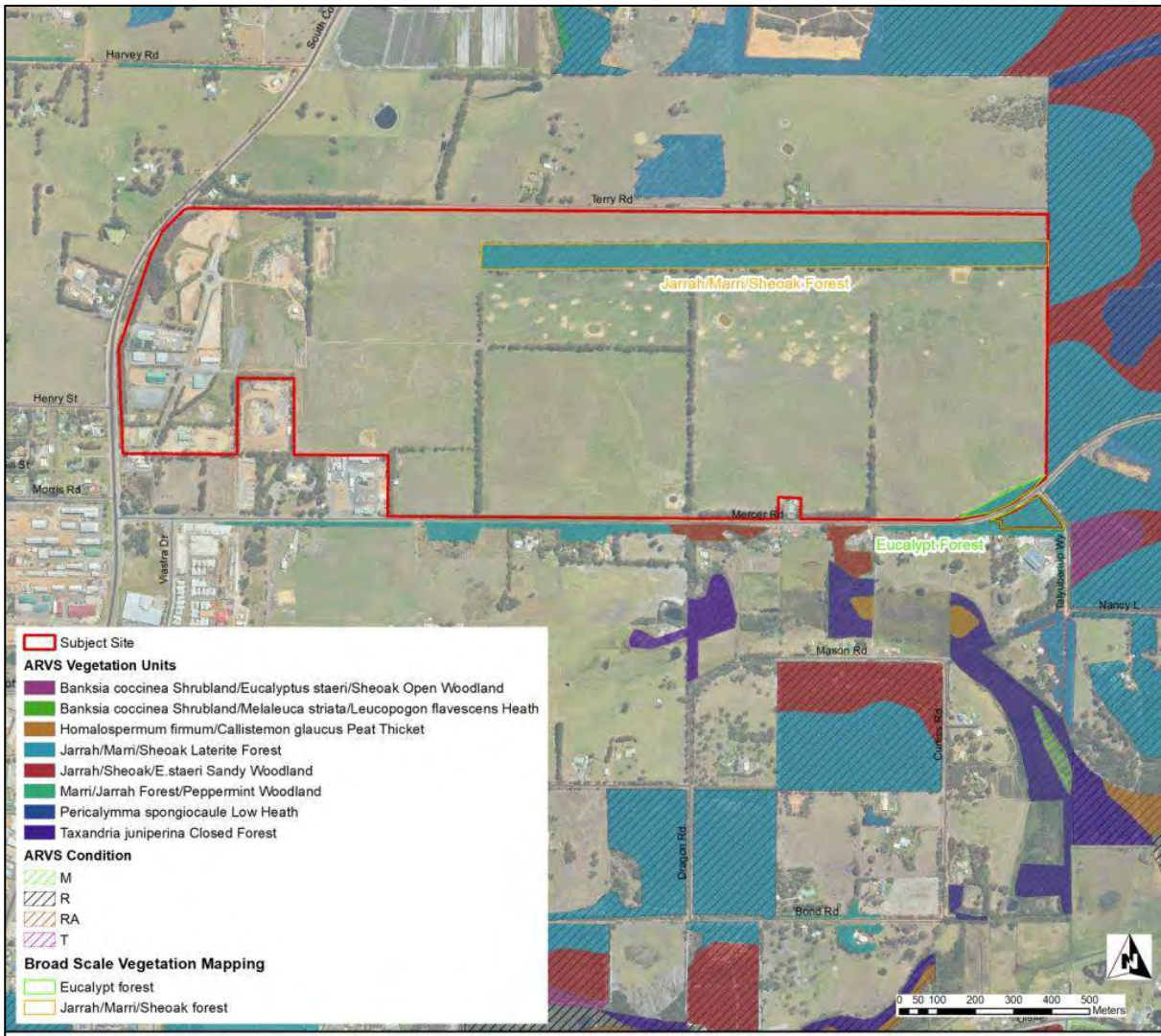


Figure 4: ARVS & Broad Scale Vegetation Survey Mapping

3.12. Vegetation Survey

The vegetation across the Subject Site and surrounding areas is consistent with rural farmland, with the majority of the site and surrounds comprising of heavily grazed pasture dominated by pasture grass species. There are two areas of remnant vegetation within the Subject Site, a strip of vegetation running parallel with the northern boundary of the site (approximately 12 ha) and a small area in the south-eastern corner of the site on either side of Mercer Road.

As part of this EAR a broad scale vegetation survey was conducted on the 29 August 2017 on the two areas of remnant vegetation. Two vegetation types were identified; the strip of vegetation in the north was identified as Jarrah/Marri Sheoak Forest and the vegetation in the south-east corner was identified as Eucalypt Forest. Broad scale Vegetation Mapping is shown on Figure 4. As per the Draft Structure Plan the internal remnant vegetation is to be retained as Public Open Space (POS).

Jarrah/Marri/Sheoak Forest

This area was previously described as being Jarrah/Marri/Sheoak Laterite Forest by Sandiford and Barrett (2010). The species identified during this survey are consistent with the ARVS vegetation type. The overstorey composition consisted of *Eucalyptus marginata*, *Allocasuarina fraseriana*, *Corymbia calophylla* and occasional patches of *Eucalyptus cornuta* and *Banksia grandis*. Midstorey species identified were *Agonis flexuosa*, *Bossiaea linophylla*, *Beaufortia decussata*, *Hakea amplexicaulis*, *Persoonia longifolia*, *Leucopogon verticillatus*, *Xanthorrhoea platyphylla*, *Bossiaea dentata*, *Hakea ruscifolia*, *Xanthosia rotundifolia*, *Tetratheca setigera*, *Sphaerolobium alatum* (?), *Hovea chorizemifolia*, *Hibbertia* sp., and *Pimelea* sp. Understorey species

identified included natives such as *Chamaescilla corymbosa* var. *corymbosa*, *Dampiera* sp., *Lomandra* sp., and *Conostylis* sp., as well as weed species such as **Cirsium* sp., **Oxalis* sp., **Cenchrus clandestinus*, and **Hypochaeris* sp. (* Denotes weed species). Based on the species composition observed during the survey this vegetation type is still consistent with ARVS.

The condition of this strip of vegetation varied throughout its extent with condition improving closer to the fenced remnant vegetation to the east. The western half of the strip was quite open, with very few midstorey species and a high proportion of sedges and grasses with areas of bare ground. This is likely due to grazing pressures from cattle. There was evidence of cattle activity throughout this area with cattle tracks, hoof prints and cow dung detected. There were areas where midstorey and understorey vegetation increased with fewer signs of disturbance present. Vegetation in this unit is considered to be in very good condition as there are obvious signs of disturbance to the vegetation structure from cattle grazing, weeds and human disturbances (Keighrey, 1994). Photographs 9 to 12 show images of Jarrah/Marri/Sheoak Forest within Subject Site.



Photograph 9 to 12 – View of Jarrah/Marri/Sheoak Forest within Subject Site

Eucalypt Forest

This area of vegetation was mapped in the ARVS as Jarrah/Marri/Sheoak Laterite Forest, however during this survey few species associated with this vegetation type were identified, there were also a high proportion of weed species were identified. The overstorey composition consists of *E. marginata*, *Eucalyptus gomphocephala*, *A. fraseriana*, *C. calophylla*, *Eucalyptus megacarpa*, **Acacia longifolia*, **Acacia dealbata*, *Eucalyptus* sp., and **Pinus radiata* (* Denotes weed species). The midstorey composition was far less diverse than the northern strip of vegetation. Species identified included *Callistemon* sp., *Beaufortia decussata*, *Leucopogon verticillatus*, *Leucopogon* sp., *Pimelea* sp., *Hibbertia* sp., *Adenanthos cuneatus*, *Hemiandra pungens*, and *Chamelaucium ciliatum*. There were very few understorey species present, with most of the area covered with plant litter, of the groundcover/understorey species present these were weed species such as *Kikuyu* and *Watsonia* sp.

Vegetation condition within this area is considered to be degraded as the basic vegetation structure has been severely impacted by multiple disturbances such as aggressive weed species and clearing activities (Keighrey, 1994). Evidence of clearing was observed during this survey as several trees and larger shrubs had been cut down. Photographs 13 to 16 show images of Eucalypt Forest within Subject Site.



Photograph 13 to 16 – View of Eucalypt Forest within Subject Site.

3.13. Fauna

The majority of the site has been historically and extensively cleared and as a consequence significant fauna habitat has been removed. Opportunistic Fauna sightings were recorded during the Broad Scale Vegetation Survey on the two areas of remnant vegetation within the Subject Site.

3.13.1. Opportunistic Fauna Sightings

During the Broad Scale Vegetation Survey of the strip of remnant vegetation in the north of the Subject Site various birds were observed and heard within the Jarrah/Marri/Sheoak Forest such as Red-Capped Parrot (*Purpleicephalus spurius*), Galah (*Eolophus roseicapillus*), Willie Wagtail (*Rhipidura leucophrys*), New Holland Honeyeater (*Phylidonyris novaehollandiae*), Yellow rumped Thornbill (*Acanthiza chrysorrhoa*), Western Gerygone (*Gerygone fusca*), Rufous Whistler (*Pachycephala rufiventris*) and Magpie (*Cracticus tibicen*). A flock of 6-10 Forest Red-tailed Black Cockatoos (*Calyptorhynchus banksii naso*) were observed feeding in the adjacent remnant vegetation to the east of the Subject Site. A potential Quenda (*Isoodon obesulus fusciventer*) runnel was identified within the understorey of the Jarrah/Marri/Sheoak Forest (Photograph 17). Western Grey Kangaroos (*Macropus fuliginosus*) were also observed.



Photograph 17 – Potential Quenda Runnel within Subject Site remnant vegetation.

3.14. Contaminated Sites

A review of the DER’s Contaminated Sites Database determined there are no registered contaminated sites within the Subject Site. However, prior to subdivision further investigations may be required to confirm there is no potential contamination on the site.

3.15. Heritage

A search of the Department of Aboriginal Affairs’s Aboriginal Heritage Inquiry System was conducted and no matches were recorded for the Subject Site or within the vicinity of the Subject Site.

A search of the Heritage Council’s inHerit database and the City of Albany’s Municipal Heritage Inventory (City of Albany 2000) was conducted with no matches found for the Subject Site or its surroundings.

3.16. Bushfire Risks and Bushfire Assessment

The publicly released Bushfire Prone Area Mapping (DFES, 2017) shows that the majority of the Subject Site is located within a Bushfire Prone Area (situated within 100m of >1 ha of bushfire prone vegetation). Bushfire Prone Area Mapping is shown on Figure 5.



Figure 5: Bushfire Prone Area Mapping

A BAL Contour plan has been prepared for the site by Level 2 Bushfire Practitioner K. Kinnear (BPAD 30794). The BAL Contour Plan has been included as Appendix D. All vegetation within 150m of the site boundary/ proposed development was classified in accordance with Clause 2.3 and Exclusions as per Clause 2.2.3.2 of AS 3959-2009. Each distinguishable vegetation plot with the potential to determine the Bushfire Attack Level is identified in the BAL Contour document. Each plot is representative of the Vegetation Classification to AS3959-2009 Table 2.3 and shown on the Vegetation Classification Mapping (Appendix D).

The Subject Site was assessed as having internal areas of Grassland Type G consistent with rural farmland, low fuel/non- vegetated areas (associated with the industrial area, tracks/roads and buildings) and an area of Forest Type A (being the strip of remnant vegetation in the north). External bushfire risks are mostly associated with the Forest Type A (CoA reserve) directly to the east and south-east of the Subject Site and Forest Type A and Woodland Type B along Mercer Road (Bio Diverse Solutions, Appendix D).

The Guidelines for Planning in Bushfire Prone Areas (WAPC, 2017) outlines bushfire protection criteria which subdivision and development proposals are assessed for compliance. The bushfire protection criteria

(Appendix 4, WAPC, 2017) are performance based criteria utilised to assess bushfire risk management measures and they outline four elements, being:

- Element 1: Location
- Element 2: Siting and Design of Development;
- Element 3: Vehicle Access; and
- Element 4: Water.

(WAPC, 2017)

The Local Structure Plan is required to meet the “Acceptable Solutions” of each Element of the bushfire mitigation measures (WAPC, 2017). The proposal will be assessed against the bushfire protection criteria Acceptable Solutions for Elements A1, A2, A3 and A4.

Acceptable Solution A1- Location

It is recommended to guide the development of the LSP that the minimum separation apply to achieve BAL 29 or less on the future dwellings (as shown on the BAL Contour Plan):

- 21-27m Forest Type A;
- 14-17m Woodland Type B;
- 13-15m Scrub Type D; and
- 8-9m Grassland Type G.

This will ensure that Acceptable Solution 1 is achieved by setbacks to BAL 29 applied through the design and layout of the road reserves and (if required) building setbacks.

Acceptable Solution A2 – Siting and design

All buildings within the Structure plan shall have an Asset Protection Zone (APZ) area associated with BAL 29 or less. Setbacks for dwellings associated with the BAL Contours can be applied through the road design from external and internal bushfire risks. Future landscaped areas (internal shall below fuel in nature and maintained areas. The internal POS area in the north shall remain as native vegetation and the internal road design will ensure BAL 29 or less prevails over the proposed dwellings.

Any future plantings in POS areas (excepting the northern POS) are to be to a APZ standard as per WAPC requirements. The developer will be responsible for implementing revegetation standards as per APZ standards. New lot owners are to conform to any planting on their lot for revegetation, screening or windbreaks to APZ standards.

Staged construction is to ensure that separation distances to residential areas are maintained, as a guide 100m from any residential building should be maintained as low fuel areas (i.e. maintained by the Developer) to ensure that BAL does not apply from current land management practises to the proposed residential areas.

Acceptable Solution A3 – Vehicular Access

The internal road layout should ensure that every lot has the ability to exit the Structure Plan in two separate directions to a minimum of two destinations. Cul-de-sacs and battle axes are not recommended. The minimum technical requirements for public roads are shown in Table 9.

Table 9: Vehicular Access Technical Requirements (WAPC, 2017)

Technical requirements	Public Road
Minimum trafficable surface (m)	*6
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
Maximum Length	N/A

Fire Service Access and Emergency Access Way will be along the internal road network and will not be required separately. Staged development should include road network construction to ensure that no one-way or dead-end streets occur. Firebreaks are to be maintained on the parent lot according to CoA Fire Management Notice (annually updated). Compliance to these issues will ensure the Acceptable Solution A3 (1-8) can be achieved.

Acceptable Solution A4 – Water Supply

The development will be provided with reticulated scheme water in accordance with the specifications of the relevant water supply authority (Water Corporation WA (WCWA)) and DFES requirements. This will be detailed in the detailed engineering drawings and be subject to approval from WCWA and DFES at subdivision condition stages, meeting the Acceptable Solution. Fire hydrant (street) outlets are required, these must be installed to WCWA standards installed in accordance with the *Water Corporation's No 63 Water Reticulation Standard* and are to be identified by standard pole and/or road markings and installed by the Developer.

The Structure Plan is deemed compliant to this Acceptable Solution 4.1.

Overall Fire Management for the site

BAL contouring across the Subject Site has allocated BAL 29 or less to apply to any buildings and can be guided by the Structure Plan design. Setbacks from bushfire risks is to be maintained through road reserves and building setbacks. The inherent bushfire risks for the site is the internal strip of vegetation in the north and the remnant vegetation contained in CoA reserve to the east. Minimum setbacks to achieve BAL 29 in these areas is 21m (northern strip of remnant vegetation) and 27m (eastern CoA reserve). All future buildings can achieve an APZ area associated with a BAL allocation of BAL 29, BAL 19 or BAL 12.5.

Vehicle access standards can be achieved through the Structure Plan design. The minimum technical requirements for Public Roads is to meet Table 9. No Battle axes are proposed and FSA will be along the public road network. One Cul-de-sac is proposed near the intersection of Range and Terry Road, as the CoA seek to minimise new intersections to Range Road and the eastern extents of Terry Road. Where the cul-de-sac is present, an EAW is shown connecting to Range Road ensuring compliance to Element A3.3 of Acceptable Solution A3. Reticulated water will be provided water in accordance with the specifications of the relevant water supply authority WCWA and DFES requirements, meeting A4.1.

A detailed Bushfire Management Plan will be required if any industry is defined as "High Risk" or to support a future Development Application for the Primary School. Additionally, a detailed Bushfire Management Plan may be required to support the staged development of the subdivision.

High Risk Land use and Vulnerable Land Uses

The LSP contemplates potential "High Risk" land use (light industry) and "Vulnerable Land Use" as per the definitions of SPP 3.7. As defined by the Guidelines for Planning in Bushfire Prone areas Vers1.2 (2017):

“High-risk land uses may include, but are not limited to: service stations, landfill sites, bulk storage of hazardous materials, fuel depots and certain heavy industries as well as military bases, power generating land uses, saw-mills, highways and railways, among other uses meeting the definition.

Proposals for non-residential, high-risk land uses in bushfire prone areas are to comply with policy measure 6.6 which requires a Bushfire Management Plan jointly endorsed by the local government and the Department of Fire and Emergency Services. This may include establishing an appropriate Asset Protection Zone or Hazard Separation Zone, and should be supported by a risk management plan that addresses bushfire risk management measures for any flammable on-site hazards.”

As Light industrial land use is proposed in the west of the Structure Plan, a detailed Bushfire Management Plan will be required to guide developers if any industry is defined as “High risk”.

Policy measure 6.6 of SPP 3.7 applies to vulnerable land uses, and refers specifically to subdivision and development applications. However, if a scheme amendment or structure plan identifies a site for a vulnerable land use, then the policy requirements should be addressed. Typically, vulnerable land uses are those where persons may be less able to respond in a bushfire emergency. A detailed Bushfire Management Plan jointly endorsed by DFES and CoA will be required for any Primary School proposed in the Structure Plan area at the Development Application stage. A Bushfire Emergency Evacuation Plan (BEEP) will be required at Development Approval Stages.

4. Land Capability Assessment

Land capability is the ability of the land to sustain a specified land use without resulting in significant onsite or offsite degradation or damage to land resources. The Land Capability Assessment of the Subject Site is completed in accordance with the State Planning Commission’s (1989) Land Capability Assessment for Local Rural Strategies. The assessment is a three-stage process and includes:

Stage 1 – Land Use Requirements

- Specify and define the proposed land use;
- Determine the specific land use requirements of that use;
- List the relevant land qualities to fulfil the land use requirements; and
- List the relevant land characteristics which determine each land quality.

Stage 2 – Land Resource Survey

- Divide the study area into mapping units which have a measurable difference in the land characteristics listed above and may be expected to influence the land quality attributes and land capabilities.

Stage 3 – Land Capability Analysis

- For each mapping unit rate each individual land quality; and
- For each mapping unit determine its overall capability to sustain the land use by comparing its land quality ratings in the capability rating table.

The WAPC (1989) utilises a five-class system of assessing Land Capability, these five classes rate the degree of physical limitations associated with land use and management needed for these. The land capability classes are shown in Table 2.

Table 2: Land Capability Classes

Capability Class	Degree of Limitation	General Description
I	Very low	Areas with a very high capability for the proposed activity or use. Very few physical limitations to the specified use are present or else they are easily overcome. Risk of land degradation under the proposed use is negligible.
II	Low	Areas with a high capability for the proposed activity or use. Some physical limitations to the use do occur affecting either its productive use or the hazard of land degradation. These limitations can however, be overcome through careful planning.
III	Moderate	Areas with a fair capability for the proposed activity or use. Moderate physical limitations to the land use do occur which will significantly affect its productive use or result in moderate risk of land degradation unless careful planning and conservation measures are undertaken.
IV	High	Areas with a low capability for the proposed activity or use. There is a high degree of physical limitations which are either not easily overcome by standard development techniques or which result in a high risk of land degradation without extensive conservation requirements.
V	Very High	Areas with a very poor capability for the proposed activity or use and the severity of physical imitations is such that its use is usually prohibitive in terms of either development costs or the associated risk of land degradation.

4.1. Land Use Requirements

There are two land uses proposed for the Subject Site as defined by the State Planning Commission (1989) Urban Development and Light Rural Industry (note these definitions are as per this policy for the purposes of this report and not any other planning instrument/policy). The location of the two proposed land uses is shown on the LSP in Appendix A, with “Urban Development” shown as “Residential” and “Light Rural Industry” shown as “Light Industry”.

4.1.1. Urban Development

The WAPC Land Capability Assessment for Rural Strategies Guideline defines Urban Development areas as follows;

‘Urban use consists of mostly residential development, but includes the use of land for extensive building complexes (such as shopping centres and offices). Urban development is an intensive form of land use which requires a high level of servicing and site disturbance.

Services include sealed and kerbed roads and carparks, storm water drainage and underground services (including reticulated water, gas and telephone connections) to cater for single housing allotments in the order of 500-700m² but also up to 2000 m².

The Water Authority’s Country Sewerage Policy indicates that deep sewerage should be provided where it is already provided within the town, or where soil, land and environmental factors specifically indicate it should be provided. Deep sewerage may not need to be provided if there are no environmental or public health problems arising from the operation of on-site septic tanks.’

The WAPC Land Capability Assessment for Rural Strategies Guideline identifies land use requirements for Urban Development areas as follows;

- Availability of extensive flat to gently sloping areas (preferably 0-2% but up to 8%);
- Deep well drained soils which are easy to excavate and provide a stable foundation for building;
- Disposal of liquid effluent via a treatment plant or from onsite septic tanks should not result in pollution of surface water bodies or groundwater resources;
- Urban stormwater is often highly polluted (high in BOD, nutrients, heavy metals and hydrocarbons) and may need to be treated to prevent point source pollution at the disposal site; and
- Urban development results in increased stormwater runoff which may raise the level of the unconfined water table or result in soil instability where steep slopes occur. The land should therefore not be subject to slumping/ landslips, water logging or water erosion.

Table 3 outlines the land qualities to fulfil the Urban Development land use requirements. The land characteristics for each land quality are shown in the guideline document (WAPC 1989).

Table 3: Land Qualities to fulfil Urban Development Land Use Requirements

Land Qualities	Rating				
	Very high	High	Moderate	Low	Very Low
Ease of excavation, x	Very high	High	Moderate	Low	Very Low
Foundation stability, b	Very high	High	Moderate	Low	Very Low
Water logging hazard, i	Low		Moderate	High	Very high
Water erosion hazard, e	Low		Moderate	High	Very high
Soil salinity, y	Very Low	Low	Moderate	High	
Soil absorption ability, a	High	Moderate	Low	Very Low	
Wind erosion hazard, w			Low	Moderate	High-Very high
Bushfire hazard, z	Very Low	Low	Moderate	High	Very high
Wave erosion hazard, u					High – Very high
Flood hazard, f	Very low				High -Very high
Water pollution hazard, s			Low	Moderate	High
Water availability, g	High			Moderate	Low
Overall capability rating	I	II	III	IV	V

4.1.2. Light Rural Industry

The WAPC Land Capability Assessment for Rural Strategies Guideline defines Light Rural Industry areas as follows;

‘This land use comprises mixed industrial uses (such as light industry, agriculture support industries) often with showroom/warehouse developments along major roads on the periphery of towns. These industries are generally controllable. The activities are mostly undertaken in warehouses or factories, while the external area, being used for traffic circulation, storage and display purposes, is generally cleared of all vegetation and compacted or sealed. Lot sizes may vary considerably but are often about 2000 m². These areas may be deep sewerred (especially if the town is sewerred) but this is generally not a requirement. A reticulated water supply is provided to each lot.’

The WAPC Land Capability Assessment for Rural Strategies Guideline identifies land use requirements for Light Rural Industrial areas as follows:

- Availability of extensive flat to gently sloping areas (0 - 8%);
- Deep to moderately deep well drained soils which are easy to excavate and provide a stable foundation for building. Moderately well drained soils with a slight susceptibility to waterlogging may be tolerated;
- The land should not be susceptible to flooding; and
- Disposal of septic effluent or other waste waters should not result in water pollution.

Table 4 outlines the land qualities to fulfil the Light Rural Industry land use requirements. The land characteristics for each land quality are shown in the guideline document (WAPC 1989).

Table 4: Land Qualities to fulfil Light Rural Industry Land Use Requirements

Land Qualities	Rating				
	I	II	III	IV	V
Ease of excavation, x	Very high-high		Moderate	Low	Very Low
Foundation stability, b	Very high-high		Moderate	Low	Very Low
Water logging hazard, i	Low	Moderate	High	Very High	
Water erosion hazard, e	Low	Moderate	High	Very High	
Soil absorption ability, a	High	Moderate	Low	Very Low	
Flood hazard, f	Nil		High		Very high
Water pollution hazard,s	Very low	Low	Moderate	High	
Water availability, g	High		Moderate		Low
Overall capability rating	I	II	III	IV	V

4.2. Land Resource Survey

The land characteristics have been analysed to determine mapping units at the Subject Site for assessing land capability. The mapping units were determined using the following land characteristics:

- Soils, including: soil type, texture, depth, PRI and permeability;
- Slope;
- Depth to groundwater;
- Land use; and
- Vegetation type.

The two distinguishable Mapping Units are defined in Table 5.

Table 5: Mapping Units

Map Unit	Characteristics within the Subject Site
Map Unit 1	<p>Silty sand topsoil over sandy gravel over sandy clay or silty sand topsoil over sandy clay.</p> <p>Soils have low permeability.</p> <p>Soils have high PRI.</p> <p>Groundwater > 2.3m BGL.</p> <p>Slope <0 to 5%.</p> <p>Predominately cleared land with pasture grasses.</p> <p>Rural land use.</p>
Map Unit 2	<p>Silty sand topsoil over gravelly sand over sandy gravel.</p> <p>Soils have low PRI.</p> <p>Groundwater > 2.3m BGL.</p> <p>Slope <0 to 5%.</p> <p>Predominately cleared land with pasture grasses.</p> <p>Rural land use.</p>

The mapping units for the Subject Site are shown on Figure 6.

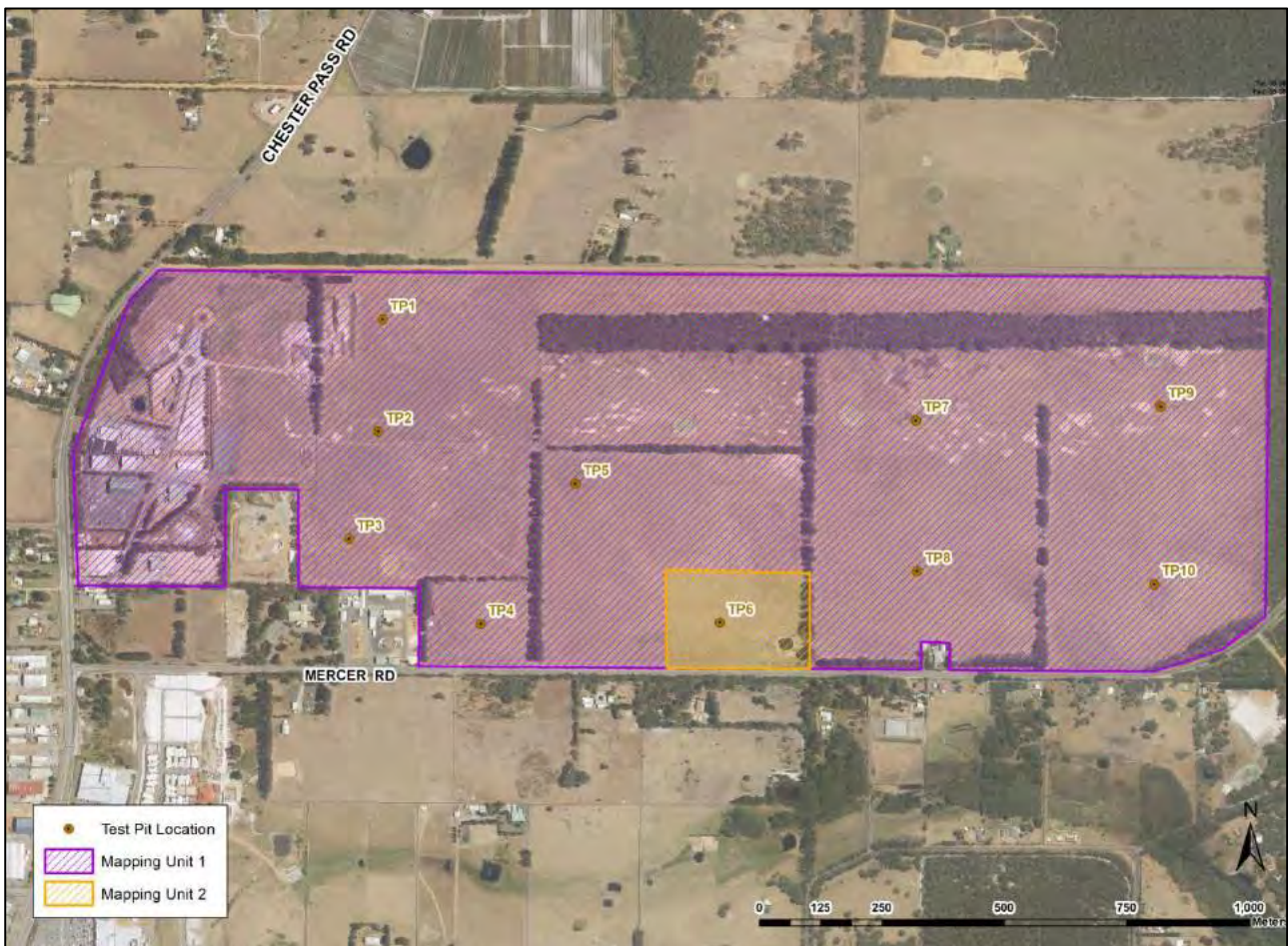


Figure 6: Land Capability Mapping Units

4.3. Land Capability Analysis

4.3.1. Urban Development

The land capability assessment for the Urban Development portion of the Subject Site is presented in Table 6. Two mapping units (Mapping Unit 1 and 2) are present in the location of the proposed Urban Development.

