Harley Dykstra

PLANNING & SURVEY SOLUTIONS

LOCAL STRUCTURE PLAN

Lots 4, 8, 9, 90 and Part Lots 5 and 6

South Western Highway, GLEN IRIS

BUNBURY
21 Spencer Street, Bunbury
PO Box 778, Bunbury WA 6231
T: 08 9792 6000
E: bunbury@harleydykstra.com.au
ABN 77 503 764 248

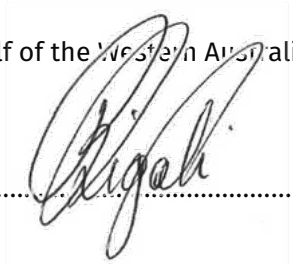
Albany Bunbury Busselton Forrestdale Perth www.harleydykstra.com.au

This Structure Plan is prepared under the provisions of the City of Bunbury Local Planning Scheme No. 8

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

28-Jul-2022
..... 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:

M. Wieclaw
.....Witness

02-Aug-2022
.....Date

02-Aug-2032
.....Date of Expiry

TABLE OF AMENDMENTS

Amendment No.	Summary of Amendment	Amendment Type	Date approved by WAPC

TABLE OF DENSITY PLANS

Density Plan No.	Area of density plan application	Date endorsed WAPC

Prepared for:	Mr Gideon Wezeman
Prepared by:	LB
Reviewed by:	SB
Date:	12.07.22
Job No:	21164
Version:	F

DISCLAIMER

EXECUTIVE SUMMARY

This report represents an application to the City of Bunbury to consider a Structure Plan over Lots 4, 8, 9, 90 and Pt Lots 5 and 6 South Western Highway, Glen Iris ("the subject land"). The subject land has a total area of 15,681m^2 and is situated approximately 4km south east of the Bunbury City Centre.

The Structure Plan will facilitate future subdivision and development to create approximately 18 residential lots at a density of R15.

The Structure Plan Summary Table below details the nature and key outcomes of the Structure Plan:

ITEM	DATA	STRUCTURE PLAN REF (SECTION NO.)
Total area covered by the Structure Plan	1.5681ha	Part 1, Section 1
Area of each land use: • Residential • Commercial • Industrial • Rural Residential	Hectares / Lot yield 1.32ha / 18 - / - - / - - / -	Part 2, Section 1.2.2
Total estimated lot yield	18 lots	Part 2, Section 1.2.2
Estimated number of dwellings	16 new dwellings	Part 2, Section 1.2.2
Estimated residential site density	13 dwellings per hectare	Part 2, Section 1.2.2
Estimated population	40 persons*	Part 2, Section 1.2.2
Number of high schools/primary schools	0	N/A
Estimated area and percentage of public open space given over to: • Regional open space • District open space • Neighbourhood parks • Local parks	Hectares / Percentage - / - - / - - / - - / -	Part 2, Section 3.1
Estimated percentage of natural area	-	Part 2, Section 3.1

* Estimate based on 2.5 persons per household

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PART ONE: IMPLEMENTATION

1. Structure Plan Area

This Structure Plan applies to Lots 4, 8, 9, 90 and Part Lots 5, 6 and 200 South Western Highway, Glen Iris, being the land contained within the inner edge of the line denoting the Structure Plan boundary on the Structure Plan map (see overleaf, page 3). The subject land has a total area of 1.5681 ha.

2. Operation

Upon receiving approval from the Western Australian Planning Commission (WAPC), the Structure Plan will become effective immediately.

3. Staging

The Structure Plan has been designed to allow the land owners to subdivide the entire structure plan area in one stage at any given time. The extension of Nenke Way is the main limitation and will require coordinated between the respective owners to ensure it is built in its entirety. The road reserve will be ceded, and the road constructed in full at the first stage of subdivision.

A contribution plan has not been created as part of this Structure Plan. However, at the time of subdivision, a formal contribution agreement will be developed between the lot owners, with each owner contributing towards the shared facilities. Contribution will be determined as per the development potential of each lot.

4. Subdivision and Development Requirements

General

a) Future subdivision and development of the subject land is to be generally in accordance with this Structure Plan.
b) The residential density applicable to the Structure Plan area should correspond with the residential density shown on the scheme map.

Servicing

c) A sewerage servicing report is to be provided prior to subdivision or development outlining the capacity of the existing sewerage system, the future demand resulting from the proposal and potential system upgrades required. Any service upgrades identified in the servicing report are to be provided at the full cost of the proponent.

Roads and Access

d) The ceding and construction of the proposed 20 metre wide Nenke Way road reserve, as defined by the Structure Plan, will be built in its entirety in one stage and will not be undertaken separately by individual land owners.
e) No new accesses/ driveways will be permitted directly off South Western Highway.
f) Prior to subdivision or development, an updated Traffic Impact Assessment is to be prepared by a suitably qualified person to the specifications and satisfaction of the relevant decisionmakers, including, but not limited to updated traffic counts, appropriate density, and upgrade requirements.

Public Open Space

g) Provision of public open space (POS) as guided by the WAPC has not been included in this Structure Plan. A cash-in-lieu payment will be provided to the City of Bunbury at the time of each subdivision within the Structure Plan area in accordance with WAPC policy.

Stormwater and Groundwater Management

h) Prior to any subdivision or development, a Stormwater and Groundwater Management Plan is to be prepared by a suitably qualified person to the specifications and satisfaction of the Department of Water and Environmental Regulation and the local government.

Permissibility

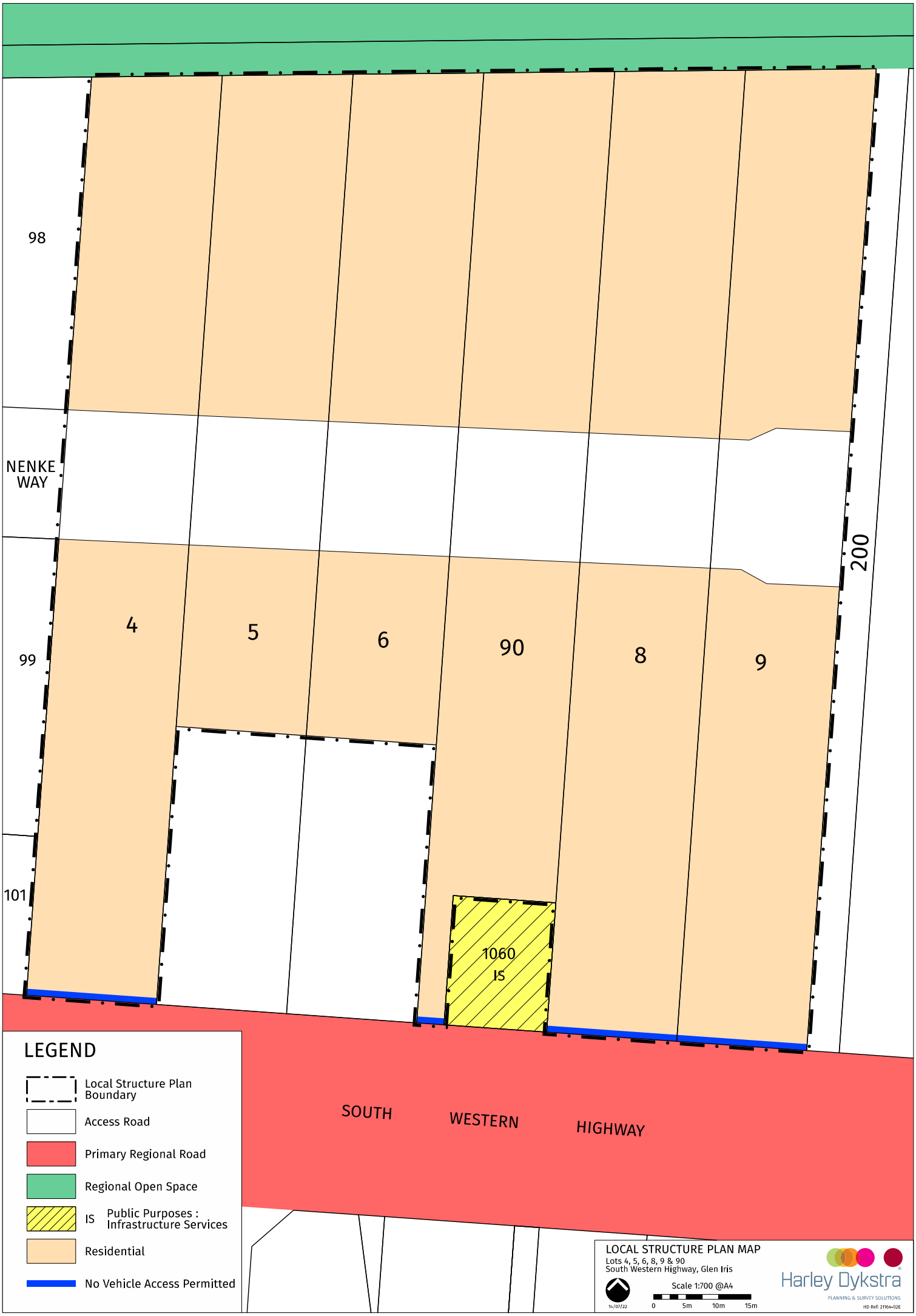
i) Land use permissibility within the Structure Plan area shall be in accordance with the corresponding zone under the City of Bunbury Local Planning Scheme No. 8.
j) Permanent development should not be located within the proposed Nenke Way road reserve as it may prejudice the ability to provide the road reserve.

Environment

k) A condition of subdivision and/or development, requiring an authorised fauna spotter to manage impacts to threatened fauna.

Other

Additional subdivision conditions will be necessary because of WAPC policy, local government and referral agency consultation.


98
NENKE WAY
200
99
4
5
6
90
8
9
101
1060
IS
SOUTH WESTERN HIGHWAY
LEGEND
Local Structure Plan Boundary
Access Road
Primary Regional Road
Regional Open Space
IS Public Purposes : Infrastructure Services
Residential
No Vehicle Access Permitted
LOCAL STRUCTURE PLAN MAP
Lots 4, 5, 6, 8, 9 & 90
South Western Highway, Glen Iris
Scale 1:700 @A4
14/07/22
0 5m 10m 15m
Harley Dykstra
PLANNING & SURVEY SOLUTIONS
HD Ref: 21164-02E

PART TWO: EXPLANATORY SECTION

1. Planning Background

1.1 Introduction and Purpose

This report has been prepared in relation to Lots 4, 8, 9, 90 and Pt Lots 5 and 6 South Western Highway, Glen Iris as supporting information to accompany the Structure Plan. This report has been prepared in accordance with the requirements of the City of Bunbury and the WAPC and establishes a framework for the future development of the subject land (for residential purposes). It discusses the issues that need to be addressed to allow for future subdivision and development.

A copy of the Structure Plan map submitted for endorsement is attached (see page 2). Once approved, the Structure Plan will provide the necessary framework to guide decision making in relation to subdivision and development applications.

1.2 Land Description

1.2.1 Location

The subject land is situated approximately 4km south east of the Bunbury City Centre. A Location Plan is included as **Figure 1** with the subject area highlighted yellow.

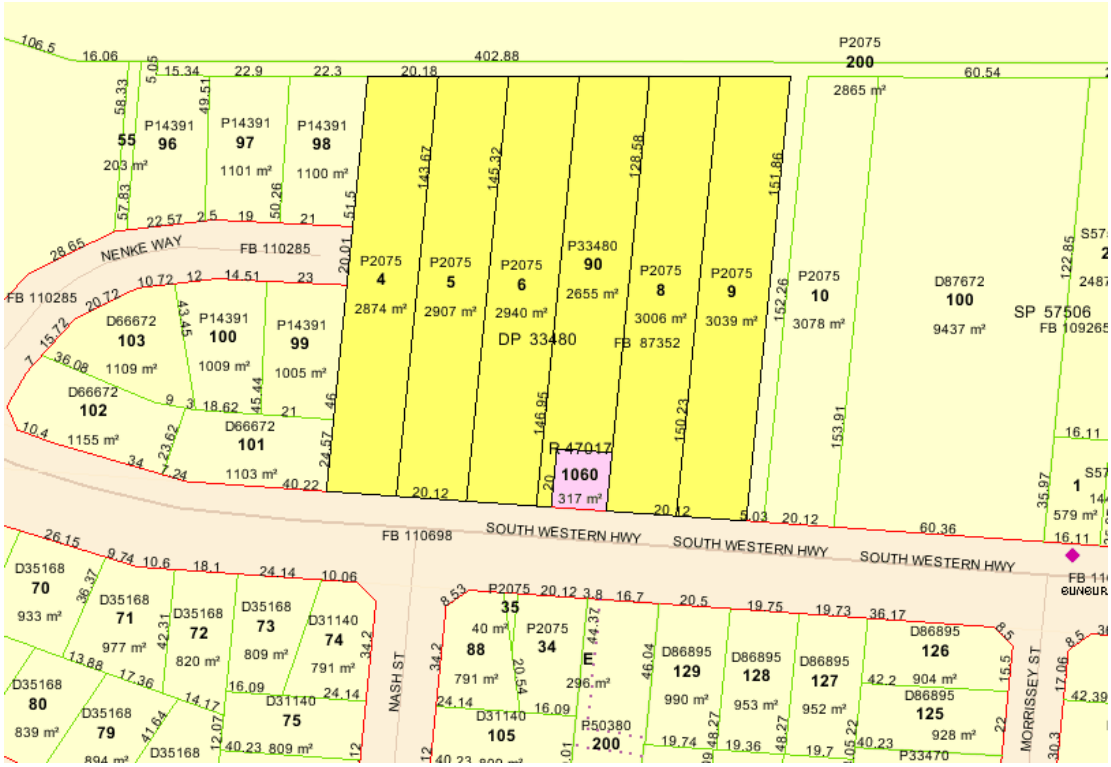


FIGURE 1 – LOCATION PLAN

1.2.2 Area and Land Use

The subject land comprises of six (6) lots with a total area of 1.5681ha. The majority of the lots contain existing single dwellings and associated infrastructure with the exception of Lots 8 and 9 which contain a single residential dwelling overlapping the boundary of these lots. All the lots currently have frontage and access available from the South Western Highway. An aerial photo of the properties can be seen at **Figure 2**.

The area is currently zoned 'Residential' with a density of 'R15' and is also within a 'Special Control Area – Development Area' (SCADA) under the City of Bunbury Local Planning Scheme No. 8. Therefore a Structure Plan is required to be prepared and endorsed prior to further subdivision or development of the land.

The Structure Plan seeks to facilitate the creation of a road reserve and residential lots, including maintaining two of the existing dwellings.

FIGURE 2 – AERIAL PHOTO

1.2.3 Legal Description and Ownership

Lot No.	House No.	Plan / Diagram	Volume	Folio	Registered Proprietor(s)	Lot Area (m^2)
4	102	2075	1167	875	Gideon Wezeman Elizabeth Margaret McNaughton	2874m^2
5	104	2075	2209	496	Tania Hancock Bruce Irwin Hancock	2907m^2 (subject area 2040m^2)
6	106	2075	2209	497	Martyn Robert Bott	2940m^2 (subject area 2067m^2)
8	112	2075	31	397A	Michael Peter Beveridge Jonelle Shirley Beveridge	3006m^2
9	112	2075	31	398A	Michael Peter Beveridge Jonelle Shirley Beveridge	3039m^2
90	108B	33480	2531	55	Diane Elizabeth Stewart Stevie John Nicholas Stewart	2655m^2
					Total	15,681m^2

TABLE 1 – LAND OWNERSHIP AND LOT DETAILS

The table above provides details in respect to the legal ownership of the subject land. Certificates of Title are included at **Appendix 1.**

1.3 Planning Framework

1.3.1 Zoning and Reservations

Greater Bunbury Region Scheme

The Structure Plan area is zoned 'Urban' under the Greater Bunbury Region Scheme (GBRS) as depicted in **Figure 3**. Residential land use is consistent with the purpose and intent of the 'Urban' zoning.

To the north of the Structure Plan area is land reserved for 'Regional Open Space'. This land is associated with the Preston River and surrounds. South Western Highway is reserved as a 'Primary Regional Road'.

All development in the Structure Plan area will be located within the 'Urban' zone.

FIGURE 3 – GBRS EXTRACT

City of Bunbury Town Planning Scheme No.8

The subject land is zoned 'Residential' by the City of Bunbury Local Planning Scheme No. 8 (the Scheme) with a designated density of 'R15'. The area zoned 'Residential' corresponds with the area zoned 'Urban' by the GBRS.

An extract of the Scheme Zoning Plan showing the zoning of the property and its surrounds is shown in **Figure 4** below. It should also be noted that the subject land is within a 'Special Control Area - Development Area (SCADA). Schedule 7, Table 10 of the scheme states that the Local Government will require a Structure Plan for a SCADA, or for any particular part of a SCADA, before recommending subdivision or approving development of land. Therefore, the Structure Plan has been prepared in accordance with this scheme requirement.