Table 6: Land Capability Assessment for Urban Development

Land Qualities	Mapping Unit 1	Mapping Unit 2
Ease of excavation, x	High	Very high
Foundation stability, b	High	Very high
Water logging hazard, i	Moderate	Low
Water erosion hazard, e	Low	Low
Soil salinity, y	Very Low	Very Low
Soil absorption ability, a	Moderate	Very Low
Wind erosion hazard, w	Low	Low
Bushfire hazard, z	Moderate	Moderate
Wave erosion hazard, u	Nil	Nil
Flood hazard, f	Nil	Nil
Water pollution hazard, s	Low	Moderate
Water availability, g	High (scheme water)	High (scheme water)
Overall capability rating	II	IV

The overall capability of the Subject Site supporting the Urban Development land use is rated as highly capable for Mapping Unit 1 and low capability for Mapping Unit 2 (refer to Table 2 for full description of capability rating).

4.3.2. Light Rural Industry

The land capability assessment for the Light Rural Industry portion of the Subject Site is presented in Table 7. Only Mapping Unit 1 is present in the location of the proposed Light Rural Industrial area.

Table 7: Light Rural Industry Land Capability Rating

Land Qualities	Mapping Unit 1
Ease of excavation, x	High
Foundation stability, b	High
Water logging hazard, i	Moderate
Water erosion hazard, e	Low
Soil absorption ability, a	Moderate
Flood hazard, f	Nil
Water pollution hazard, s	Low
Water availability, g	High (scheme water)
Overall capability rating	II

The overall capability of the Subject Site supporting the Light Rural Industry land use is rated as highly capable (refer to Table 2 for full description of capability rating).

5. Potential Environmental Impacts and Management Measures

5.1. Acid Sulphate Soils

Acid Sulphate Soils (ASS) are stable when left undisturbed, but when they are exposed to air, during excavation or dewatering, this can set off a reaction resulting in acidity (sulfuric acid) being produced. The potential impacts relate to the potential for oxidation of excavated or in situ ASS generating acidic conditions, and possibly releasing metals into groundwater or surface water catchments. ASS mapping indicates the Subject Site is not situated on any known Acid Sulphate Soils (Figure 2). There is however a section of high to moderate risk of ASS occurring within 3m of natural soil surface to the south of the Subject Site on Mercer Road.

The final fill levels and excavation requirements of the proposed subdivision will determine if an ASS and Dewatering Management Plan (ASSDMP) is required to be prepared prior to subdivision. If required, the ASSDMP will be prepared to satisfy the DER and will outline the soil management measures, the groundwater and dewatering effluent monitoring measures and the contingency management measures required to minimise any environmental impacts.

5.2. Water Management

Findings outlined in Sections 3.7 and 3.8 indicate there are limited water management risks associated with development of the Subject Land. Based on the investigations, there is no requirement to undertake pre-development groundwater monitoring. Overall, the soil types enable stormwater infiltration at source.

The water management objectives are to maintain the quantity of surface water and groundwater so that existing and potential environmental values are protected and to ensure that the quality of water emissions (surface and ground) do not adversely affect environmental values or the health, welfare and amenity of people and land uses, and meets statutory requirements and acceptable standards.

A number of management/design measures will be implemented to reduce the impact of the proposed development on surface water and groundwater flows, levels and quality, the function and environmental values of the site, or its interconnected areas. Management measures relevant to construction and the development will be identified in a Local Water Management Strategy (LWMS).

The LWMS details the integrated water management strategies to facilitate future urban water management planning. The LWMS will achieve integrated water management through the following design objectives:

- Effectively manage the risk to human life, property damage and environmental degradation from water contamination, flooding and waterlogging.
- Maintain and if possible improve water quality (surface and groundwater) within the development in relation to pre-development water quality.
- Reduce potable water consumption within both public and private spaces using practical and cost-effective measures.
- Promote infiltration of surface water on site to minimise the risk of further water quality degradation in the Catchment.
- Implement best management practices in regards to stormwater management.
- Incorporate where possible, low maintenance, cost-effective landscaping and stormwater treatment systems.

The LWMS will incorporate the following structural Best Management Practices (BMPs) to address water quantity and quality for the LSP:

- A conceptual drainage strategy demonstrating that the land is capable of retaining the 100 ARI event, while providing an indicative location of stormwater detention.

- Structural and non-structural controls will be used to improve stormwater quality, as compared to a development that does not actively manage stormwater.
- Rainfall from the 1 year 1-hour ARI (Annual Recurrence Interval) events will be retained and infiltrated as close to the source as possible.
- All residential lots will confine run-off from roofs and paving within the property boundary.
- Large rainfall events (10 ARI to 100 ARI) will be conveyed and retained through a network of roads, drainage reserves and POS within each catchment.
- It is anticipated that there will be no impacts from stormwater run-off to downstream ecosystems.

It is expected that development of the site will have a positive impact on groundwater and stormwater quality through BMPs and the treatment of stormwater prior to infiltration. Based on the site assessment and the management measures proposed, it is not expected that any changes to groundwater flows, levels or quality will have an adverse impact on the function and environmental values of the site.

5.3. Waste Water Management

The Subject Site is situated in a Sewerage Sensitive Area that does not have access to deep or reticulated sewerage. It is proposed the initial stage/s of the subdivision will involve the extension of the Light Industrial Area (similar to the existing Industrial Area) and on-site effluent disposal will be required for this area. All residential subdivision will be connected to reticulated sewerage.

The draft Government Sewerage Policy (DoP, 2016) outlines that on-site effluent disposal may be considered for non-residential subdivision that:

- Are remote from existing or proposed sewerage schemes and the proposed development cannot be connected to reticulated sewerage;
- Utilise secondary treatment systems with nutrient removal if in a sewage sensitive area or a public drinking water source area; and
- Where the proponent has demonstrated, to the satisfaction of the Western Australian Planning Commission on the advice of the Department of Health and the Department of Water that there is sufficient capacity to treat and dispose of sewage and contain associated buffers on-site. Consideration will be given to the maximum hydraulic load that can be contained within the lot and the potential impacts on waterways and wetlands.

The minimum lot size for non-residential lots is determined on a case-by-case basis. Residential lots with on-site effluent disposal in sewerage sensitive areas must be at least 1 hectare in size (DoP, 2016).

The proposed industrial area as shown on the LSP was assessed against the requirements for lots with on-site effluent disposal as outlined in the draft Government Sewerage Policy (DoP, 2016). The requirements and assessment to each requirement is shown in Table 8.

Table 8: Assessment to On-site Effluent Disposal Lot Requirements

Lot Requirement (DoP, 2016)	Assessment to Requirement
Adequate separation from groundwater – the discharge point of the on-site sewage disposal system should be at least 1.2 to 1.5 metres, depending on soil type, in sewerage sensitive areas.	Groundwater was not encountered to 2.3 metres depth (Great Southern Geotechnics, 2017).
An on-site sewage disposal system should not be located within 30 metres of a private bore used for household/drinking water purposes.	There are no private bores registered within the Subject Site or with in the vicinity of the proposed Industrial Area (DoW Water Register, 2017).

Table 8 continued over page.

Lot Requirement (DoP, 2016)	Assessment to Requirement
An on-site sewage disposal system should not be located within 100 metres of a waterway.	No waterways located within the Subject Site or within 100m of the proposed Industrial Area (Site inspection conducted 29/8/2017)
An on-site sewage disposal system should not be located within 100m of a significant wetland.	No significant wetlands located within the Subject Site or within the vicinity of proposed Industrial Area (DEC and CoA 2017 database search)
An on-site sewage disposal system should not be located within 100 metres of a surface or subsurface drainage system that discharges directly into a downstream waterway or waterbody.	No surface or subsurface drainage systems located within the Subject Site or within 100m of the proposed Industrial Area (Site inspection conducted 29/8/2017 and DoW database search)
An on-site sewage disposal system should not be located within any area subject to inundation and/or flooding in a 10 per cent Annual Exceedance Probability (AEP) rainfall event.	Given the relatively higher topography in the area and gradual slopes of the land inundation in the location of the proposed Industrial area is unlikely.

The assessment found that the proposed light industrial area is appropriate for effluent disposal and meets the stated minimum requirements for on-site sewage disposal systems as outlined in the *Draft Government Sewerage Policy* (Department of Planning, 2016). In addition, the low permeability and high PRI of the soils in the location of the proposed industrial area will allow for slow draining assisting the process of being fixed by soil microbes.

As the industrial area is in a sewerage sensitive area a secondary waste water treatment system with nutrient removal should be used. The provision of on-site sewage disposal systems including calculation of land application area shall be in accordance with minimum site requirements contained in Schedule 3 of the draft Government Sewerage Policy (DoP, 2016) and must be approved for use in Western Australia by the Department of Health. The Local Planning Scheme requirements for the current Light Industrial area require 'dry industry' and 'alternative treatment effluent disposal systems'.

Where on-site sewage disposal is to be provided by a secondary treatment system, the WAPC will require a notification on title pursuant to Section 70A of the *Transfer of Land Act 1893* (as amended) advising that an on-site secondary treatment sewage disposal system and unencumbered area to which treated sewage is to be distributed are required.

5.4. Flora and Vegetation

The aim of the flora and vegetation management strategy is to maintain the abundance, diversity, geographic distribution and productivity of flora at the species and ecosystem levels through the avoidance or management of adverse impacts and through improvement in knowledge.

The site's historical use for agriculture and grazing has degraded the vegetation on site and reduced the native vegetation cover to a strip of remnant vegetation in the north of the site and a small area in the south-east corner of the site. Consequently, it is anticipated that the proposed development would have very little impact on native vegetation. All efforts should be made to conserve existing native vegetation. There is support however to clear, as required, replanted vegetation which is Bluegums given they are generally unsuitable in an urban area.

The following management measures have been developed and incorporated into the LSP to reduce the likelihood of impacts to vegetation and flora. These measures have been developed with the aim of retaining the key existing biological values of the site:

- Remnant vegetation will be retained within the vegetation strip in the north of the Subject Site and in the south-east corner of the site (inclusion within POS will provide the most effective way of managing the conservation values of the native vegetation).
- Access crossings within the vegetation strip will be limited to facilitate retention and natural regeneration of vegetation.
- Use of native vegetation species in areas of POS and revegetation areas to maintain local biodiversity.

5.5. Fauna

The aim of the fauna management strategy is to maintain the abundance, diversity, geographic distribution and productivity of native fauna at the species and ecosystem levels through the avoidance or management of adverse impacts and improvement in knowledge.

As the majority of the site has been historically cleared and as a result, fauna habitat has largely been removed. The only potentially significant fauna habitat on site is within the two areas of remnant vegetation.

The following management measures have been developed and incorporated into the LSP to reduce the likelihood of impacts to native fauna:

- Regional fauna corridor will be retained through maintaining the strip of remnant vegetation in the north of the Subject Site and the vegetation in the south-east corner.
- Use of native vegetation species in areas of POS to promote habitat for native fauna species.

5.6. Fire Management

The Local Structure Plan is required to meet the “Acceptable Solutions” of each Element of the bushfire mitigation measures (WAPC, 2017). The proposal has been assessed against the bushfire protection criteria Acceptable Solutions for Elements A1, A2, A3 and A4, as per the Guidelines for Planning in Bushfire Prone Areas (WAPC, 2017).

The Subject Site was assessed against the bushfire protection criteria Acceptable Solutions for Elements A1, A2, A3 and A4. Please refer to the summary table below.

Table 9: 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	Compliant BAL 29 or less applied to lots
Element 2 – Siting and Design	A2.1 Asset Protection Zone	Yes	Compliant, APZ in BAL 29 or less N/A
Element 3 – Vehicular Access	A3.1 Two Access Routes	Yes	Compliant two access to 2 destinations
	A3.2 Public Road	Yes	Compliant
	A3.3 Cul-de-sacs	Yes	Compliant with EAW
	A3.4 Battle axes	N/A	N/A
	A3.5 Private driveways	Yes	Compliant
	A3.6 Emergency Access Ways	Yes	Compliant
	A3.7 Fire Service Access Ways	N/A	N/A
	A3.8 Firebreaks	Yes	Compliant on parent lot
Element 4 – Water	A4.1 Reticulated areas	Yes	Compliant
	A4.2 Non-reticulated areas	N/A	N/A
	A4.3 Individual lots in non-reticulated areas	N/A	N/A

5.7. Light Industrial Area and Associated Buffers

The EPA Draft Guidance Statement No. 3 *Separation Distances Between Industrial and Sensitive Land Uses* (EPA, 2015) provides generic separation distances from particular industries to sensitive land uses. Sensitive land uses are land uses applied to places where people live or regularly spend time and which are therefore sensitive to emissions from industry.

The EPA's hierarchy for the management of emissions is:

- Avoid or minimise the creation and discharge of emissions through design and operation of the facility;
- Ensure environmental impacts from emissions are acceptable and meet the relevant regulations and health criteria at the boundary of the site; and
- Implement separation distances to ensure that any residual emissions and unintended emissions do not impact adversely on sensitive land uses.

The generic separation distances are based on the consideration of typical emissions that may affect the amenity of nearby sensitive land uses. These include:

- Gaseous and particulate emissions;
- Noise;
- Dust; and
- Odour.

The only 'Sensitive Land Use' within the vicinity of the proposed Light Industrial area is the proposed Residential area. According to the EPA (2015) the general minimum vegetated setback of 200m is required to private residences, however the *Guidance Number 3 Separation Distances between Industrial and Sensitive Land Uses - Appendix 1* (EPA, 2015) must be consulted for the industry types proposed within the development area and their associated separation to distance to sensitive land use prior to development.

6. Management Commitments and Conclusions

The proposed LSP recognises the importance of the key environmental and landscape attributes of the area, and incorporates these in an urban form, that creates an environmentally responsive urban development that meets the EPA and City of Albany's environmental requirements. Consequently, the environmental outcomes of the proposed LSP are considerable and include:

- Providing an improvement in groundwater and surface water quality through residential and industrial development and implementation of water sensitive urban design and best stormwater drainage management practices.
- Revegetation using native species (where currently there is very little native species and diversity) in areas of POS to promote fauna habitat and flora diversity. Landscaped urban areas to promote biodiversity using native plants.
- Maintaining areas of remnant vegetation and limiting access points through these areas to the subdivision to prevent adverse impacts particularly for transient fauna.
- The Local Structure Plan is required to meet the "Acceptable Solutions" of each Element of the bushfire mitigation measures (WAPC, 2017).
- As Light industrial land use is proposed in the west of the Structure Plan, a detailed Bushfire Management Plan will be required to guide developers if any industry is defined as "High Risk".
- A detailed Bushfire Management Plan jointly endorsed by DFES and CoA will be required for any Primary School proposed in the Structure Plan area at the Development Application stage. A Bushfire Emergency Evacuation Plan (BEEP) will be required at Development Approval Stages.
- The proposed light industrial area is deemed appropriate for effluent disposal and meets the state's minimum requirements for on-site sewage disposal systems as outlined in the *Draft Government Sewerage Policy* (Department of Planning, 2016). Where on-site sewage disposal is to be provided by a secondary treatment system, the WAPC will require a notification on title pursuant Section 70A of the *Transfer of Land Act 1893* (as amended) advising that an on-site secondary treatment sewage disposal system and unencumbered area to which treated sewage is to be distributed are required.
- Provide vegetated buffer and/or other management techniques between industrial areas to sensitive land uses (such as residential) in accordance with the EPA's (2015) Guidance Statement No. 3 *Separation Distances Between Industrial and Sensitive Land Uses*.

7. References

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Appendices

Appendix A – Draft Local Structure Plan (Edge Planning & Property, 2017)

Appendix B – Geotechnical Investigation (Great Southern Geotechnics, 2017)

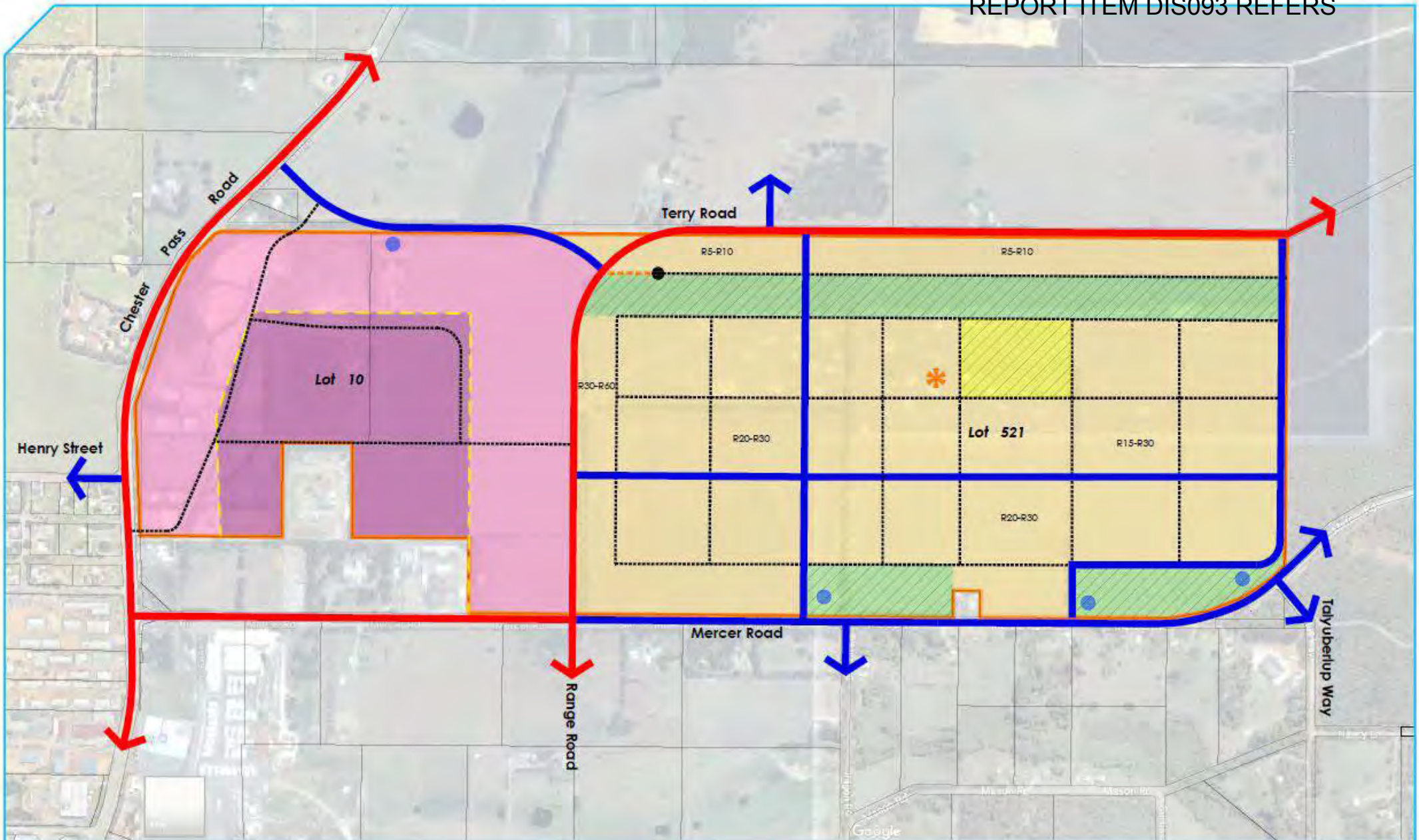
Appendix C – Phosphorous Retention Index Test Results (CSBP Laboratory, 2017)

Appendix D – BAL Contour Plan (Bio Diverse Solutions, 2017)



Appendix A

Draft Local Structure Plan (Edge Planning & Property, 2017)



LOCAL STRUCTURE PLAN

Lot 10 Chester Pass Road and
Lot 521 Mercer Road
Walmsley

LEGEND

- Local Structure Plan Boundary
- Integrator Arterial Road
- Neighbourhood Connector Road
- Local Road
- Parks and Recreation
- Public Use - School
- Residential
- Drainage 241
- Light Industry Precinct A
- Light Industry Precinct B
- * Community Purpose Site
- 200m Buffer to Sensitive Uses
- Emergency Access Way

D	ADD EMERGENCY A. WAY.	171118
C	MINOR MODIFICATIONS	171023
B	MINOR MODIFICATIONS	171022
A	LOCAL STRUCTURE PLAN	171012
REV	DESCRIPTION	YYMMDD
DRAWING NUMBER	REV	SCALE 1:2500
EP 170820/06	D	SHEET A/3

edge
PLANNING & PROPERTY

edge Planning & Property
124 Howe Street, Mount Clarence
Adelaide SA 5032
P: 0883499999
M: 0883 100 526

Appendix B

Geotechnical Investigation (Great Southern Geotechnics, 2017)

VERSION 1

Report No 104/1

SEPTEMBER 17, 2017



GEOTECHNICAL INVESTIGATION

BIO DIVERSE SOLUTIONS

LOT 10 CHESTER PASS RD & LOT 521 MERCER RD, MILPARA WA 6330

PRESENTED BY: M.COFFEY

GREAT SOUTHERN GEOTECHNICS
5A 209 CHESTER PASS RD, ALBANY WA

ACN: 613 485 644 ABN: 77 613 485 644
Info@gsgeotechnics.com

1.0 INTRODUCTION

As authorised by Kathryn Kinnear of Bio Diverse Solutions, a site investigation for the proposed development of Lot 10 Chester Pass Rd & Lot 521 Mercer Rd, Milpara WA 6330 was performed on the 29th of August, 2017.

2.0 GENERAL

This purpose of the investigation was to determine the following:

- Surface site conditions
- Subsurface soil profiles & characteristics
- Depth of ground water tables .

3.0 SITE INVESTIGATION

The site is approximately 5.0kms North of the Albany CBD and is located on the Northern side of Mercer Road spanning over 2kms West to East.

Established trees border the fence lines of grassy paddocks and natural bushland can be found adjacent to the eastern boundary.

Site conditions and Test pit locations were recorded and are shown in Appendix 2

The field investigation consisted of ten test pits excavated on-site to depths of up to 2.3m using a Kubota KX41-3V Mini Excavator with a 300mm wide Hydraulic open flight auger attachment.















All soil layers encountered were visually assessed and classified on-site

The subsurface soil profiles are shown on the Test pit logs located in Appendix 1

IMPORTANT NOTE: We have endeavoured to locate the test pits so that they are representative of the subsurface materials across the site. However, soil conditions may change dramatically over short distances and our investigations may not locate all soil variations across the site.

This report and associated documentation was undertaken for the specific purpose described in the report and shall not be relied on for other purposes. This report was prepared solely for the use by Bio Diverse Solutions and any reliance assumed by other parties on this report shall be at such parties own risk.

COLOURS

	BLACK - BROWN (bk)		BLUE (bl)		ORANGE (or)
	BROWN (br)		BLUE - GREEN (bl/gr)		RED (rd)
	GREY - BROWN (gy/br)		GREEN (gr)		RED - BROWN (rd/br)
	GREY (gy)		YELLOW (yl)		PINK (pk)
	BLUE - GREY (bl/gy)		YELLOW - BROWN (yl/br)		PURPLE (pr)

MOISTURE CONDITION OF SOIL

TERM	DESCRIPTION
Dry	Cohesive soils; hard and friable or powdery, well dry of plastic limit. Granular soils; cohesionless and free-running.
Moist	Soil feels cool, darkened in colour. Cohesive soils can be moulded. Granular soils tend to cohere.
Wet	Soil feels cool, darkened in colour. Cohesive soils usually weakened and free water forms on hands when handling. Granular soils tend to cohere and free water forms on hands when handling.

PARTICLE SHAPES

ANGULAR	SUB-ANGULAR	SUB-ROUNDED	ROUNDED
			

PARTICLE SIZES

BOULDERS	COBBLES	COARSE GRAVEL	MEDIUM GRAVEL	FINE GRAVEL	COARSE SAND	MEDIUM SAND	FINE SAND	SILT	CLAY
>200mm	63-200mm	20-63mm	6-20mm	2.36-6mm	0.6-2.36mm	0.2-0.6mm	0.075-0.2mm	0.002-0.075mm	<0.002mm

GRAIN SIZE

SOIL TYPE (ABBREV.)	CLAY (CL)	SILT (SI)	SAND (SA)			GRAVEL (GR)		COBBLES (CO)	
SIZE	< 2µm	2-75µm	Fine 0.075-0.2mm	Medium 0.2-0.6mm	Coarse 0.6-2.36mm	Fine 2.36-6mm	Medium 6-20mm	Coarse 20-63mm	63-200mm
SHAPE & TEXTURE	Shiny	Dull	← angular or subangular or subrounded or rounded →						
FIELD GUIDE	Not visible under 10x	Visible under 10x	Visible by eye	Visible at < 1m	Visible at < 3m	Visible at < 5m	Road gravel	Rail ballast	Beaching

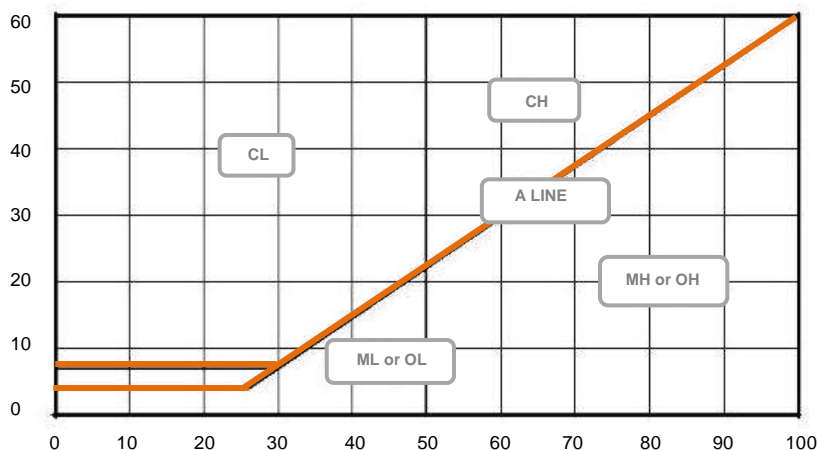
CLASSIFICATION CHART

Explanatory Notes

FIELD IDENTIFICATION PROCEDURES (Excluding particles larger than 60mm and basing fractions on estimated mass)				GROUP SYMBOLS	TYPICAL NAMES	
COARSE GRAINED SOILS More than 50% of material less than 63 mm is larger than 0.075 mm	GRAVELS More than 50% of coarse fraction is larger than 2.36mm	CLEAN GRAVELS (Little or no fines)	Wide range in grain size and substantial amounts of all intermediate sizes, not enough fines to bind coarse grains, no dry strength	GW	Well graded gravels, gravel-sand mixtures, little or no fines	
		GRAVELS WITH FINES (Appreciable amount of fines)	Predominantly one size or range of sizes with some intermediate sizes missing, not enough fines to bind coarse grains, no dry strength	GP	Poorly Graded gravels and gravel-sand mixtures, little or no fines, uniform gravels	
			'Dirty' materials with excess of non-plastic fines, zero to medium dry strength	GM	Silty gravels, gravel-sand-silt mixtures	
		GRAVELS WITH FINES (Appreciable amount of fines)	'Dirty' materials with excess of plastic fines, medium to high dry strength	GC	Clayey gravels, gravel-sand-clay mixtures	
	SANDS More than 50% of coarse fraction is smaller than 2.36mm		CLEAN SANDS (Little or no fines)	Wide range in grain size and substantial amounts of all intermediate sizes, not enough fines to bind coarse grains, no dry strength	SW	Well graded sands, gravelly sands, little or no fines
		SANDS WITH FINES (Appreciable amount of fines)	Predominantly one size or range of sizes with some intermediate sizes missing, not enough fines to bind coarse grains, no dry strength	SP	Poorly graded sands and gravelly sands; little or no fines, uniform sands	
			'Dirty' materials with excess of non-plastic fines, zero to medium dry strength	SM	Silty sands, sand-silt mixtures	
		'Dirty' materials with excess of plastic fines, medium to high dry strength	SC	Clayey sands, sand-clay mixtures		
FINE GRAINED SOILS More than 50% of material less than 63 mm is smaller than 0.075 mm	IDENTIFICATION PROCEDURES ON FRACTIONS <0.2mm					
	SILTS AND CLAYS Liquid limit less than 50	DRY STRENGTH	DILATANCY	TOUGHNESS		
		None to low	Quick to slow	None	ML	Inorganic silts and very fine sands, rock flour, silty or clayey fine sands with low plasticity. Silts of low to medium Liquid Limit.
		Medium to high	None to very slow	Medium	CL, CI	Inorganic clays of low to medium plasticity, gravelly clays, sandy clays, silty clays.
	SILTS AND CLAYS Liquid limit greater than 50	Low to medium	Slow	Low	OL	Organic silts and organic silt-clays of low to medium plasticity.
		Low to medium	Slow to none	Low to medium	MH	Inorganic silts, micaceous or diatomaceous fine sandy or silty soils, silts of high Liquid Limit.
		High to very high	None	High	CH	Inorganic clays of high plasticity.
	SILTS AND CLAYS Liquid limit greater than 50	Medium to high	None to very slow	Low to medium	OH	Organic clays of high plasticity
		Readily identified by colour, odour, spongy feel and frequently by fibrous texture			Pt	Peat and other highly organic soils

PLASTICITY CHART

For laboratory classification of fine grained soils



PLASTICITY

DESCRIPTIVE TERM	OF LOW PLASTICITY	OF MEDIUM PLASTICITY	OF HIGH PLASTICITY
Range Of Liquid Limit (%)	≤ 35	> 35 ≤ 50	> 50

DESCRIPTION OF ORGANIC OR ARTIFICIAL MATERIALS

PREFERRED TERMS	SECONDARY DESCRIPTION
Organic Matter	Fibrous Peat/ Charcoal/ Wood Fragments/ Roots (greater than approximately 2mm diameter)/ Root Fibres (less than approximately 2mm diameter)
Waste Fill	Domestic Refuse/ Oil/ Bitumen/ Brickbats/ Concrete Rubble/ Fibrous Plaster/ Wood Pieces/ Wood Shavings/ Sawdust/ Iron Filings/ Drums/ Steel Bars/ Steel Scrap/ Bottles/ Broken Glass/ Leather

CONSISTENCY - Cohesive soils

TERM	VERY SOFT	SOFT	FIRM	STIFF	VERY STIFF	HARD
Symbol	VS	S	F	St	VSt	H
Undrained Shear Strength (kPa)	< 12	12 - 25	25 - 50	50 - 100	100 - 200	> 200
SPT (N) Blowcount	0 - 2	2 - 4	4 - 8	8 - 15	15 - 30	> 30
Field Guide	Exudes between the fingers when squeezed	Can be moulded by light finger pressure	Can be moulded by strong finger pressure	Cannot be moulded by fingers. Can be indented by thumb nail	Can be indented by thumb nail	Can be indented with difficulty with thumb nail

CONSISTENCY - Non-cohesive soils

TERM	VERY LOOSE	LOOSE	MEDIUM DENSE	DENSE	VERY DENSE	COMPACT
Symbol	VL	L	MD	D	VD	CO
SPT (N) Blowcount	0 - 4	4 - 10	10 - 30	30 - 50	50 - 100	> 50/150 mm
Density Index (%)	< 15	15 - 35	35 - 65	65 - 85	85 - 95	> 95
Field Guide	Ravels	Shovels easily	Shovelling very difficult	Pick required	Pick difficult	Cannot be picked

MINOR COMPONENTS

TERM	TRACE	WITH
% Minor Component	Coarse grained soils: < 5% Fine grained soils: <15%	Coarse grained soils: 5 - 12% Fine grained soils: 15 - 30%
Field Guide	Presence just detectable by feel or eye, but soil properties little or no different to general properties of primary components	Presence easily detectable by feel or eye, soil properties little different to general properties of primary component

GEOLOGICAL ORIGIN

	TYPE	DETAILS
TRANSPORTED SOILS	Aeolian Soils	Deposited by wind
	Alluvial Soils	Deposited by streams and rivers
	Colluvial Soils	Deposited on slopes
	Lacustrine Soils	Deposited by lakes
	Marine Soils	Deposited in ocean, bays, beaches and estuaries
FILL MATERIALS	Soil Fill	Describe soil type, UCS symbol and add 'FILL'
	Rock Fill	Rock type, degree of weathering, and word 'FILL'.
	Domestic Fill	Percent soil or rock, whether pretrucible or not.
	Industrial Fill	Percent soil, whether contaminated, particle size & type of waste product, i.e. brick, concrete, metal

STRENGTH OF ROCK MATERIAL

TERM	SYMBOL	IS(50)	(MPA)	FIELD GUIDE TO STRENGTH
Extremely Low	EL	≤0.03		Easily remoulded by hand to a material with soil properties.
Very Low	VL	>0.03	≤0.1	Material crumbles under firm blows with sharp end of pick; can be peeled with knife; too hard to cut a triaxle sample by hand. Pieces up to 3 cm thick can be broken by finger pressure.
Low	L	>0.1	≤0.3	Easily scored with a knife; indentations 1 mm to 3 mm show in the specimen with firm blows of the pick point; has dull sound under hammer. A piece of core 150 mm long by 50 mm diameter may be broken by hand. Sharp edges of core may be friable and break during handling.
Medium	M	>0.3	≤1.0	Readily scored with a knife; a piece of core 150 mm long by 50 mm diameter can be broken by hand with difficulty.
High	H	>1	≤3	A piece of core 150 mm long by 50 mm diameter cannot be broken by hand but can be broken by a pick with a single firm blow; rock rings under hammer.
Very High	VH	>3	≤10	Hand specimen breaks with pick after more than one blow; rock rings under hammer.
Extremely High	EH	>10		Specimen requires many blows with geological pick to break through intact material; rock rings under hammer.