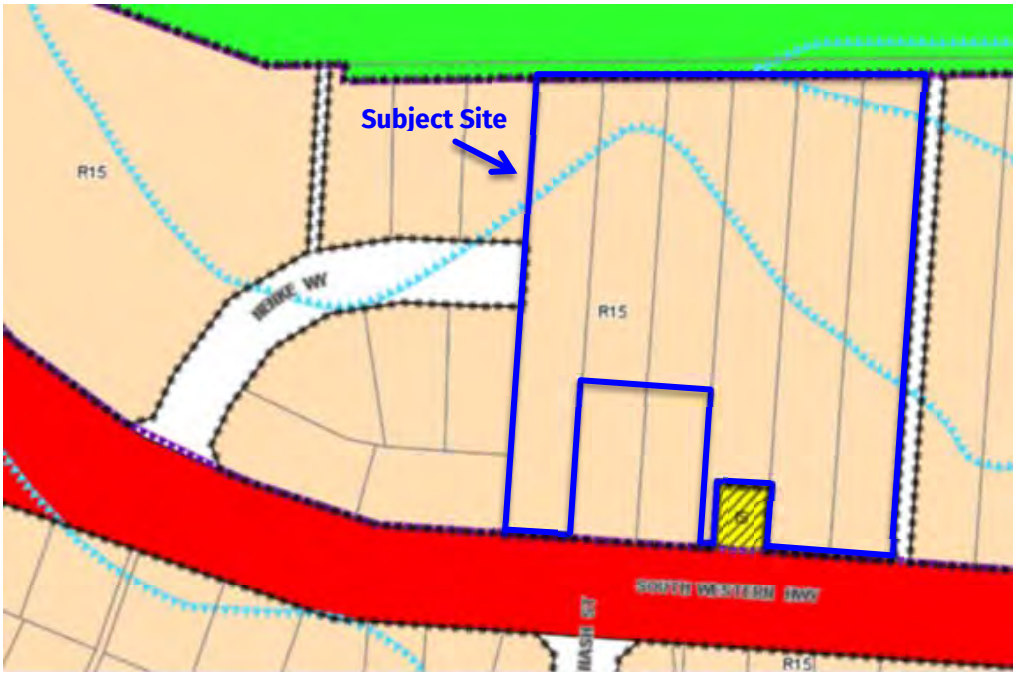


FIGURE 4 – EXTRACT FROM LOCAL PLANNING SCHEME NO. 8

1.3.2 Regional and Sub-regional Structure Plan

This Structure Plan is not associated to any higher order Structure Plans.

1.3.3 Planning Strategies

State Planning Strategy

The purpose of the State Planning Strategy is to provide a strategic guide for land use planning for the state of Western Australia until 2029. This strategy aims to develop a land use planning system to assist the state in achieving a range of goals, including *'wealth generation, conserving and enhancing the environment and building vibrant and safe communities for the enjoyment of this and future generations'*.

The strategy acknowledges the future growth predicted within the south west population of Western Australia. Accordingly it states that, "*If growth in the region is to be managed, it will be necessary to develop more sustainable and identifiable new communities*". The strategy also states that, "*The South-West Urban System needs to be developed as a means of actively preparing for urban growth*".

The Structure Plan seeks to satisfy the intent and principles of this strategy through providing for a residential development which can be adequately serviced by appropriate (existing) infrastructure and meets the intended use of the land as identified in the Scheme.

City of Bunbury - Local Planning Strategy 2018

The purpose of the City of Bunbury Local Planning Strategy is to help guide and promote sustainable development within the City of Bunbury for the next 20 years. It seeks to support the statutory guidance of the Local Planning Scheme No. 8 to achieve the following objectives:

- 2.3: Maintain a high standard of community infrastructure;
- 3.4: Facilitate urban design, diversity of land uses and enabling infrastructure; and
- 4.3: Promote Bunbury as a place which supports commercial; residential and social development.

The strategy also aims to:

> *Facilitate the evolution of a pattern of mutually supportive residential neighborhoods and their activity centres, which contribute to the economic, social and environmental sustainability of Bunbury.*

The Structure Plan seeks to achieve the objectives and aims of the LPS by providing the opportunity for a medium density development to be built, which seeks to utilise surrounding infrastructure so as to increase the economic vitality of Glen Iris.

At clause 2A – 2.1 the Strategy states the following:

> *Apply a base R-Code of R20 over all residential areas, except those areas in the vicinity of activity centres to which an appropriate higher R-Code will apply.*

It is anticipated that the site will ultimately be capable of development at the R20 density code, subject to a local planning scheme amendment.

1.3.4 Planning Policies

State Planning Policy No. 1 – State Planning Framework Policy

The purpose of SPP1 is to bring together the state and regional policies that apply to land use and development in Western Australia and to establish the general principles for land use planning and development in WA. SPP1 states, *"the primary aim of planning is to provide for the sustainable use and development of land"*. It goes on to quantify this through identifying and expanding upon the five key principles that further define this statement – environment, community, economy, infrastructure and regional development.

The Structure Plan seeks to satisfy the intention and principles of this policy by making provision for future residential development which will make more efficient use of the land and the existing infrastructure in the locality, while ensuring that no environmentally sensitive areas are detrimentally affected.

State Planning Policy No. 3 – Urban Growth and Settlement

The objectives of SPP3 include: *"To promote the development of a sustainable and liveable neighbourhood form which reduces energy, water and travel demand while ensuring safe and convenient access to employment and services by all modes, provides choice and affordability of housing and creates an identifiable sense of place for each community."*

The Structure Plan achieves the principles and intent of this policy, as future residential development and residential lots will make more efficient use of existing services, in close proximity to the Bunbury City Centre and other facilities.

State Planning Policy No. 3.1 – Residential Design Codes

The Residential Design Codes (R-Codes) provide a comprehensive approach to the guidance and control of residential development throughout Western Australia. One of the principal controls of the document is the allocation of density codes throughout 'Residential' zoned land in Town Planning Schemes.

Density codes allow the Local Government and Western Australian Planning Commission to set minimum standards for development, the most important being the minimum lot size applicable. In relation to the Structure Plan, the land is already zoned 'Residential' and an increase in the density coding will allow for efficient use of the land. This Structure Plan aims to guide future residential development on the property in light of the 'Development Investigation Policy Area' in which the property is located.

Future residential development on the property, while complying with the Structure Plan requirements, will also need to comply with the R-Codes and the applicable density coding.

State Planning Policy No. 3.7 – Planning in Bushfire Prone Areas (SPP 3.7)

The subject land is partially within a Bushfire Prone Area as indicated on the Department of Fire and Emergency Services mapping.

In accordance with SPP 3.7 requirements, a Bushfire Management Plan (BMP) has been prepared for the Structure Plan by a level one bushfire planning and design accredited practitioner. The BMP is attached at **Appendix 2** and is discussed in further detail in Section 2.4 of this report.

State Planning Policy No. 5.4: *Road and Rail Transport Noise and Freight Considerations in Land use planning (SPP 5.4)*

State Planning Policy No. 5.4 aims to achieve a number of things, including:

- *Protect people from unreasonable levels of transport noise by establishing a standardized set of criteria to be used in the assessment of proposals; and*
- *Encourage best-practice design and construction standards for new development proposals and new or redeveloped transport infrastructure proposals.*

In order to achieve these outcomes the SPP 5.4 provides the following outdoor noise criteria relating to the Structure Plan:

Time of Day	Noise Target	Noise Limit
Day (6:00am – 10:00 pm)	$L_{Aeq\ (Day)}$ = 55 dB (A)	$L_{Aeq\ (Day)}$ = 60 dB (A)
Night (10:00pm -6:00 am)	$L_{Aeq\ (Night)}$ = 50 dB (A)	$L_{Aeq\ (Night)}$ = 55 dB (A)

The Structure Plan seeks to meet these noise limits as outlined in SPP 5.4. Further explanation as to how the development meets the guidelines of SPP 5.4 is outlined in Section 2.7 of this report.

GBRS Floodplain Management Policy

The GBRS Floodplain Management Policy relates to potential flood prone areas in the Greater Bunbury Region Scheme area. More specifically, the subject land is within the 100m-wide Preston River levee bank buffer area defined in the Policy and therefore subject to the Policy requirements.

The Policy stipulates that in terms of future development, habitable buildings can be considered acceptable within flood levee bank buffer areas provided they are set back 20m from the bottom of the levee. It is also noted however, that subsequent advice from the Department of Water and Environmental Regulation (DWER) confirmed that development can occur within the levee setback area if finished floor levels match that of the levee bank (5.5m AHD). Future development in the area adjacent to the existing levee bank will therefore need to comply with this requirement.

Liveable Neighbourhoods

Liveable Neighbourhoods is an operational policy for the design and assessment of Structure Plans and subdivision of new urban areas. It is considered a 'best practice' document that may be considered by Local Government to assist in its consideration of planning related matters.

The Liveable Neighbourhoods is intended to operate as a policy to facilitate the development of sustainable communities. The following Liveable Neighbourhood aims are relevant to the Structure Plan:

- *"To ensure cost-effective and resource efficient development to promote affordable housing"; and*
- *"To maximise land efficiency wherever possible."*

The Structure Plan meets these aims by proposing residential development that makes efficient use of the land and the existing services and is suitable for the locality. Specific requirements outlined in the Liveable Neighbourhoods policy have also been adhered to, especially in relation to the road design (detailed further in Section 3.2 below).

1.4 Other Approvals and Decisions

Although never formally adopted, it is noted that the City previously prepared a Structure Plan for the Nenke Way locality overall. The City facilitated the preparation of this Structure Plan through 2007 to 2009. In 2009, Council resolved to not progress the Structure Plan. It was also at this time that the DIPA boundary was set around the land in the Nenke Way locality.

1.5 Pre-Lodgement Consultation

Prior to lodgment of this Structure Plan, consultation has been undertaken with the City of Bunbury in relation this proposal. Different aspects of the proposal were informally discussed on a number of occasions and a formal meeting with Thor Farnworth was held on the 16th June 2017 in which a concept plan design was considered and supported in principle.

A Structure Plan and Scheme Amendment was lodged with the City of Bunbury on the 11th of October 2017. Upon review, the City of Bunbury outlined a number of items which required further detail. These matters have now been addressed as part of this revised report.

The land owners of the development have been involved throughout the planning process, attending various meetings with regards to development design, costing and future development options.

The Water Corporation was contacted on the 21st of December 2017, in order to obtain information and planning advice regarding the levee bank situated on the northern boundary of the structure plan site. In summary, the following advice was received:

- The Water Corporation stated they have no major concerns about the development. However, a number of recommendations were given (as per the following points);

- Due consideration should be given to the major flood level of the Preston River and advice should be sought from the City of Bunbury with regard to the minimum floor level for the development;
- Earth works or any other development works especially along the northern boundary of the development should not weaken the structural integrity of the existing levee/bank, should not lower the levee/bank level and should not obstruct access along and across the levee/bank; and
- The proponent should discuss any works that are likely to have any impact on the levee/bank with the Water Corporation and obtain approval before undertaking them.

The Structure Plan seeks to address the issues raised by the Water Corporation. Finished building height and earthworks will be determined at the time of subdivision and therefore the proposal seeks to adhere to the advice received from the Water Corporation. It is also noted that later advice was received from DWER and this has been outlined in section 1.3.4 of this report (under 'GBRS Floodplain Management Policy').

2. Site Conditions and Constraints

2.1 Biodiversity and Natural Area Assets

The subject property is mostly cleared of vegetation with the exception of lots 8 and 9 which contain a number of mature trees that form part of an existing domestic garden. Accendo Australia was engaged in March 2018 to assess the significance of this native vegetation and the impact this would have on any native fauna (western ringtail possums and black cockatoo).

The environmental report is attached as **Appendix 3** of this report. In summary, the following was determined:

> *"Due to the high level of historical disturbance the vegetation condition can be considered to be highly degraded and fauna values and biodiversity in general are consequently very low".*
>
> *"... The site lacks any actual nesting trees, foraging resources are very limited and no roosting activity was evident. The results of the fauna assessment indicate that development of the site will not have any direct impact on the species in question."*

In accordance with advice received from Accendo Australia, the Structure Plan will not directly impact any fauna habitat. The report does however recommend a fauna management plan to be prepared for implementation during site works (with the primary aim of ensuring no individuals are killed or injured) and this can be undertaken following subdivision approval for the land.

Consultation with the City of Bunbury identified a wetland to be located on the southern portion of Lot 8. Upon further investigation, it has been found that this waterway is not a registered wetland and is instead a man-made pond (built by the previous owners of lot 8 and 9). Its source of water is from the storm water drain outlet located on the southern boundary of Lot 8. Therefore, this waterway does not inhibit future development in accordance with the Structure Plan.

2.2 Landform and Soils

The majority of the subject land is generally flat with a height of approximately 7m AHD. Lots 8 and 9 slope down gently from where the existing house is located toward the Preston River. Sandy soils are found throughout the subject land.

A formal Geotechnical Assessment of the soil type has not been completed for the Structure Plan area and will be completed at the time of subdivision to determine the soil type, density and acid sulfate level.

It is noted that a search of the Shared Land Information Platform which was conducted in order to ascertain the risk of Acid Sulfate Soils (ASS) on the property revealed a high to moderate risk of ASS within 3 metres of natural ground level over the subject land.

This level of risk is also encountered for adjoining lots on the northern side of South Western Highway between Robertson Drive and the Preston River Bridge. The existing level of development in the locality highlights that residential development is possible notwithstanding the high to moderate level of ASS risk.

As confirmed earlier, a formal geotechnical assessment (including an acid sulfate soils investigation) will be undertaken at the time of subdivison. However, at this time it is also noted that additional fill will be required prior to development of the land occurring and this will help to ensure that acid sulfate soils are not disturbed, as per the principles outlined in the WAPC Acid Sulfate Soils Planning Guidelines.

2.3 Groundwater and Surface Water

There is no evidence of any groundwater issues on the property. It is anticipated that the level of the groundwater relative to the surface will be established at the time that geotechnical investigations are undertaken.

In accordance with the draft Structure Plan report produced by the City of Bunbury in 2009, all finished building heights will be determined at the time of subdivision and in accordance with the City of Bunbury's Local Planning Policy- Development within 100m of the Preston River Levee, as well as DWER advice outlined earlier.

2.4 Bushfire Hazard

The subject land is marginally within a bushfire prone area, as designated by the Department of Fire and Emergency Commissioner. As a result, a Bushfire Management Plan (BMP) has been prepared as part of the proposal and a copy of the BMP is attached at **Appendix 2**.

The BMP demonstrates that all future lots will allow the construction of dwellings with a BAL-29 rating or lower, with the majority allowing for the construction of buildings with a rating of BAL-12.5.

The BMP also provides acceptable solutions and responses to the performance criteria outlined in Guidelines for Planning in Bushfire Prone Areas.

2.5 Heritage

A search of the Department of Planning, Lands and Heritage Aboriginal Heritage Inquiry System was conducted in August 2017.

This search identified that no registered aboriginal heritage sites affect the subject land.

Notwithstanding the lack of registered sites on the property, the developer will be subject to the *Aboriginal Heritage Act* and its obligations relating to the recording and protection of any heritage finds that may be uncovered during the development. This is the same obligation that exists for all development in areas where there was pre-European settlement.

2.6 Context and other Land Use Constraints and Opportunities

2.6.1 Services

All new lots created as a result of the subdivision will need to be connected to reticulated gas, sewer, water, power and telecommunications. The locations of all services relevant to the site are detailed below.

Electricity

Aerial electricity is currently located in the South Western Highway road reserve as well as the Nenke Way road reserve. It is also noted that a number of underground power connections are present along the southern boundary of the subject land which service a number of the existing lots. The existing services located onsite are sufficient to support the development.

Reticulated Sewer

Reticulated sewerage is present in the South Western Highway road reserve and the verge of Nenke Way. Extension to this existing sewer infrastructure is possible and will be determined at the time of subdivision.

Reticulated Water

Reticulated water is present in the northern verge of the South Western Highway road reserve and the northern road reserve of Nenke Way. Extension of the existing reticulated water supply is possible in order to allow connections for the future residential development on site.

Telecommunications

Telecommunication lines are located in South Western Highway road reserve as well as the Nenke Way road reserve. This service can be easily connected to any future residential development on site.

Reticulated Gas

Reticulated gas is present in the southern road reserve of both the South Western Highway and Nenke Way. Connection to this service can be easily established to support the residential development.

2.6.2 Water Management

The lots will utilise on-site drainage given the appropriate soil conditions. Further details on the lot drainage requirements for the development will be determined in consultation with the Local Government at subdivision/ development stage.

As noted earlier, comments received from the Water Corporation confirmed that they have no major concerns about the development. A number of recommendations were given, such as consideration of minimum floor level for the development and maintaining the levee bank and these recommendations will be heeded as part of the future development.

2.6.3 Traffic and Transport

All existing lots which make up the subject land are currently serviced via South Western Highway.

Nenke Way currently finishes on the western boundary of Lot 4. Nenke Way is to be extended to service the new residential lots. As a result no new crossovers/ driveways will access South Western Highway.

A Traffic Impact Assessment has been prepared by CDC Engineering as part of this Structure Plan and is attached as **Appendix 4**. In summary, the Traffic Impact assessment concludes the following:

- The Structure Plan is not considered to have a material effect on the surrounding road network as it adds a maximum of 12 vehicles per hour on any lane and the maximum increase in traffic is less than 10% of the existing roads capacity; and
- Assessment of the intersection of South Western Highway and Nenke Way indicates that there will be negligible impact on the Degree of Saturation, Levels of Service and Average delays on all lanes. The anticipated impact on Nenke Way will see it operating with increased delays which are still less than similar roads in the area.

It should also be noted that since the Traffic Impact Assessment was completed (on the basis of 33 additional houses), the overall potential lot yield has been reduced to 16 additional houses, thereby reducing potential traffic impacts further.

The extension to Nenke Way will therefore have a limited impact on the surrounding road network and therefore will not require any future upgrades to the Nenke Way/ South Western Highway intersection as part of the implementation of this Structure Plan.

2.7 Acoustic Assessment

An Acoustic Assessment has been completed by Herring Storer Acoustics in support of this Structure Plan, with a copy of the assessment contained within **Appendix 5**, and summarised as follows:

- The measured acoustic level during the day was recorded at 60.9 dB(A) and 53 dB(A) at night;
- SPP 5.4 requires a maximum of 60dB(A) and 55 dB(A) during the day and night respectively. Outdoor living Areas are to be a maximum of 50 dB(A);
- To achieve the Quiet house requirements of SPP 5.4, lots directly fronting the South Western Highway are to be designed in accordance with Quiet House Design Package B with an additional three lots to have a notification place on their title noting their proximity to the South Western Highway as per Appendix C of the Acoustic Report.

The Acoustic report therefore supports the Structure Plan ensuring lots fronting the South Western Highway are appropriately managed to ensure they meet the Quiet House Design Requirements of SPP 5.4.

3. Local Structure Plan

3.1 Land Use

The Structure Plan has been prepared in accordance with Part 5 and Schedule 7 of City of Bunbury Town Planning Scheme No. 8 (the Scheme).

The Structure Plan depicts the development of the property for residential land uses in accordance with the requirements of the City of Bunbury and other state planning instruments.

3.2 Design

Besides the density coding as outlined above, the existing Nenke Way which currently finishes at the western edge of Lot 4 is to be extended through the subject land parallel to the South Western Highway. The Nenke Way extension will service all the new residential lots. As a result no new crossovers/ driveways will access South Western Highway.

On the 11th of October 2017 Harley Dykstra submitted an initial Structure Plan and report with the road layout as per the 2009 Draft Structure Plan developed by the City of Bunbury. However, further consultation with the City of Bunbury in late 2017, recommended the extension of Nenke Way to be parallel with the South Western Highway and not strictly in accordance with the draft Nenke Way Structure Plan. This recommendation was received and the Structure Plan amended to reflect this request. Additionally, the City requested that the end of the Nenke Way extension allow for a cul-de-sac to provide an effective turn around for service vehicles. Again, the design was amended to reflect this request.

It is also noted that the Nenke Way extension as part of this Structure Plan allows for a further extension at a later stage, subject to the landowners to the east of the subject land pursuing this option. Nenke Way could therefore be extended further east in the future and link back to South Western Highway to create a through road.

The construction of the Nenke Way extension will be built in its entirety and not in stages. The design for the Nenke Way extension incorporates a landscaped verge which allows for on street parking in accordance with the Liveable Neighborhoods document access street C. A proposed road reserve width of 20m is proposed since the traffic volume for this road will not exceed 3000 vehicle movements per day, but there is the possibility of additional traffic movements through further planning to the east. A road reserve width of 20m ensures that there is sufficient capacity within the road reserve to facilitate greater traffic volumes into the future, if required.

Vehicle access points along Nenke Way can be strategically located as demonstrated so as to minimise the loss of grassed verge. These access points allow for safe entry and exit from Nenke Way.

The Structure Plan design can allow for the retention of two out of three of the existing houses.

4. Conclusion

The Structure Plan has been prepared in accordance with the adopted planning strategies and other planning documents relevant to the locality.

The key elements and outcomes of the Structure Plan are as follows:

- The Structure Plan has been prepared to facilitate fully serviced, medium density residential development which allows for more efficient use of this existing residential zoned land and more efficient use of the existing services in the locality;
- The Structure Plan allows for development of the property for residential land uses in accordance with the requirements of the City of Bunbury and other state planning instruments;
- No new crossovers/ driveways will access South Western Highway;
- The Nenke way road extension will be built in its entirety and not in stages;
- Two existing houses will be retained while complying with the R-code requirements for the development overall.

Once approved, this Structure Plan will provide the City of Bunbury with the necessary framework in which to guide its decision making when considering applications for subdivision approval.

5. Technical Appendices

Appendix No.	Nature of Document	Assessment Agency	Approval Status
1	Certificates of Title	N/A	N/A
2	Bushfire Management Plan	Local Authority/DFES	Submitted for consideration
3	Accendo Australia Fauna Assessment	Local Authority	Submitted for consideration
4	Traffic Impact Assessment	Local Authority & MRWA	Submitted for consideration
5	Acoustic Assessment	Local Authority & MRWA	Submitted for consideration

Appendix 1

Certificates of Title

888V

REGISTER NUMBER	
4/P2075	
DUPLICATE EDITION	DATE DUPLICATE ISSUED
4	30/6/2014

WESTERN AUSTRALIA

RECORD OF CERTIFICATE OF TITLE

VOLUME 1167 FOLIO 875

UNDER THE TRANSFER OF LAND ACT 1893

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

REGISTRAR OF TITLES WESTERN AUSTRALIA

LAND DESCRIPTION:

LOT 4 ON PLAN 2075

REGISTERED PROPRIETOR:
(FIRST SCHEDULE)

GIDEON WEZEMAN
ELIZABETH MARGARET MCNAUGHTON
BOTH OF 35 TUART STREET, SOUTH BUNBURY
AS TENANTS IN COMMON IN EQUAL SHARES

(T M685204) REGISTERED 27 JUNE 2014

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

1. M685205 MORTGAGE TO PERPETUAL LTD REGISTERED 27.6.2014.

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: 1167-875 (4/P2075).
PREVIOUS TITLE: 563-112.
PROPERTY STREET ADDRESS: 102 SOUTH WESTERN HWY, GLEN IRIS.
LOCAL GOVERNMENT AREA: CITY OF BUNBURY.

WESTERN AUSTRALIA

REGISTER NUMBER	
5/P2075	
DUPLICATE EDITION	DATE DUPLICATE ISSUED
2	27/5/2004

VOLUME 2209 FOLIO 496

RECORD OF CERTIFICATE OF TITLE

UNDER THE TRANSFER OF LAND ACT 1893

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 5 ON PLAN 2075

REGISTERED PROPRIETOR:
(FIRST SCHEDULE)

BRUCE IRWIN HANCOCK
TANIA HANCOCK
BOTH OF 39 ISLAND QUEEN STREET, WITHERS
AS JOINT TENANTS

(T I861225) REGISTERED 22/4/2004

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

1. T2403/1903 EASEMENT BENEFIT SEE TRANSFER 2403/1903. REGISTERED 1/1/1903.
2. I861226 MORTGAGE TO COMMONWEALTH BANK OF AUSTRALIA REGISTERED 22/4/2004.

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:	P2075
PREVIOUS TITLE:	300-104A
PROPERTY STREET ADDRESS:	104 SOUTH WESTERN HWY, GLEN IRIS.
LOCAL GOVERNMENT AUTHORITY:	CITY OF BUNBURY

WESTERN AUSTRALIA

REGISTER NUMBER	
6/P2075	
DUPLICATE EDITION	DATE DUPLICATE ISSUED
2	23/12/2002

VOLUME 2209 FOLIO 497

RECORD OF CERTIFICATE OF TITLE

UNDER THE TRANSFER OF LAND ACT 1893

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 6 ON PLAN 2075

REGISTERED PROPRIETOR:
(FIRST SCHEDULE)

MARTYN ROBERT BOTT OF 106 SOUTH WESTERN HIGHWAY, BUNBURY

(T I904631) REGISTERED 1/6/2004

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

1. T2403/1903 EASEMENT BENEFIT SEE TRANSFER 2403/1903. REGISTERED 1/1/1903.
2. *I904632 MORTGAGE TO BANK OF WESTERN AUSTRALIA LTD REGISTERED 1/6/2004.

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: P2075
PREVIOUS TITLE: 300-104A
PROPERTY STREET ADDRESS: 106 SOUTH WESTERN HWY, GLEN IRIS.
LOCAL GOVERNMENT AUTHORITY: CITY OF BUNBURY

NOTE 1: DUPLICATE CERTIFICATE OF TITLE NOT ISSUED AS REQUESTED BY DEALING I904632

WESTERN AUSTRALIA

REGISTER NUMBER	
8/P2075	
DUPLICATE EDITION	DATE DUPLICATE ISSUED
3	4/12/2014

VOLUME 31 FOLIO 397A

RECORD OF CERTIFICATE OF TITLE

UNDER THE TRANSFER OF LAND ACT 1893

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REGISTRAR OF TITLES

LAND DESCRIPTION:

LOT 8 ON PLAN 2075

REGISTERED PROPRIETOR:
(FIRST SCHEDULE)

MICHAEL PETER BEVERIDGE
JONELLE SHIRLEY BEVERIDGE
BOTH OF 20 EDGECUMBE STREET, COMO
AS JOINT TENANTS

(T L844903) REGISTERED 31/1/2012

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

1. M843836 MORTGAGE TO PERPETUAL LTD REGISTERED 2/12/2014.

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:	31-397A (8/P2075)
PREVIOUS TITLE:	557-109
PROPERTY STREET ADDRESS:	112 SOUTH WESTERN HWY, GLEN IRIS.
LOCAL GOVERNMENT AUTHORITY:	CITY OF BUNBURY

WESTERN AUSTRALIA

REGISTER NUMBER	
9/P2075	
DUPLICATE EDITION	DATE DUPLICATE ISSUED
3	4/12/2014

VOLUME 31 FOLIO 398A

RECORD OF CERTIFICATE OF TITLE

UNDER THE TRANSFER OF LAND ACT 1893

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 9 ON PLAN 2075

REGISTERED PROPRIETOR:
(FIRST SCHEDULE)

MICHAEL PETER BEVERIDGE
JONELLE SHIRLEY BEVERIDGE
BOTH OF 20 EDGECUMBE STREET, COMO
AS JOINT TENANTS

(T L844903) REGISTERED 31/1/2012

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

1. M843836 MORTGAGE TO PERPETUAL LTD REGISTERED 2/12/2014.

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:	31-398A (9/P2075)
PREVIOUS TITLE:	557-109
PROPERTY STREET ADDRESS:	112 SOUTH WESTERN HWY, GLEN IRIS.
LOCAL GOVERNMENT AUTHORITY:	CITY OF BUNBURY

WESTERN AUSTRALIA

REGISTER NUMBER	
90/DP33480	
DUPLICATE EDITION	DATE DUPLICATE ISSUED
5	27/7/2005

VOLUME 2531 FOLIO 55

RECORD OF CERTIFICATE OF TITLE

UNDER THE TRANSFER OF LAND ACT 1893

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 90 ON DEPOSITED PLAN 33480

REGISTERED PROPRIETOR:
(FIRST SCHEDULE)

STEVIE JOHN NICHOLAS STEWART
DIANE ELIZABETH STEWART
BOTH OF 108 SOUTH WEST HIGHWAY, GLEN IRIS
AS JOINT TENANTS

(T L026640) REGISTERED 31/7/2009

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

1. T2402/1903 EASEMENT BENEFIT SEE TRANSFER 2402/1903. REGISTERED 1/1/1903.
2. *L026641 MORTGAGE TO COMMONWEALTH BANK OF AUSTRALIA REGISTERED 31/7/2009.

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: DP33480
PREVIOUS TITLE: 300-105A
PROPERTY STREET ADDRESS: 108B SOUTH WESTERN HWY, GLEN IRIS.
LOCAL GOVERNMENT AUTHORITY: CITY OF BUNBURY

NOTE 1: DUPLICATE CERTIFICATE OF TITLE NOT ISSUED AS REQUESTED BY DEALING K589987

Harley Dykstra

Appendix 2

Bushfire Management Plan

Bushfire management plan/Statement addressing the Bushfire Protection Criteria coversheet

Site address: Lots 4, 5, 6, 8, 9 and 90 South Western Highway, Glen Iris

Site visit: Yes ☑ No ☐

Date of site visit (if applicable): Day 7 Month August Year 2017

Report author or reviewer: Lindsay Bergsma

WA BPAD accreditation level (please circle):

Not accredited ☐ Level 1 BAL assessor ☑ Level 2 practitioner ☐ Level 3 practitioner ☐

If accredited please provide the following.

BPAD accreditation number: BPAD37610 Accreditation expiry: Month July Year 2022

Bushfire management plan version number: E

Bushfire management plan date: Day 19 Month August Year 2021

Client/business name: G Wezeman

	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)?		✓
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 bushfire protection criteria elements)?	✓	

Is the proposal any of the following (see SPP 3.7 for definitions)?	Yes	No
Unavoidable development (in BAL-40 or BAL-FZ)		✓
Strategic planning proposal (including rezoning applications)	✓	
High risk land-use		✓
Vulnerable land-use		✓

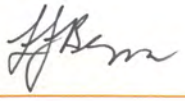
None of the above ☐

Note: Only if one (or more) of the above answers in the tables is yes should the decision maker (e.g. local government or the WAPC) refer the proposal to DFES for comment.

Why has it been given one of the above listed classifications (E.g. Considered vulnerable land-use as the development is for accommodation of the elderly, etc.)?

Proposal is for a Structure Plan

The information provided within this bushfire management plan to the best of my knowledge is true and correct:

Signature of report author or reviewer 

Date 19/08/2021

Harley Dykstra

PLANNING & SURVEY SOLUTIONS

Bushfire Management Plan

Lots 4, 5, 6, 8, 9 & 90 South Western Highway, Glen Iris

Prepared by Harley Dykstra Pty Ltd for G Wezeman

BUNBURY
21 Spencer Street, Bunbury WA 6230
PO Box 778, Bunbury WA 6231

T: 08 9792 6000
F: 08 9721 9611

E: bunbury@harleydykstra.com.au
www.harleydykstra.com.au

Albany Bunbury Busselton Kelmscott Perth

ACN 009 101 786 ABN 77 503 764 248

bsi. ISO 9001 Quality Management
FS 536019

DOCUMENT CONTROL

Control Version	Date	Status	Distribution	Comment
A	14.08.17	Draft	Internal	For review
B	16.08.17	Final	Local Gov.	Lodge with Structure Plan
C	11.04.18	Revised	Local Gov.	Lodged with revised Structure Plan document
D	01.10.19	Revised	Local Gov.	Amended as requested by Local Gov.
E	19.08.21	Revised	Local Gov.	Amended as requested by Local Gov.

Prepared for:	G Wezeman
Prepared by:	LB
Reviewed by:	CP
Date:	19.08.21
Job No:	21164
Version:	E

DISCLAIMER

This document has been prepared by HARLEY DYKSTRA PTY LTD (the Consultant) on behalf of the Client. All contents of the document remain the property of the Consultant and the Client except where otherwise noted and is subject to Copyright. The document may only be used for the purpose for which it was commissioned and in accordance with the terms of engagement for the commission.

This document has been exclusively drafted. No express or implied warranties are made by the Consultant regarding the research findings and data contained in this report. All of the information details included in this report are based upon the existent land area conditions and research provided and obtained at the time the Consultant conducted its analysis.

Regardless of the outcomes required by this report it is very important to note that the risk of ignition always remains. Bushfires, by nature, can burn in a variety of different manners and are unpredictable. As noted within AS 3959-2018, the purpose of constructing dwellings to the standard prescribed in this document is to *reduce* the risk of ignition whilst a bushfire front passes. The reader must understand that there will always remain an element of risk.

The findings of this report are valid for a period of 5 years after its issue. If there is a possibility that vegetation structure and location has changed significantly since the date of the site inspection, a new Bushfire Management Plan should be prepared.

CONTENTS

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DISCLAIMER i
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1.0 INTRODUCTION

1.1 Summary of Report

Harley Dykstra has been commissioned by the landowners of Lots 4, 5, 6, 8, 9 and 90 South Western Highway, Glen Iris to prepare a Bushfire Management Plan. The Bushfire Management Plan takes into account the various requirements of State Planning Policy 3.7 – Planning in Bushfire Prone Areas and its associated guidelines, including justification against the four Bushfire Protection Criteria identified in Appendix 4 of the guidelines. It has been prepared in support of a Structure Plan for the subject site.

1.2 Subject Site

The site subject to this Bushfire Management Plan is known as Lots 4, 5, 6, 8, 9 and 90 South Western Highway, Glen Iris and is currently occupied by a total of 3 existing dwellings and associated outbuildings. The site has been identified as partially bushfire prone by the Department of Fire and Emergency Services, ensuring that a Bushfire Management Plan is required in support of any Structure Plan.

1.3 Proposed Development

The proposed Structure Plan seeks to increase the residential density of the locality to allow for further residential development (see the Subdivision Concept Plan attached at **Appendix A**). The development includes the proposed extension of Nenke Way to provide legal road frontage for the future lots.

2 VEGETATION CLASSIFICATION

A Bushfire Attack Level Assessment was completed at the site, classifying all vegetation within 100m of the proposed development. It was assessed in accordance with Methodology 1 of Australian Standard 3959-2018 (Clause 2.2). The following provides a classification of each vegetation plot identified at the site visit.

Plot 1 **Class G Grassland** **Downslope 0-5°**

Photo ID: 1

Photo ID: 2

Plot 1 currently comprises grassland as shown above.