ROCK MATERIAL WEATHERING CLASSIFICATION

TERM	SYMBOL	DEFINITION
Residual Soil	RS	Soil developed on extremely weathered rock; the mass structure and substance fabric are no longer evident; there is a large change in volume but the soil has not been significantly transported
Extremely Weathered Rock	XW	Rock is weathered to such an extent that it has 'soil' properties, i.e. it either disintegrates or can be remoulded, in water.
Distinctly Weathered Rock	DW	Rock strength usually changed by weathering. Rock may be highly discoloured, usually be ironstaining. Porosity may be increased by leaching or may be decreased due to deposition of weathering products in pores.
Slightly Weathered Rock	SW	Rock is slightly discoloured but shows little or no change of strength from fresh rock.
Fresh Rock	FR	Rock shows no sign of decomposition or staining.




Appendix 1

Test Pit Logs

		Report No. 104/1	Job No. 104	Sheet 1 of 10				
Client: Bio Diverse Solutions Project: Proposed Light Industrial Area Project No: n/a Location: Lot 10 Chester Pass Rd & Lot 521 Mercer Rd, Milpara WA Test Pit No.: TP1 Sample No.: 17G288			Operator/Contractor: GSG Equipment type: Kubota KX41-3V Excavation Method : 300mm Auger Position: 50 H 580601 6128901 Elevation:					
Date Commenced: 29.08.2017 Date Completed: 29.08.2017		Logged By: M.Coffey Checked By: M.Coffey		Excavation Dimensions: Depth 2.3 (m) Width 0.3 (m)				
Depth Below Surface (mm)	Layer Depth (mm)	Material Description <small>SOIL TYPE, Plasticity, Colour, Particle characteristics, Secondary and other minor components</small>	Moist. Condition	Consistency / Strength	Cementation	Water Table	Classification Symbol	Sample/Test
0 - 200	200	(Topsoil) SAND with silt: Dark grey, fine to medium grained. Roots & root fibres.	M	L		Water table not encountered		
200 - 900	700	Sandy GRAVEL: Brown, fine to coarse grained, sub-rounded to sub-angular. Fine to medium grained sand.	M	D-VD				
900 - 2300	1400	Sandy CLAY: Low to medium plasticity, Light brown/orange. Fine to medium grained sand.	M	S / F				
Comments:			Pit Terminated at:		(mm) below ground level			
			✓ or ✗					
			Target Depth	✓	2300			
			Cave In					
			Refusal					
			Near Refusal					
			Flooding					
			Lack of Reach					
Materials Consistency/Strength		Rock	Cementation		▼ Water			
Cohesive	Non-Cohesive				Water first Encountered			
VS - Very Soft	VL - Very Loose	EL - Extremely Low	IN - Indurated		Moisture			
S - Soft	L - Loose	VL - Very Low	PC - Poorly Cemented		D - Dry M - Moist W - Wet			
F - Firm	MD - Medium Dense	L - Low	MC - moderately Cemented		General			
St - Stiff	D - Dense	M - Medium	WC - Well Cemented		N/A - Not Applicable			
VSt - Very Stiff	VD - Very Dense	H - High			N/D - Not Determined			
H - Hard	CO - Compact	VH - Very High						
		EH - Extremely High						

REPORT ITEM DIS093 REFERS


Test Pit Report

		Report No. 104/1	Job No. 104	Sheet 2 of 10				
Client: Bio Diverse Solutions Project: Proposed Light Industrial Area Project No.: n/a Location: Lot 10 Chester Pass Rd & Lot 521 Mercer Rd, Milpara WA Test Pit No.: TP2 Sample No.: 17G289			Operator/Contractor: GSG Equipment type: Kubota KX41-3V Excavation Method : 300mm Auger Position: 50 H 580560 6128698 Elevation:					
Date Commenced: 29.08.2017 Date Completed: 29.08.2017		Logged By: M.Coffey Checked By: M.Coffey		Excavation Dimensions: Depth 2.3 (m) Width 0.3 (m)				
Depth Below Surface (mm)	Layer Depth (mm)	Material Description <small>SOIL TYPE, Plasticity, Colour, Particle characteristics, Secondary and other minor components</small>	Moist. Condition	Consistency / Strength	Cementation	Water Table	Classification Symbol	Sample/Test
0 - 100	100	(Topsoil) SAND with silt: Dark grey, fine to medium grained. Roots & root fibres.	M	L		Water table not encountered		
100 - 300	200	Sandy GRAVEL: Brown, fine to coarse grained, sub-rounded to sub-angular. Fine to medium grained sand.	W	L				
300 - 700	400	Sandy CLAY: Low to medium plasticity, Light brown/orange. Fine to medium grained sand.	M	S				
700 - 2300	1600	Sandy CLAY: Low to medium plasticity, Grey mottled orange/red. Fine to medium grained sand.	M	S-F				
Comments:			Pit Terminated at:		(mm) below ground level			
			✓ or ✗					
			Target Depth	✓	2300			
			Cave In					
			Refusal					
			Near Refusal					
			Flooding					
			Lack of Reach					
Materials Consistency/Strength		Rock	Cementation		▼ Water			
Cohesive	Non-Cohesive	EL - Extremely Low	IN - Indurated		Water first Encountered			
VS - Very Soft	VL - Very Loose	VL - Very Low	PC - Poorly Cemented		Moisture			
S - Soft	L - Loose	L - Low	MC - moderately Cemented		D - Dry M - Moist W - Wet			
F - Firm	MD - Medium Dense	M - Medium	WC - Well Cemented		General			
St - Stiff	D - Dense	H - High			N/A - Not Applicable			
VSt - Very Stiff	VD - Very Dense	VH - Very High			N/D - Not Determined			
H - Hard	CO - Compact	EH - Extremely High						

REPORT ITEM DIS093 REFERS

Test Pit Report


		Report No. 104/1	Job No. 104	Sheet 3 of 10				
Client: Bio Diverse Solutions Project: Proposed Light Industrial Area Project No: n/a Location: Lot 10 Chester Pass Rd & Lot 521 Mercer Rd, Milpara WA Test Pit No.: TP3 Sample No.: 17G290			Operator/Contractor: GSG Equipment type: Kubota KX41-3V Excavation Method: 300mm Auger Position: 50 H 580597 6128498 Elevation:					
Date Commenced: 29.08.2017 Date Completed: 29.08.2017		Logged By: M.Coffey Checked By: M.Coffey		Excavation Dimensions: Depth 2.3 (m) Width 0.3 (m)				
Depth Below Surface (mm)	Layer Depth (mm)	Material Description <small>SOIL TYPE, Plasticity, Colour, Particle characteristics, Secondary and other minor components</small>	Moist. Condition	Consistency / Strength	Cementation	Water Table	Classification Symbol	Sample/Test
0 - 150	150	(Topsoil) SAND with silt: Dark grey/brown, fine to medium grained. Roots & root fibres.	M	L		Water table not encountered		
150 - 400	250	Sandy GRAVEL: Brown, fine to coarse grained, sub-rounded to sub-angular. Medium to coarse grained sub-angular to angular sand.	M-W	D-MD				
400 - 1100	700	Sandy CLAY: Low to medium plasticity, Brown/orange. Fine to medium grained sand.	M	S-F				✓
1100 - 2300	1200	Sandy CLAY: Low to medium plasticity, Red mottled grey/brown. Fine to medium grained sand.	M	S-F				
Comments:			Pit Terminated at: (mm) below ground level ✓ or ✗		Target Depth: ✓ 2300 Cave In: Refusal: Near Refusal: Flooding: Lack of Reach:			
Materials Consistency/Strength		Rock	Cementation		Water			
Cohesive	Non-Cohesive				Water first Encountered			
VS - Very Soft S - Soft F - Firm St - Stiff VSt - Very Stiff H - Hard	VL - Very Loose L - Loose MD - Medium Dense D - Dense VD - Very Dense CO - Compact	EL - Extremely Low VL - Very Low L - Low M - Medium H - High VH - Very High EH - Extremely High	IN - Indurated PC - Poorly Cemented MC - moderately Cemented WC - Well Cemented		Moisture			
				D - Dry M - Moist W - Wet				
				General				
				N/A - Not Applicable N/D - Not Determined				


		Report No. 104/1	Job No. 104	Sheet 4 of 10				
Client: Bio Diverse Solutions Project: Proposed Light Industrial Area Project No: n/a Location: Lot 10 Chester Pass Rd & Lot 521 Mercer Rd, Milpara WA Test Pit No.: TP4 Sample No.: 17G291			Operator/Contractor: GSG Equipment type: Kubota KX41-3V Excavation Method : 300mm Auger Position: 50 H 580829 6128337 Elevation:					
Date Commenced: 29.08.2017 Date Completed: 29.08.2017		Logged By: M.Coffey Checked By: M.Coffey		Excavation Dimensions: Depth 2.3 (m) Width 0.3 (m)				
Depth Below Surface (mm)	Layer Depth (mm)	Material Description <small>SOIL TYPE, Plasticity, Colour, Particle characteristics, Secondary and other minor components</small>	Moist. Condition	Consistency / Strength	Cementation	Water Table	Classification Symbol	Sample/Test
0 - 200	200	(Topsoil) SAND with silt: Dark grey, fine to medium grained. Roots & root fibres.	M	L		Water table not encountered		
200 - 550	350	Sandy GRAVEL: Brown, fine to coarse grained, sub-rounded to sub-angular. Cobbles up to 100mm. Fine to medium grained sand.	M-W	D-VD				
550 - 900	350	Sandy CLAY: Low to medium plasticity, Light brown mottled red/orange. Fine to medium grained sand.	M	S-F				
900 - 2300	1400	Sandy CLAY: Low to medium plasticity, Grey mottled red/brown. Fine to medium grained sand.	M	F				
Comments:			Pit Terminated at: (mm) below ground level ✓ or ✗		Target Depth ✓ 2300 Cave In Refusal Near Refusal Flooding Lack of Reach			
Materials Consistency/Strength		Rock	Cementation		Water Water first Encountered			
Cohesive VS - Very Soft S - Soft F - Firm St - Stiff VSt - Very Stiff H - Hard	Non-Cohesive VL - Very Loose L - Loose MD - Medium Dense D - Dense VD - Very Dense CO - Compact	EL - Extremely Low VL - Very Low L - Low M - Medium H - High VH - Very High EH - Extremely High	IN - Indurated PC - Poorly Cemented MC - moderately Cemented WC - Well Cemented		Moisture D - Dry M - Moist W - Wet			
					General N/A - Not Applicable N/D - Not Determined			


REPORT ITEM DIS093 REFERS


Test Pit Report


		Report No. 104/1	Job No. 104	Sheet 5 of 10				
Client: Bio Diverse Solutions Project: Proposed Light Industrial Area Project No: n/a Location: Lot 10 Chester Pass Rd & Lot 521 Mercer Rd, Milpara WA Test Pit No.: TP5 Sample No.: 17G292			Operator/Contractor: GSG Equipment type: Kubota KX41-3V Excavation Method: 300mm Auger Position: 50 H 580977 6128666 Elevation:					
Date Commenced: 29.08.2017 Date Completed: 29.08.2017		Logged By: M.Coffey Checked By: M.Coffey		Excavation Dimensions: Depth 2.3 (m) Width 0.3 (m)				
Depth Below Surface (mm)	Layer Depth (mm)	Material Description <small>SOIL TYPE, Plasticity, Colour, Particle characteristics, Secondary and other minor components</small>	Moist. Condition	Consistency / Strength	Cementation	Water Table	Classification Symbol	Sample/Test
0 - 200	200	(Topsoil) SAND with silt: Dark grey/brown, fine to medium grained. Roots & root fibres.	M	L		1200mm below existing ground level		
200 - 500	300	Sandy GRAVEL: Brown, fine to coarse grained, sub-rounded to sub-angular. Fine to medium grained sand.	M-W	MD				
500 - 1000	500	Sandy GRAVEL: Brown, fine to coarse grained, sub-rounded to sub-angular. Cobbles & Boulders up to 200mm. Fine to medium grained sand.	M	VD				
1000 - 1200	200	Sandy CLAY: Low to medium plasticity, Light brown/orange. Fine to medium grained sand.	M	F				
1200 - 2300	1100	Sandy CLAY: Low to medium plasticity, Red mottled grey. Fine to medium grained sand.	M	F				
Comments: <i>Water table measured 1200mm below existing ground level 3hrs 55mins after achieving full depth of test pit.</i> <i>Water noted seeping into test pit at 500mm below surface level.</i>			Pit Terminated at: (mm) below ground level ✓ or ✗		Target Depth <input checked="" type="checkbox"/> 2300 Cave In <input type="checkbox"/> Refusal <input type="checkbox"/> Near Refusal <input type="checkbox"/> Flooding <input type="checkbox"/> Lack of Reach <input type="checkbox"/>			
Materials Consistency/Strength		Rock	Cementation		Water Water first Encountered			
Cohesive VS - Very Soft S - Soft F - Firm St - Stiff VSt - Very Stiff H - Hard	Non-Cohesive VL - Very Loose L - Loose MD - Medium Dense D - Dense VD - Very Dense CO - Compact	EL - Extremely Low VL - Very Low L - Low M - Medium H - High VH - Very High EH - Extremely High	IN - Indurated PC - Poorly Cemented MC - moderately Cemented WC - Well Cemented		Moisture D - Dry M - Moist W - Wet			
					General N/A - Not Applicable N/D - Not Determined			

		Report No. 104/1	Job No. 104	Sheet 6 of 10				
Client: Bio Diverse Solutions Project: Proposed Light Industrial Area Project No. n/a Location: Lot 10 Chester Pass Rd & Lot 521 Mercer Rd, Milpara WA Test Pit No.: TP6 Sample No.: 17G293			Operator/Contractor: GSG Equipment type: Kubota KX41-3V Excavation Method : 300mm Auger Position: 50 H 581324 6128351 Elevation:					
Date Commenced: 29.08.2017 Date Completed: 29.08.2017		Logged By: M.Coffey Checked By: M.Coffey		Excavation Dimensions: Depth 2.3 (m) Width 0.3 (m)				
Depth Below Surface (mm)	Layer Depth (mm)	Material Description <small>SOIL TYPE, Plasticity, Colour, Particle characteristics, Secondary and other minor components</small>	Moist. Condition	Consistency / Strength	Cementation	Water Table	Classification Symbol	Sample/Test
0 - 200	200	(Topsoil) SAND with silt: Dark grey/brown, fine to medium grained. Roots & root fibres.	M	L		1700mm below existing ground level		
200 - 400	200	SAND with silt: Grey, fine to medium grained.	M	L				
400 - 700	300	SAND with silt: Light grey, fine to medium grained.	M	L				
700 - 1500	800	Gravelly SAND with silt: Brown, fine to medium grained. Fine to medium grained, sub-rounded to sub-angular gravel.	M	MD				
1500 - 2300	800	Sandy GRAVEL: Brown, fine to coarse grained, sub-rounded to sub-angular. Fine to medium grained sand.	M	MD				
Comments: <i>Water table measured 1700mm below existing ground level 1hr 55mins after achieving full depth of test pit.</i>			Pit Terminated at: (mm) below ground level ✓ or ✗					
			Target Depth	✓	2300			
			Cave In					
			Refusal					
			Near Refusal					
			Flooding					
			Lack of Reach					
Materials Consistency/Strength		Rock	Cementation		Water			
Cohesive	Non-Cohesive				Water first Encountered			
VS - Very Soft	VL - Very Loose	EL - Extremely Low	IN - Indurated		Moisture			
S - Soft	L - Loose	VL - Very Low	PC - Poorly Cemented		D - Dry M - Moist W - Wet			
F - Firm	MD - Medium Dense	L - Low	MC - moderately Cemented		General			
St - Stiff	D - Dense	M - Medium	WC - Well Cemented		N/A - Not Applicable			
VSt - Very Stiff	VD - Very Dense	H - High			N/D - Not Determined			
H - Hard	CO - Compact	VH - Very High						
		EH - Extremely High						

		Report No. 104/1	Job No. 104	Sheet 7 of 10				
Client: Bio Diverse Solutions Project: Proposed Light Industrial Area Project No: n/a Location: Lot 10 Chester Pass Rd & Lot 521 Mercer Rd, Milpara WA Test Pit No.: TP7 Sample No.: 17G294			Operator/Contractor: GSG Equipment type: Kubota KX41-3V Excavation Method: 300mm Auger Position: 50 H 581693 6128729 Elevation:					
Date Commenced: 29.08.2017 Date Completed: 29.08.2017		Logged By: M.Coffey Checked By: M.Coffey		Excavation Dimensions: Depth 2.3 (m) Width 0.3 (m)				
Depth Below Surface (mm)	Layer Depth (mm)	Material Description <small>SOIL TYPE, Plasticity, Colour, Particle characteristics, Secondary and other minor components</small>	Moist. Condition	Consistency / Strength	Cementation	Water Table	Classification Symbol	Sample/Test
0 - 200	200	(Topsoil) SAND with silt: Dark grey, fine to medium grained. Roots & root fibres.	M	L		900mm below existing ground level		
200 - 800	600	Sandy GRAVEL: Brown, fine to coarse grained, sub-rounded to sub-angular. Cobbles & boulders up to 200mm. Fine to medium grained sand.	M-W	L-MD				
800 - 1200	400	Sandy CLAY: Low to medium plasticity, Brown/orange. Fine to medium grained sand.	M	S-F				
1200 - 2300	1100	Sandy CLAY: Low to medium plasticity, Red mottled grey. Fine to medium grained sand.	M	F				
Comments: <i>Water table measured 900mm below existing ground level 3hrs 55mins after achieving full depth of test pit.</i> <i>Water noted seeping into test pit at 700mm below surface level.</i>			Pit Terminated at: (mm) below ground level ✓ or ✗		Target Depth <input checked="" type="checkbox"/> 2300 Cave In <input type="checkbox"/> Refusal <input type="checkbox"/> Near Refusal <input type="checkbox"/> Flooding <input type="checkbox"/> Lack of Reach <input type="checkbox"/>			
Materials Consistency/Strength		Rock	Cementation		Water			
Cohesive	Non-Cohesive	EL - Extremely Low	IN - Indurated		Water first Encountered			
VS - Very Soft	VL - Very Loose	VL - Very Low	PC - Poorly Cemented		Moisture			
S - Soft	L - Loose	L - Low	MC - moderately Cemented		D - Dry M - Moist W - Wet			
F - Firm	MD - Medium Dense	M - Medium	WC - Well Cemented		General			
St - Stiff	D - Dense	H - High			N/A - Not Applicable			
VSt - Very Stiff	VD - Very Dense	VH - Very High			N/D - Not Determined			
H - Hard	CO - Compact	EH - Extremely High						

		Report No. 104/1	Job No. 104	Sheet 8 of 10				
Client: Bio Diverse Solutions Project: Proposed Light Industrial Area Project No: n/a Location: Lot 10 Chester Pass Rd & Lot 521 Mercer Rd, Milpara WA Test Pit No.: TP8 Sample No.: 17G295			Operator/Contractor: GSG Equipment type: Kubota KX41-3V Excavation Method : 300mm Auger Position: 50 H 581720 6128505 Elevation:					
Date Commenced: 29.08.2017 Date Completed: 29.08.2017		Logged By: M.Coffey Checked By: M.Coffey		Excavation Dimensions: Depth 2.3 (m) Width 0.3 (m)				
Depth Below Surface (mm)	Layer Depth (mm)	Material Description <small>SOIL TYPE, Plasticity, Colour, Particle characteristics, Secondary and other minor components</small>	Moist. Condition	Consistency / Strength	Cementation	Water Table	Classification Symbol	Sample/Test
0 - 200	200	(Topsoil) SAND with silt: Dark grey, fine to medium grained. Roots & root fibres.	M	L		Water table not encountered		
200 - 800	600	Sandy GRAVEL: Brown, fine to coarse grained, sub-rounded to sub-angular. Fine to medium grained sand.	M	D-VD				
800 - 1000	200	Sandy CLAY with gravel: Low to medium plasticity, Light brown mottled red/orange. Fine to medium grained sand. Fine to medium grained, angular to sub-angular gravel.	M	F				
1000 - 1900	900	Sandy CLAY: Low to medium plasticity, Red mottled light brown/orange. Fine to medium grained sand. (VSt between depth 1700mm to 1900mm)	M	F-VSt				
1900 - 2300	400	Sandy CLAY: Low plasticity, orange mottled red/cream. Fine to medium grained sand.	M	S-F				
Comments:			Pit Terminated at: (mm) below ground level		✓ or ✗ Target Depth ✓ 2300 Cave In Refusal Near Refusal Flooding Lack of Reach			
Materials Consistency/Strength		Rock	Cementation		Water			
Cohesive	Non-Cohesive				Water first Encountered			
VS - Very Soft	VL - Very Loose	EL - Extremely Low	IN - Indurated		Moisture			
S - Soft	L - Loose	VL - Very Low	PC - Poorly Cemented		D - Dry M - Moist W - Wet			
F - Firm	MD - Medium Dense	L - Low	MC - moderately Cemented		General			
St - Stiff	D - Dense	M - Medium	WC - Well Cemented		N/A - Not Applicable			
VSt - Very Stiff	VD - Very Dense	H - High			N/D - Not Determined			
H - Hard	CO - Compact	VH - Very High						
		EH - Extremely High						

		Report No. 104/1	Job No. 104	Sheet 9 of 10					
Client: Bio Diverse Solutions Project: Proposed Light Industrial Area Project No: n/a Location: Lot 10 Chester Pass Rd & Lot 521 Mercer Rd, Milpara WA Test Pit No.: TP9 Sample No.: 17G296			Operator/Contractor: GSG Equipment type: Kubota KX41-3V Excavation Method: 300mm Auger Position: 50 H 582184 6128769 Elevation:						
Date Commenced: 29.08.2017 Date Completed: 29.08.2017		Logged By: M.Coffey Checked By: M.Coffey		Excavation Dimensions: Depth 2.3 (m) Width 0.3 (m)					
Depth Below Surface (mm)	Layer Depth (mm)	Material Description <small>SOIL TYPE, Plasticity, Colour, Particle characteristics, Secondary and other minor components</small>	Moist. Condition	Consistency / Strength	Cementation	Water Table	Classification Symbol	Sample/Test	
0 - 200	200	(Topsoil) SAND with silt: Dark grey, fine to medium grained. Roots & root fibres.	M	L		Water table not encountered			
200 - 800	600	Sandy GRAVEL: Brown, fine to coarse grained, sub-rounded to sub-angular. Fine to medium grained sand.	M	MD					
800 - 1100	300	Sandy CLAY: Low to medium plasticity, brown/orange. Fine to medium grained sand.	M	S-F					
1100 - 2300	1200	Sandy CLAY: Low to medium plasticity, Red mottled grey. Fine to medium grained sand.	M	F					
Comments:			Pit Terminated at: (mm) below ground level						
			✓ or ✗						
			Target Depth	✓	2300				
			Cave In						
			Refusal						
			Near Refusal						
			Flooding						
			Lack of Reach						
Materials Consistency/Strength		Rock	Cementation		▼ Water				
Cohesive	Non-Cohesive				Water first Encountered				
VS - Very Soft	VL - Very Loose	EL - Extremely Low	IN - Indurated		Moisture				
S - Soft	L - Loose	VL - Very Low	PC - Poorly Cemented		D - Dry M - Moist W - Wet				
F - Firm	MD - Medium Dense	L - Low	MC - moderately Cemented		General				
St - Stiff	D - Dense	M - Medium	WC - Well Cemented		N/A - Not Applicable				
VSt - Very Stiff	VD - Very Dense	H - High			N/D - Not Determined				
H - Hard	CO - Compact	VH - Very High							
		EH - Extremely High							

		Report No. 104/1	Job No. 104	Sheet 10 of 10					
Client: Bio Diverse Solutions Project: Proposed Light Industrial Area Project No: n/a Location: Lot 10 Chester Pass Rd & Lot 521 Mercer Rd, Milpara WA Test Pit No.: TP10 Sample No.: 17G297			Operator/Contractor: GSG Equipment type: Kubota KX41-3V Excavation Method : 300mm Auger Position: 50 H 582184 6128441 Elevation:						
Date Commenced: 29.08.2017 Date Completed: 29.08.2017		Logged By: M.Coffey Checked By: M.Coffey		Excavation Dimensions: Depth 2.3 (m) Width 0.3 (m)					
Depth Below Surface (mm)	Layer Depth (mm)	Material Description <small>SOIL TYPE, Plasticity, Colour, Particle characteristics, Secondary and other minor components</small>	Moist. Condition	Consistency / Strength	Cementation	Water Table	Classification Symbol	Sample/Test	
0 - 200	200	(Topsoil) SAND with silt: Dark grey, fine to medium grained. Roots & root fibres.	M	L		Water table not encountered			
200 - 400	200	SAND with silt: Grey/brown, fine to coarse grained sub-rounded to sub-angular. <small>(Contains some cobbles up to 150mm)</small>	M	L-MD					
400 - 2300	1900	Sandy CLAY: Low to medium plasticity, Light brown/orange. Fine to medium grained sand. <small>(Contains pockets of yellow/cream fine to medium grained sand).</small>	M	L				✓	
Comments:						Pit Terminated at: (mm) below ground level ✓ or ✗			
						Target Depth	✓	2300	
						Cave In			
						Refusal			
						Near Refusal			
						Flooding			
						Lack of Reach			
Materials Consistency/Strength		Rock	Cementation		Water				
Cohesive	Non-Cohesive				Water first Encountered				
VS - Very Soft	VL - Very Loose	EL - Extremely Low	IN - Indurated		Moisture				
S - Soft	L - Loose	VL - Very Low	PC - Poorly Cemented		D - Dry	M - Moist	W - Wet		
F - Firm	MD - Medium Dense	L - Low	MC - moderately Cemented		General				
St - Stiff	D - Dense	M - Medium	WC - Well Cemented		N/A - Not Applicable				
VSt - Very Stiff	VD - Very Dense	H - High			N/D - Not Determined				
H - Hard	CO - Compact	VH - Very High							
		EH - Extremely High							

Appendix 2

Site Map & Test Pit Locations

The fieldwork was carried out on the 29th of August 2017 and comprised the following:
 Ten test pits were excavated using a Kubota KX41-3V Mini Excavator with a 300mm wide Auger attachment to achieve depths of up to 2.3m to visually assess subsurface conditions and monitor any ground water present. Approximate Test Pit locations are shown on **Figure 2**.