Plot 2 **Class G Grassland** **Upslope/ Flat**

Photo ID: 3

Photo ID: 4

Plot 2 currently comprises grassland as shown above. The privately owned land is currently used for grazing for horses.

Plot 3 **Class D Scrub** **Downslope 0-5⁰**

Photo ID: 5

Photo ID: 6

Plot 3 currently comprises scrub with bushes less then 6m in height.

Plot 4 **Low Threat Cl 2.2.3.2 (f)**

Photo ID: 7

Photo ID: 8

Plot 4 is a managed domestic garden and therefore excluded under the Australian Standard 3959-2018.

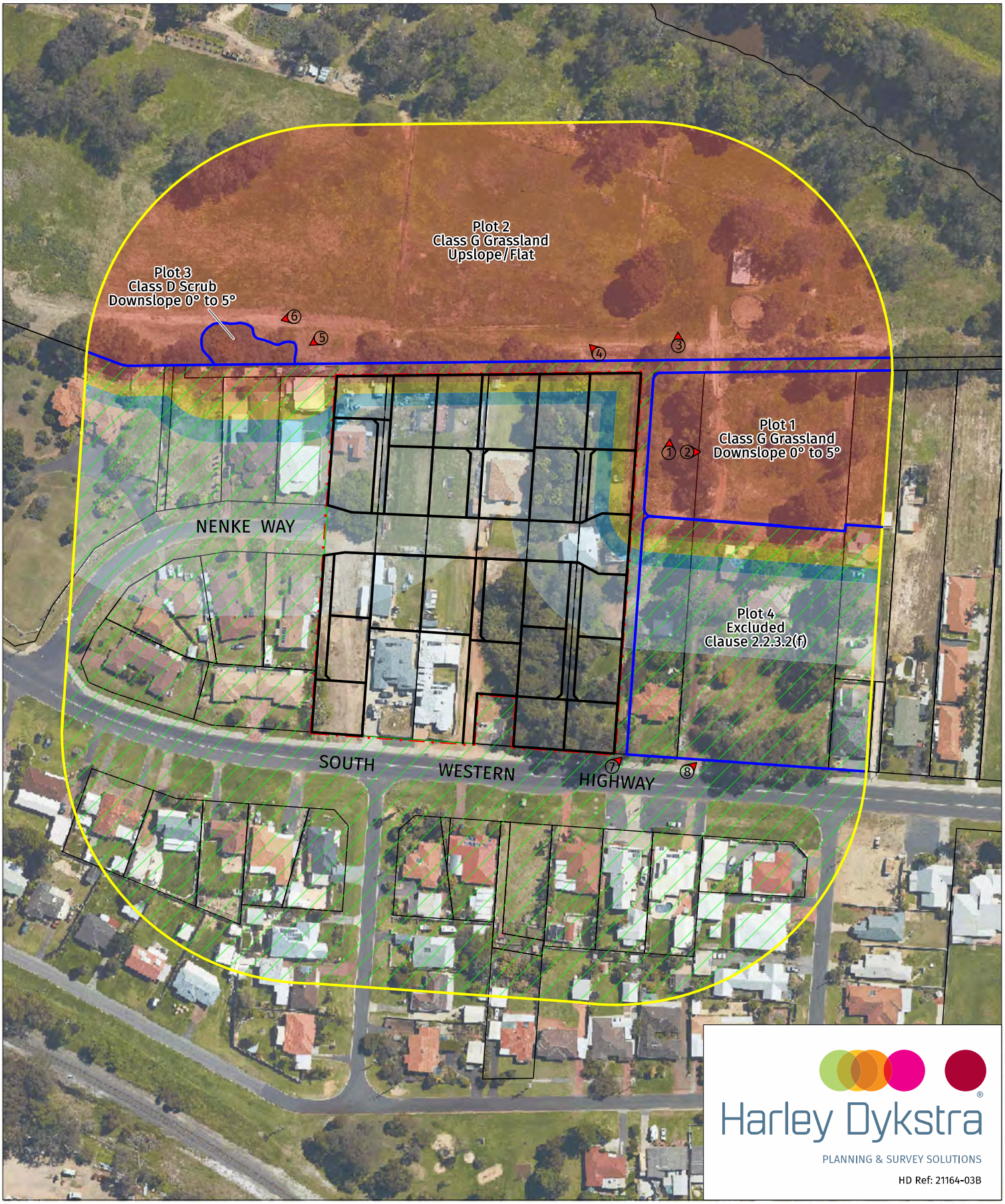
2.1 Results

A Bushfire Attack Level (BAL) Contour Map was produced using the Fire Danger index that has been determined in accordance with the applicable standard for Western Australian Municipalities, which is the standard found in Table 2.1 of AS 3959-2018. The BAL Contour Map (overleaf) demonstrates the potential radiant heat impact for the subject site.

It is important to note that the assessment has been prepared on the assumption that the subject site will be entirely managed to an APZ standard once the development has been completed due to the medium residential density lots proposed (see the Subdivision Concept Plan attached at **Appendix A**). Therefore, vegetation on the subject site has not been assessed given that its post-development state will be considered low threat.

It is clear from the BAL Contour Map that future dwellings can be sufficiently sited on the various lots to ensure that they are located in an area of BAL 29 or less. The map indicates that the majority of the proposed lots will have ratings of BAL 12.5 or BAL Low.

Because the site is subject to a potential radiant heat level of greater than BAL Low, the following sections address the criteria listed in Appendix 4 of the Guidelines associated with SPP 3.7 – Planning in Bushfire Prone Areas.



Harley Dykstra®
PLANNING & SURVEY SOLUTIONS
HD Ref: 21164-03B

Location details:
Lots 4, 5, 6, 8, 9 & 90
South Western Hwy,
Glen Iris

Assessment date: 07/08/2017

Prepared by: Lindsay Bergsma

Accreditation number: BPAD37610

Accreditation expiry date: July 2018

Date aerial photo: Oct 2016

BAL Contour Map

0 10m 20m 40m

N

Legend:
- Subject land
- Proposed Lots
- Vegetation Boundary
- 100m Buffer
- Managed Low Threat

Bushfire Attack Levels:
- BAL 12.5
- BAL 19
- BAL 29
- BAL 40
- BAL Flame Zone
- (8) Photo Location/Orientation

3 BUSHFIRE REGULATION COMPLIANCE

State Planning Policy 3.7 provides a number of objectives that it seeks to achieve, with its primary purpose being to "implement effective, risk-based land use planning and development to preserve life and reduce the impact of bushfire on property and infrastructure". This overall objective is manifested in a number of policy objectives that seek to implement the purpose of the policy. These objectives provide general statements of intent, and their practical rationalisation is developed in Appendix 4 of the guidelines associated with SPP 3.7 under the heading Bushfire Protection Criteria. Appendix 4 provides four different elements that are to be complied with. The following section will, therefore, demonstrate compliance with these elements.

3.1 Bushfire Protection Criteria

Element	Acceptable Solution	Compliance	Notes
Location	A1.1 Development Location	Yes	There is sufficient area, as demonstrated on the BAL Contour Map, in each lot so that dwellings can be constructed in an area with a BAL Rating of BAL 29 or less.
Siting and Design of Development	A2.1 Asset Protection Zone (APZ)	Yes	The whole site can be managed as an APZ in accordance with the standard prescribed in A2.1. If land owners or the subdivider wish to prepare an amended APZ requirement for a specific lot, then an application can be made to the City of Bunbury to amend the requirement for an APZ to exist over the entire lot. Should the Local Government determine that the revised APZ design is acceptable, the approved amended APZ design will be enforced in addition to the other requirements of this Bushfire Management Plan.
Vehicular Access	A3.1 Two Access Routes	No	Nenke Way is an existing cul-de-sac and currently is approximately 130m in length. Nenke Way is proposed to be extended by another 130m, for a total length of approximately 260m. However, the proposed increase in road length will only add approximately 10 seconds to a standard vehicle trip at 50km/hr, all within an area that has a very low fire risk (i.e. will be managed). The intent of this requirement will therefore be met in that the proposed access and egress will allow all vehicles to move through the locality easily and safely at all times.
	A3.2 Public Road	Yes	All public roads will meet the minimum requirements contained in Table 4 of

			Appendix 4 of the guidelines.
	A3.3 Cul-de-Sac	No	Nenke Way is an existing cul-de-sac and currently is approximately 130m in length. Nenke Way is proposed to be extended by another 130m, for a total length of approximately 260m (slightly over the 200m maximum length outlined in the Guidelines). However, the proposed increase in road length will only add approximately 10 seconds to a standard vehicle trip at 50km/hr, all within an area that has a very low fire risk (i.e. will be managed). The intent of this requirement will therefore be met in that the proposed access and egress will allow all vehicles to move through the locality easily and safely at all times. The new cul-de-sac will be constructed in accordance with the requirements stipulated in the Guidelines.
	A3.4 Battle-axe:	N/A	No battleaxe legs would result from the Subdivision Concept Plan proposed.
	A3.5 Private Driveways longer than 50m	N/A	No Private Driveways are proposed at this stage of development.
	A3.6 Emergency Access Way	N/A	No emergency access way is proposed.
	A3.7 Fire Service Access Routes	N/A	No fire service access routes are proposed as part of the future infill development.
	A3.8 Firebreak Widths	N/A	Due to the size of the lots proposed, firebreaks will not be required.
Water	A4.1 Reticulated Areas	Yes	The subject site is already currently serviced with a reticulated water supply and all new lots will be connected to this service.
	A4.2 Non-Reticulated Areas	N/A	There are no non-reticulated areas.
	A4.3 Individual lots with Non-reticulated areas	N/A	There are no individual lots with non-reticulated areas.

4 IMPLEMENTATION AND ENFORCEMENT

The following table provides a list of works that need to be implemented as a part of the subdivision and also provides details as to the maintenance of these, including the responsible party for each item.

Works Item	Implementation		Maintenance	
	Responsibility	Timeframe	Responsibility	Timeframe
APZ	Developer	Subdivision Implementation Stage	Land Owners	Perpetual
Battle-axes	Developer	Subdivision Implementation Stage	Land Owners	Perpetual
Private Driveways	Land Owners	Concurrent with dwelling construction	Land Owners	Perpetual
Firefighting Water (Hydrants)	Developer	Subdivision Implementation Stage	Aqwest	Perpetual
Fire Break Notice (Incl. BMP compliance)	Local Government	At each Fire Break Notice issue	Local Government	Perpetual

5 CONCLUSION

The Bushfire Management Plan for Lots 4, 5, 6, 8, 9 and 90 South Western Highway, Glen Iris, has been prepared in accordance with State Planning Policy 3.7 – Planning in Bushfire Prone Areas. In doing so, compliance with the various policy measures, and in particular those contained in Appendix 4 of the associated Guidelines, has been demonstrated. The proposed subdivision will be adequately serviced by Nenke Way to allow for connections with the surrounding road network. Dwellings can also be constructed subject to potential radiant heat levels of BAL 29 or less and each lot will be connected with reticulated water.

On this basis, it is respectfully requested that this Bushfire Management Plan be endorsed.

APPENDIX A

Subdivision Concept Plan

SUBDIVISION CONCEPT PLAN

Lots 4, 5, 6, 8, 9 & 90
South Western Highway
GLEN IRIS

Plan No.	21164-01
Date	19/08/21
Drawn	NP
Checked	LB
Revision	F
Scale	1:600@A3

0 5m 10m 15m

NOTE: This plan has been prepared for planning purposes. Areas, Contours and Dimensions shown are subject to survey

BUNBURY OFFICE:
21 Spencer Street,
Bunbury WA 6230
T: 08 9792 6000 F: 08 9721 9611
E: bunbury@harleydykstra.com.au
W: www.harleydykstra.com.au
Offices also at Albany, Busselton, Kelmscott and Perth

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PLANNING & SURVEY SOLUTIONS

NOTES

No new vehicular access points onto South Western Highway.

The layout depicted on this plan is indicative and has no statutory status. It is subject to change following receipt of specialist site specific technical information and following assessment and consideration by the City of Bunbury and the Department of Planning, Lands and Heritage.

LEGEND

- Subject Land (1.5681ha)
- Boundaries to be Removed
- Proposed Green Title (3 Lots)
- Proposed Survey Strata Title (22 Lots)
- Dwelling to be Retained
- Dwelling to be Removed
- No Vehicle Access Permitted
- E — Underground Electricity (DBYD)
- AE — Overhead Electricity (DBYD)
- W — Reticulated Water (DBYD)
- S — Reticulated Sewer (DBYD)
- T — Telecommunications (DBYD)
- G — Reticulated Gas (DBYD)
- D — Drainage (DBYD)
- Power Dome (DBYD)

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Harley Dykstra

Appendix 3

Fauna Assessment Report

Fauna Assessment

Lots 8 and 9
South Western Highway
Glen Iris

MARCH 2018

Version 2

On behalf of:
Accendo Australia
PO Box 5178
WEST BUSSELTON WA 6280
M: 0418 950 852
T: (08) 9755 7217
E: kirsten@accendoaustralia.com.au

Prepared by:
Greg Harewood
Zoologist
PO Box 755
BUNBURY WA 6231
M: 0402 141 197
E: gharewood@iinet.net.au

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SUMMARY

This report details the results of a fauna assessment of Lots 8 and 9 South Western Highway, Glen Iris (the site) (Figure 1). It is understood that the landowners are proposing to subdivide the existing two lots into several smaller lots.

The site has a total area of about 0.6 hectares (ha) and contains a mosaic of exotic, non-endemic and native endemic vegetation over lawns and unmaintained grasslands. The site also contains a small lake, buildings (a house and sheds) and a driveway.

The primary aim of the assessment reported on here is to identify existing and potential habitat values for western ringtail possums (*Pseudocheirus occidentalis*) (WRPs) and black cockatoos within the site.

While the site appears to contain some habitat suitable for western ringtail possums to utilise ((given the presence of favoured foraging species (i.e. peppermint) and refuge opportunities (dense foliage in a variety of trees and large shrubs)) no recent evidence of the species was observed.

The black cockatoo assessment indicates that the site does not represent an area of significance for any of the three species known to frequent the area. The site lacks any actual nesting trees, foraging resources are very limited, and no roosting activity was evident.

The results of the fauna assessment indicate that development of the site will not have any direct impact on the species in question.

Given the high number of common brushtail possums frequenting the site it is however recommended that a fauna management plan be prepared for implementation during any site works (vegetation clearing and demolition of the house and shed) with the primary aim of ensuring no individuals are killed or injured.

1. INTRODUCTION

This report details the results of a fauna assessment of Lots 8 and 9 South Western Highway, Glen Iris (the site) (Figure 1). It is understood that the landowners are proposing to subdivide the existing two lots into several smaller lots.

The site has a total area of about 0.6 hectares (ha) and contains a mosaic of exotic, non-endemic and native endemic vegetation over lawns and unmaintained grasslands. The site also contains a small lake, buildings (a house and sheds) and a driveway.

The primary aim of the assessment reported on here was to identify existing and potential habitat values for western ringtail possums (*Pseudocheirus occidentalis*) (WRPs) and black cockatoos within the site. The information provided represents one of several technical reports that will be used to inform, guide and support ongoing planning by providing an understanding of the suite of environmental values present. It is also anticipated that the data presented will be used by regulatory authorities to assess the potential impact of the proposal on fauna and fauna habitats.

2. SCOPE OF WORKS

The scope of works, as defined by Accendo Australia, was to:

- Carry out a preliminary survey of western ringtail possums with the aim of obtaining an estimate of the distribution, abundance and habitat extent of the species within the site;
- Carry out a black cockatoo habitat assessment with the aim of determining the status, extent and quality of habitat within the site; and
- Prepare a report summarising methods and results.

Note: For the purposes of this report the term black cockatoo is in reference to all three species i.e. Baudin's black-cockatoo *Calyptorhynchus baudinii*, Carnaby's black-cockatoo *Calyptorhynchus latirostris* and the forest red-tailed black-cockatoo *Calyptorhynchus banksii naso*, unless stated otherwise.

3. METHODS

3.1 FAUNA HABITAT ASSESSMENT

Vegetation units and landforms observed during field survey have been used to define broad fauna habitat types across the site.

3.2 WESTERN RINGTAIL POSSUM ASSESSMENT

3.2.1 Daytime Survey

A day time survey to locate and record dreys, obvious tree hollows, scats and individual WRPs was carried out on the 21 March 2018. This involved a series of close spaced

traverses on foot across the subject site (concurrent with black cockatoo habitat assessment).

3.2.2 Night Time Survey

A night time survey to locate and record individual WRPs was carried out on the 22 March 2018. This involved a series of close spaced traverses across the subject site, on foot at night using a LED head torch.

3.2.3 Habitat Assessment

Description and comments on the amount and quality of WRP habitat within the subject site are provided based on observations made during the site surveys.

3.3 BLACK COCKATOO HABITAT ASSESSMENT

The following methods were employed during the black cockatoo habitat assessment to comply with the defined scope of works and are based on guidelines published by the DotEE (Commonwealth of Australia 2012) which states that surveys of Carnaby's, Baudin's and forest red-tailed black cockatoo habitat should:

- be done by a suitably qualified person with experience in vegetation or cockatoo surveys, depending on the type of survey being undertaken;
- maximise the chance of detecting the species' habitat and/or signs of use;
- determine the context of the site within the broader landscape—for example, the amount and quality of habitat nearby and in the local region (for example, within 10 km);
- account for uncertainty and error (false presence and absences); and
- include collation of existing data on known locations of breeding and feeding birds and night roost locations.

Habitat used by black cockatoos have been placed into three categories by the DotEE (Commonwealth of Australia 2012) these being:

- Breeding Habitat;
- Foraging Habitat; and
- Night Roosting Habitat.

So as to comply with the request scope of works and in line with the published guidelines the following was carried out on the 21 March 2018 (concurrent with WRP assessment).

3.3.1 Breeding Habitat

The black cockatoo breeding habitat assessment has involved the identification of all suitable breeding trees species within the subject site that had a DBH of equal to or over 50cm. The DBH of each tree was estimated using a pre-made 50 cm "caliper".

Target tree species included marri and jarrah and any other *Corymbia/Eucalyptus* species of a suitable size that are present. Peppermints, *banksia*, sheoak and *melaleuca* tree species (for example) were not assessed as they typically do not develop hollows that are used by black cockatoos.

The location of each tree identified as being over the threshold DBH was recorded with a GPS and details on tree species, number and size of hollows (if any) noted. Trees observed to contain hollows (of any size/type) were marked with "H" using spray paint.

Potential hollows were placed into one of four categories, based on the size of the apparent hollow entrance, these being:

- Small = ~<5cm diametre (i.e. entrance too small for a black cockatoo);
- Medium = ~5cm-10cm diametre (i.e. entrance too small for a black cockatoo);
- Large = ~>10cm diametre (entrance large enough for a black cockatoo but possible hollow appears to be unsuitable for nesting i.e. wrong orientation, too small, too low or too shallow); or
- Large (cockatoo) = ~>10cm diametre (entrance appears big enough to provide access to a possible hollow that may be suitable for a black cockatoo to use for nesting).

Based on this assessment trees present within the survey area have then been placed into one of four categories:

- Tree < 50cm DBH or an unsuitable species (not assessed/recorded);
- Tree >50cm DBH, no hollows seen;
- Tree >50cm DBH, one or more hollows seen, none of which appeared suitable for black cockatoos to use for nesting; or
- Tree >50cm DBH, one or more hollows seen, with at least one considered possibly suitable for black cockatoos to use for nesting.

For the purposes of this study a tree containing a potential black cockatoo nest hollow has been defined as:

Generally, any tree which is alive or dead that contains one or more visible hollows (cavities within the trunk or branches) suitable for occupation by black cockatoo for the purpose of nesting/breeding. Hollows that had an entrance greater than about 10cm in

diameter and would allow the entry of a black cockatoo into a suitably orientated and sized branch/trunk, was recorded as a "potential nest hollow".

Identified hollows were examined using binoculars for evidence of actual use by black cockatoos (e.g. chewing around hollow entrance, scarring and scratch marks on trunks and branches). Trees with possible nest hollows were also scratched and raked with a large stick/pole in attempt to flush any sitting birds from hollows and calls of chicks were also listened for. It should be noted that the survey may have been conducted outside of the main breeding season of one or more of the three species of black cockatoo and therefore any lack of nesting activity may have been a consequence of this fact.

3.3.2 Foraging Habitat

The location and nature of black cockatoo foraging evidence (e.g. chewed fruits around base of trees) observed during the reconnaissance survey was recorded. The nature and extent of potential foraging habitat present was also documented irrespective of the presence of any actual foraging evidence.

3.3.3 Night Roosting Habitat

Direct and indirect evidence of black cockatoos roosting within trees in the subject site was noted if observed (e.g. branch clippings, droppings or moulted feathers). This part of the assessment included a dusk survey prior to commencement of the nocturnal WRP survey (21 March 2018) aimed at observing any actual roosting activity.

3.4 OTHER FAUNA

During all survey work opportunistic observations of all vertebrate fauna species were also recorded.

Evidence of the presence or likely presence of other species of conservation significance (including suitable habitat) was searched for and recorded concurrent with the WRP/black cockatoo assessments. The aim was to obtain sufficient information to make a definitive comment on the likely significance of the site to other species of conservation significance which may be present.

4. SURVEY LIMITATIONS

No seasonal sampling has been carried out as part of this fauna assessment. The conclusions presented are based upon field data and the environmental monitoring and/or testing carried out over a limited period of time and are therefore merely indicative of the environmental condition of the site at the time of the field assessments. It should be recognised that site conditions can change with time.

Lack of observational data on some species should also not necessarily be taken as an indication that a species is absent from the site or does not utilise it for some purpose at times.

During the black cockatoo habitat survey trees with hollows were searched for. It should be noted that identifying hollows suitable for fauna species from ground level has limitations. Generally the full characteristics of any hollow seen are not fully evident (e.g. internal dimensions). It is also difficult to locate all hollows within all trees as some are not observable from ground level.

The location of observations was recorded using a handheld GPS. The accuracy of the GPS cannot be guaranteed above a level of about 5 to 10 metres, though it should be noted that in some circumstance the accuracy can increase or decrease beyond this range.

5. RESULTS

5.1 FAUNA HABITAT ASSESSMENT

The site appears to have been historically cleared of the majority of native vegetation many years ago. Native species that remain consist of a number of peppermint (*Agonis flexuosa*) and paperback (*Melaleuca rhaphiophylla*) trees. Peppermint is most common in the rear half of the site, with paperbark being concentrated around the small lake present in the front half of the property. A range of exotic and non-endemic trees and shrubs have then been planted as gardens around the centrally located residential dwelling and along lot boundaries. Native ground cover (small shrubs, herbs and grasses) are totally absent.

Due to the high level of historical disturbance the vegetation condition can be considered to be highly degraded and fauna values and biodiversity in general are consequently very low.

Descriptions and example images of the vegetation present within the site is provided in Table 1.

Table 1: Main Fauna Habitats within the Site

Fauna Habitat Description	Example Image
Planted exotic and non-endemic trees and shrubs.	

Fauna Habitat Description	Example Image
Peppermint over a grassland of introduced species.	
Small lake with fringing Paperbark.	
Existing cleared/highly degraded areas – including open areas, buildings and driveway.	

5.2 WESTERN RINGTAIL POSSUM ASSESSMENT

5.2.1 Daytime Survey

The locations of various possum related observations made during the daytime surveys are shown in Figure 2.

Only one old, deteriorating WRP drey (daytime refuge constructed from small sticks and foliage) was located during the day survey. No other evidence of the species presence onsite was observed (i.e. no scats or individuals). Scats attributed to common brushtail possums were observed at some locations.

Manmade structures (houses, sheds), forks in trees, subtle cavities in tree trunks, fallen hollow logs, rabbit burrows and dense ground cover are also used by WRPs for daytime refuge (to varying degrees) and therefore observations of dreys only provide a guide to WRP habitat use/quality as other opportunities for daytime refuge may exist.

5.2.2 Night Time Survey

The nocturnal survey observations are also shown in Figure 2. Ten common brushtail possums were observed within or near the boundaries of the site during the nocturnal survey. No western ringtail possums were recorded.

5.2.3 Habitat Assessment

Habitat within the site appears, at least superficially suitable for WRPs to utilise given the presence of favoured foraging species (i.e. peppermint) and refuge opportunities (dense foliage in a variety of trees and large shrubs).

The lack of any recent WRP activity (recent dreys, scats or individuals) does however suggest the species is not currently utilising the area for some reason.

5.3 BLACK COCKATOO HABITAT ASSESSMENT

5.3.1 Breeding Habitat

Trees considered potentially suitable for black cockatoos to use as nesting habitat which were found within the site were comprised of the following species:

- Unidentified non-endemic planted eucalypts – *Eucalyptus* spp.*;*

A summary of the potential black cockatoo habitat trees observed within the survey area is provided in Table 2 below and their location shown in Figure 3.

Table 2: Summary of Potential Black Cockatoo Habitat Trees (DBH ≥50cm) within the Site

Total Number of Habitat Trees	Number of Trees with No Hollows Observed	Number of Trees with Hollows Considered Unsuitable for Nesting Black Cockatoos	Number of Trees with Hollows Considered Possibly Suitable for Nesting Black Cockatoos	Tree Species
				Unidentified Non-Endemic Eucalypt
3	3	0	0	3

The assessment identified three trees within the site with a DBH of ≥50cm. None of these trees appear to contain hollows of any size.

Additional details on each habitat tree observed can be found in Appendix A.

5.3.2 Foraging Habitat

The following represents a list of the observed plant species present within the site known to be used by one or more of the black cockatoo species as a food source (i.e. foraging habitat).

- Marri (*Corymbia calophylla)* (one specimen only).

No evidence of black cockatoos foraging onsite was observed during the field survey and the extent of available food resources appears to be very small with only one marri tree being present.

5.3.3 Night Roosting Habitat

No existing roosting trees (trees used at night by black cockatoos to rest) were positively identified during the survey. It is considered unlikely that black cockatoos roost onsite.

5.4 OTHER FAUNA

No evidence of any other fauna species of conservation significance using the site was seen. As indicated in Section 5.1 overall fauna habitat values within the site are very low given the level of historical disturbance and lack of natural fauna habitats.

6. CONCLUSION

The fauna assessment of Lots 8 and 9 South Western Highway, Glen Iris was primarily carried out to identify existing and potential habitat values for western ringtail possums and black cockatoos.

While the site appears to contain some habitat suitable for western ringtail possums to utilise ((given the presence of favoured foraging species (i.e. peppermint) and refuge opportunities (dense foliage in a variety of trees and large shrubs)) no recent evidence of the species was observed. The black cockatoo assessment indicates that the site does not represent an area of significance for any of the three species known to frequent the area. The site lacks any actual nesting trees, foraging resources are very limited, and no roosting activity was evident.

The results of the fauna assessment indicate that development of the site will not have any direct impact on the species in question.

Given the high number of common brushtail possums frequenting the site it is however recommended that a fauna management plan be prepared for implementation during any site works (vegetation clearing and demolition of the house and shed) with the primary aim of ensuring no individuals are killed or injured.

7. REFERENCES

Commonwealth of Australia (2012). *EPBC Act* Referral guidelines for three threatened black cockatoo species: Carnaby's cockatoo (endangered) *Calyptorhynchus latirostris*, Baudin's cockatoo (vulnerable) *Calyptorhynchus baudinii*, Forest red-tailed black cockatoo (vulnerable) *Calyptorhynchus banksii naso*.

FIGURES

Legend

Lot 8 and 9 Boundaries

N

0 10 20 30 40

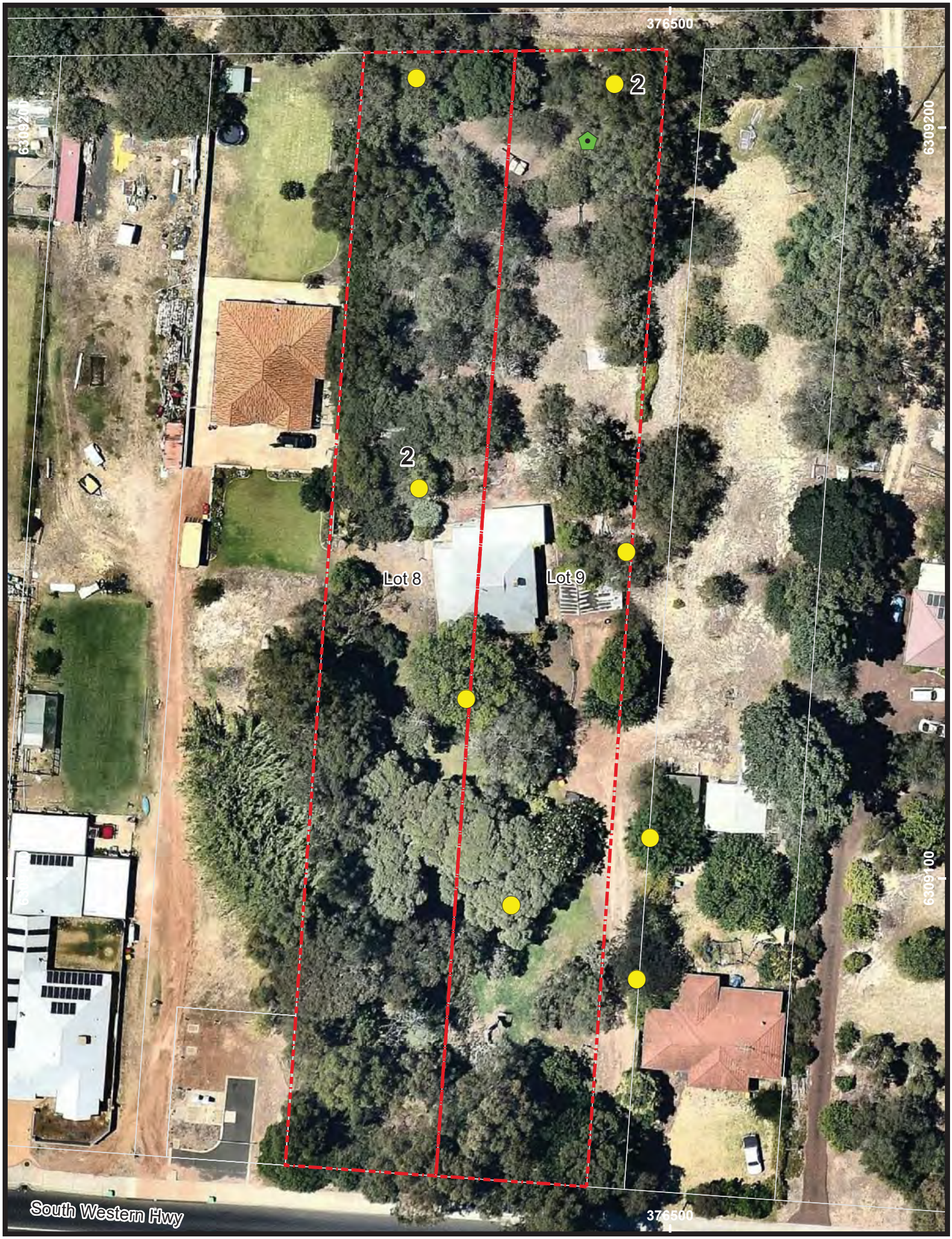
Metres

Lot 8 & 9
South Western Hwy
Glen Iris

Air Photo

Drawn: G Harewood
Date: 25/03/2018
Scale: 1:650
Projection/Coordinate System: UTM/MGA Zone 50

Figure: 1



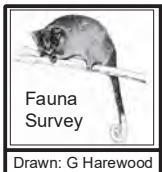
Legend

- Lot 8 and 9 Boundaries
- Common Brushtail Possum
- Old WRP Drey

N

0 10 20 30 40

Metres



Drawn: G Harewood

Date: 25/03/2018

Scale: 1:650

Projection/Coordinate System: UTM/MGA Zone 50

Lot 8 & 9
South Western Hwy
Glen Iris

Possum Observations

Figure: 2

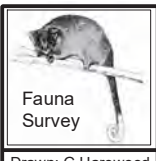
Legend

- Lot 8 and 9 Boundaries
- Habitat Tree - No Hollows Seen

N

0 10 20 30 40

Metres



Lot 8 & 9
South Western Hwy
Glen Iris

Habitat Trees (DBH >50cm)

Drawn: G Harewood	
Date: 25/03/2018	
Scale: 1:650	
Projection/Coordinate System: UTM/MGA Zone 50	Figure: 3

APPENDIX A

HABITAT TREE DETAILS

Habitat Trees
DBH >50cm
Datum - GDA94

Waypoint Number	Zone	mE	mN	Tree Species	Tree Height (m)	Number of Hollows	Potential Cockatoo Nest Hollow	Comments
wpt001	50H	376490	6309056	Unknown Eucalypt	20+	0	No	Planted Non-endemic
wpt002	50H	376488	6309062	Unknown Eucalypt	15-20	0	No	Planted Non-endemic
wpt003	50H	376485	6309060	Unknown Eucalypt	15-20	0	No	Planted Non-endemic

DISCLAIMER

This fauna assessment report ("the report") has been prepared in accordance with the scope of services set out in the contract, or as otherwise agreed, between the Client and Greg Harewood ("the Author"). In some circumstances the scope of services may have been limited by a range of factors such as time, budget, access and/or site disturbance constraints. In accordance with the scope of services, the Author has relied upon the data and has conducted environmental field monitoring and/or testing in the preparation of the report. The nature and extent of monitoring and/or testing conducted is described in the report.

The conclusions are based upon field data and the environmental monitoring and/or testing carried out over a limited period of time and are therefore merely indicative of the environmental condition of the site at the time of preparing the report. Also it should be recognised that site conditions, can change with time.

Within the limitations imposed by the scope of services, the field assessment and preparation of this report have been undertaken and performed in a professional manner, in accordance with generally accepted practices and using a degree of skill and care ordinarily exercised by reputable environmental consultants under similar circumstances. No other warranty, expressed or implied, is made.

In preparing the report, the Author has relied upon data, surveys, analyses, designs, plans and other information provided by the Client and other individuals and organisations, most of which are referred to in the report ("the data"). Except as otherwise stated in the report, the Author has not verified the accuracy of completeness of the data. To the extent that the statements, opinions, facts, information, conclusions and/or recommendations in the report ("conclusions") are based in whole or part on the data, those conclusions are contingent upon the accuracy and completeness of the data. The Author will not be liable in relation to incorrect conclusions should any data, information or condition be incorrect or have been concealed, withheld, misrepresented or otherwise not fully disclosed to the Author.