Figure 1 - Site Location



Figure 2 - Lot 10 Chester Pass Rd & Lot 521 Mercer Rd, Milpara WA 6330



Test Pit No. 1 Excavation



Test Pit No. 1 Spoil



Test Pit No. 2 Excavation



Test Pit No. 2 Spoil



Test Pit No. 3 Excavation



Test Pit No. 3 Spoil



Test Pit No. 4 Excavation



Test Pit No. 4 Spoil



Test Pit No. 5 Excavation



Test Pit No. 5 Spoil



Test Pit No. 6 Excavation



Test Pit No. 6 Spoil



Test Pit No. 7 Excavation



Test Pit No. 7 Spoil



Test Pit No. 8 Excavation



Test Pit No. 8 Spoil



Test Pit No. 9 Excavation



Test Pit No. 9 Spoil



Test Pit No. 10 Excavation



Test Pit No. 10 Spoil

Appendix 3

Test Results



5a 209 Chester Pass Road, Milpara WA 6330
 Mobile: 0407 903 297 Email: Info@gsgotechnics.com

Dry Density / Moisture Content Relationship Test Report

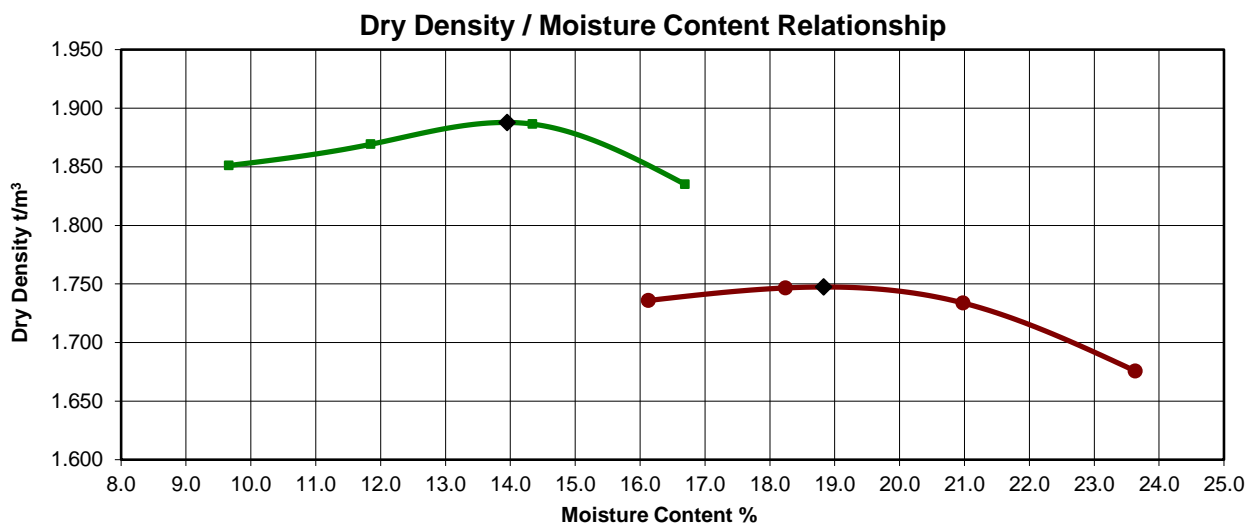
Sheet 1 of 1

Report No. 104/1

Job No. 104

Client: Bio Diverse Solutions
 Project: Proposed Light Industrial Area
 Road: Lot 10 Chester Pass Rd & Lot 521 Mercer Rd, Milpara WA 6330
 Section: N/A

Sample No.	Sample Location	Field Description
17G298	Test Pit 3	Sandy CLAY
17G299	Test Pit 10	Sandy CLAY



Sample Number	17G298 ●	17G299 ●	●
Depth	400mm - 1100mm	400mm to 2300mm	
Stabiliser Used			
Stabiliser Added %			
Curing Period	Water (Days)	Field	Field
	Stabiliser (Hrs)		
Moisture Content Method used	AS 1289.2.1.1	AS 1289.2.1.1	
Sampling Method	AS 1289.1.2.1 Proc 6.5	AS 1289.1.2.1 Proc 6.5	
Date Sampled	29.08.2017	29.08.2017	
Date Received	29.08.2017	29.08.2017	
Date Tested	02.09.2017	02.09.2017	
Test Method	AS 1289.5.2.1	AS 1289.5.2.1	
Maximum Dry Density t/m ³	1.75	1.89	
Optimum Moisture Content %	19.0	14.0	
Adjusted Maximum Dry Density t/m ³			
Adjusted Optimum Moisture Content %			
Percentage Retained %	37.5 mm	0	0
Percentage Retained %	19.0 mm	0	0

<p>Comments: N/a</p> <p>Distribution: Laboratory File / Kathryn Kinnear</p>	<p>Approved Signatory: </p> <p>Name: M.Coffey Function: Laboratory Manager Date: 17.09.2017</p>
-------------------------------------------------------------------------------------------	-------------------------------------------------------------------------------------------------------------------------------------------



Falling Head Permeability Report		Test Method: AS 1289.6.7.2	
Client:	Bio Diverse Solutions	Ticket No:	S812
Project:	Lot 10 Chester Pass Rd & Lot 521 Mercer Road	Report No:	LLS17/2133_2
Location:	Milpara, WA 6339	Sample No:	LLS17/2133
Sample ID:	TP3 400-1100mm (17G298)	Issue Date:	14-September-2017

Sampling Procedure: Tested as Received

Laboratory Moisture Ratio (%) 100.5

Laboratory Density Ratio (%) 95.0

Compactive Effort Modified

Surcharge (kPa) 3

% Retained on 19mm Sieve 0

Coefficient of Permeability (m / sec) 4.1×10^{-8}

Client Address: 5a 209 Chester Pass Road, Albany WA 6330

Comments: MMDD and OMC Values supplied by Great Southern Geotechnics



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 Accreditation No. 19872

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Approved Signature: 

Name: Matt van Herk
Function: Laboratory Manager
Date: 14-September-2017



Falling Head Permeability Report		Test Method: AS 1289.6.7.2	
Client:	Bio Diverse Solutions	Ticket No:	S812
Project:	Lot 10 Chester Pass Rd & Lot 521 Mercer Road	Report No:	LLS17/2134_2
Location:	Milpara, WA 6339	Sample No:	LLS17/2134
Sample ID:	TP10 400-2300mm (17G299)	Issue Date:	14-September-2017

Sampling Procedure: Tested as Received

Laboratory Moisture Ratio (%) 98.5

Laboratory Density Ratio (%) 95.0

Compactive Effort Modified

Surcharge (kPa) 3

% Retained on 19mm Sieve 0

Coefficient of Permeability (m / sec) 1.8×10^{-8}

Client Address: 5a 209 Chester Pass Road, Albany WA 6330

Comments: MMDD and OMC Values supplied by Great Southern Geotechnics



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Approved Signature: 

Name: Matt van Herk
Function: Laboratory Manager
Date: 14-September-2017

Appendix C

Phosphorous Retention Index Test Results (CSBP Laboratory, 2017)



Customer Bio Diverse Solutions
Job Chiquita Burgers
Date Rec'd 1/09/2017

Lab Number	Name	Code	Customer	Depth	Phosphorus Retention Index
2ZS17085	Test Pit 3	01/09/17	Bio Diverse Solutions	40-110	2387.4
2ZS17086	Test Pit 6	01/09/17	Bio Diverse Solutions	20-70	0.8
2ZS17087	Test Pit 10	01/09/17	Bio Diverse Solutions	40-230	608.0
2ZS17088	Test Pit 1	01/09/17	Bio Diverse Solutions	20-90	2414.5

ATTACHMENT 4



Edge Planning & Property
124 Hare Street, Mount Clarence
AUBURN WA 6230
P 08 9497 3333
E info@edgeplanning.com.au
M 08 9497 3334

D	ADD EMERGENCY A. WAY.	171118
C	MINOR MODIFICATIONS	171023
B	MINOR MODIFICATIONS	171022
A	LOCAL STRUCTURE PLAN	171012
REV	DESCRIPTION	YYMMDD
DRAWING NUMBER	REV	SCALE 1:7500
EP 170520 06	D	SHEET A3

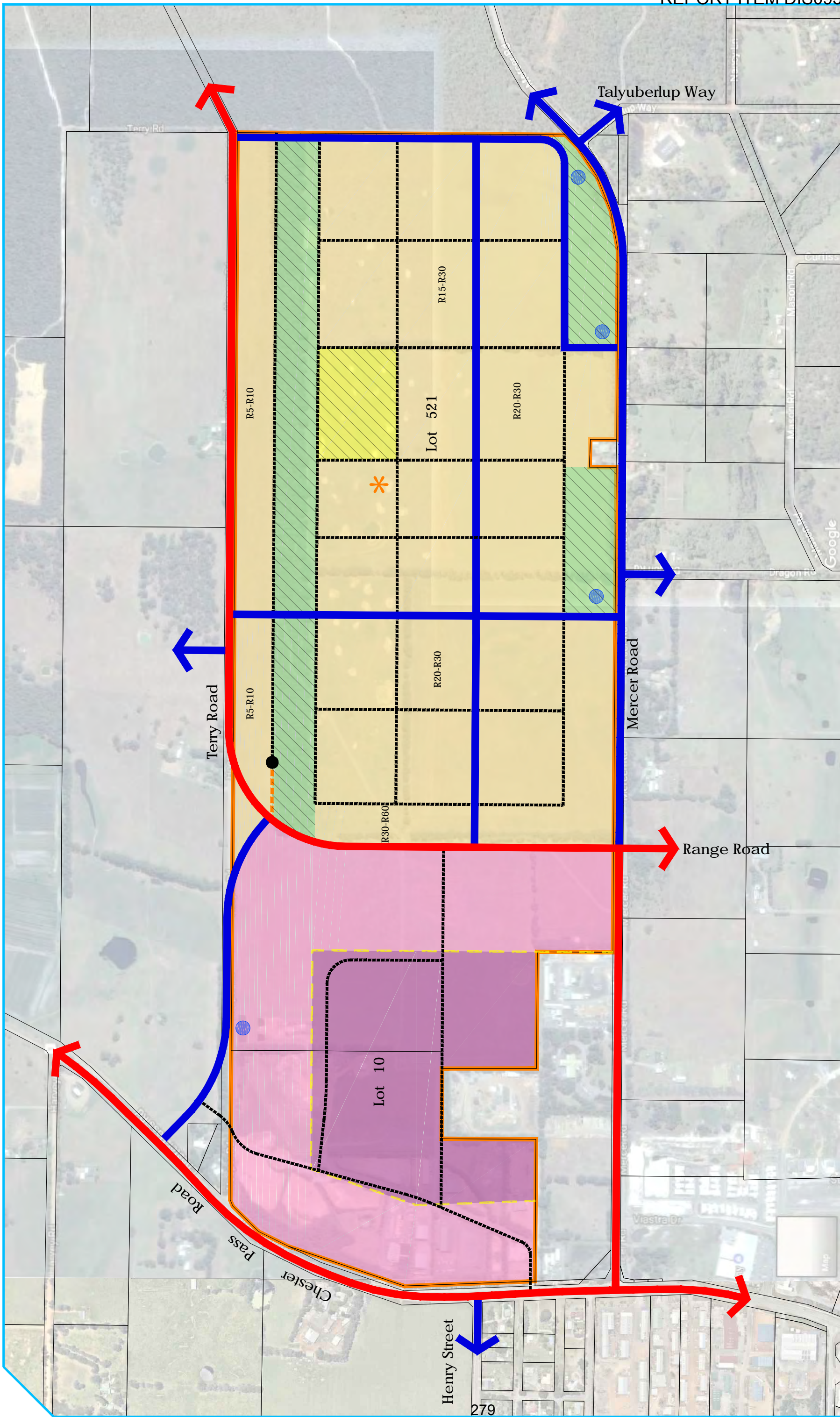


- Light Industry Precinct A
- Light Industry Precinct B
- Community Purpose Site
- 200m Buffer to Sensitive Uses
- Emergency Access Way

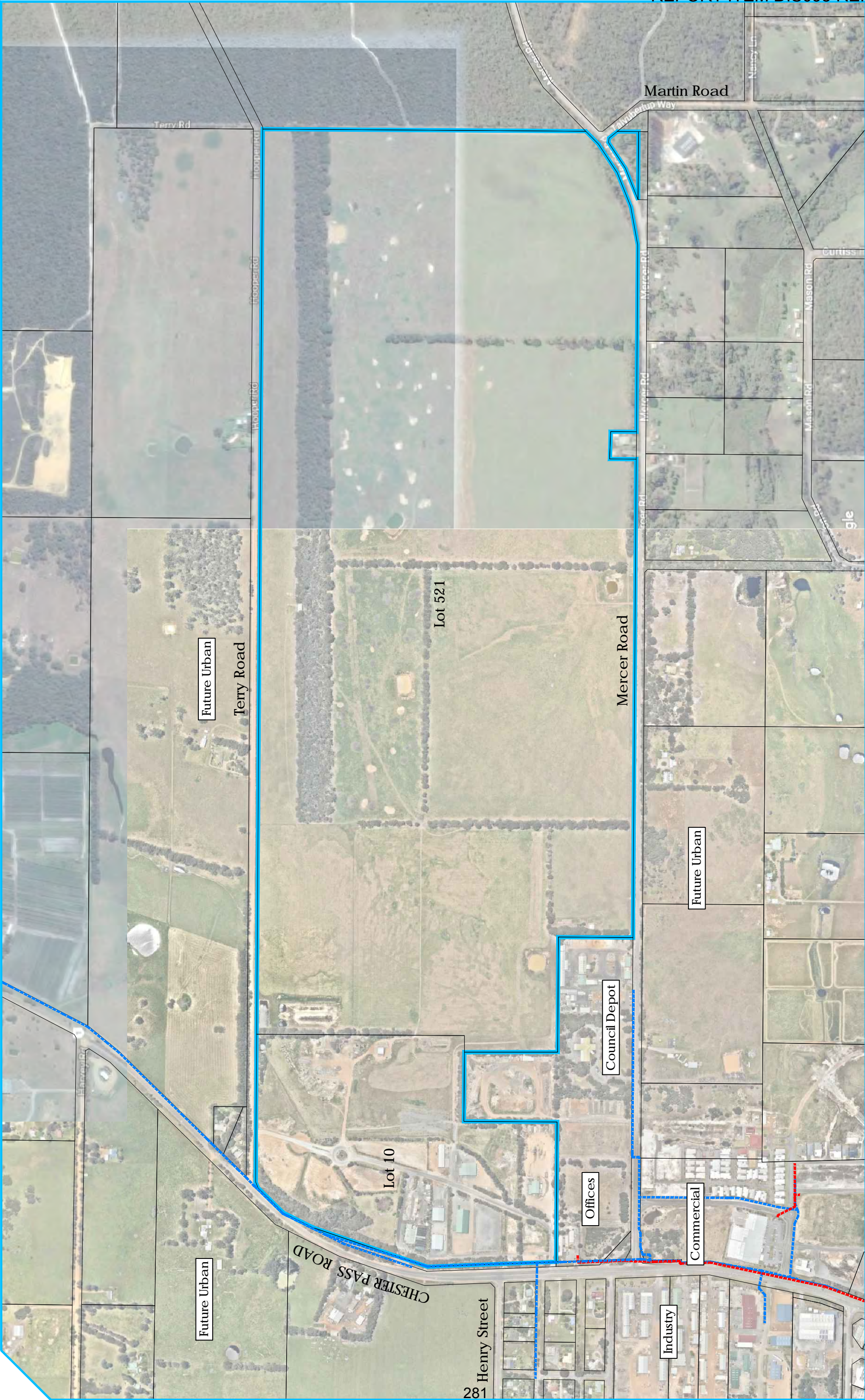
- Parks and Recreation
- Public Use - School
- Residential
- Drainage

- LEGEND**
- Local Structure Plan Boundary
 - Integrator Arterial Road
 - Neighbourhood Connector Road
 - Local Road

LOCAL STRUCTURE PLAN
Lot 10 Chester Pass Road and
Lot 521 Mercer Road
Walmsley



ATTACHMENT 5

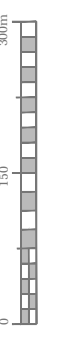


Edge Planning & Property
124 Hulse Street, Mount Clarence
AUBURN WA 6230
M 0409 107 334





DRAWING NUMBER
EP 170520 03

REV A
A CONTEXT PLAN
170522 SJ ST
REV DESCRIPTION YMMDD DRAWN/APP/VD

SCALE 1:7500
SHEET A3











Legend

-  Structure Plan Boundary
-  Existing Lot Boundary
-  Existing u/ground Water Pipe
-  Existing u/ground Sewer Pipe

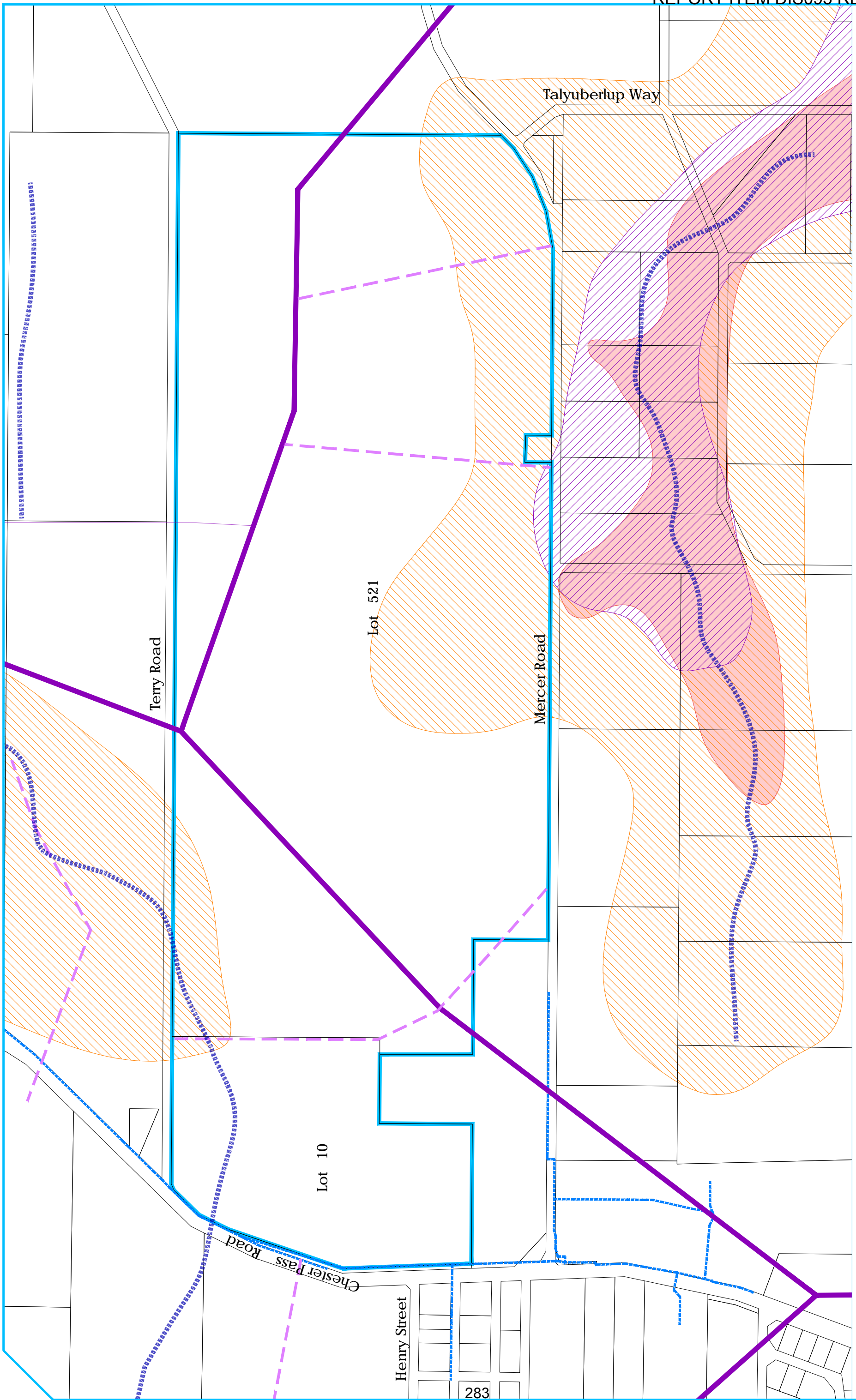
CONTEXT PLAN
Lot 10 Chester Pass Road
and Lot 521 Mercer Road
Walmsley

ATTACHMENT 6

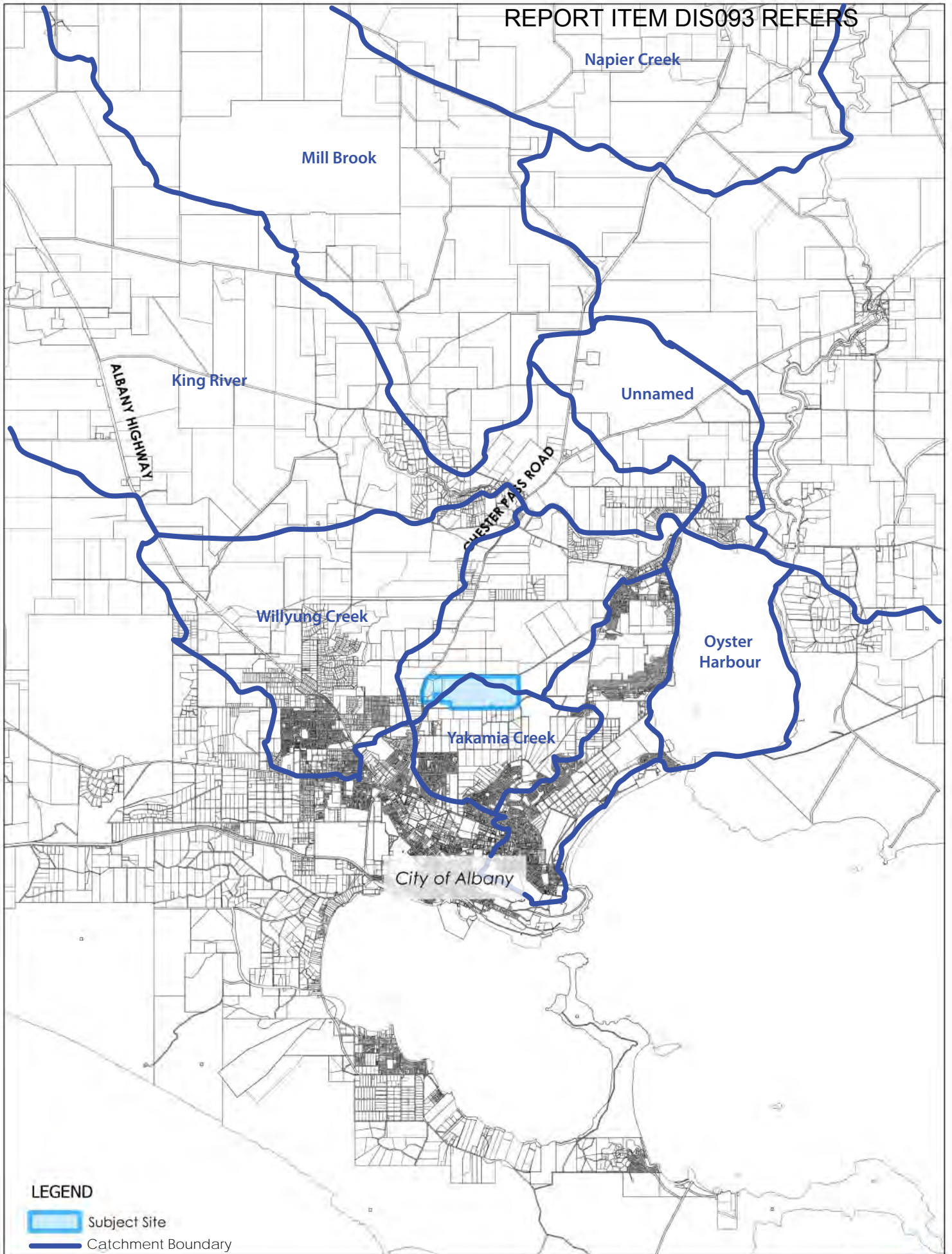
-  Moderate to High Risk Acid Sulphate Soils within 3m of Natural Soil Surface (Department of Environmental Regulation 2015)
-  Waterlogging Risk 10-30% (Moderate - Very High Risk) (Department of Agriculture and Food: Fisheries and Regional Development 2017)
-  Waterlogging Risk 50-70% (Moderate - Very High Risk) (Department of Agriculture and Food: Fisheries and Regional Development 2017)

- LEGEND**
-  Subject Land
 -  Underground Water Pipe
 -  Seasonal Water Course / Living Stream
 -  Catchment Boundary
 -  Sub-catchment Boundary



CONTEXT WATER INFORMATION
 Lot 10 Chester Pass Road and
 Lot 521 Mercer Road
 Walmsley



ATTACHMENT 7



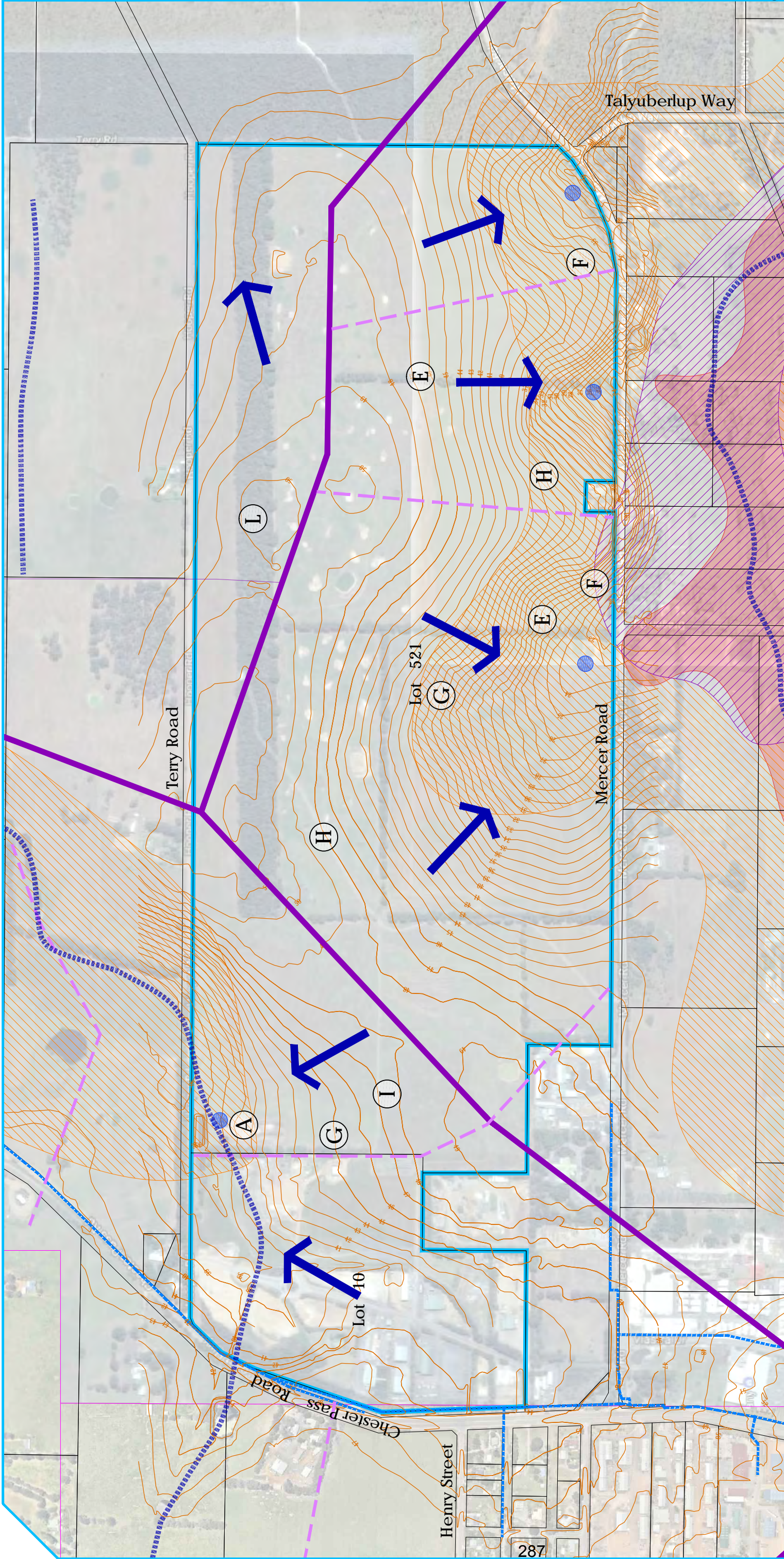
LEGEND

-  Subject Site
-  Catchment Boundary

LOCATION AND CATCHMENTS
Lot 10 Chester Pass Road and
Lot 521 Mercer Road
Walmsley



ATTACHMENT 8



LOCAL WATER MANAGEMENT STRATEGY
Lot 10 Chester Pass Road and
Lot 521 Mercer Road
Walmsley

- LEGEND**
- Subject Land
 - Contours
 - ➔ Drainage Path
 - Seasonal Water Course / Living Stream
 - Indicative Detention Basin
 - Catchment Boundary
 - Sub-catchment Boundary
 - Moderate to High Risk Acid Sulphate Soils within 3m of Natural Soil Surface (Department of Environmental Regulation 2015)
 - Waterlogging Risk 10-30% (Moderate - Very High Risk) (Department of Agriculture and Food; Fisheries and Regional Development 2017)
 - Waterlogging Risk 50-70% (Moderate - Very High Risk) (Department of Agriculture and Food; Fisheries and Regional Development 2017)

- (A)** Undertake enhancement of the seasonal watercourse within the Structure Plan area to create a 'j' or 'u' shape. Consider the preferred tenure and management of the seasonal watercourse at the subdivision stage.
- (B)** Adopt water sensitive urban design with post development flows to be as close as possible to the pre-development flow.
- (C)** Stormwater to be retained on lots for up to the 1 in 1 year, 1 hour ARI event. Support measures including rainwater tanks and soakwells.
- (D)** Stormwater run-off from roads to be designed to accommodate the 1 in 5 year ARI event through roadside bioretention swales with overflow in larger flood events directed to detention basins.
- (E)** Relevant roads to be designed to accommodate flood routes for a 1 in 100 ARI year event.
- (F)** At the detailed design stage, consider utilising stormwater for the irrigation of public open space and street trees.
- (G)** All lots to be connected to the reticulated water system.
- (H)** All residential lots to be connected to the reticulated sewerage system.
- (I)** Where industrial lots are 1 hectare or above, they will be serviced with an approved method of effluent disposal.
- (J)** Buildings to be raised at least 0.3 metre above the ground level.
- (K)** Support an education strategy including the provision of information on Waterwise gardens and water-efficient appliances.
- (L)** Native vegetation to be conserved and incorporated into Public Open Space.