The report has been prepared for the benefit of the Client and no other party. The Author assumes no responsibility and will not be liable to any other person or organisation for or in relation to any matter dealt with or conclusions expressed in the report, or for any loss or damage suffered by any other person or organisation arising from matters dealt with or conclusions expressed in the report (including without limitation matters arising from any negligent act or omission of the Author or for any loss or damage suffered by any other party relying upon the matters dealt with or conclusions expressed in the report). Other parties should not rely upon the report or the accuracy or completeness of any conclusions and should make their own enquiries and obtain independent advice in relation to such matters.

The Author will not be liable to update or revise the report to take into account any events or emergent circumstances or facts occurring or becoming apparent after the date of the report.

Appendix 4

Traffic Impact Assessment

TRANSPORT IMPACT STATEMENT

PROPOSED STRUCTURE PLAN

Lots 4-6,8,9,90 & 200 South Western Highway, Glen Iris

CDC Consulting Engineers, 25 Ross Drive, Perth Airport WA6105 - admin@cdcengineering.com.au

Document Information

Prepared for:	Harley Dykstra
Project Name:	Lots 4-6,8,9,90 & 200 South Western Highway, Glen Iris
Job Reference:	1917120
Date:	14 August 2019

Document Control

Revision	Date	Author	Author Initials	Issued To
A	14/08/2019	Michael Collins	MC	Harley Dykstra

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1.0 INTRODUCTION

CDC Consulting Engineers have been engaged by Harley Dykstra to prepare a Transport Impact Statement for the proposed Scheme Amendment and Structure Plan for Lots 4-6, 8, 9, 90 and 200 South Western Highway, Glen Iris. The subject sites are currently zoned residential R15 and the Structure Plan proposes rezoning to R30 which will yield an additional 33 lots. To access the proposed lots, an extension of Nenke Way is required.

This report presents the methodology and findings of the assessment which was prepared in line with the guidelines set out in the Western Australian Planning Commission publications; Transport Impact Assessment Guidelines, Volumes 1 – 5.

1.1 BACKGROUND INFORMATION

A Transport Statement can be described as a brief statement outlining the transport aspects of the proposed subdivision. The intent of the statement is to provide the approving authority with sufficient transport information to confirm that the proponent has adequately considered the transport aspects of the subdivision and that it would not have an adverse transport impact on the surrounding area. It is expected that most, if not all, of the information provided within a Transport Statement is to be of a nontechnical nature, that is, will not require input from a specialist in transportation planning or traffic engineering. Therefore, we consider the methodology incorporation within this assessment to be more than adequate to meet the objectives of the Transport Impact Assessment Guidelines.

In preparing this report reference has been made to:

- Main Roads Western Australian, Metropolitan Traffic Digest 2009/10 – 2014/15
- Main Road's Intersection Crash Ranking Interactive Report and Crash Analysis Reporting System (CARS)
- Guide to Traffic Generating Developments, Version 2.2, October 2002 - Roads and Traffic Authority, New South Wales; and
- Trip Generation Manual – Institute of Transportation Engineers (ITE), Washington, USA.

2.0 EXISTING SITUATION

The subject site is located in Glen Iris within the City of Bunbury and is currently occupied by five dwellings and various out buildings and sheds spread across the structure plan area with each property having a crossover to South Western Highway.

The site has an approximate overall area of 17.9ha and is generally flat in nature. The site is bounded by Nenke Way to the West and South Western Highway to the South.

FIGURE 1: SITE LOCATION

2.1 CURRENT ROAD NETWORK

Nenke Way fronts the western site boundary and is constructed as a 7m wide single carriageway 'Access Road'. Access Roads are described by MRWA as providing access to abutting properties with amenity, safety and aesthetic aspects having priority over the vehicle movement function. Access Roads have a maximum desirable capacity of 3000vpd with current volumes expected to be less than 500vpd.

The road is kerbed, asphalted and drained via a pit and pipe network and has a priority controlled intersection with South Western Highway. The road 140m long and terminates in a cul de sac, it is currently only utilised by 10 properties and is subject to a default speed limit of 50kmh.

FIGURE 2: NENKE WAY – LOOKING EAST TOWARDS THE DEVELOPMENT SITE

FIGURE 3: NENKE WAY – LOOKING SOUTH TOWARDS SOUTH WESTERN HIGHWAY

South Western Highway is constructed as an undivided 10.0m wide single carriageway road. The road is constructed to a sealed, kerbed and drained standard. South Western Highway is classified as a Primary Distributor and is under the control of MRWA. Primary Distributors are described by MRWA as providing for major regional and inter-regional movements carrying large volumes of generally fast moving traffic. South Western Highway is subject to a speed limit of 60km/h.

South Western Highway had an AADT of 12540vpd in 2013/2014. The theoretical capacity of South Western Highway would need to be calculated in line MRWA's Guidelines for Determining and Assigning Responsibility for Roads in Western Australia.

FIGURE 4: SOUTH WESTERN HIGHWAY – LOOKING WEST TOWARDS NENKE WAY

FIGURE 5: SOUTH WESTERN HIGHWAY – LOOKING EAST AWAY FROM NENKE WAY

2.2 PUBLIC TRANSPORT

Immediately outside the site are two bus stops for service number 827 on each side of each side of South Western Highway.

2.3 PEDESTRIAN AND CYCLIST ACCESS

A 2.4m wide shared path is available on the northern side of South Western Highway. The path is constructed to a good standard in the vicinity of the development with no obvious improvement measures required.

2.4 CRASH ANALYSIS

Main Roads Intersection Crash Ranking Interactive Report and Crash Analysis Reporting System (CARS) was utilised to assess the current accident statistics around the development. The system reports on all roads and intersections which have had one or more reported road crashes over a 5 years period from 2012 to 2017.

2.4.1 INTERSETION OF NENKE WAY AND SOUTH WESTERN HIGHWAY

The system advised that there were two incidents resulting in "Major Property Damage" reported in 2018. One incident was reported as "31 – Same Lane Rear End" and the other was reported as "10 – Other Vehicles From Adjacent Approach".

2.5 CURRENT SAFETY CONCERNS

Review of the crash statistics and on-site conditions suggests that there is no site-specific safety issues or concerns which need to be addressed as part of this development. However, review of the Safe Intersection Sight Distance (SISD) for the Nenke Way suggests that the line of sight to the east may be obstructed by the corner property (1B Nenke Way). Without provision of a detailed feature survey it is very difficult confirm but as previously mentioned, there is no evidence of this being an issue relative to crash statistics.

2.6 EXISTING TRAFFIC FLOWS

In order to obtain an appreciation of existing traffic volumes experienced by South Western Highway, reference was made to Main Roads Western Australia's 'trafficmap' which has been created to view and download traffic counts collected from across the state. The data collected for Southern Western Highway (West of Dodson Rd) is summarised in the table below:

Statistic Type	Peak Period	East Bound Peak Hr	EB Peak Hr Vol	West Bound Peak Hr	WB Peak Hr Vol
Monday to Friday	AM	08:00	**547**	08:00	**641**
Monday to Friday	PM	16:00	**589**	16:00	**688**

TABLE 1: EXISTING TRAFFIC FLOWS – SOUTH WESTERN HIGHWAY (2013/14)

Allowing for a growth factor of 3% p.a. the current volumes can be expected to be in the order of those stated below:

Statistic Type	Peak Period	East Bound Peak Hr	EB Peak Hr Vol	West Bound Peak Hr	WB Peak Hr Vol
Monday to Friday	AM	08:00	**634**	08:00	**743**
Monday to Friday	PM	16:00	**683**	16:00	**798**

TABLE 2: PROJECTED TRAFFIC FLOWS – SOUTH WESTERN HIGHWAY (2019)

In order to obtain an appreciation of existing traffic volumes on Nenke Way reference is made to the Roads and Traffic Authority's Guide to Traffic Generating Developments Version 2.2 October 2002. The guidelines provide daily and peak hour trip generation rates based on the dwelling number of the development:

- Daily vehicle trips = 9.0 per dwelling
- Weekday peak hour vehicle trips = 0.85 per dwelling.

The assumed In/Out split for both the morning and afternoon peaks has been taken from the Trip Generation Manual published by the Institute of Transportation Engineers (ITE), Washington, USA which gives the following recommendations:

- AM – 25% In 75% Out
- PM – 67% In 33% Out

Apply the above factors and assuming the same directional split of South Western results in the total traffic volume at the intersection of Nenke Way and South Western Highway as indicted below:

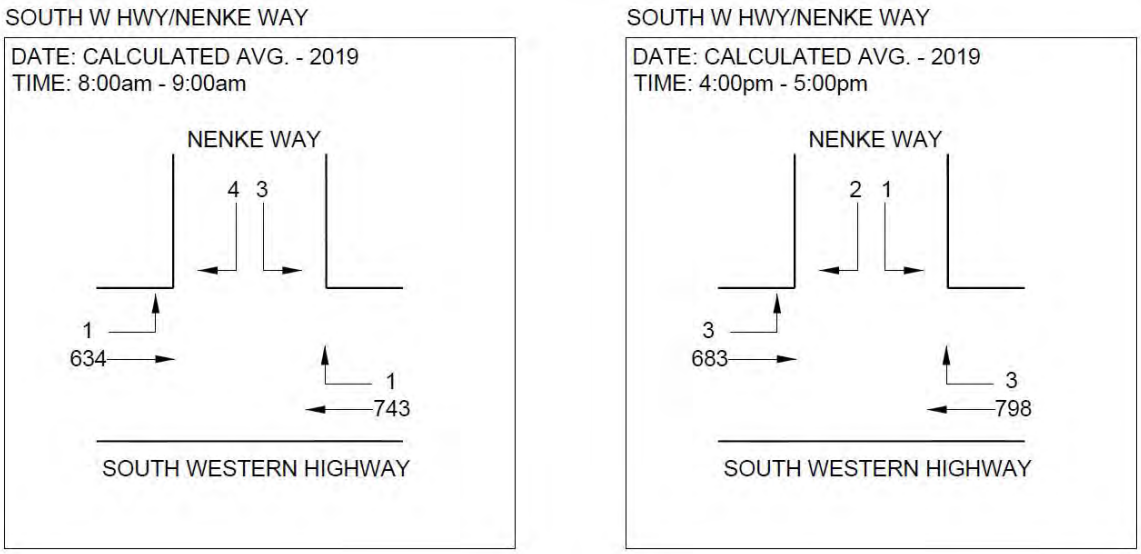


FIGURE 6: CALCULATED AVG. TRAFFIC FLOWS – SOUTH WESTERN HIGHWAY/NENKE WAY (2019)

3.0 DEVELOPMENT PROPOSAL

The subject site is currently zoned residential R15 and is proposed to be rezoned to R30 which will create an additional 33 lots, with the existing Nenke Way (cul-de-sac) to be extended to service the future lots. The majority of the proposed lots (32) will be accessed by the Nenke Way extension and one lot will utilise an existing crossover to South Western Highway.

See below for the proposed Structure Plan Layout:

FIGURE 7: PROPOSED SITE LAYOUT

3.1 PARKING

On street parking is generally not required for the developments of this nature but a number of parallel bays are proposed on Nenke Way. The proposed bays will ultimately be designed to the requirements of Australian Standard AS/NZS 2890.

3.2 ACCESS PROVISION

Access to the development site will be via the extension of Nenke Way and access to the individual lots will be via standard residential crossovers constructed to the City of Bunbury standards.

The proposed geometry of Nenke Way matches the existing and the proposed cul-de-sac turning circle will have a minimum radius of nine metres with 15-metre radius transitions.

Any proposed crossovers will be located in an area as to provide ample sight distance for a stopped vehicle to safely enter the road in a forward direction and cross over sight distance provided should be in accordance with AS 2890.

4.0 TRAFFIC GENERATION AND DISTRIBUTION

4.1 TRAFFIC GENERATION

To calculate the traffic generation from the development and as per the recommendations of the Section 5 of Western Australian Planning Commission's publication 'Transport Impact Assessment Guidelines', reference is made to the Roads and Traffic Authority's Guide to Traffic Generating Developments Version 2.2 October 2002.

The guidelines provide daily and peak hour trip generation rates based on the expected dwelling number of the proposed development:

- Daily vehicle trips = 9.0 per dwelling
- Weekday peak hour vehicle trips = 0.85 per dwelling.

Apply the above factors to the proposed development results in the volumes stated below:

Description	Unit	No.	Total Daily Trips	AM Peak Hr	PM Peak Hr
Additional Dwellings	No.	33	297	28	28
Total			**297**	**28**	**28**

TABLE 3: TRAFFIC GENERATION

4.2 TRAFFIC DISTRIBUTION

The In/Out split for both the morning and afternoon peaks has been taken from the Trip Generation Manual published by the Institute of Transportation Engineers (ITE), Washington, USA which gives the following recommendations:

- AM – 25% In 75% Out
- PM – 67% In 33% Out

Apply the above and assuming the same directional split of South Western results in the total with development traffic volumes indicted in Figure 8.

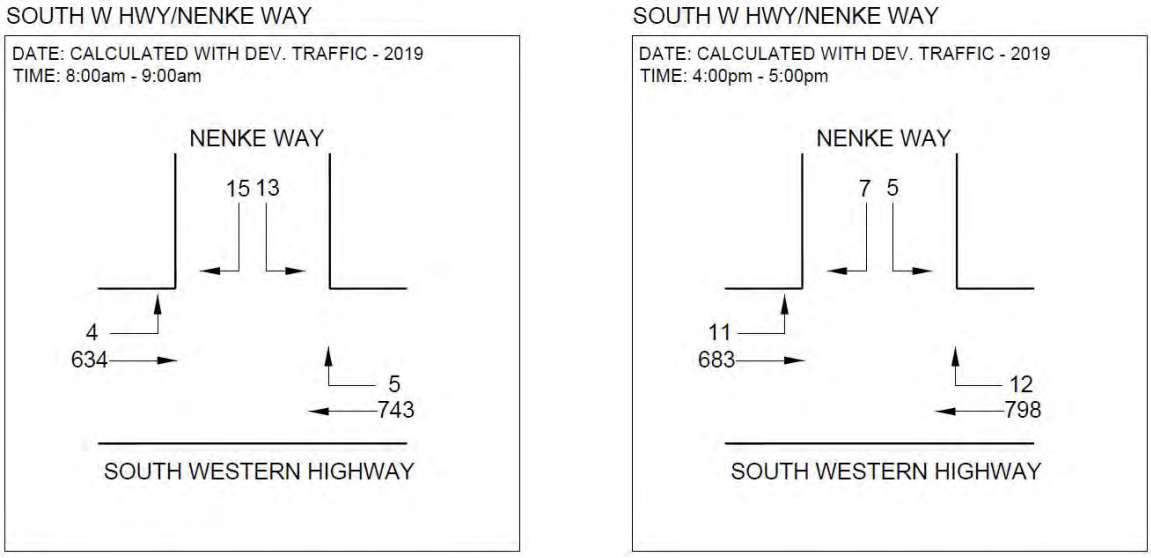


FIGURE 8: WITH DEVELOPMENT TRAFFIC FLOWS (2019)

4.3 TRAFFIC IMPACT ON SURROUNDING ROADS

A development which generates between 10 and 100 vehicle trips per hour is classed by the Western Australian Planning Commission's publication 'Transport Impact Assessment Guidelines', Volume 1 2016 as having a 'Moderate Impact' on the surrounding road network and further assessment is deemed unnecessary, unless:

- Development traffic would be likely to increase traffic on any lane by more than 100 veh/hr.
- An increase in traffic of more than 10% of the existing road capacity.

Therefore, the proposed development is not considered to have a material effect on the surrounding road network as it adds a maximum of 12 vehicles per hour on any lane and the maximum increase in traffic is less than 10% of the existing roads capacity.

4.4 INTERSECTION ASSESSEMENT

As per the requirements of Section 10.10.6 of WAPC's Transport Impact Assessment Guidelines Vol. 2 and as per the request of the City of Bunbury; a high level assessment has been undertaken on the intersection arrangement at Nenke Way and South Western Highway.

Due to the planned construction of the Bunbury Outer Ring Road the assessment has been based on the 2019 traffic flows rather than 10 years in the future. This approach has been taken as it is expected that the BORR will significantly reduce the traffic flows on South Western Highway as it is anticipated that the proposed ring road will:

- Reduce local congestion through increasing efficiency for freight vehicles and regional traffic
- Improve long term access to the Bunbury Port
- Enhance amenity on local roads by reducing freight and regional traffic
- Create a safer road system for the wider Bunbury community

The assessment was undertaken using SIDRA Intersection. SIDRA Intersection is a software package used for intersection and network capacity, level of service and performance analysis by traffic engineers, operations and planning professionals

Sidra Intersection provides a large number of intersection and network performance measures and a number of alternative Level of Service (LOS) methods and LOS Target settings to determine acceptable

intersection and network design. Standard performance measures including delay, queue length and levels of service. If required, performance and level of service results can be given at various aggregation levels (individual lanes, individual movements, approaches, intersections, routes and networks) and separately for vehicles, pedestrians, and persons. For the purposes of this assessment, the following outputs have been investigated:

- Degree of Saturation (DoS): The degree of saturation of an intersection approach may be defined as the ratio of the arrival flow (demand) to the capacity of the approach during the same period. The degree of saturation of an intersection approach ranges from close to zero for very low traffic flows up to one for saturated flow or capacity. A degree of saturation greater than one indicates oversaturated conditions in which long queues of vehicles build up on the critical approaches. In general, the lower the degree of saturation the better the quality of traffic service.
- Level of Service (LoS): is a qualitative measure for ranking operating conditions, based on factors such as speed, travel time, freedom to manoeuvre, interruptions, comfort and convenience.
- Average Delay: is the average of all travel time delays for vehicles through the intersection.