SCALE 1:7500
 SHEET A3
 0 150 300m

edge
 PLANNING & PROPERTY

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DRAWING NUMBER: EP 170520 05
 REV: B

REV	DESCRIPTION	DATE
B	ADD F. MOD TO NOTE L	17/11/18
A	IMMS	17/10/06
	YTM/DD	

APPENDIX 12

CONTRIBUTION PLAN: ARDESS-WALMSLEY LOCAL STRUCTURE PLAN

1. Background

- 1.1 The developer of Lot 10 Chester Pass Road, Walmsley and the developer of Lot 521 Mercer Road, Walmsley are largely responsible for subdivision works relating to their land based on Western Australian Planning Commission (WAPC) policies.
- 1.2 In accordance with *State Planning Policy 3.6 Development Contributions for Infrastructure* and other WAPC policies, some subdivision works (land contributions, infrastructure works and monetary contributions) adjoining the Structure Plan area and/or within Lot 521 Mercer Road are the responsibility of developers and/or landowners outside the *Ardess-Walmsley Local Structure Plan* area and/or are the responsibility of the City.

2. Contributions

- 2.1 The attached Contributions Plan provides the framework for key infrastructure, community facilities and land requirements (referred to as land contributions, infrastructure works and monetary contributions in SPP 3.6) to be provided by developers (also means subdividers) within the *Ardess-Walmsley Local Structure Plan* area, by developers and/or landowners outside the *Ardess-Walmsley Local Structure Plan* area and by the City.
- 2.2 The key contributions relate to:
 - i) Terry Road;
 - ii) Range Road;
 - iii) Mercer Road/Range Road intersection;
 - iv) Mercer Road/neighbourhood connector intersections;
 - v) primary school site; and
 - vi) public open space.
- 2.3 There will be separate consideration by the City regarding how it will fund the costs of future widening of Terry Road and Range Road to four (4) lanes within and adjoining the *Ardess-Walmsley Local Structure Plan* and how it will fund the Mercer Road/Range Road intersection construction/upgrading. This may require a separate Contribution Plan/s and/or Local Planning Policies relating to the full construction and implementation of extending Range Road/Terry Road between North Road, Albany and Lower King Road, Oyster Harbour.

3. Implementation

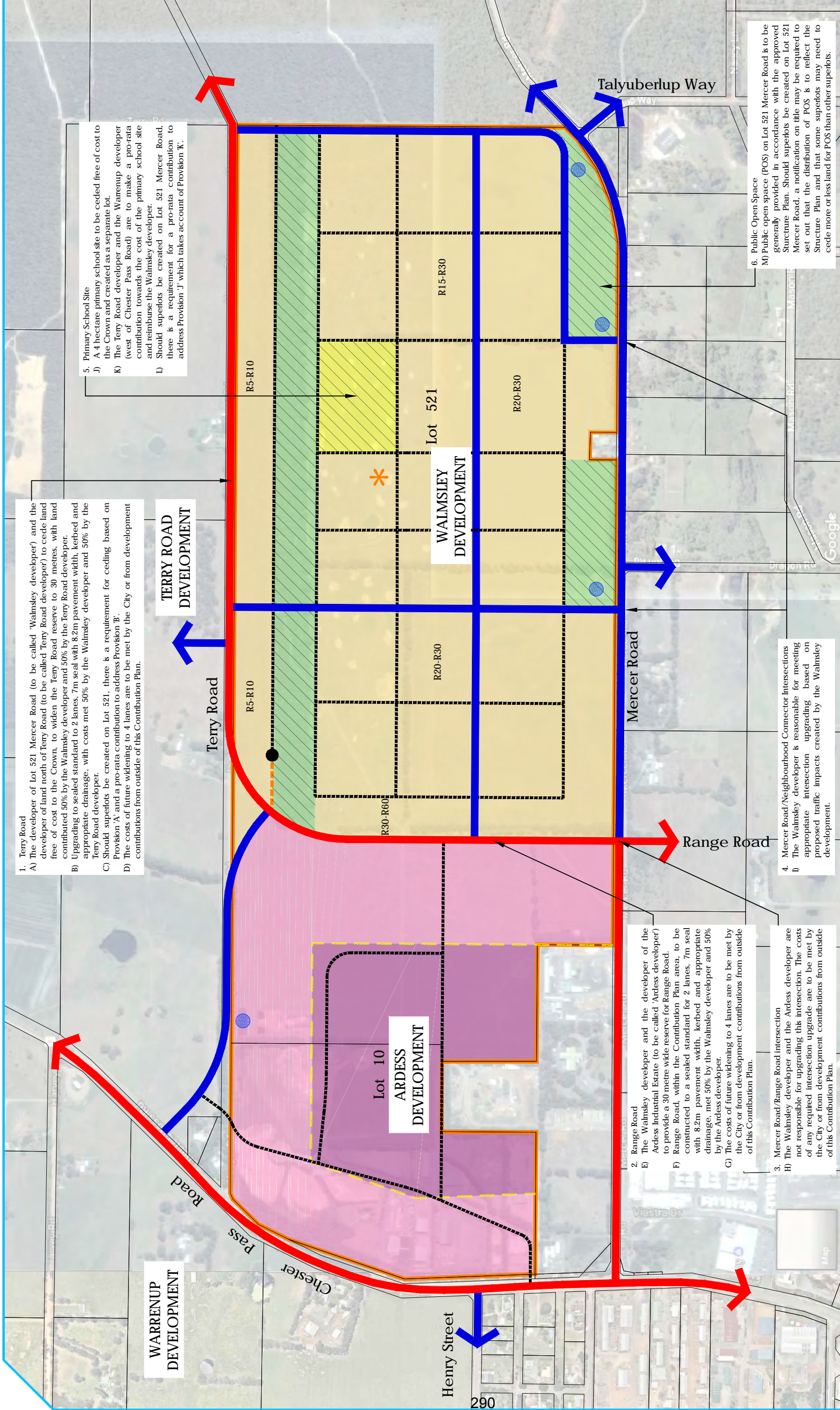
- 3.1 Developers should refer to section 7.1 of Part One - Implementation section of the *Ardess-Walmsley Local Structure Plan* for developer contribution responsibilities.
- 3.2 Implementation of the Structure Plan will be through application of the provisions of Part One - Implementation of the Structure Plan through scheme amendment, subdivision and/or development processes.
- 3.3 Based on section 2.3 above, the City may create separate planning guidance to facilitate funding and achieve suitable outcomes.

CONTRIBUTION PLAN

Lot 10 Chester Pass Road and

Lot 521 Mercer Road

Walmsley



1. Terry Road
A) The developer of Lot 521 Mercer Road (to be called 'Walmsley developer') and the developer of land north of Terry Road (to be called 'Terry Road developer') to cede land free of cost to the Crown, to widen the Terry Road reserve to 30 metres, with land contributed 50% by the Walmsley developer and 50% by the Terry Road developer.
B) Upgrading to sealed standard to 2 lanes, 7m seal with 8.2m pavement width, kerbed and appropriate drainage, with costs met 50% by the Walmsley developer and 50% by the Terry Road developer.
C) Should superlots be created on Lot 521, there is a requirement for ceding based on Provision 'A' and a pro-rata contribution to address Provision 'B'.
D) The costs of future widening to 4 lanes are to be met by the City or from development contributions from outside of this Contribution Plan.

5. Primary School Site
J) A 4 hectare primary school site to be ceded free of cost to the Crown and created as a separate lot.
K) The Terry Road developer and the Wamenup developer (west of Chester Pass Road) are to make a pro-rata contribution towards the cost of the primary school site and reimburse the Walmsley developer.
L) Should superlots be created on Lot 521 Mercer Road, there is a requirement for a pro-rata contribution to address Provision 'J' which takes account of Provision 'K'.

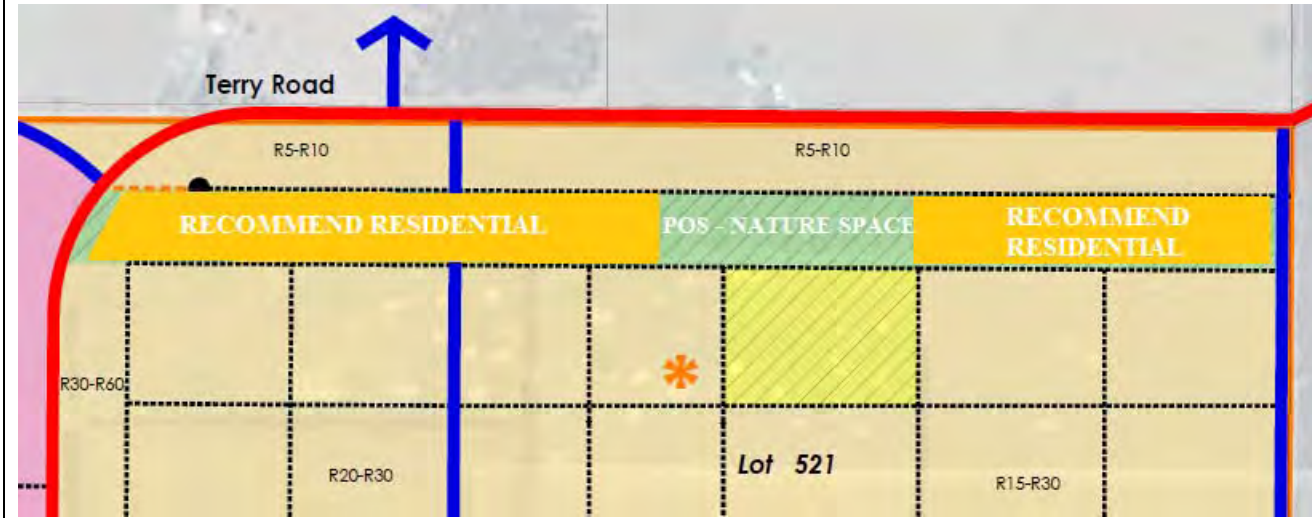
2. Range Road
E) The Walmsley developer and the developer of the Ardess Industrial Estate (to be called 'Ardess developer') to provide a 30 metre wide reserve for Range Road.
F) Range Road, within the Contribution Plan area, to be constructed to a sealed standard for 2 lanes, 7m seal with 8.2m pavement width, kerbed and appropriate drainage, met 50% by the Walmsley developer and 50% by the Ardess developer.
G) The costs of future widening to 4 lanes are to be met by the City or from development contributions from outside of this Contribution Plan.

3. Mercer Road/Range Road intersection
H) The Walmsley developer and the Ardess developer are not responsible for upgrading this intersection. The costs of any required intersection upgrade are to be met by the City or from development contributions from outside of this Contribution Plan.

6. Public Open Space
M) Public open space (POS) on Lot 521 Mercer Road is to be generally provided in accordance with the approved Structure Plan. Should superlots be created on Lot 521 Mercer Road, a notification on title may be required to set out that the distribution of POS is to reflect the Structure Plan and that some superlots may need to cede more or less land for POS than other superlots.

4. Mercer Road/Neighbourhood Connector Intersections
I) The Walmsley developer is responsible for meeting appropriate intersection upgrading based on proposed traffic impacts created by the Walmsley development.

<p style="text-align: center;">Schedule of Submissions LOCAL STRUCTURE PLAN No.10 Lot 10 Chester Pass Road and Lot 521 Mercer Road, Walmsley.</p>			
No.	Address	Copy/Summary of Submissions	
		<p><i>Note: This is a broad summary of the submissions only. A copy of the submissions in full has been provided to the Council as a separate document.</i></p>	<p><i>City comments/recommendations</i></p>
	AGENCY		
1.	ATCO Gas Australia	<p><u>Gas</u> ATCO Gas Australia does not have any objection to the proposed Local Structure Plan.</p>	<p><u>Note</u> No modification to structure plan required.</p>
2.	Water Corporation	<p><u>Wastewater</u> The implementation of sewer planning relies on the area being developed in a logical and orderly manner from west to east.</p> <p>Leapfrogging the urban front will likely incur costs for the developers in the construction of temporary wastewater infrastructure and the extension of water reticulation mains.</p> <p>The ultimate servicing of most of this land relies on the construction of a major waste water pumping station.</p>	<p><u>Uphold</u> The Water Corporation mentions that the subject land, including the industrial land, should be connected to reticulated sewer.</p> <p>The structure plan is recommending, that the areas identified for industry are not connected to the Water Corporations sewerage system and are instead developed with on-site effluent disposal systems.</p> <p>It is recommended that the structure plan is amended to ensure:</p> <ol style="list-style-type: none"> 1. Any additional industrial areas are connected to reticulated sewer. 2. Future developers are aware of the need to contribute to services and infrastructure, including a major waste water pumping station. 3. The contribution plan considers any additional contributions culminating from additional investigative work recommended by this schedule.
		<p><u>Water Supply</u> The subject area is within the Albany Water Zone and currently no detailed retic level water planning exists. Subject to verification of capacity issues as further subdivision and development proceeds, the Corporation will consider allowing developers to incrementally extend water reticulation-sized mains (generally 200mm diameter or smaller) into the subdivision areas.</p>	<p><u>Note</u> The subject area is within the Albany Water Zone and currently no detailed retic level water planning exists. Subject to verification of capacity issues as further subdivision and development proceeds, the Corporation may consider allowing developers to incrementally extend water reticulation-sized mains (generally 200mm diameter or smaller) into the subdivision areas.</p> <p>No modification to structure plan required.</p>
3.	Department of Biodiversity, Conservation and Attractions.	<p><u>Native Vegetation</u> The retention of native vegetation not only maintains the natural amenity for this area but also supports threatened species through retention of habitat.</p>	<p><u>Uphold – in part</u> The structure plan is recommending the protection of an existing strip of native vegetation.</p> <p>The structure plan proposes to protect the vegetation via ceding to the Crown as Public Open Space.</p> <p>The structure plan has categorised the proposed POS (conservation area) as 'Restricted' POS. The Western Australian Planning Commission (draft) Liveable Neighbourhoods document recommends that 'Restricted access conservation areas' should not be accepted as a contribution to POS provision.</p>

			<p>The City's The City's Public Parkland Policy states: <i>Areas of bushland that have little or no recreational value (conservation status) should not be ceded to the City of Albany as POS.</i></p> <p>The proposed conservation area will not provide a POS function to the community. The conservation area should not be deemed as 'Restricted' use and should not be ceded as POS.</p> <p>As per the below illustration, it is recommended that the structure plan is changed to identify portions of the proposed conservation area for residential development and portion for 'POS - Nature space'.</p> <p>Nature spaces provide a setting for people to enjoy and connect with nature. Sites are managed to enable access by the community whilst protecting environmental values. It may be possible to provide a high quality space for improving environmental values, by considering the viability of the site and its contribution to local biodiversity.</p> 
4.	Department of Planning, Lands and Heritage	<p><u>Future Industry Zoning</u> The Structure Plan needs to justify demand for/extent of proposed industrial land shown in context of the needs of the locality and the overall Albany City needs.</p> <p><u>Transport depot - 200m Buffer</u> Transport depots are considered to be inappropriate adjacent to sensitive land uses such as residential. Delete provision for transport depots to be located adjacent to residential or other sensitive land uses. Confine transport depots to a core area separated by minimum 200m buffer.</p> <p><u>City Land</u> The structure plan should take a precautionary view on the land use options available for Council land, in particular the need or otherwise for a 200m buffer from the northern boundary for the establishment of proposed transport depots.</p> <p><u>Land Uses – Light Industry</u> Limit the outer ring of industrial uses to standard light industries via light industrial zone.</p>	<p><u>Uphold</u> It is recommended that an industrial demand and supply analysis is undertaken to validate identifying additional land for industry.</p> <p><u>Uphold</u> As per Environmental Protection Guidelines and neighbour comment, it is recommended that the structure plan is modified by deleting provision for transport depots within 200m buffer.</p> <p><u>Note</u> The City propose to continue to operate Lot 52 as a depot site, which includes storage yard, workshop, maintenance and administration. No modification to structure plan required.</p> <p><u>Uphold</u> It is recommended that the structure plan is modified to ensure that provision is made for the 200m buffer area to be zoned 'Light Industry'.</p>

	<p><u>Range of industrial lot size.</u> New light industry zones need to provide for a range a lot sizes (including lots less than 1ha).</p>	<p><u>Uphold.</u> It is recommended that the structure plan is modified to ensure a range of lot sizes (including lots less than 1ha).</p>
	<p><u>Reticulated sewer – additional industrial areas</u> All of the additional land proposed by the Structure Plan for industry is to be provided with reticulated sewerage so that the zone can accommodate the whole range of lot sizes and uses, with only the inner core of the existing industrial zone being unsewered with a min 1ha lots.</p>	<p><u>Uphold</u> It is recommended that the structure plan is modified to ensure that all of the additional land proposed by the structure plan is provided with reticulated sewerage.</p>
	<p><u>Reticulated sewer – existing industrial areas</u> The existing zoned industrial area to remain unsewered and confined to dry industries until such time as more dense development in the area needs to be accommodated in which case sewerage would be needed.</p>	<p><u>Uphold</u> It is recommended that the structure plan is modified to note that; <i>the existing zoned industrial area may remain unsewered and confined to dry industries until such time as more dense development in the area needs to be accommodated in which case sewerage would be needed.</i></p>
	<p><u>Controls – Light Industry</u> Modifying the Structure Plan such that where the Light Industry zone is to be adjacent to/opposite residential areas within or outside SP area (eg Range Road and northern boundary of proposed industry area) , the Structure Plan prescribes the need for controls over uses and development to avoid potential conflict between some light industry uses and adjacent uses. The structure plan could also flag amendments to Local Planning Scheme such that some uses, e.g. Service Station is changed from 'P' to 'D' use in the Light Industry zone.</p>	<p><u>Uphold</u> It is recommended that the structure plan is modified to ensure provisions and land use classifications are implemented to avoid potential conflict between some light industry uses and adjacent uses. E.g. Service Station is changed from 'P' to 'D' use in the Light Industry zone.</p>
	<p><u>Zoning</u> Modifying the Structure Plan to require industrial areas to be appropriately zoned prior to subdivision</p>	<p><u>Uphold</u> It is recommended that the structure plan is modified to ensure industrial areas are appropriately zoned prior to subdivision (include a zoning provision).</p>
	<p><u>Service Roads</u> Prescribe and show the need for local residential service roads adjacent/parallel to Mercer Road, Range Road and Terry Road.</p>	<p><u>Uphold</u> It is recommended that the structure plan is modified to ensure service roads are developed adjacent/parallel to Mercer Road, Range Road and Terry Road. Include commentary in text and show on map.</p>
	<p><u>Min R20 Density</u> Amend SP to show proposed R5/10 area as having proposed minimum density code of R20.</p>	<p><u>Uphold</u> It is recommended that the structure plan is modified to show proposed R5/10 area as having proposed minimum density code of R20.</p>
	<p><u>Transport/Roads/Intersections</u> Further investigation is needed by way of preliminary engineering assessment to ensure grade of proposed road alignments and intersections would 'be appropriate for heavy vehicles (northern road connection from Chester Pass Road would provide for heavy vehicles to access Range Road).</p>	<p><u>Uphold</u> It is proposed that access via the proposed northern road connection to Chester Pass Road is for as-of-right vehicles only. RAV7 vehicles not permitted. It is recommended that the structure plan makes provision to ensure the northern road connection to Chester Pass Road is for as-of-right vehicles only.</p>

			<p>It is recommended that the structure plan and contribution plan are modified in accordance with recommendations culminating from a Traffic Impact Assessment to ensure grade and use of proposed internal road alignments and intersections would be appropriate for heavy vehicles.</p> <p>The Traffic Impact Assessment is to be developed prior to endorsement of the structure plan.</p>
		<p><u>Transport Depot – sunset clause</u> Provisions in the structure plan and scheme should require approvals for transport depots to be subject to 'sunset' clause such that in the future they may be relocated to locations which meet future transport objectives of MRWA and the City.</p>	<p><u>Uphold</u></p> <p>It is recommended that the structure plan is modified to ensure Development Approvals for transport depots are subject to a Temporary Development Approval (e.g. reviewed every 5 years).</p>
		<p><u>Leasehold with private roads versus Freehold with public roads</u> The Structure Plan needs to make it clear that the expanded industrial area is intended to be private leasehold lots serviced by private roads, and that provision of reticulated water and sewerage, power, etc would be compatible and satisfactory to the Service Providers such as the Water Corporation under this tenure arrangement.</p>	<p><u>Uphold</u></p> <p>The expanded industrial area is intended to be private leasehold lots serviced by private roads.</p> <p>The structure plan states: <i>In the future, the owners of Lot 10 Chester Pass Road and the City will review whether the private road becomes vested with the City as a public road.</i></p> <p>Under a private arrangement, the Water Corporation would provide an appropriately sized service to a single lot (green title) based on availability and capacity of the water and wastewater system. Water mains are laid in gazetted roads and would not be extended to private roads. Similarly a wastewater connection would be provided to the lot boundary.</p> <p>The applicant can make arrangements to configure a private water supply ring main within their lot to service the private lots, this can also be done for wastewater (private plumbing) and effectively is managed by the owners, with the Corporation being responsible to the recognised lot boundary only.</p> <p>It is recommended that the structure plan is modified to clarify servicing obligations (e.g. provision of reticulated water) under a private system and any differences that may be applicable under a public system.</p>
		<p><u>Crossover – Lot 10</u> Review needs to be undertaken to determine if a single access point to Chester Pass Road is applicable given the Structure Plan shows an additional access to the north.</p>	<p><u>Uphold</u></p> <p>It is recommended that the structure plan is modified in accordance with the recommendations from of a Traffic Impact Assessment to determine if the current single access point to Chester Pass Road (Lot10), for RAV7 vehicles, is applicable.</p>
5.	Department of Education	<p><u>School</u> The proposed site location and the 4 hectares identified for the primary school site is acceptable to the Department. The estimated Lot yield is sufficient for the proposal for a primary school within the identified local structure plan.</p>	<p><u>Noted</u></p> <p>The structure plan recommends that landholders adjacent to the structure plan area contribute to the cost of the proposed primary school site. Contributions for schools are managed by the Department of Education. The structure plan does not need to calculate contributions for the proposed school.</p> <p>It is recommended that, reference within the structure plan, to contribution planning for the proposed school, is deleted.</p>
6.	Main Roads WA	<p><u>Restrictive Covenant</u> Where not already in place, restrictive covenants to all lots sharing boundary's with the Chester Pass Rd road reserve will be applied. No further access points to Chester Pass Rd will be approved by Main Roads. This includes emergency fire access points, requirements for bushfire safety must be addressed by other means.</p>	<p><u>Uphold</u></p> <p>It is recommended that a provision is included to ensure development and subdivision is aware that no additional access to Chester Pass Road may be permitted.</p>

		<p><u>Stormwater – Chester Pass Rd</u> No stormwater from the development is to be discharged into the Chester Pass Rd drainage system.</p>	<p><u>Uphold</u> Recommend including provision to ensure stormwater is not discharged from development into the Chester Pass Rd drainage system.</p>
		<p><u>Notification – Chester Pass Rd</u> All future planning must take into account that the Chester Pass Road is a major heavy vehicle freight route and buildings in the vicinity will be affected by transport noise and vibration.</p>	<p><u>Uphold</u> It is recommended that a provision is included to ensure landholders are aware (notification on title and notification on Development Applications) that Chester Pass Road is a major heavy vehicle freight route and buildings in the vicinity will be affected by transport noise and vibration.</p>
		<p><u>Private Access Roads</u> Main Roads questions the validity of privately owned access roads within the industrial estate, it raises the question of substandard access for heavy vehicles as the roads are not included in the Restricted Access Vehicle network system.</p>	<p><u>Uphold</u> It is recommended that a provision is included to ensure roads are developed to accommodate heavy vehicles.</p>
		<p><u>Closure – Crossover – Chester Pass Rd</u> Main Roads may request the closure of the existing driveway access to Chester Pass Road after the Terry Road connection to Chester Pass Road is realigned and completed.</p>	<p><u>Dismiss – in part</u> It is intended that heavy vehicles continue to use the existing private access onto Chester Pass Road. It is intended that the Terry Road connection to Chester Pass Road is used by as-of-right vehicles and not large trucks (RAV7). The structure plan currently states: <i>The main access to the Ardess Industrial Estate is via a single entry road onto Chester Pass Road. Secondary access is permitted between the estate and Terry Road for as-of-right vehicles.</i> The structure plan currently includes a provision to ensure that development will be advised that there is no guarantee that restricted access vehicles will be permitted to use Chester Pass Road between Menang Drive and the main roundabout (intersection with Albany Highway, North Road and Hanrahan Road) following the Albany Ring Road being completely constructed and operational to the Port of Albany. It is recommended that the structure plan is amended by way of a Traffic Impact Assessment to determine alternative access for large trucks (RAV7), should Main Roads request closure of the existing driveway access to Chester pass Road.</p>
		<p><u>Crossover – Chester Pass Rd</u> Any change of use or upgrading of the current driveway access to Chester Pass Rd is to be approved by Main Roads. As the development grows further treatments to the existing crossover access may be required (turn pockets etc).</p>	<p><u>Uphold</u> Should a Traffic Impact Assessment declare otherwise, it is recommended that a provision is included in the structure plan notifying developer(s) that further treatments to the existing Chester Pass Road crossover may be required (e.g. turn pocket) as industrial development grows.</p>
7.	Department of Water and Environmental Regulation (Water resource matters)	<p><u>Wastewater</u> The site is not located within a Sewerage Sensitive Area as defined in the draft Government Sewerage Policy (Department of Planning Lands and Heritage, 17 November 2017).</p>	<p><u>Noted</u> No modification to structure plan required.</p>
		<p><u>On-site sewage disposal.</u> Under the draft Government Sewerage Policy the acceptability for on-site sewage is considered on case-by-case basis for approved industrial development.</p>	<p><u>Noted.</u> No modification to structure plan required.</p>

	<p><u>Land capability assessment</u> There are inconsistencies within the document regarding the land capability assessment for urban development.</p>	<p><u>Uphold</u></p> <p>The land capability assessment identifies an area (Mapping Unit No.2) as having as low development capability ('IV'), mainly due to a 'Very Low' soil absorption ability. Regardless, the structure plan identifies the area as being suitable for development.</p> <p>It is recommended that the structure plan is amended to identify measures necessary to overcome land capability issues for the Mapping Unit No.2 area (low development capability).</p>
	<p><u>Waterway - location</u> The location of the waterway shown on the LWMS map is not entirely accurate. The modified waterway which enters Lot 10 from Chester Pass Road and which exits Lot 10 on Terry Drive is located further to the north of the waterway that is mapped. Based on a site visit, the waterway is contained entirely within Lot 10 and this is supported by aerial imagery where the course of the waterway is visible.</p>	<p><u>Uphold</u></p> <p>It is recommended that the structure plan is amended to identify the waterway further north and entirely within Lot 10.</p>
	<p><u>Waterway – living stream</u> Development of the waterway into a Living Stream would improve the values of the waterway including water quality discharging into the King River.</p>	<p><u>Noted</u></p> <p>The LWMS currently states the following for the living stream: <i>Undertake enhancement of the seasonal watercourse within the Structure Plan area to create a 'Living Stream'. Consider the preferred tenure and management of the seasonable watercourse at the subdivision stage.</i></p> <p>It is recommended that provisions culminating from the LWMS are placed on the structure plan map and in the structure plan text provisions.</p>
	<p><u>Waterway - revegetation</u> Revegetation could be used to provide connectivity with the Living Stream to the vegetation corridor to the east on Lot 521, although realignment of the existing waterway may be required to achieve this. The department recommends that rehabilitation of the waterway occurs and that the Living Stream is included within POS.</p>	<p><u>Dismiss</u></p> <p>Public Open Space is given up in accordance with the <i>Planning and Development Act 2005</i>, to accommodate 'Residential' development. The subject area is proposed for industrial development.</p> <p>No modification to structure plan required.</p>
	<p><u>Local water management strategy.</u> The document does not provide the work required to support the recommendations made in the LWMS. For instance, the LWMS does not 'prove up' the geotechnical study for stormwater design or demonstrate what needs to be done to meet the design objectives and criteria. The LWMS's stormwater management strategy should make recommendations based on appropriate measurement and modelling. The methodology of the Australian rainfall and runoff: a guide to flood estimation for hydrological and hydraulic analyses is a prerequisite to infrastructure design. No surface water modelling has been undertaken as required with preparation of a LWMS and no preliminary calculations or sketches are provided all of which are required to provide proof of concept.</p> <p>Drainage modelling needs to be undertaken to determine the detailed land requirements and flood ways needed to cope with storm events. The location of the surface flow paths and floodwater storage areas needs to be shown so that consultation with the department and drainage service providers can occur to establish</p>	<p><u>Uphold</u></p> <p>It is recommended that the LWMS is updated in accordance with measurement and modelling and the following documents:</p> <ul style="list-style-type: none"> • Better Urban Water Management (WAPC, Oct 2008); and • Developing a local water management strategy (DoW, Dec 2008). <p>In particular, the LWMS needs to demonstrate stormwater design criteria (detailed land requirements and floodways - not just principles) to meet stormwater objectives.</p> <p>The location of the surface flow paths and floodwater storage areas needs to be shown to establish acceptability for meeting flood protection, amenity and other requirements.</p> <p>Provisions of the LWMS need to be incorporated into the structure plan map and text.</p>