4.4.1 EXISTING INTERSECTION OPERATION

The output from the Sidra Analysis undertaken on the intersection of Nenke Way and South Western Highway during the AM and PM peak under the current expected conditions are summarised below:

Lane Use and Performance

	Demand Flows				HV	Cap.	Deg. Satn	Lane Util.	Average Delay	Level of Service	95% Back of Queue		Lane Length	SL Type	Cap. Adj.	Prob. Block.
	L	T	R	Total							Vehicles	Distance				
	veh/h	veh/h	veh/h	veh/h	%	veh/h	v/c	%	sec		veh	m	m		%	%
East: S Western Hwy WB																
Lane 1	0	782	1	783	13.5	1788	0.438	100	10.2	LOS B	11.0	85.6	500	–	0.0	0.0
Approach	0	782	1	783	13.5		0.438		10.2	LOS B	11.0	85.6				
North: Nenke Way																
Lane 1	3	0	4	7	0.0	42	0.174	100	89.7	LOS F	0.6	4.0	500	–	0.0	0.0
Approach	3	0	4	7	0.0		0.174		89.7	LOS F	0.6	4.0				
West: S Western Hwy EB																
Lane 1	1	667	0	668	13.5	1793	0.373	100	0.0	LOS A	0.0	0.0	500	–	0.0	0.0
Approach	1	667	0	668	13.5		0.373		0.0	LOS A	0.0	0.0				
Intersection				1459	13.4		0.438		5.9	NA	11.0	85.6				

TABLE 4: EXISTING MORNING PEAK HOUR

Lane Use and Performance

	Demand Flows				HV	Cap.	Deg. Satn	Lane Util.	Average Delay	Level of Service	95% Back of Queue		Lane Length	SL Type	Cap. Adj.	Prob. Block.
	L	T	R	Total							Vehicles	Distance				
	veh/h	veh/h	veh/h	veh/h	%	veh/h	v/c	%	sec		veh	m	m		%	%
East: S Western Hwy WB																
Lane 1	0	840	3	843	13.4	1776	0.475	100	12.8	LOS B	12.5	97.7	500	–	0.0	0.0
Approach	0	840	3	843	13.4		0.475		12.8	LOS B	12.5	97.7				
North: Nenke Way																
Lane 1	1	0	2	3	0.0	24	0.133	100	142.8	LOS F	0.4	2.9	500	–	0.0	0.0
Approach	1	0	2	3	0.0		0.133		142.8	LOS F	0.4	2.9				
West: S Western Hwy EB																
Lane 1	3	719	0	722	13.4	1793	0.403	100	0.0	LOS A	0.0	0.0	500	–	0.0	0.0
Approach	3	719	0	722	13.4		0.403		0.0	LOS A	0.0	0.0				
Intersection				1568	13.4		0.475		7.2	NA	12.5	97.7				

TABLE 5: EXISTING EVENING PEAK HOUR

As can be seen in the tables above, Nenke Way is currently operating at LOS F due to the traffic volumes on South Western Highway. The anticipated delays of up to 142.8 seconds and an average queue length over the morning peak hour of 4m are believed less than those in the immediate area given that

there are a number of residential streets with a much greater number of dwellings having a similar intersection arrangement with South Western Highway.

4.4.2 PROPOSED INTERSECTION OPERATION

The output from the Sidra Analysis undertaken on the intersection of Nenke Way and South Western during the Post Development AM and PM peak is as follows:

Lane Use and Performance																
	Demand Flows				HV	Cap.	Deg. Satn	Lane Util.	Average Delay	Level of Service	95% Back of Queue		Lane Length	SL Type	Cap. Adj.	Prob. Block.
	L	T	R	Total							Vehicles	Distance				
	veh/h	veh/h	veh/h	veh/h	%	veh/h	v/c	%	sec		veh	m	m		%	%
East: S Western Hwy WB																
Lane 1	0	782	5	787	13.4	1768	0.445	100	10.5	LOS B	11.1	86.5	500	–	0.0	0.0
Approach	0	782	5	787	13.4		0.445		10.5	LOS B	11.1	86.5				
North: Nenke Way																
Lane 1	14	0	16	29	0.0	44	0.668	100	158.5	LOS F	2.7	19.0	500	–	0.0	0.0
Approach	14	0	16	29	0.0		0.668		158.5	LOS F	2.7	19.0				
West: S Western Hwy EB																
Lane 1	4	667	0	672	13.4	1793	0.375	100	0.1	LOS A	0.0	0.0	500	–	0.0	0.0
Approach	4	667	0	672	13.4		0.375		0.1	LOS A	0.0	0.0				
Intersection				1488	13.1		0.668		8.7	NA	11.1	86.5				

TABLE 6: PROPOSED MORNING PEAK HOUR

Lane Use and Performance																
	Demand Flows				HV	Cap.	Deg. Satn	Lane Util.	Average Delay	Level of Service	95% Back of Queue		Lane Length	SL Type	Cap. Adj.	Prob. Block.
	L	T	R	Total							Vehicles	Distance				
	veh/h	veh/h	veh/h	veh/h	%	veh/h	v/c	%	sec		veh	m	m		%	%
East: S Western Hwy WB																
Lane 1	0	840	13	853	13.3	1729	0.493	100	13.8	LOS B	12.8	100.1	500	–	0.0	0.0
Approach	0	840	13	853	13.3		0.493		13.8	LOS B	12.8	100.1				
North: Nenke Way																
Lane 1	5	0	7	13	0.0	26	0.491	100	206.6	LOS F	1.7	11.8	500	–	0.0	0.0
Approach	5	0	7	13	0.0		0.491		206.6	LOS F	1.7	11.8				
West: S Western Hwy EB																
Lane 1	12	719	0	731	13.3	1794	0.407	100	0.1	LOS A	0.0	0.0	500	–	0.0	0.0
Approach	12	719	0	731	13.3		0.407		0.1	LOS A	0.0	0.0				
Intersection				1596	13.2		0.493		9.0	NA	12.8	100.1				

TABLE 7: PROPOSED EVENING PEAK HOUR

A detailed assessment on the impact on the Degree of Saturation (DoS), Level of Service (LOS) and Average Delays is given in Section 4.4.3.

4.4.3 DETAILED ASSESSMENT

See summary tables below from side by side comparison of current and proposed intersection operations :

	EX AM						PROP AM					
	Deg. Satn	Lane Util.	Average Delay	Level of Service	95% Back of Queue		Deg. Satn	Lane Util.	Average Delay	Level of Service	95% Back of Queue	
					Vehicles	Distance					Vehicles	Distance
	v/c	%	sec		veh	m	v/c	%	sec		veh	m
East: S Western Hwy WB												
Lane 1	0.438	100	10.2	LOS B	11	85.6	0.445	100	10.5	LOS B	11.1	86.5
Approach	0.438		10.2	LOS B	11	85.6	0.445		10.5	LOS B	11.1	86.5
North: Nenke Way												
Lane 1	0.174	100	89.7	LOS F	0.6	4	0.668	100	158.5	LOS F	2.7	19
Approach	0.174		89.7	LOS F	0.6	4	0.668		158.5	LOS F	2.7	19
West: S Western Hwy EB												
Lane 1	0.373	100	0	LOS A	0	0	0.375	100	0.1	LOS A	0	0
Approach	0.373		0	LOS A	0	0	0.375		0.1	LOS A	0	0
Intersection	0.438		5.9	NA	11	85.6	0.668		8.7	NA	11.1	86.5

TABLE 8: SIDE BY SIDE COMPARISON – MORNING PEAK HOUR

	EX PM						PROP PM					
	Deg. Satn	Lane Util.	Average Delay	Level of Service	95% Back of Queue		Deg. Satn	Lane Util.	Average Delay	Level of Service	95% Back of Queue	
					Vehicles	Distance					Vehicles	Distance
	v/c	%	sec		veh	m	v/c	%	sec		veh	m
East: S Western Hwy WB												
Lane 1	0.475	100	12.8	LOS B	12.5	97.7	0.493	100	13.8	LOS B	12.8	100.1
Approach	0.475		12.8	LOS B	12.5	97.7	0.493		13.8	LOS B	12.8	100.1
North: Nenke Way												
Lane 1	0.133	100	142.8	LOS F	0.4	2.9	0.491	100	206.6	LOS F	1.7	11.8
Approach	0.133		142.8	LOS F	0.4	2.9	0.491		206.6	LOS F	1.7	11.8
West: S Western Hwy EB												
Lane 1	0.403	100	0	LOS A	0	0	0.407	100	0.1	LOS A	0	0
Approach	0.403		0	LOS A	0	0	0.407		0.1	LOS A	0	0
Intersection	0.475		7.2	NA	12.5	97.7	0.493		9	NA	12.8	100.1

TABLE 9: SIDE BY SIDE COMPARISON – EVENING PEAK HOUR

As can be seen in tables above and as discussed below; the proposed structure plan is expected to have a minor and acceptable impact on the Degree of Saturation, Average Delays and Levels of Service for the intersection.

Degree of Saturation: A maximum negligible increase of 0.007 can be seen for South Western Highway. The most significant impact of 0.494 can be seen in Nenke Way. However, this increased DOS is still well less than the desired maximum of 1.0 and is also anticipated to be much less than that of similar intersections in the area.

Average Delay: A maximum negligible increase of 1 second can be seen for South Western Highway. The most significant increase of 68.8 seconds can be seen in Nenke Way. However, the revised maximum delay of 206.6 seconds is not uncommon at similar intersections in the area such as Nash and Morrissey Street to the east. In this situation it is likely that vehicles exiting from Nenke Way would take advantage of the break in traffic flows when the signals change at the intersection of Robertson Drive and Picton Road .

Level of Service: There is no change in Levels of Service seen across the intersection as Nenke Way is operating at LOS F with or without the development traffic due to the current volumes of traffic on South Western Highway.

With the above assessment criteria in mind, we believe the additional traffic can easily be accommodated by the intersection. Also, the proposed construction of the Bunbury Outer Ring Road

is expected to reduce the traffic flow on South Western Highway and thus improve the amenity of the local road network in the area and therefore reduce delays and improve the levels of service currently seen.

5.0 CONCLUSIONS

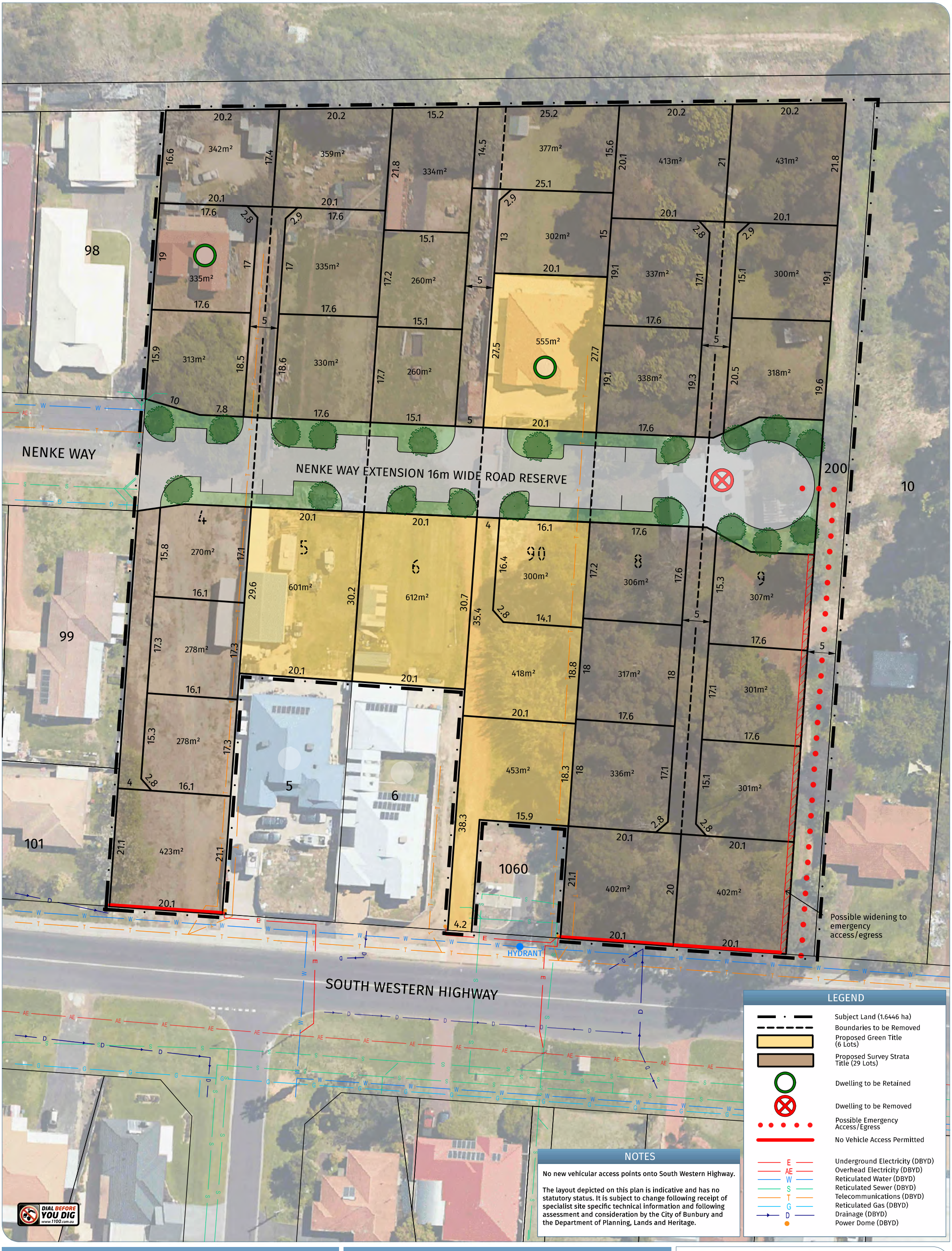
This report presents the methodology and findings of the assessment which was prepared in line with the guidelines set out in the Western Australian Planning Commission publications; Transport Impact Assessment Guidelines, Volumes 1 – 5:

The following conclusions have been made regarding the proposed works:

- Review of the crash statistics and on-site conditions suggests that there are no site specific safety issues or concerns which need to be addressed as part of this development .
- The proposed on Nenke Way extension needs to be designed to IPWEA Standards and the on street parking and crossovers will need to be designed as per the requirements of AS2890.
- The proposed development is not considered to have a material effect on the surrounding road network as it adds a maximum of 12 vehicles per hour on any lane and the maximum increase in traffic is less than 10% of the existing roads capacity.
- Assessment of the intersection of South Western Highway and Nenke Way indicates that there will be negligible impact on the Degree of Saturation, Levels of Service and Average Delays on all lanes. The anticipated impact on Nenke Way will see it operating with increased delays which are still less than similar roads in the area. However, it is anticipated that these delays will be significantly improved following the full construction of the Bunbury Outer Ring Road as its primary objectives include:
    I. Reducing local congestion through increasing efficiency for freight vehicles and regional traffic
    II. Improving long term access to the Bunbury Port
    III. Enhancing amenity on local roads by reducing freight and regional traffic
    IV. Creating a safer road system for the wider Bunbury community

APPENDIX A

PROPOSED STRUCTURE PLAN



NOTES

No new vehicular access points onto South Western Highway.

The layout depicted on this plan is indicative and has no statutory status. It is subject to change following receipt of specialist site specific technical information and following assessment and consideration by the City of Bunbury and the Department of Planning, Lands and Heritage.

LEGEND

- Subject Land (1.6446 ha)
- Boundaries to be Removed
- Proposed Green Title (6 Lots)
- Proposed Survey Strata Title (29 Lots)
- Dwelling to be Retained
- Dwelling to be Removed
- Possible Emergency Access/Egress
- No Vehicle Access Permitted
- E — Underground Electricity (DBYD)
- AE — Overhead Electricity (DBYD)
- W — Reticulated Water (DBYD)
- S — Reticulated Sewer (DBYD)
- T — Telecommunications (DBYD)
- G — Reticulated Gas (DBYD)
- D — Drainage (DBYD)
- Power Dome (DBYD)

SUBDIVISION CONCEPT PLAN

Lots 4, 5, 6, 8, 9, 90 & 200
South Western Highway
GLEN IRIS

Plan No.	21164-01
Date	10/05/18
Drawn	JW
Checked	LB
Revision	D
Scale	1:600@A3

0 5m 10m 15m

NOTE: This plan has been prepared for planning purposes. Areas, Contours and Dimensions shown are subject to survey

BUNBURY OFFICE:
21 Spencer Street,
Bunbury WA 6230
T: 08 9792 6000 F: 08 9721 9611
E: bunbury@harleydykstra.com.au
W: www.harleydykstra.com.au
Offices also at Albany, Busselton, Kelmscott and Perth

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Appendix 5

Acoustic Assessment

HARLEY DYKSTRA

PROPOSED RESIDENTIAL DEVELOPMENT

LOTS 4-6, 8, 90 and 200 SOUTH WESTERN HIGHWAY GLEN IRIS

TRAFFIC NOISE ASSESSMENT

JULY 2019

OUR REFERENCE: 24625-1-19190

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(08) 9367 6200
hsa@hsacoustics.com.au

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FOR

HARLEY DYKSTRA

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C	Quiet House Design Requirements

1. INTRODUCTION

Herring Storer Acoustics was commissioned by Harley Dykstra to undertake a road traffic noise assessment for the proposed Sub-Division located at Lots 4-6, 8, 9, 90 and 200 South Western Highway, Glen Iris.