		<p>acceptability for meeting flood protection, amenity and other requirements.</p> <p>The DWER would support the use of tree pits along road verges particularly as a strategy where on site infiltration is limited by slow draining soil types.</p>	
8.	City of Albany	<p><u>Contribution Planning</u> The contribution plan prepared for the Ardess structure plan indicates the need for contributions for a school, Terry Road, Range Road and intersection treatment at Mercer Road and Range Road.</p> <p>May be that more information is necessary to validate cost per dwelling. Information including:</p> <ol style="list-style-type: none"> 1. Total cost of infrastructure; 2. Determine proportion of vehicle usage of infrastructure; <ol style="list-style-type: none"> a. Vehicle usage external; and b. Vehicle usage occurring from structure plan area; <ol style="list-style-type: none"> i. Based on average annual daily traffic. 3. Determine total development cost relevant to structure plan area; <ol style="list-style-type: none"> a. Based on proportion of vehicle use. 4. Determine expected dwelling count; <ol style="list-style-type: none"> a. Based on 14dwelling/ha. 5. Determine cost per dwelling; 6. Determine payback cost attributed to landholder ceding road reserve. 	<p>It is recommended that a Cost Apportionment Schedule is prepared to ensure costs are evenly shared between landholders (validate cost per dwelling).</p> <p>A traffic impact assessment should be completed to identify necessary infrastructure treatments and upgrades and vehicle usage.</p> <p>The sharing of costs should be based on the proportion of vehicle usage (includes external), cost to design, cost to develop and cost to cede land.</p> <p>The onus should be on individual landholders to coordinate their timing and development with adjoining landholders or to recoup applicable development costs in accordance with Section 159 of the <i>Planning and Development Act 2005</i>.</p> <p>The following specific modifications in relation to contributions are recommended.</p> <ul style="list-style-type: none"> • Recommend modifying the Terry Road contribution provision 1D), to comply with a traffic impact assessment and Cost Apportionment Schedule. <p>D) The costs of future widening to 4 lanes are to be met by the City or from development contributions from outside of this Contribution Plan.</p> <p>May be that the contribution condition reads something like:</p> <p><i>The land required for the widening of Terry Road, as shown on the structure plan and in accordance with the traffic impact assessment and Cost Apportionment Schedule is to be set aside as a separate lot for acquisition pending future road widening requirements. An easement is to be provided over all of the lot to be set aside for the benefit of the remaining lot(s) for the purpose of providing vehicular access, right of footway, water, sewer, drainage, gas, electricity, television, telecommunications and other necessary service infrastructure, pending construction of the future road widening to the satisfaction of the Western Australian Planning Commission.</i></p> <p><i>The widened section of Terry Road, as shown on the structure plan and in accordance with the traffic impact assessment, is to be constructed and drained at the cost of the landowner/applicant. In relation to this condition, the traffic impact assessment is to determine</i></p> <ul style="list-style-type: none"> • Recommend modifying the primary school contribution provisions 5K) and 5L), as follows. K) The Terry Road developer and the Warrenup developer (west of Chester Pass Road) are to make a pro-rata contribution towards the cost of the primary school site and reimburse the Walmsley developer. L) Should superlots be created on Lot 521 Mercer Road, there is a requirement for a pro-rata contribution to address Provision 'J' which takes account of Provision 'K'. <p><i>Arrangements being made, to the satisfaction of the Western Australian Planning Commission, for the transfer of land identified for school, free of cost to the Department of Education for the provision of a primary school site(s) to serve the area. The land denoted as proposed primary school site on the structure plan is to be set aside as a separate lot,</i></p>

			<p>pending the acquisition of the land by the Department of Education. At the residential subdivision stage, the landowner/applicant is to make a pro-rata contribution towards the cost of the acquisition of the primary school site identified in the subdivision locality, to the satisfaction of the Department of Education.</p> <ul style="list-style-type: none"> Recommend modifying the Range Road contribution provision 2F), as follows; F) Range Road, within the Contribution Plan area, to be constructed to a sealed standard for 2 lanes, 7m seal with 8.2m pavement width, kerbed and appropriate drainage, met 50% by the Walmsley developer and 50% by the Ardess developer. <p>F) Range Road, within the Contribution Plan area, being constructed in accordance with the traffic impact assessment and Cost Apportionment Schedule, to the satisfaction of the City of Albany.</p> <p>In relation to this condition, the expectation is that Range Road is ceded to accommodate 4 lanes and developed in the interim to a sealed standard for 2 lanes, 7m seal with 8.2m pavement width, kerbed and appropriate drainage.</p> <ul style="list-style-type: none"> Recommend deleting the contribution provisions 2G) as follows: G) The costs of future widening to 4 lanes are to be met by the City or from development contributions from outside of this Contribution Plan. <p>The expectation is that Range Road is ceded to accommodate 4 lanes. The cost of ceding is not to be met by the City. The Cost Apportionment Schedule should account for the ceding of land.</p> <ul style="list-style-type: none"> Recommend modifying contribution provision 3H), as follows; H) The Walmsley developer and the Ardess developer are is partly not responsible for upgrading this intersection. The costs of any required intersection upgrade are to be met by the City or from development contributions from outside of this Contribution Plan. <p>The Cost Apportionment Schedule should account for the development of infrastructure.</p>
	PUBLIC		
9.		<p><u>Ardess Estate</u> Ardess Estate is a popular industrial estate providing affordable and flexible accommodation to businesses in Albany. Currently the site has a mixture of small transport, logistic and warehouse uses. The current tenants have chosen to locate in Ardess Estate as leasing land significantly reduces the upfront cost of setting up a site. Growth in the estate has been substantial over the past 5 years with further development expected as all buildings are currently occupied. Further growth of the estate will add to the economic activity and job creation of the area whilst attracting new business to Albany.</p> <p>Light and general industry land for lease is limited, making development difficult in this sector. We support the proposed extension of the industrial area surrounding Ardess Estate to ensure a long term supply of industrial land within a reasonable proximity to other commercial areas and good accessibility to the CBD and rural land.</p>	<p><u>Noted</u></p> <p>No modification to structure plan required.</p>

	Historically Ardess Estate has provided affordable accommodation which is essential for the growth of small to medium businesses in Albany. In the past 12 months Ardess Pty Ltd has developed a small warehouse complex which is aimed at start up and small business to allow a stepping stone into medium industrial sites. Further development of this model is planned as there is a gap in the market for 90-150sqm sheds in a price range achievable to start-up businesses.	
10.	<p><u>Competition and Development Standards</u> Object strongly to the Walmsley Local Structure Plan.</p> <p>We are developers of Pendeen General Industrial Estate, we are trying to continue the establishment of Pendeen General Industrial Land we have land (21 hectares) available and ready access to Albany's freight route, Menang Drive.</p> <p>We have to provide roadside kerbing, underground drainage, street lighting these things seem not to be provided by Ardess and we consider that this is not putting us on an equal footing with Ardess developers.</p>	<p><u>Uphold in-part</u></p> <p>It is recommended that provision is included within the structure plan to ensure roads are developed to an urban standard, to the satisfaction of the City.</p>
	<p><u>Future Access – Chester Pass Rd</u> With the proposed expansion of Ardess Industrial Estate more trucking companies could move into this area and continue south on Chester Pass Rd towards the main roundabout of Albany instead of heading out of town and utilising the bypass ring road- Menang Drive.</p> <p>There is a statement in the Environment Assessment Capability Assessment Report - "that restricted access vehicles may not be guaranteed access to Chester Pass Rd between Menang Drive and the main roundabout when Menang Drive is completed," how would the City of Albany enforce this policy in the future?</p>	<p><u>Noted</u></p> <p>It is recommended that the structure plan is modified to ensure Development Approval applications for transport depots are subject to Temporary Development Approval (e.g. reviewed every 5 years).</p> <p>The structure plan currently states: <i>Development that incorporates restricted access vehicles will be advised that there is no guarantee that restricted access vehicles will be permitted to use Chester Pass Road between Menang Drive and the main roundabout (intersection with Albany Highway, North Road and Hanrahan Road) following the Albany Ring Road being completely constructed and operational to the Port of Albany. Associated development approvals may also contain conditions or advice relating to future limitations of access for restricted access vehicles.</i></p>
	<p><u>Land Supply/Demand</u> If Ardess Industrial Estate expands, this will further stress a depressed market for industrial land.</p>	<p><u>Noted</u></p> <p>It is recommended that an industrial demand and supply analysis is undertaken to validate identifying additional land for industry.</p>
	<p><u>Land Use Conflict</u> Not good planning to increase industrial land when surrounded by residential.</p>	<p><u>Uphold</u></p> <p>It is recommended that the structure plan is amended to support light industrial activities (not general industrial) adjacent to residential areas. Co-locating light industry and residential provides opportunity for employment within walking distance.</p> <p>It is recommended that the structure plan is modified to ensure provisions and land use classifications are implemented to avoid potential conflict between some light industry uses and adjacent uses. E.g. Service Station is changed from 'P' to 'D' use in the Light Industry zone.</p>
11.	<p><u>Employment Opportunity</u> Support the Ardess - Walmsley Structure Plan as proposed by Ten Year Developments for the following reasons:</p>	<p><u>Noted</u></p> <p>No modification to structure plan required.</p>

		<ul style="list-style-type: none"> • It creates an opportunity for local employment and business growth. • It will provide an enhanced central location for existing and new business ventures. • It complements the existing plan Ardess has for its land. • There is minimal environmental impact with the retention of native vegetation. 	
12.		<p><u>Policy Principles</u> It is apparent that the proposal to expand the Ardess Industrial area has had little regard to the objectives and recommendations of State Planning Policies such as;</p> <ul style="list-style-type: none"> • SPP 5.4 Road and Rail Noise and Freight Considerations in Land Use Planning. • Policy DC4 Industrial subdivision. • SPP4.1 Industrial Interface. • EPA Environmental Assessment Guidelines for Separation Distances between Industrial and sensitive land Uses <p>The land owners of Lots 6 and 271 on the western side of Chester Pass Road and Lot 5498 to the north, object to the absence of buffers. Transport depots as noted in the EPA's 'Environmental Assessment Guidelines for Separation Distances between Industrial and Sensitive Land Uses', are associated with gaseous, noise, dust and odour issues and a 200 metre separation distance is recommended.</p>	<p><u>Uphold</u></p> <p>It is recommended that the structure plan is modified by deleting provision for transport depots within 200m buffer.</p>
		<p><u>Transport depot</u> A location of transport orientated uses within the proposed ring road will draw traffic into the urban core and will have a significant impact on the amenity of the Residential, Community and Commercial areas.</p> <p>Transport depots may be denied access along Chester Pass Road when the ring road is constructed. Therefore makes no planning sense to locate transport depots in the area. Likely create significant issues in the future.</p>	<p><u>Uphold in-part</u></p> <p>Large restricted access vehicles (RAV's) are permitted to travel on the Chester Pass Road, which adjoins the subject land.</p> <p>The structure plan states (section 6.3):</p> <p><i>Development that incorporates restricted access vehicles will be advised that there is no guarantee that restricted access vehicles will be permitted to use Chester Pass Road between Menang Drive and the main roundabout (intersection with Albany Highway, North Road and Hanrahan Road) following the Albany Ring Road being completely constructed and operational to the Port of Albany. Associated development approvals may also contain conditions or advice relating to future limitations of access for restricted access vehicles.</i></p> <p>It is recommended that the structure plan is modified to ensure Development Approval applications for transport depots are subject to Temporary Development Approval (e.g. reviewed every 5 years).</p>
		<p><u>Traffic Impact Assessment</u> A detailed traffic impact assessment, as required by State Planning Policy 5.4 has not been prepared for what purports to be a significant transport orientated development.</p> <p>It is likely that alternative access to Chester Pass Road will be required which will result in heavy goods vehicles being drawn through surrounding residential areas. The owner of Lot 5498 is likely to be</p>	<p><u>Uphold</u></p> <p>It is recommended that the structure plan is modified by way of a Traffic Impact Assessment. The Traffic Impact Assessment needs to determine appropriate routes for RAVs, function of roads and intersection treatments associated with traffic movement and volumes.</p> <p>It is recommended that the structure plan makes provision to ensure the northern road connection to Chester Pass Road is for as-of-right vehicles only...or justify otherwise.</p>

	impacted if this occurs and objects to such access as it will detrimentally impact on his residential development.	
	<p><u>Sewer</u> Excluding the area from scheme sewer will significantly increase the cost of bringing the sewer into the area. Connection to sewer will also enable the Ardess Industrial Estate to provide a wide range of lot sizes ranging from 2,000m² upwards.</p>	<p><u>Uphold</u> It is recommended that the structure plan is modified to ensure that all of the additional land proposed by the structure plan is provided with reticulated sewerage.</p>
	<p><u>Crossover Lot 10 – Chester Pass Rd</u> The existing access to Chester Pass Road does not provide passing /slip lanes for heavy vehicles either entering or exiting the site.</p>	<p><u>Noted</u> Main Roads stated in their submission, the following: <i>Any change of use or upgrading of the current driveway access to Chester Pass Rd is to be approved by Main Roads. As the development grows further treatments to the existing crossover access may be required (turn pockets etc).</i> It is recommended that the structure plan is modified to ensure development applications are referred to MRWA for comment. Should a Traffic Impact Assessment declare otherwise, it is recommended that a provision is included in the structure plan notifying developer(s) that further treatments to the existing Chester Pass Road crossover may be required (e.g. turn pocket) as industrial development grows.</p>
	<p><u>Brooks Garden Activity Centre - viability</u> The development of an extensive industrial area within the primary catchment area of the Brooks Garden Activity Centre will do little to support the viability of the centre. Fully serviced lots ranging from 2,000m² upwards will generate significantly more jobs over the long term and will be more compatible with the surrounding area. Rather than space extensive industrial development, a greater emphasis on residential development will support the Activity Centre.</p>	<p><u>Uphold</u> It is recommended that the structure plan is modified to ensure a range of lot sizes in the industrial precinct (including lots 4000m² - 1ha).</p>
	<p><u>Terry Road</u> The owners of Lot 4925 and 5498 Terry Road object to the designation of Terry Road as an Integrated Arterial Road which will require a five metre road widening on either side. In discussion with MRWA, the CoA and DPLH, it was agreed that Mercer Road and Terry Road would be designated as Neighbourhood Connector Roads.</p>	<p><u>Noted</u> Road hierarchy should reflect existing and proposed function/characteristic - in keeping with Liveable Neighbourhoods. E.g. 'Primary Distributor', Integrator Arterial', 'Neighbourhood Connector'. It is recommended that the structure plan is modified by way of a Traffic Impact Assessment. The Traffic Impact Assessment needs to determine function of roads associated with traffic movement and volumes.</p>
	<p><u>Residential Density</u> The proposed designation of R5-10 Residential development along the southern side of Terry Road will significantly impact on the viability of constructing Terry Road to an Arterial Road standard.</p>	<p><u>Uphold</u> It is recommended that the structure plan is modified to show proposed R5/10 area as having proposed minimum density code of R20.</p>
	<p><u>POS</u> The size of Lot 521 provides an opportunity to consolidate the POS requirement to create a District Open Space area to cater for future active recreation. The designation of the vegetation running east-west across the property as POS is contrary to Liveable Neighbourhoods and Council's POS Policy and will result in inadequate provision for active POS. It also represents a lost opportunity to create a district</p>	<p><u>Uphold</u> The following is recommended for POS:</p> <ul style="list-style-type: none"> • Relocate and redefine POS to serve particular function, including 'recreation', 'nature' and 'sport'. • Centralise POS, locate adjacent to school and define as a district size space. • Delete POS at south east corner.

		<p>POS area which in association with a primary school could become a major attraction.</p>	<ul style="list-style-type: none"> • Modify/rationalise southern POS configuration. • Delete POS – conservation strip. Keep portion adjacent to school site for ‘nature’ space (POS for the purpose of conservation is not permitted). • Unless appropriately designed, delete basins from POS areas. Refer to draft Liveable Neighbourhoods for appropriate stormwater design measures located in POS areas. • Revegetation using native species (where currently there is very little native species and diversity) in areas of POS to promote fauna habitat and flora diversity. <p>Recommend showing landscape strips on the structure plan – around light industrial areas and adjacent to Range Rd...in accordance with the EPA’s (2015) Draft Guidance Statement No. 3 Separation Distances Between Industrial and Sensitive Land Uses.</p> <p>Recommend locating High density adjacent to POS. Recommend including surveillance provision for dwellings fronting POS.</p>
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CITY OF ALBANY
LOCAL PLANNING SCHEME No. 1

LOCAL STRUCTURE PLAN No.17

RURAL RESIDENTIAL AREA No. 11
LOTS 1 & 973 NANARUP ROAD, LOWER KING

Endorsement

This structure plan is prepared under the provisions of the City of Albany Local Planning Scheme No. 1.

IT IS CERTIFIED THAT THIS STRUCTURE PLAN WAS APPROVED BY RESOLUTION OF THE WESTERN AUSTRALIAN PLANNING COMMISSION ON:

_____ Date

Signed for and on behalf of the Western Australian Planning Commission:

an officer of the Commission duly authorised by the Commission pursuant to section 16 of the Planning and Development Act 2005 for that purpose, in the presence of:

_____ Witness

_____ Date

_____ Date of Expiry

REPORT ITEM DIS094 REFERS

Amendments:

Amendment No.	Summary of Amendment	Amendment Type	Date Approved (WAPC)

EXECUTIVE SUMMARY

The Local Structure Plan has been prepared to guide subdivision and development of Lots 1 and 973 Nanarup Road, Lower King, Albany, for Rural Residential purposes and 'Additional Uses' sites for short stay accommodation and aquaculture.

The land is located approximately 15 kilometres from the Albany Central Area and is currently used to agist stock.

The land is designated for rural residential development in the City of Albany Local Planning Strategy and will effectively form an extension of the Sheringa Park rural residential area which abuts its western boundary.

Key elements of the plan include:

- Provision for 26 rural residential lots ranging in size from 1.0ha to 2.9ha in area clustered on the more elevated areas of the property and two larger lots of 8.0ha and 9.8ha incorporating the creekline and surrounding lower lying land.
- Protection of Johnson Creek within an extended creek protection area.
- Provision for a secondary means of access and egress for Sheringa Park to the west which currently only has one point of access/egress in emergency situations.
- The designation of 'Additional Uses' sites for short stay accommodation and aquaculture.
- The incorporation of development and associated scheme provisions to minimise the export of nutrients into Oyster Harbour, provision for a buffer to rural land use to the north and incorporation of best practice bushfire management.

Key Outcomes of the Local Structure Plan area summarised in the Table below:

Item	Data		Section number reference within the Local Structure Plan report
Total area of local Structure Plan	60.71 ha		1.0
Land Use Proposed	Area	Lot Yield	
Rural Residential	53.81 ha	28 lots	Part 2
Additional Uses			
• Aquaculture	2.9 ha	1 lot	Part 2
• Tourist Accommodation	4.0 ha	1 lot	
Creek Line Protection Area	2.67 ha		
Building Exclusion Area	15.14 ha		
Estimated dwellings	29		Part 2
Estimated holiday chalets	12		
Estimated Additional Population	70		

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PART 1. – STATUTORY

1.0 Local Structure Plan Area

The Local Structure Plan Area consists of Lot 1 and Lot 973 Nanarup Road as shown below.

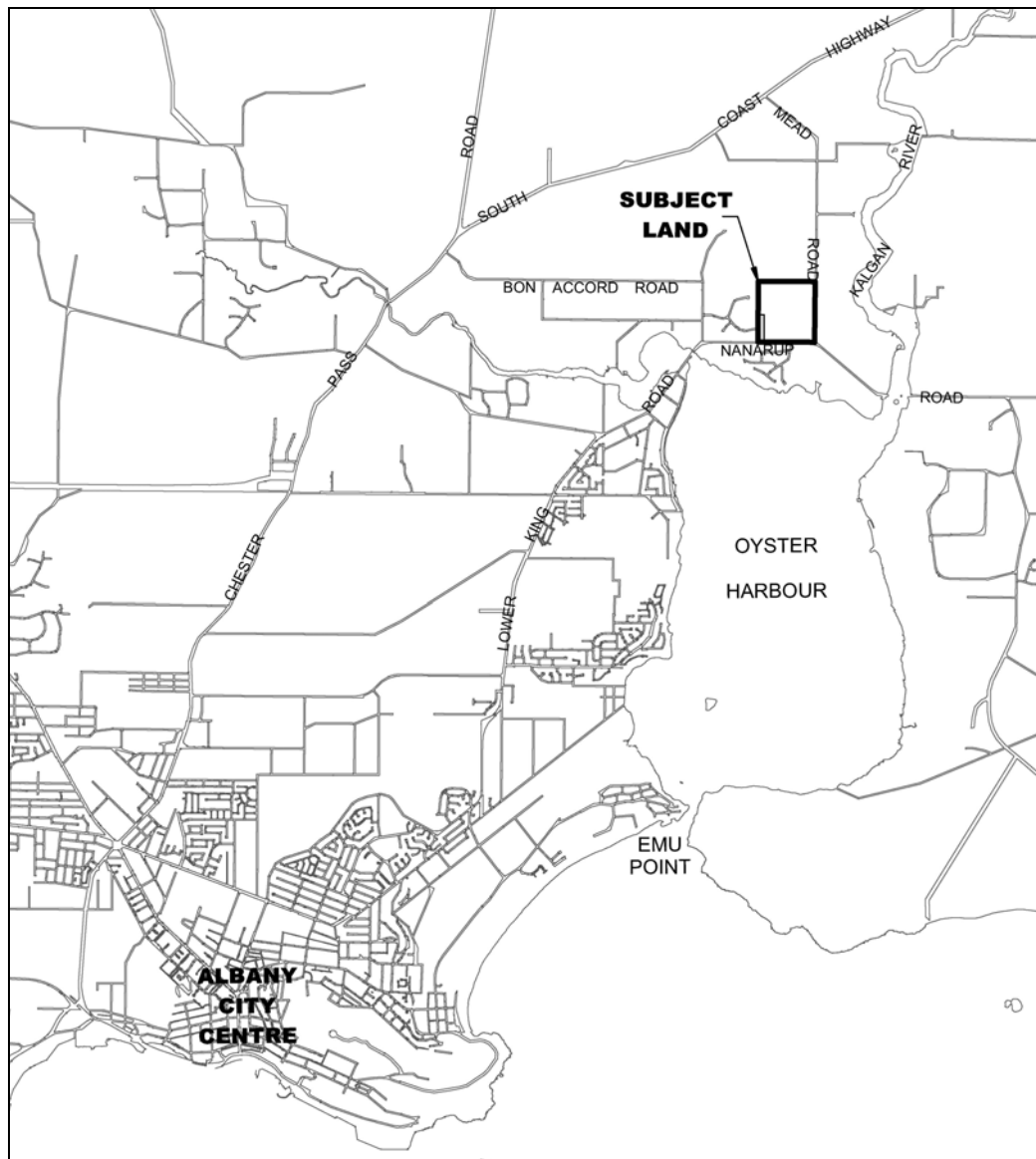


Table 2: Land Description

Land Description	Plan/ Diagram	Vol	Folio	Area	Street Address	Owner
Lot 1 Nanarup Rd	D37903	1533	461	2.9 ha	93 Nanarup Rd, Lower King.	Steven Craig Lucas
Lot 973 Nanarup Rd	P104135	2218	331	57.81 ha	133 Nanarup Rd, Lower King.	George Arthur Clark Pauleen Margaret Clark

2.0 Content of Local Structure Plan

The Local Structure Plan (LSP) comprises two parts being:

1. Statutory; containing the Local Structure Plan Map (Following Page)
2. Explanatory; referring to the background for and issues inherent in the Local Structure Plan as set out in Local Planning Scheme No. 1 Amendment No. 7.

3.0 Relationship to Local Planning Scheme No. 1

The requirements of the LSP apply as if they were part of the Scheme.

In any conflict between scheme clauses or provisions and the LSP, the provisions or clauses of the scheme shall prevail.

Words and expressions used in the LPS have the same meaning as given in Local Planning Scheme No. 1.

Pursuant to clause 27 Schedule 2 Part 4 of the Planning and Development (Local Planning Schemes) Regulations 2015, due regard is to be given to the requirements of the Local Structure Plan in any subdivision and development applications.

4.0 Operation

This Local Structure Plan comes into effect on the date that it is endorsed by the Western Australian Planning Commission (WAPC).

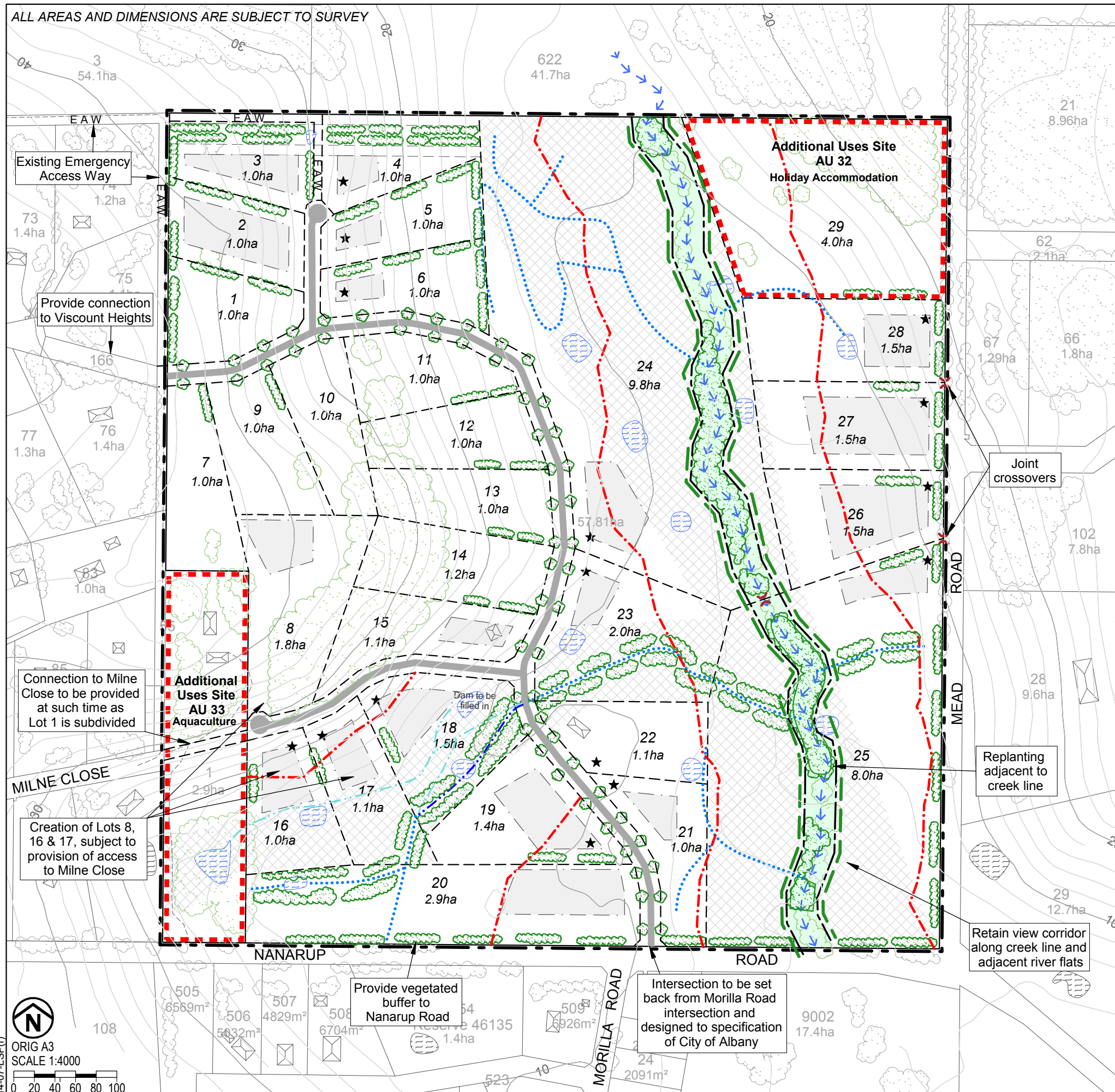
5.0 Subdivision and Development Requirements

Subdivision of lots within the Local Structure Plan area shall generally be in accordance with the endorsed Local Structure Plan. Staging of the subdivision will be subject to demand and subject to conditions of subdivision approval.

Land use and development shall have regard to Schedule 14 - Rural Residential zone of the City of Albany Local Planning Scheme 1, and development within the Additional Uses zone shall have regard to Schedule 2 - Additional Uses of the Local Planning Scheme 1.

LOCAL STRUCTURE PLAN FINAL VERSION

Lots 1 & 973 Nanarup Road
Lower King, City of Albany
March 2018



PART 2 – EXPLANATORY

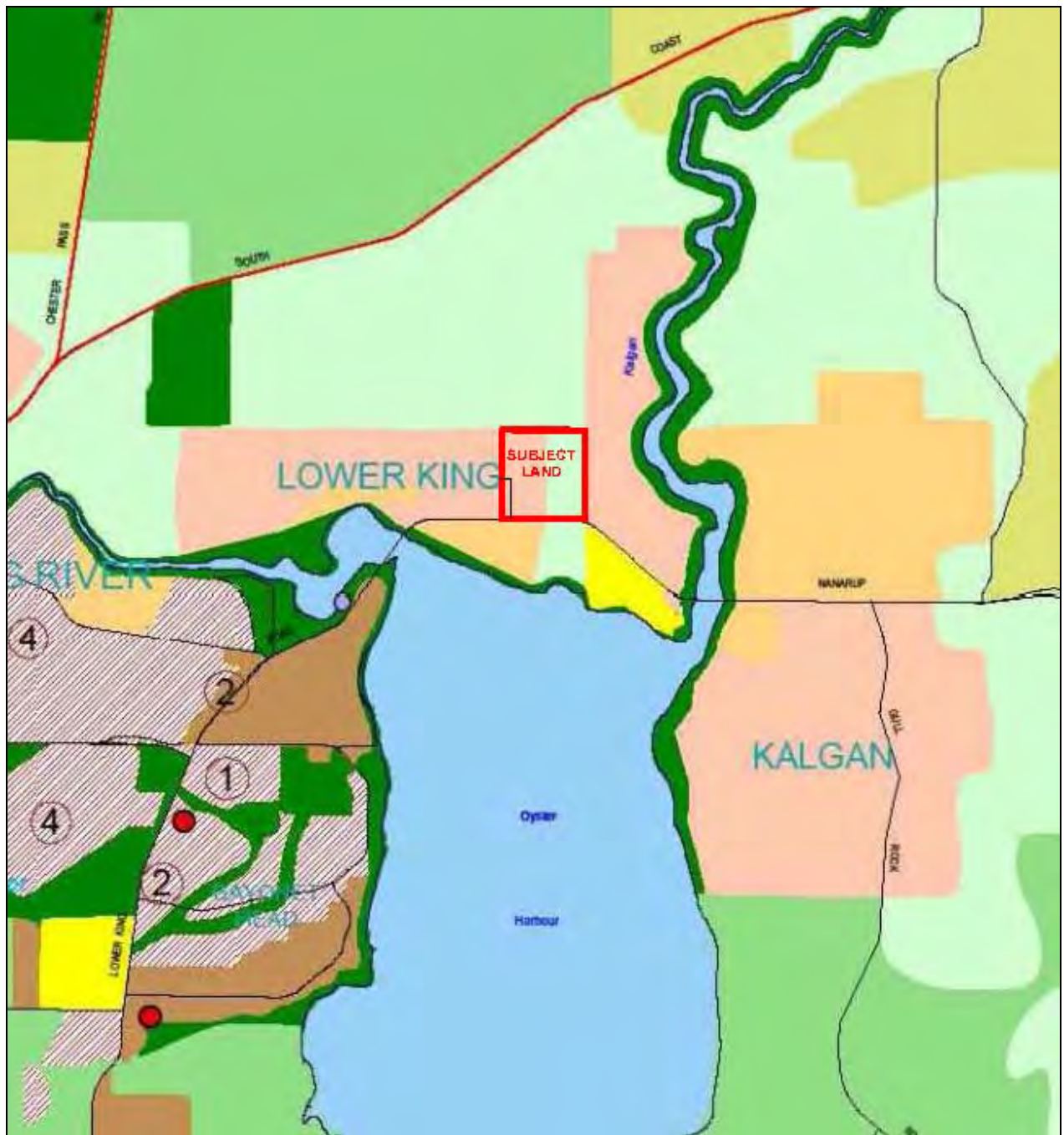
The purpose of the Local Structure Plan is to provide a guide as to how Lot 973 Nanarup Road can be subdivided for rural residential purposes, taking into account:

- land capability;
- vegetation and landscape protection;
- bushfire protection;
- creek line protection and management;
- onsite effluent disposal and retention of nutrients on site;
- access to and from Nanarup Road.

Detailed background information relating to these matters is contained in the Local Planning Scheme No. 1 Amendment No. 7 documentation.

Key elements of the Local Structure Plan are:

- The creation of 28 rural residential lots. 26 ranging in size from 1.0 ha to 2.9 ha are clustered on the more elevated areas of the property.
- Two larger lots of 9.8 ha and 8.0 ha encompass Johnson Creek and the adjacent lower lying land. This will facilitate ongoing management of the creek line and retains a landscape corridor on either side of the creek with development restricted to the more elevated land.
- Lot layout and building envelopes ensure that development and associated onsite effluent disposal systems will be located on land with a high capability and well set back from more poorly drained land.
- Remnant vegetation is retained with appropriate setbacks for adjacent development to meet fire management requirements.
- A landscaped buffer is provided to General Agricultural land abutting the northern boundary.
- The road system will connect through to Sheringa Park to the west providing both developments with the necessary secondary access/egress.
- The intersection onto Nanarup Road will be designed to Austroads standards to take account of Morilla Road intersection on the opposite side of the road.
- Two additional uses sites are proposed, one in the south west corner and one in the north east corner. The former provides for aquaculture to be developed utilising the existing dam on the property and the latter allows for tourist accommodation to be developed. Incorporation into Schedule 2 - Additional Uses of Local Planning Scheme No 1 provides for appropriate conditions to be established to guide and manage the development of these additional uses.
- Bushfire planning and preparation of BAL mapping for the property confirms that all proposed lots with one exception, have development areas where BAL 12.5 or less will apply. The exception has a BAL of predominantly 19.



Extract of map 9B of the Local Planning Strategy



Government of **Western Australia**
Department of **Communities**



AMENDMENT TO APPROVED MCKAIL STRUCTURE PLAN

Lots 1, 2 & 3 South Coast Highway, McKail

Updated report 11 April 2018



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Figure 1: McKail Location Aerial View

Figure 2: Location Aerial View of McKail Structure Plan Area

Background

Location

The suburb of McKail is located approximately 5km northwest of the Albany town centre. It is generally bounded by Albany Highway to the north and east, Link Road to the west and South Coast Highway to the south. The suburb adjoins Marbellup to the east, Willyung, Warrenup, Milpara and Orana to the north and east and Gledhow to the south.

The suburb has a mix of General Agriculture, Rural Residential, Public Use land uses to the west and mix of older housing stock and new residential development in the eastern and portion of the suburb. There is a single commercial centre in the suburb with a Local Centre located at the corner of Albany Highway and Lancaster Road.



Figure 1: McKail Location Aerial View

The Site

Lots 1, 2 & 3 South Coast Highway form the Approved *McKail Structure Plan* (the site). The site extends north from South Coast Highway to Celestial Drive and is bound by Clydesdale Road to the east and existing residential development to the west. The site is 1.5km west of a Neighbourhood Centre in the adjoining suburb of Orana and within 2km of North Albany Senior High School and South Regional TAFE. The site is well connected

with road transport links to the town centre and airport. There are also multiple bus stops within a walkable distance.



Figure 2: Location Aerial View of McKail Structure Plan Area

Zoning

The site was previously entirely zoned 'Future Urban' under the *City of Albany Local Planning Scheme No. 1 (LPS1)*. The future urban zone is to –

Provide for structure planning of land within the zone to guide and coordinate land use and infrastructure provision where multiple ownerships or larger parcels of land requiring the staging of development is involved.

Stage 1 of the Structure Plan area has been developed for 'Residential' and 'Parks and Recreation', as reflected in *LPS1*. The portion not yet developed in line with the Structure Plan, part of Stage 2 development, remains zoned for 'Future Urban'. Stage 2 proposes Residential, Public Open Space, Local Centre and Primary School land uses.

Structure Plan

Approved Structure Plan

The *McKail Structure Plan* was approved in November 2010 (see **Appendix 1**). The Structure Plan area is partly developed with residential development, road networks and public open space to the north. The Structure Plan includes the location of a primary



school site and additional public open space and residential yet to be developed to the south. The Structure Plan estimates a yield of 460 lots.

The *Detailed Area Plan for Lot 2 South Coast Highway* (see **Appendix 2**) was approved in February 2013. The DAP area was developed as the first part of a two-stage development of the Structure Plan Area (see **Appendix 3**).

Modifications to Structure Plan

The proposed modifications to the Structure Plan, shown on the Structure Plan dated October 2017, (see **Appendix 4**) have been discussed with both the City of Albany and the Department of Planning. Support have been given from both parties in regard to the modifications being consistent with a minor amendment.

The modifications include:

- Residential lot configuration – to provide flexibility for lot configuration, create a greater mix of lot sizes, standardise block layout to facilitate regular lots, improve lot orientation to facilitate 6-star energy ratings for dwellings and reduce laneways and rear loaded product;
- Street layout design – to reduce the overall road percentage, increase the efficiency of traffic movement and improve road interface with South Coast Highway;
- Entry statement – POS to be included at the entrance to the development to provide for an entry statement and ensure that residential lot access points are separated from the intersection with South Coast Highway;
- Recoding of lots coded R30/R40/R50 to R30/40 and R40 – to reflect the actual development as part of Stage 1 and provide appropriate development for the area and attractive streetscapes in Stage 2;
- Increasing density adjacent to public open space from R20 to R30 – to increase surveillance and maximise outlook to and use of space;
- Identify larger R40 lots for grouped dwelling development;
- Include bushfire assessment for the site, and
- Change in the terminology replacing ‘Local Shopping’ with ‘Local Centre’, as to be a consistent zone under the *City of Albany Local Planning Scheme No. 1*.

The location of the primary school and public open space is unchanged. The modified Structure Plan yield is consistent with the original proposal.



Development Conditions

Development and subdivision of lots coded R30/40 and R40 on the Structure Plan will be subject to the provisions of future Local Development Plan (formerly DAPs) which will address the following, to the satisfaction of the Western Australia Planning Commission:

- Buildings envelopes/ setbacks;
- Building heights;
- Garage/ carport positions;
- Access;
- Fencing;
- Site coverage;
- Private open space;
- Outbuildings;
- Landscaping;
- Variations to the Residential Design Codes.

And for lots adjoining South Coast Highway –

- Noise mitigation

And for lots within BAL rating 12.5 or above-

- A requirement for a notification to be placed on the subdivision application approval for lots. The notification should state: “The site is within a bushfire prone area as designated by an Order made by the Fire and Emergency Commissioner and may be subject to a Bushfire Management Plan. Additional planning and building requirements may apply to development of the site. “

Local Amenity

The proposed modifications to the Structure Plan will provide for a more responsive street and lot layout that provides local amenity, safe and efficient access and promotes a sense of place.

The Structure Plan is compliant with *Liveable Neighbourhoods*, notably in regard to the treatment of the interface with South Coast Highway. As part of a future LDP, lots adjacent to South Coast Highway will ensure dwellings are constructed in accordance with building design and construction treatments in *State Planning Policy 5.4 Road and Rail Transport Noise and Freight Considerations in Land Use Planning*.



The modifications will not materially alter the purpose and intent of the approved Structure Plan. Whilst the remainder of the Structure Plan area is subject to subdivision (as part of Stage 2), there is no anticipated reduction in the lot yield for the site with the changes in density and layout. As mentioned previously, the public open space and primary school site allocated will remain unchanged.

Development

Subdivision and development of the southern portion of the site will take place as part of Stage 2, with land development anticipated in the short to medium term.

The site is subject to the *City of Albany Local Planning Scheme No. 1*, and the *Residential Design Codes* except where varied under LDPs.

Bushfire

SPP 3.7 Planning in Bushfire Prone areas requires Structure Plans to be accompanied by a Bushfire Management Plan which includes a Bushfire Hazard Level assessment and BAL contour map. It is important that structure plans consider requirements of the bushfire protection criteria at this level to ensure that Hazard Separation and Zones and Asset Protection Zones can be established at a subsequent planning stage.

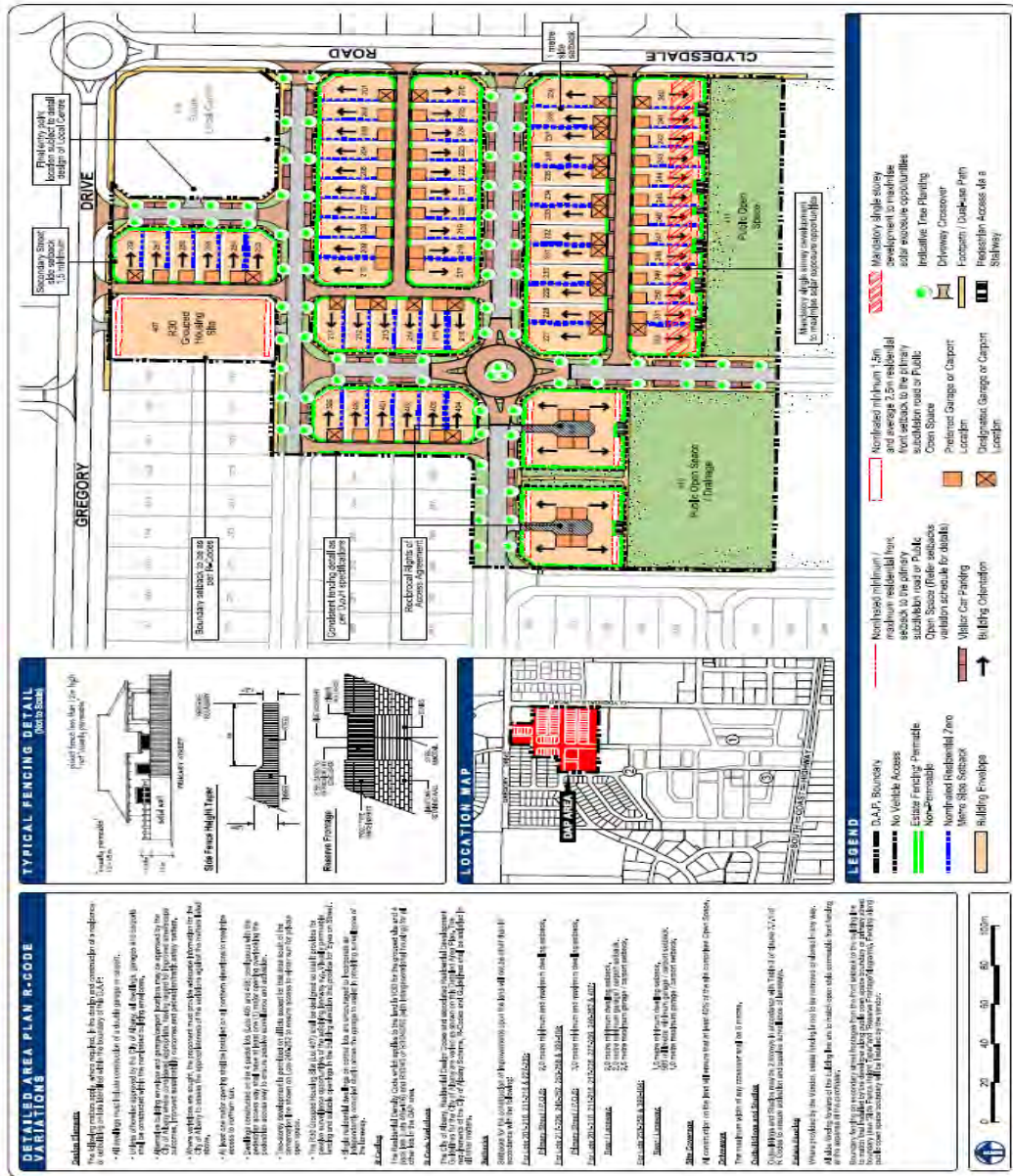
A Bushfire Management Plan (BMP) for the site was prepared by Ecosystem Solutions in March 2018 (see Appendix 5). Most of the site is not subject to a BAL rating or within BAL-low. With the provision of low-fuel zones, all residential lots are BAL -29 or below.

The hazard level of the development is expected to decrease to low for most of the area post vegetation clearing of the school and public open space areas and subject to landscaping and management plans as required. This will be further assessed during with the subdivision of the site.

Conclusion

In the context of the Structure Plan, the modification is considered minor, however it provides notable improvements to the streetscape, lot diversity and the neighbourhood sense of place. The modification will facilitate a greater diversity, choice and affordability of housing in an area supported by a Local Centre, Primary School and a variety of public open space.

Appendix 2 - Detailed Area Plan for Lot 2 South Coast Highway.



DRAFT

DETAILED AREA PLAN
Lot 2 South Coast Highway, ALBANY

RPS

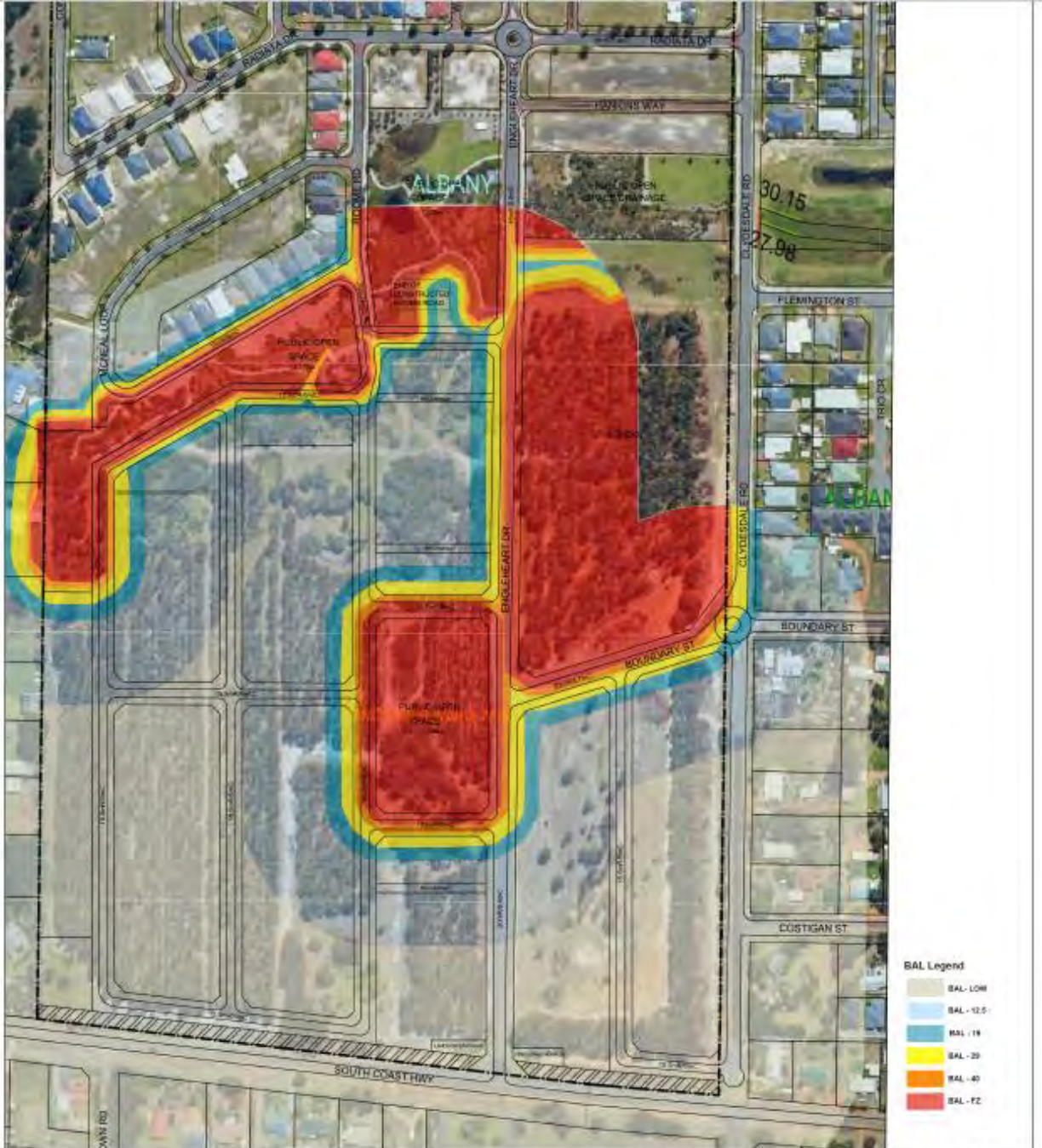
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Appendix 3 - Staged Development of Structure Plan Area





6	10.04.18	ISSUED FOR INFORMATION
3	23.01.18	ISSUED FOR INFORMATION
2	10.10.17	ISSUED FOR INFORMATION
1	12.01.17	ISSUED FOR INFORMATION
Rev	Date	Note

North
 Scale: 1:2500 @ A3
 Drawn: J.K.

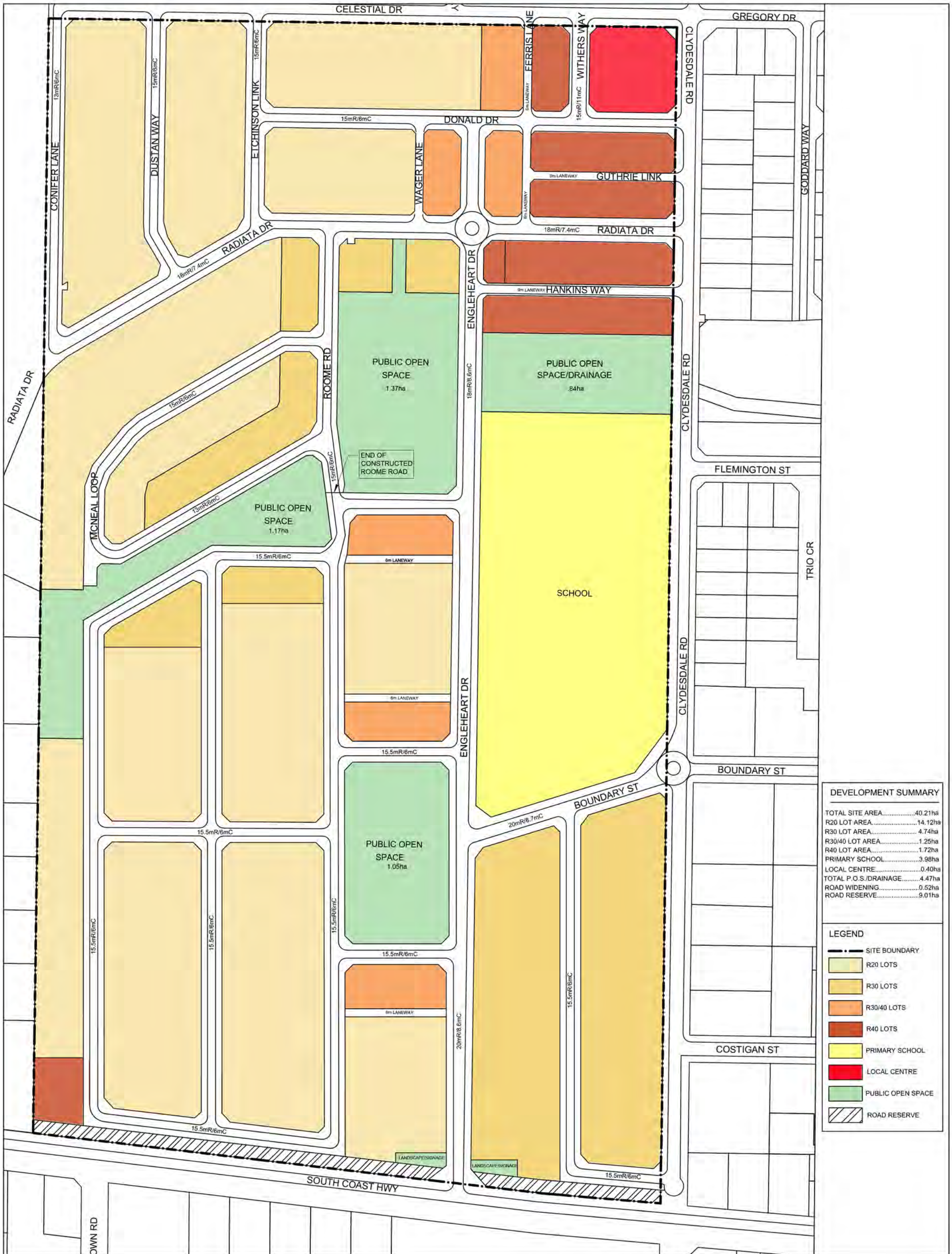


Lots 1, 2, 3 South Coast Highway, MCKAIL
Map of Bushfire Attack Level Assessment

BMP data sourced from Bushfire Management Plan report prepared by Ecosystem Solutions Pty Ltd on 8 March 2018



Appendix 5 – Bushfire Management Plan



DEVELOPMENT SUMMARY

TOTAL SITE AREA.....	40.21ha
R20 LOT AREA.....	14.12ha
R30 LOT AREA.....	4.74ha
R30/40 LOT AREA.....	1.25ha
R40 LOT AREA.....	1.72ha
PRIMARY SCHOOL.....	3.98ha
LOCAL CENTRE.....	0.40ha
TOTAL P.O.S./DRAINAGE.....	4.47ha
ROAD WIDENING.....	0.52ha
ROAD RESERVE.....	9.01ha

LEGEND

- SITE BOUNDARY
- R20 LOTS
- R30 LOTS
- R30/40 LOTS
- R40 LOTS
- PRIMARY SCHOOL
- LOCAL CENTRE
- PUBLIC OPEN SPACE
- ▨ ROAD RESERVE

3	23.01.18	ISSUED FOR INFORMATION
2	03.10.17	ISSUED FOR INFORMATION
1	15.08.17	ISSUED FOR INFORMATION
Rev	Date	Note

North
 Scale: 1:2500 @ A3
 Drawn: J.K



Government of Western Australia
 Department of Communities
 Ho 327

**Lots 1, 2, 3 South Coast Highway, MCKAIL
 MODIFIED STRUCTURE PLAN**

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: Clydesdale Park

Suburb: McKail

State: WA

P/code: 6330

Local government area: City of Albany

Description of the planning proposal: Subdivision of existing lot into 244 residential lots

BMP Plan / Reference Number: 18472

Version: Rev A

Date of Issue: 12/03/2018

Client / Business Name: Department of Communities (Houseing)

Reason for referral to DFES	Yes	No
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)?	<input type="checkbox"/>	<input checked="" type="checkbox"/>
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)?	<input type="checkbox"/>	<input checked="" type="checkbox"/>
Is the proposal any of the following special development types (see SPP 3.7 for definitions)?		
Unavoidable development (in BAL-40 or BAL-FZ)	<input type="checkbox"/>	<input checked="" type="checkbox"/>
Strategic planning proposal (including rezoning applications)	<input type="checkbox"/>	<input checked="" type="checkbox"/>
Minor development (in BAL-40 or BAL-FZ)	<input type="checkbox"/>	<input checked="" type="checkbox"/>
High risk land-use	<input type="checkbox"/>	<input checked="" type="checkbox"/>
Vulnerable land-use	<input type="checkbox"/>	<input checked="" type="checkbox"/>

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.)?

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 Gary McMahon	Accreditation Level Level 3	Accreditation No. 35078	Accreditation Expiry 11/2018
Company Ecosystem Solutions		Contact No. 0427 59 1960	

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 12/03/2018

Bushfire Management Plan

Lot 1, 2 & 3 South Coast Highway, McKail

8 March 2018

Prepared for:
Department of Communities (Housing)
C/- Graham Findlay



Limitations Statement

This report has been solely prepared for Department of Communities (Housing) (C/- Graham Findlay). No express or implied warranties are made by Ecosystem Solutions Pty Ltd regarding the findings and data contained in this report. No new research or field studies were conducted other than those specifically outlined in this report. All of the information details included in this report are based upon the research provided and obtained at the time Ecosystem Solutions Pty Ltd conducted its analysis.

In undertaking this work the authors have made every effort to ensure the accuracy of the information used. Any conclusions drawn or recommendations made in the report are done in good faith and the consultants take no responsibility for how this information and the report are used subsequently by others.

Please note that the contents in this report may not be directly applicable towards another organisation's needs. Ecosystem Solutions Pty Ltd accepts no liability whatsoever for a third party's use of, or reliance upon, this specific report.

Document Control

Client - Department of Communities (Housing)

Site - Lot 1, 2 & 3 South Coast Highway, McKail

Version	Revision	Purpose	Author	Reviewer	Submitted	
					Form	Date
Draft Report	Rev A	Draft Report	DP	KP	Electronic (email)	8/03/2018

Filename: \\ECONAS\Data\PROJECTS\18472 Clydesdale Park McKail Stage 2 BMP (Dept of Communities - Housing)\Reports\Lot 1, 2, 3 South Coast Highway BMP.docx

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1 Proposal

This Bushfire Management Plan (BMP) has been prepared for Lot 1, 2 & 3 South Coast Highway, McKail, within the Clydesdale Park Estate (**hereafter referred to as the 'Site'**) by Ecosystem Solutions Pty Ltd, Gary McMahon (B.Sc. M. Env Mgmt. PG Dip Bushfire Protection).

The Site is 40.21 ha and borders Clydesdale Road to the east and South Coast Highway to the south. The vegetation consists of introduced *Eucalyptus* trees, mainly Blue Gums.

The Site is located within the urban area of the City of Albany, with Albany town centre approximately 7km south east of the Site. Residential houses and small pockets of trees surround the Site, with public open space provided to the north.

The proposal is to subdivide the Site (Figure 1) to contain:

- Residential lots, 244, with areas ranging from 293 m² to 608 m²;
- Public open space;
- Local shopping;
- Primary School;
- Internal roads, 11; and
- Roadside verge on the south of the Site, bordering South Coast Highway.

The Site is located within a bushfire prone area, as declared by State Planning Policy 3.7: Planning in Bushfire Prone Areas (Figure 2).

The purpose of this BMP is to detail the fire management methods and requirements that will be implemented within and around the Site to reduce the threat to residents and fire fighters in the event of a fire.



Figure 2 Map of Bushfire Prone Areas for Lot 1, 2 & 3 South Coast Highway, McKail

2 Bushfire Assessment Results

2.1 Assessment Inputs

The Site assessment was conducted on 25 January 2018 by a BPAD Accredited Practitioner for the purpose of determining the Bushfire Attack Level in accordance with AS 3959-2009 Simplified Procedure (Method 1).

All vegetation within 150m of the Site was classified and the slope under the vegetation determined in accordance with Clause 2.2.3 & 2.2.5 of AS 3959-2009, shown in the photos below with map

provided in

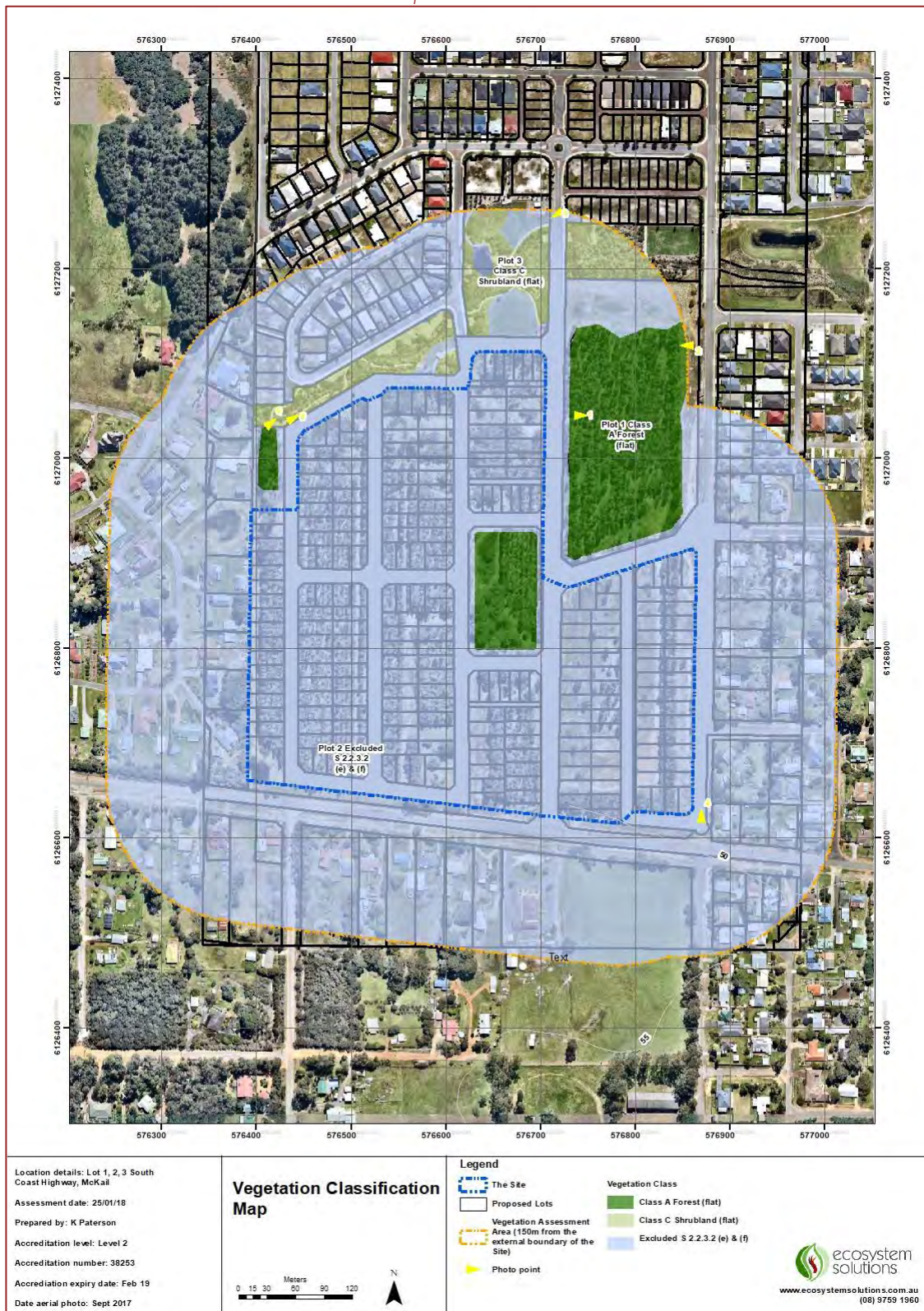


Figure 3.

Plot 1 Vegetation Classification or Exclusion Clause

Class A Forest Flat



Photo ID: 1



Photo ID: 2

Description / Justification for Classification:

Eucalyptus globulus (Blue Gum) plantations. All vegetation remaining within the lots will be cleared as part of the development process

Plot 2 Vegetation Classification or Exclusion Clause



Photo ID: 3

Description / Justification for Classification:

Excluded Cl. S. 2.2.3.2 (e) & (f)



Photo ID: 4

Managed land within the Site and surrounding landscape

Plot 3 Vegetation Classification or Exclusion Clause



Photo ID: 5

Description / Justification for Classification:

Class C Shrubland Flat



Photo ID: 6

Mixed native shrub and sedge species including *Taxandria* and *Melaleuca*

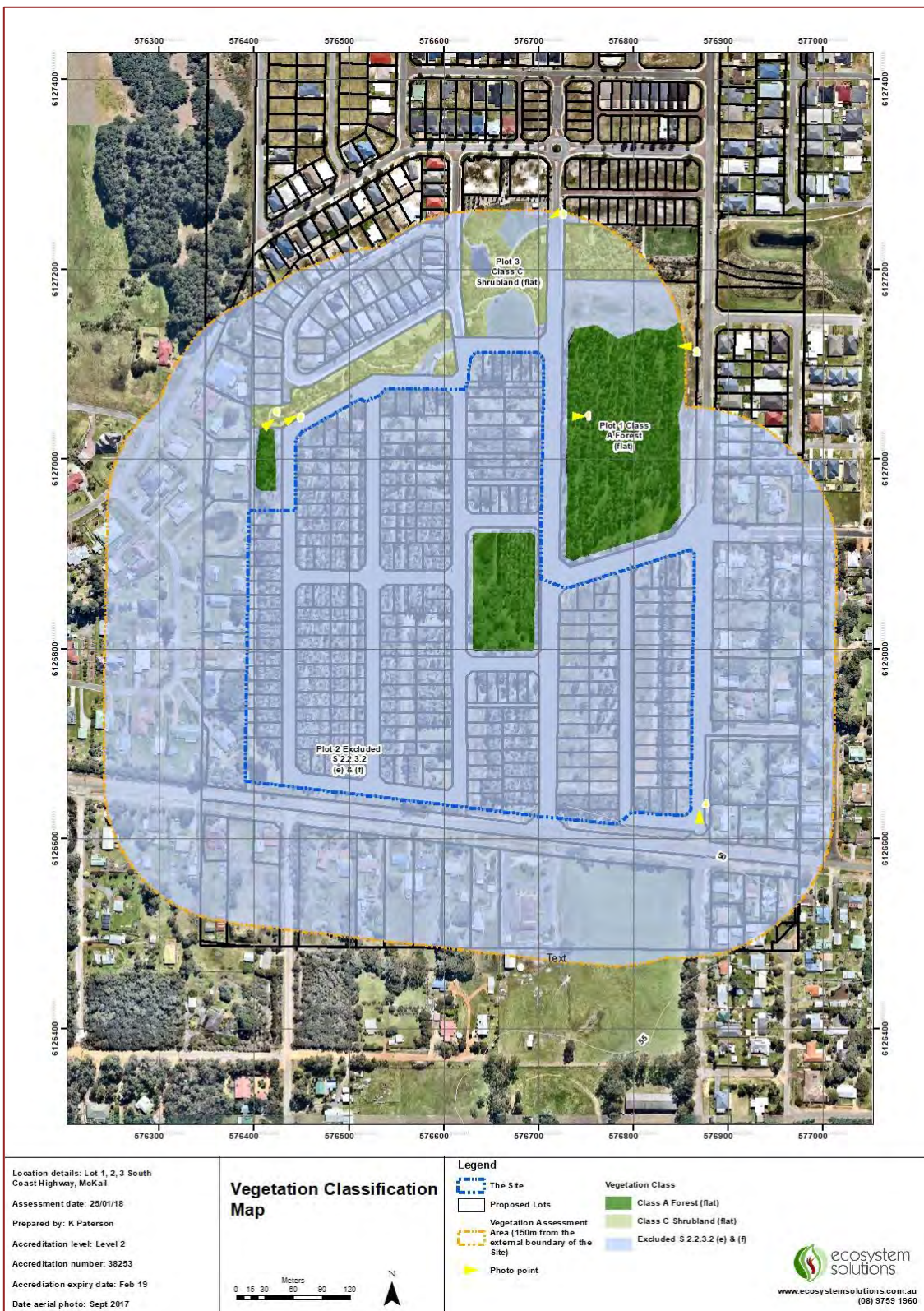


Figure 3 Map of Vegetation Class and Effective Slope

2.2 Assessment Outputs

The results from the Site assessment are provided in Table 1. The Determined Bushfire Attack Level (highest BAL) for the Site has been determined in accordance with clause 2.2.6 of AS 3959-

2009 with map provided in

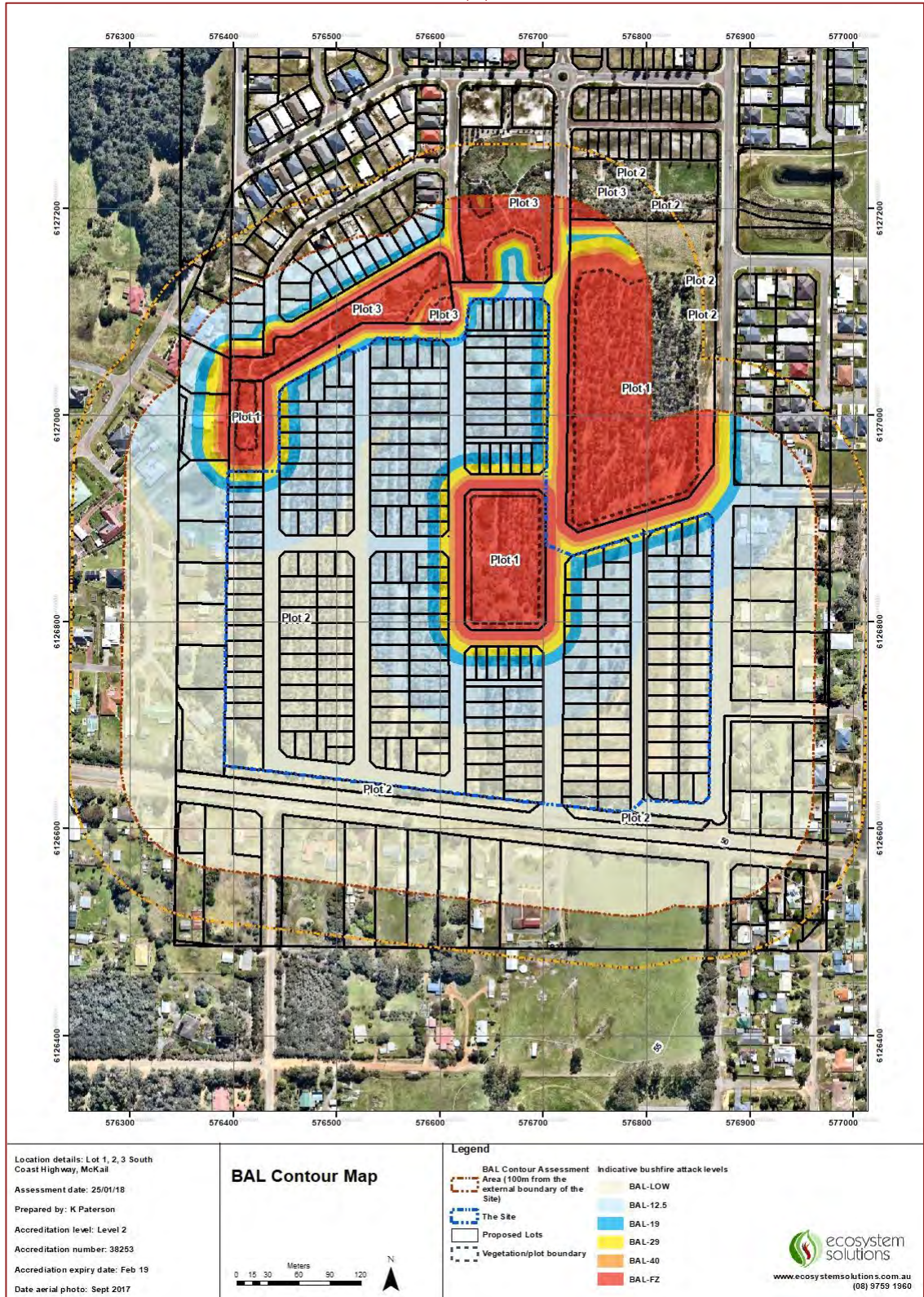


Figure 4.

The Separation distance, described in Table 1 Site Assessment ResultsTable 1, will be achieved with the establishment and maintenance of the low-fuel zone within the Public Open Space (shown in Figure 5).

Table 1 Site Assessment Results

Method 1 BAL Determination				
Fire Danger Index - 80 (AS3959-2009 Table 2.1)				
Plot	Vegetation Classification	Effective Slope Under the Classified Vegetation (degrees)	Separation Distance to the Classification Vegetation (metres)	Bushfire Attack Level
1	Class A Forest	Flat	Minimum 21m	BAL-29
2	Excluded S 2.2.3.2 (e) & (f)	N/A	N/A	BAL-LOW
3	Class C Shrubland	Flat	Minimum 9m	BAL-29
Determined Bushfire Attack Level				BAL-29

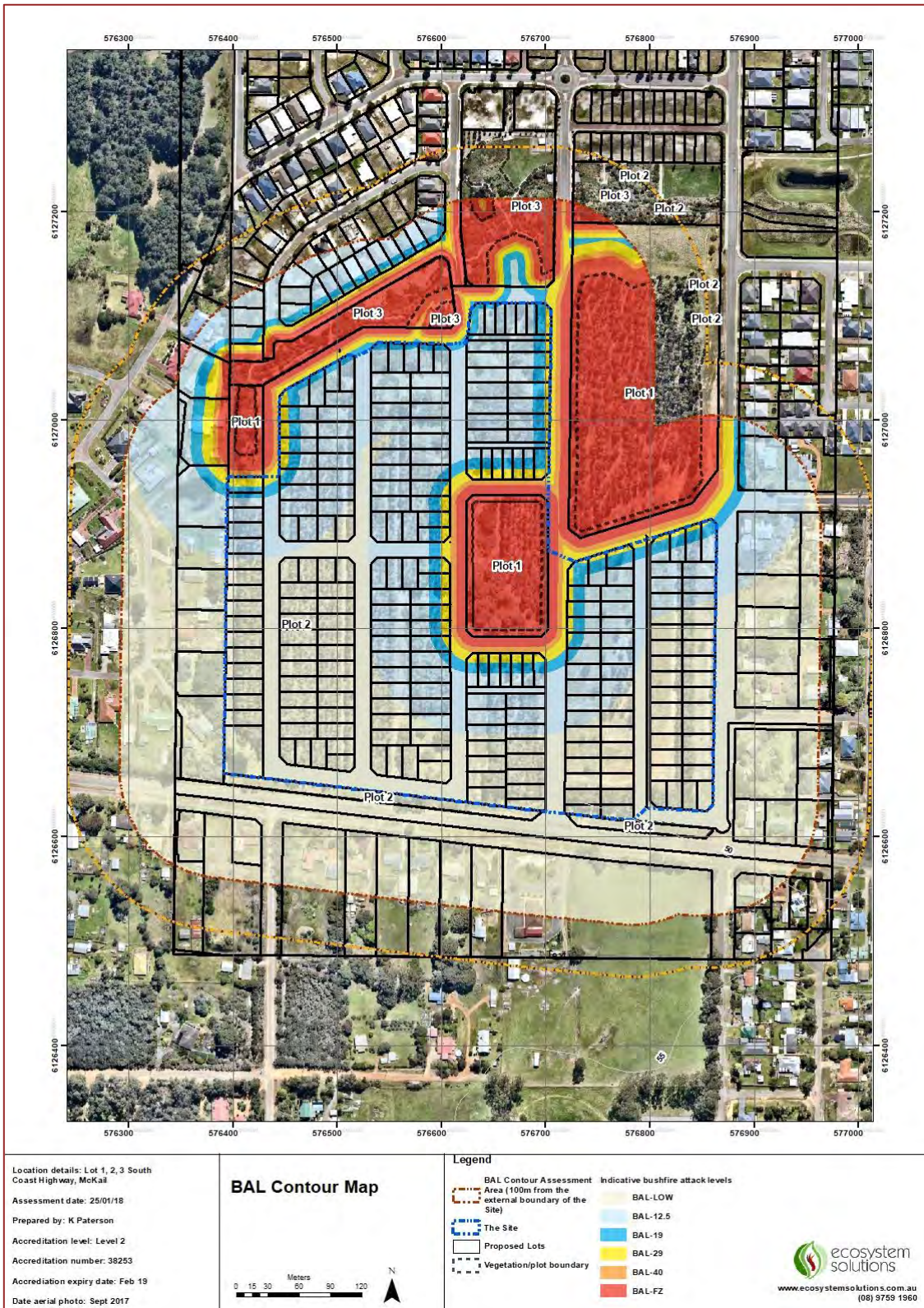


Figure 4 Map of Bushfire Attack Level Assessment

3 Environmental Considerations

3.1 Native Vegetation - modification and clearing

The proposal includes clearing of approximately 40.21 ha of introduced *Eucalyptus* trees, mainly Blue Gums. The Site contains minimal native vegetation. The area has been assessed for environmental values, with no significant environmental values identified (Table 2).

Table 2 Significant environmental values identified within the Site

Environmental Value	Yes or No	If Yes - describe
Conservation Covenants	No	Not applicable
Bushfire Forever Sites	No	Not applicable
Conservation Category Wetlands and Buffer	No	Not applicable
Threatened Ecological Communities (TECs)	No	Not applicable
Declared Rare Flora (DRF)	No	Not applicable
Significant through Local Planning or Biodiversity Strategy	No	Not applicable

The bushfire assessment and management strategies contained in this BMP assume that environmental approval for the clearing of vegetation will be achieved or clearing permit exemptions will apply.

3.2 Re-vegetation / Landscape Plans

The Public Open Spaces will retain the current vegetation with a low-fuel zone border as required according to Figure 5.

The Roadside reserve on the south of the Site, bordering South Coast Highway, will be grass to retain a low-fuel zone.

4 Identification of Bushfire Hazard Issues

Bushfire behaviour is significantly affected by weather conditions. Bushfires will burn more aggressively when high temperatures combine with low humidity and strong winds. Generally, the greatest fire risk occurs from summer through to autumn, when the moisture levels in the soil and vegetation are low.

The surrounding landscape includes extensive areas that have been cleared for residential purposes, with pockets of native remnant vegetation.

The removal of the introduced *Eucalyptus* species as part of this proposal on the Site will reduce the bushfire hazard within the area.

The cleared areas in the surrounding landscape pose a Low bushfire hazard due to the lack of remaining vegetation. The remnant vegetation within neighbouring properties poses a Moderate bushfire hazard due to most of this vegetation being parkland cleared and lacking in understorey, as well as the fragmented nature of the bushland.

The overall fire risk to people and property within the Site is considered Moderate due to the mixture of cleared areas and remnant bushland surrounding the Site. By complying with the requirements of this BMP, this risk can be appropriately managed.

5 Assessment Against the Bushfire Protection Criteria

5.1 Compliance with the Acceptable Solutions for each Element

Bushfire Protection Criteria - Element 1 - Location		
Intent: To ensure that strategic planning proposals, subdivision and development applications are located in areas with the least possible risk of bushfire to facilitate the protection of people, property and infrastructure.		
Performance Principle P1: The intent may be achieved where the strategic planning proposal, subdivision or development application is located in an area where the bushfire hazard assessment is or will, on completion, be moderate or low OR a BAL-29 or below applies AND the risk can be managed. For unavoidable development in areas where BAL-40 or BAL-FZ applies, demonstrating that the risk can be managed to the satisfaction of DFES and the decision-maker.		
Acceptable Solution	Compliance	Assessment Statements
<p>A1.1 Development location</p> <p>The strategic planning proposal, subdivision and development application is located in an area that is or will, on completion, be subject to either a moderate or low bushfire hazard level, or BAL-29 or below.</p>	<p>Compliance with this element is achieved.</p>	<p>The Site was assessed with all lots to be BAL-29 with the provision of a low-fuel zones established and maintained in the Public Open Space according to Figure 5.</p>

Bushfire Protection Criteria - Element 2 - Siting and Design		
Intent: To ensure that the siting and design of development minimises the level of bushfire impact.		
Performance Principle P2: The siting and design of the strategic planning proposal, subdivision or development application, including roads, paths and landscaping, is appropriate to the level of bushfire threat that applies to the site. That it incorporates a defendable space and significantly reduces the heat intensities at the building surface thereby minimising the bushfire risk to people, property and infrastructure, including compliance with AS 3959 if appropriate.		
Acceptable Solution	Compliance	Assessment Statements
<p>A2.1 Asset Protection Zone (APZ)</p> <p>Every habitable building is surrounded by, and every proposed lot can achieve, an APZ depicted on submitted plans, which meets the following requirements:</p> <ul style="list-style-type: none"> • Width: Measured from any external wall or supporting post or column of the proposed building, and of sufficient size to ensure the potential radiant heat impact of a bushfire does not exceed 29kW/m² (BAL-29) in all circumstances. • Location: the APZ should be contained solely within the boundaries of the lot on which the building is situated, except in instances where the neighbouring lot or lots will be managed in a low-fuel state on an ongoing basis, in perpetuity (see explanatory notes). • Management: the APZ is managed in accordance with the requirements of 'Standards for Asset Protection Zones'. (see Schedule 1). 	<p>Compliance with this element is achieved.</p>	<p>Asset Protection Zones will be achieved with the provision of low-fuel zones established and maintained in the Public Open Spaces according to Figure 5.</p>

Bushfire Protection Criteria - Element 3 - Vehicular Access		
Intent: To ensure that the vehicular access serving a subdivision/development is available and safe during a bushfire event.		
Performance Principle P3: The internal layout, design and construction of public and private vehicular access and egress in the subdivision/ development allow emergency and other vehicles to move through it easily and safely at all times.		
Acceptable Solution	Compliance	Assessment Statements
<p>A3.1 Two Access Routes</p> <p>Two different vehicular access routes are provided, both of which connect to the public road network, provide safe access and egress to two different destinations and are available to all residents/the public at all times and under all weather conditions.</p>	<p>Compliance with this element is achieved.</p>	<p>Every lot within the Site has two internal vehicular access routes which connect to South Coast Highway to the south and Albany Highway to the north.</p> <p>South Coast Highway can be taken to Albany town centre to the west or Denmark to the east.</p> <p>Albany Highway can be taken to Albany town centre to the south east or Mount Barker to the north west.</p> <p>All roads are well constructed public roads with clear shoulders for good vision.</p>
<p>A3.2 Public Road</p> <p>A public road is to meet the requirements in Table 4, Column 1.</p>	<p>Compliance with this element is achieved.</p>	<p>Eleven roads have been proposed within the Site which connect to Engleheart Drive and Clydesdale Road.</p> <p>All roads will be public and built to comply with the requirements in Table 6, Column 1.</p>

Bushfire Protection Criteria - Element 3 - Vehicular Access

A3.3 Cul-de-sac (including a dead-end road) Not applicable to this Site.

Where no alternative exists (i.e. the lot layout already exists, demonstration required):

- Requirements in Table 4, Column 2;
- Maximum length: 200 m (if public emergency access is provided between cul-de-sac heads maximum length can be increased to 600 m provided no more than eight lots are serviced and the emergency access way is no more than 600 m); and
- Turn-around area requirements, including a minimum 17.5 metre diameter head.

A3.4 Battle-axe Not applicable to this Site.

Where no alternative exists, (demonstration required):

- Requirements in Table 4, Column 3;
- Maximum length: 600 m; and
- Minimum width: 6 m.

Bushfire Protection Criteria - Element 3 - Vehicular Access

A3.5 Private driveway >50m

Not applicable to this Site.

Each lot within the Site will have a private driveway less than 50m.

- Requirements in Table 4, Column 3;
- Required where a house site is more than 50 m from a public road;
- Passing bays: every 200 m with a minimum length of 20 m and a minimum width of 2 m;
- Turn-around areas designed to accommodate type 3.4 fire appliances and to enable them to turn around safely every 500 m (i.e. kerb to kerb 17.5 m) and within 50 m of a house;
- Any bridges or culverts are able to support a minimum weight capacity of 15 t; and
- All-weather surface (i.e. compacted gravel, limestone or sealed).

A3.6 Emergency Access Way

Not applicable to this Site.

Where no alternative exists (demonstration required), an emergency access way is to be provided as an alternative link to a public road during emergencies:

- Requirements in Table 4, Column 4;
- No further than 600 m from a public road;
- Provided as right of way or public access easement in gross to ensure accessibility to the public and fire services during an emergency; and
- Must be signposted

Bushfire Protection Criteria - Element 3 - Vehicular Access

A3.7 Fire Service Access Routes (perimeter roads) Not applicable to this Site.

To provide access within and around the edge of the subdivision and related development to provide direct access to bushfire prone areas for fire fighters and link between public road networks for firefighting purposes:

- Requirements Table 4, Column 5;
- Provided as right of ways or public access easements in gross to ensure accessibility to the public and fire services during an emergency;
- Surface: all-weather (i.e. compacted gravel, limestone or sealed);
- Dead end roads are not permitted;
- Turn-around areas designed to accommodate type 3.4 appliances and to enable them to turn around safely every 500 m (i.e. kerb to kerb 17.5 m);
- No further than 600 m from a public road;
- Allow for two-way traffic; and
- Must be signposted.

A3.8 Firebreak Width Not applicable to this Site.

Lots greater than 0.5 ha must have an internal perimeter firebreak of a minimum width of 3 m or to the level as prescribed in the local firebreak notice issued by the local government.

Bushfire Protection Criteria - Element 4 - Water		
Intent: To ensure that water is available to the subdivision, development or land use to enable people, property and infrastructure to be defended from bushfire.		
Performance Principle P4: The subdivision, development or land use is provided with a permanent and secure water supply that is sufficient for fire fighting purposes.		
Acceptable Solution	Compliance	Assessment Statements
<p>A4.1 Reticulated Areas</p> <p>The subdivision, development or land use is provided with a reticulated water supply in accordance with the specifications of the relevant water supply authority and Department of Fire and Emergency Services.</p>	<p>Compliance with this element is achieved.</p>	<p>A reticulated water supply will be provided to all lots in accordance with the Department of Water requirements.</p> <p>Fire Hydrants will be supplied in accordance with the Department of Fire and Emergency Services requirements.</p>
<p>A4.2 Non-reticulated Areas</p> <p>Water tanks for fire fighting purposes with a hydrant or standpipe are provided:</p> <ul style="list-style-type: none"> • Volume: minimum 50,000 L per tank; • Ratio of tanks to lots: minimum one tank per 25 lots (or part thereof); • Tank location: no more than 2 km to the further most house site within the residential development to allow a 2.4 fire appliance to achieve a 20 minute turnaround time at legal road speeds; • Hardstand and turn-around areas suitable for a type 3.4 fire appliance (i.e. kerb to kerb 17.5 m) are provided within 3 m of each water tank; and • Water tanks and associated facilities are vested in the relevant local government. 	<p>Not applicable to this Site.</p>	

Bushfire Protection Criteria - Element 4 - Water

A4.3 Individual lots within non-reticulated areas (only for one additional lot) Not applicable to this Site.

Single lots above 500 m² need a dedicated static water supply on the lot that has the effective capacity of 10,000 L.

5.2 Performance Based Solutions

The Site assessment was conducted in accordance with AS 3959-2009 Simplified Procedure (Method 1). The Proposal meets all the compliance requirements for the four Bushfire Protection Criteria Elements. There are no performance-based solutions proposed.

5.3 Summary of the Assessment Outcomes

This plan provides acceptable solutions and responses to the performance criteria outlined in Guidelines for Planning in Bushfire Prone Areas (WAPC, 2017).

The layout and design of the development is such that no structure will be required to be exposed to a radiant heat flux in excess of 29kW/m² (BAL-29) provided the management as outlined in the plan is adopted.

Any class 1,2, 3 or 10 structure that is to be constructed, or additions planned to existing dwellings shall be designed and built to conform with Australian Standards AS3959-2009:

- BAL-29: sections 3 & 7;
- BAL-19 sections 3 & 6; and
- BAL 12.5 sections 3 & 5.

A summary of the Bushfire Management Strategies to be implemented is provided in Figure 5.



Figure 5 Map of Bushfire Management Strategies

6 Responsibilities for Implementation and Management of the Required Bushfire Measures

The responsibilities for the Developer, Builder, Landowner/Occupier and City of Albany are outlined in Table 3, Table 4, Table 5 and Table 6 respectively.

Table 3 Developer Responsibilities

Number	Action	Due	Completed
1	Install the public roads to the standards stated in the BMP.	Prior to occupancy	<input type="checkbox"/>
2	Install the water reticulation to all lots in accordance with the Department of Water requirements.	Prior to occupancy	<input type="checkbox"/>
3	Install Fire Hydrants in accordance with the Department of Fire and Emergency Services requirements	Prior to occupancy	<input type="checkbox"/>
4	Establish Asset Protection Zones as described in this Bushfire Management Plan.	Prior to occupancy	<input type="checkbox"/>
5	Establish the Public Open Space with low-fuel zones according to Figure 5	Prior to occupancy	<input type="checkbox"/>
6	Establish the roadside verge as a low-fuel zone.	Prior to occupancy	<input type="checkbox"/>
7	Transfer the ownership of the Public Open Space and Roadside verge to the Shire City of Albany for management.	Prior to occupancy	<input type="checkbox"/>
8	<p>Where WAPC condition a subdivision application approval with a requirement to place a notification onto the certificate(s) of title and a notice of the notification onto the diagram or plan of survey (deposited plan). This will be done pursuant to Section 165 of the <i>Planning and Development Act 2005</i> ('Hazard etc. affecting land, notating titles as to:') and applies to lots with a determined BAL rating of BAL-12.5 or above.</p> <p>The notification will be required to state: 'This land is within a bushfire prone area as designated by an Order made by the Fire and Emergency Services Commissioner and may be subject to a Bushfire Management Plan. Additional planning and building requirements may apply to development on this land'.</p>	Creation of titles and deposited plan	<input type="checkbox"/>

9	Provide a copy and obtain endorsement of this Bushfire Management Plan by those with responsibility under this plan including Builders, Landowners/Occupiers and City of Albany.	Post planning approval and prior to lot sale	<input type="checkbox"/>
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Table 4 Builder Responsibilities

Number	Action	Due	Completed
1	Be aware of the existence of any BMP that refers to the Site.	Prior to any building work.	<input type="checkbox"/>
2	Ensure the building or incidental structure to which a building permit applies is compliant on completion with the bushfire provisions of the Building Code of Australia (BCA) as it applies in WA.	Prior to any building work.	<input type="checkbox"/>

Table 5 Landowner/Occupier Responsibilities

Number	Action	Due
1	Maintain the Asset Protection Zone (APZ) to the dimensions and standard stated in the BMP.	Ongoing
2	Maintain vehicular access routes within the lot to the required surface condition and clearances.	Ongoing
3	Ensure that any builders (of future structures on the Lot) are aware of the existence of this Bushfire Management Plan and the responsibilities it contains regarding the application of construction standards corresponding to the determined BAL rating.	Ongoing
4	Ensure all future buildings the landowner has responsibility for, are designed and constructed in full compliance with: (a) the requirements of the <i>WA Building Act 2011</i> and the bushfire provisions of the Building Code of Australia (BCA) as applicable to WA; and (b) with any identified additional requirements established by this BMP or the relevant local government.	Ongoing
8	Be aware updating the Bushfire Management Plan may be required to ensure that the bushfire risk management measures remain effective. Bushfire plans do not expire and are a 'living document'. Updating is required in certain circumstances, including (but not limited to) if site conditions change, if further details are required at subsequent development stages or to reflect new technologies or methodologies in best practice bushfire risk management ('Guidelines' s4.6.4 and s4.6.5).	Ongoing

Table 6 City of Albany Responsibilities

Number	Action	Due
1	Manage the Public Open Space with low-fuel zones according to Figure 5.	Ongoing
2	Manage Roadside verge as a low-fuel zone to reduce the bushfire hazard.	Ongoing

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3	Maintain fire hydrants in good operational condition and at or above designated capacity.	Ongoing
4	Develop and maintain district bushfire fighting services and facilities.	Ongoing
5	Administer the <i>Bushfire Act 1954</i> and monitor landowner compliance.	Ongoing
6	Promote education and awareness of bushfire prevention and preparation measures through the community.	Ongoing
7	Administer the requirements of the <i>Planning and Development Act 2005</i> and the <i>Building Act 2011</i> .	Ongoing