The purpose of this study was to assess noise received within the development from vehicles travelling along South Western Highway and if exceedances with the stated criteria were determined, to establish the required attenuation measures to control noise intrusion to acceptable levels. The traffic noise assessment has been carried out in accordance with the WAPC State Planning Policy 5.4 *"Road and Rail Transportation Noise and Freight Consideration in Land Use Planning"*.

As part of the study, the following was carried out:

- Monitor existing noise received from vehicles travelling along South Western Highway.
- For future traffic flows, determine noise that would be received at residences within the development from vehicles travelling on South Western Highway.
- Assess the predicted noise levels for compliance with the appropriate criteria.
- If exceedances are predicted, comment on possible noise amelioration options for compliance with the appropriate criteria.

For information, the Packages "Quiet House" requirements as outlined in the Implementation Guidelines SPP 5.4 are attached in Appendix C.

2. SUMMARY

Under the Western Australian Planning Commission (WAPC) Planning Policy 5.4 *"Road and Rail Transport Noise and Freight Considerations in Land Use Planning"* (SPP5.4), we believe that the appropriate criteria for assessment for this development are as listed below for "Noise Limits".

EXTERNAL

$L_{Aeq(Day)}$ of 60 dB(A); and
$L_{Aeq(Night)}$ of 55 dB(A).

INTERNAL

$L_{Aeq(Day)}$ of 40 dB(A) in living and work areas; and
$L_{Aeq(Night)}$ of 35 dB(A) in bedrooms.

Noise received at an outdoor area should also be reduced as far as practicable, with an aim of achieving an L_{Aeq} (night) of 50 dB(A).

Noise received in the Sub-Division from South Western Highway for future road traffic volumes are above the Limit noise level criteria, therefore, Quiet House Design Package B are required for lots adjacent South Western Highway. These lots are identified in Appendix C as well as those requiring Notification on the Title.

3. ACOUSTIC CRITERIA

3.1 WAPC PLANNING POLICY

The Western Australian Planning Commission (WAPC) released on 22 September 2009 State Planning Policy 5.4 *"Road and Rail Transport Noise and Freight Considerations In Land Use Planning"*. Section 5.3 – Noise Criteria, which outlines the acoustic criteria, states:

"5.3 - NOISE CRITERIA

Table 1 sets out the outdoor noise criteria that apply to proposals for new noise-sensitive development or new major roads and railways assessed under this policy.

These criteria do not apply to –

- *proposals for redevelopment of existing major roads or railways, which are dealt with by a separate approach as described in section 5.4.1; and*
- *proposals for new freight handling facilities, for which a separate approach is described in section 5.4.2.*

The outdoor noise criteria set out in Table 1 apply to the emission of road and rail transport noise as received at a noise-sensitive land use. These noise levels apply at the following locations—

- *for new road or rail infrastructure proposals, at 1 m from the most exposed, habitable façade of the building receiving the noise, at ground floor level only; and*
- *for new noise-sensitive development proposals, at 1 m from the most exposed, habitable façade of the proposed building, at each floor level, and within at least one outdoor living area on each residential lot.*

Further information is provided in the guidelines.

TABLE 1 - OUTDOOR NOISE CRITERIA

Time of day	*Noise Target*	*Noise Limit*
Day (6 am–10 pm)	$L_{Aeq(Day)}$ *= 55 dB(A)*	$L_{Aeq(Day)}$ *= 60 dB(A)*
Night (10 pm–6 am)	$L_{Aeq(Night)}$ *= 50 dB(A)*	$L_{Aeq(Night)}$ *= 55 dB(A)*

The 5 dB difference between the outdoor noise target and the outdoor noise limit, as prescribed in Table 1, represents an acceptable margin for compliance. In most situations in which either the noise-sensitive land use or the major road or railway already exists, it should be practicable to achieve outdoor noise levels within this acceptable margin. In relation to greenfield sites, however, there is an expectation that the design of the proposal will be consistent with the target ultimately being achieved.

Because the range of noise amelioration measures available for implementation is dependent upon the type of proposal being considered, the application of the noise criteria will vary slightly for each different type. Policy interpretation of the criteria for each type of proposal is outlined in sections 5.3.1 and 5.3.2.

The noise criteria were developed after consideration of road and rail transport noise criteria in Australia and overseas, and after a series of case studies to assess whether the levels were practicable. The noise criteria take into account the considerable body of research into the effects of noise on humans, particularly community annoyance, sleep disturbance, long-term effects on cardiovascular health, effects on children's learning performance, and impacts on vulnerable groups such as children and the elderly. Reference is made to the World Health Organization (WHO) recommendations for noise policies in their publications on community noise and the Night Noise Guidelines for Europe. See the policy guidelines for suggested further reading.

5.3.1 Interpretation and application for noise-sensitive development proposals

In the application of these outdoor noise criteria to new noise-sensitive developments, the objective of this policy is to achieve –

- *acceptable indoor noise levels in noise-sensitive areas (for example, bedrooms and living rooms of houses, and school classrooms); and*
- *a reasonable degree of acoustic amenity in at least one outdoor living area on each residential lot[1].*

If a noise-sensitive development takes place in an area where outdoor noise levels will meet the noise target, no further measures are required under this policy.

In areas where the noise target is likely to be exceeded, but noise levels are likely to be within the 5dB margin, mitigation measures should be implemented by the developer with a view to achieving the target levels in a least one outdoor living area on each residential lot[1]. Where indoor spaces are planned to be facing any outdoor area in the margin, noise mitigation measures should be implemented to achieve acceptable indoor noise levels in those spaces. In this case, compliance with this policy can be achieved for residential buildings through implementation of the deemed-to-comply measures detailed in the guidelines.

In areas where the outdoor noise limit is likely to be exceeded (i.e. above $L_{Aeq(Day)}$ of 60 dB(A) or $L_{Aeq(Night)}$ of 55 dB(A)), a detailed noise assessment in accordance with the guidelines should be undertaken by the developer. Customised noise mitigation measures should be implemented with a view to achieving the noise target in at least one outdoor living or recreation area on each noise-sensitive lot or, if this is not practicable, within the margin. Where indoor spaces will face outdoor areas that are above the noise limit, mitigation measures should be implemented to achieve acceptable indoor noise levels in those spaces, as specified in the following paragraphs.

For residential buildings, acceptable indoor noise levels are $L_{Aeq(Day)}$ of 40 dB(A) in living and work areas and $L_{Aeq(Night)}$ of 35 dB(A) in bedrooms[2]. For all other noise-sensitive buildings, acceptable indoor noise levels under this policy comprise noise levels that meet the recommended design sound levels in Table 1 of Australian Standard AS 2107:2000 Acoustics—Recommended design sound levels and reverberation times for building interiors.

1 For non residential noise-sensitive developments, (e.g. schools and child care centres) consideration should be given to providing a suitable outdoor area that achieves the noise target, where this is appropriate to the type of use.
2 For residential buildings, indoor noise levels are not set for utility spaces such as bathrooms. This policy encourages effective "quiet house" design, which positions these non-sensitive spaces to shield the more sensitive spaces from transport noise (see guidelines for further information).

These requirements also apply in the case of new noise-sensitive developments in the vicinity of a major transport corridor where there is no existing railway or major road (bearing in mind the policy's 15-20 year planning horizon). In these instances, the developer should engage in dialogue with the relevant infrastructure provider to develop a noise management plan to ascertain individual responsibilities, cost sharing arrangements and construction time frame.

If the policy objectives for noise-sensitive developments are not achievable, best practicable measures should be implemented, having regard to section 5.8 and the guidelines."

The Policy, under Section 5.7, also provides information regarding "Notifications on Titles".

3.2 APPROPRIATE CRITERIA

Based on the above, the following criteria are proposed for this development:

External	
Day	Maximum of 60 dB(A) L_{Aeq}
Night	Maximum of 55 dB(A) L_{Aeq}
Outdoor Living Areas*	Maximum of 50 dB(A) $L_{Aeq\ (night\ period)}$
Internal	
Sleeping Areas	35 dB(A) $L_{Aeq(night)}$
Living Areas	40 dB(A) $L_{Aeq(day)}$

*This is a suggested noise level; noise is to be reduced as far as practicably possible.

4. MEASUREMENTS AND OBSERVATIONS

To determine the existing acoustic environment at the proposed development, a noise data logger was installed adjacent at South Western Highway from the 29th July until the 8th August 2017.

The automatic noise data logger records sound pressure levels in accordance with Australian Standard 2702-1984: *Acoustics - Method For Measurement of Road Traffic Noise.* The logger used records statistical noise level data, of which the L_{A1}, L_{A10}, L_{Aeq} and L_{A90} levels are reported. These are defined below:

L_{A10} The noise level exceeded for 10% of the time (in this instance, the noise level exceeded for 6 minutes in each 1-hour period).

L_{Aeq} The energy equivalent noise level for the 1-hour period. A single number value that expresses the time-varying sound level for the 1-hour period as though it were a constant sound level with the same total sound energy as the time-varying level.

L_{A90} The noise level exceeded for 90% of the time (in this instance, the noise level exceeded for 54 minutes in each 1-hour period).

The loggers were calibrated before and after the measurement period and have been subject to a laboratory calibration within the last 24 months.

The results of the noise logging are summarised in Table 4.1.

TABLE 4.1 - SUMMARY OF MEASURED NOISE LEVELS (SOUTH WESTERN HIGHWAY)

Parameter	Measured Level dB(A)*	Difference between $L_{10(18hour)}$ and $L_{Aeq(parameter)}$ dB(A)
$L_{A10\ (18\ hour)}$	63.7	N/A
$L_{Aeq,\ day\ (6am\ to\ 10pm)}$	60.9	= $L_{A10\ (18\ hour)}$ – 2.8
$L_{Aeq,\ night\ (10pm\ to\ 6am)}$	53.0	= $L_{A10(18\ hour)}$ – 10.7

* It is normal practice to quote decibels to the nearest whole number. Fractions are retained here to minimise any cumulative rounding error.

5. MODELLING

Modelling of noise received within the subdivision from South Western Highway was carried out using SoundPlan, using the Calculation of Road Traffic Noise (CoRTN) algorithms. The input data for the model included:

- Increased traffic volume, assuming 3% growth.
- Other traffic data as listed in Table 4.1.
- A +2.5 dB adjustment to allow for façade reflection.

The traffic data currently available on the Main Roads web site are as listed in Table 5.1. Table 5.1 also lists the percentage heavy vehicles and the calculated future traffic flows.

TABLE 5.1 - SUMMARY OF TRAFFIC DATA

Parameter	South Western Highway
Current Traffic Flow (vpd)	16,770
Future Traffic Flow (vpd)	25,370
Percentage Heavy Vehicles (%)	13%
Speed (km/hr)	60

For noise modelling of future traffic, it has been assumed that the percentage of future heavy vehicles remains the same as for the current traffic flows.

We note that with the difference between the $L_{Aeq,8hr}$ and the $L_{Aeq,16hr}$ being greater than 5 dB(A), achieving compliance with the day period criteria will also result in achieving compliance with the night period criteria. Hence, noise modelling has been undertaken for the day period only.

The noise contour plots for the day period are attached in Appendix B.

6. ASSESSMENT

In accordance with the WAPC Planning Policy 5.4, an assessment of the noise that would be received within the development located at South Western Highway, Glen Iris has been undertaken.

In accordance with the Policy, the following would be the acoustic criteria applicable to this project:

External

Day	Maximum of 60 dB(A) L_{Aeq}
Night	Maximum of 55 dB(A) L_{Aeq}
Outdoor Living Areas (Night)	Maximum of 50 dB(A) L_{Aeq}

Internal

Sleeping Areas	35 dB(A) $L_{Aeq(night)}$
Living Areas	40 dB(A) $L_{Aeq(day)}$

Noise received at an outdoor area should also be reduced as far as practicable with an aim of achieving an L_{Aeq} (night) of 50 dB(A).

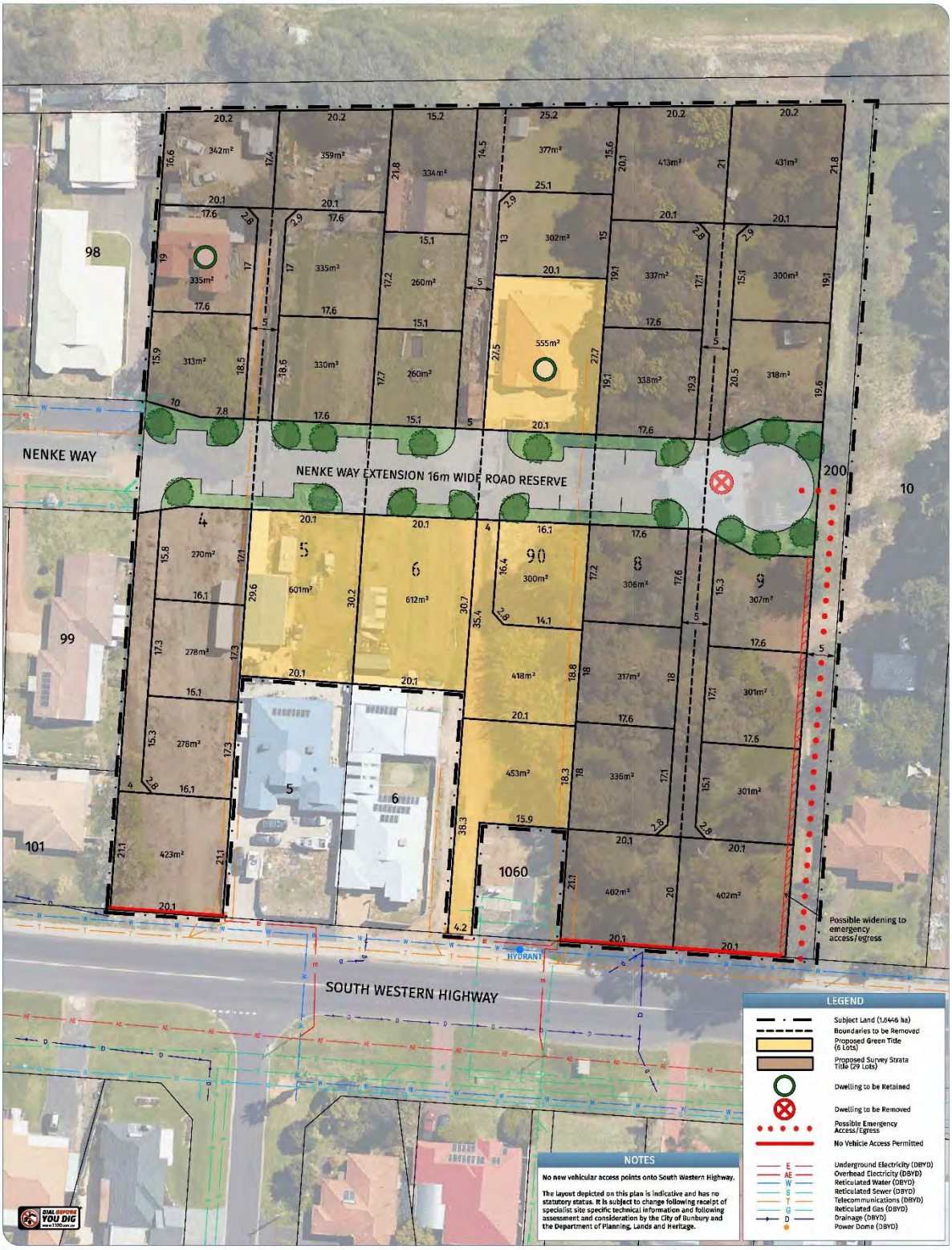
Noise received in the Sub-Division from South Western Highway for future road traffic volumes are above the Limit noise level criteria therefore Quiet House Design Package B is required for lots adjacent South Western Highway. These lots are identified in Appendix C as well as those requiring Notification on the Title.

An example of a suitable notice, as provided within the Guidelines is:

> *This lot is situated in the vicinity of South Western Highway and is currently affected, and / or may in the future be affected by transport noise.*

APPENDIX A

DEVELOPMENT PLANS



SUBDIVISION CONCEPT PLAN

Lots 4, 5, 6, 8, 9, 90 & 200
South Western Highway
GLEN IRIS

Plan No.	21164-01
Date	10/05/18
Drawn	JW
Checked	LB
Revision	D
Scale	1:600@A3

BUNBURY OFFICE:
21 Spencer Street,
Bunbury WA 6230
T: 08 9792 6000 F: 08 9721 9611
E: bunbury@harleydykstra.com.au
W: www.harleydykstra.com.au
Offices also at Albany, Busselton, Kelmscott and Perth

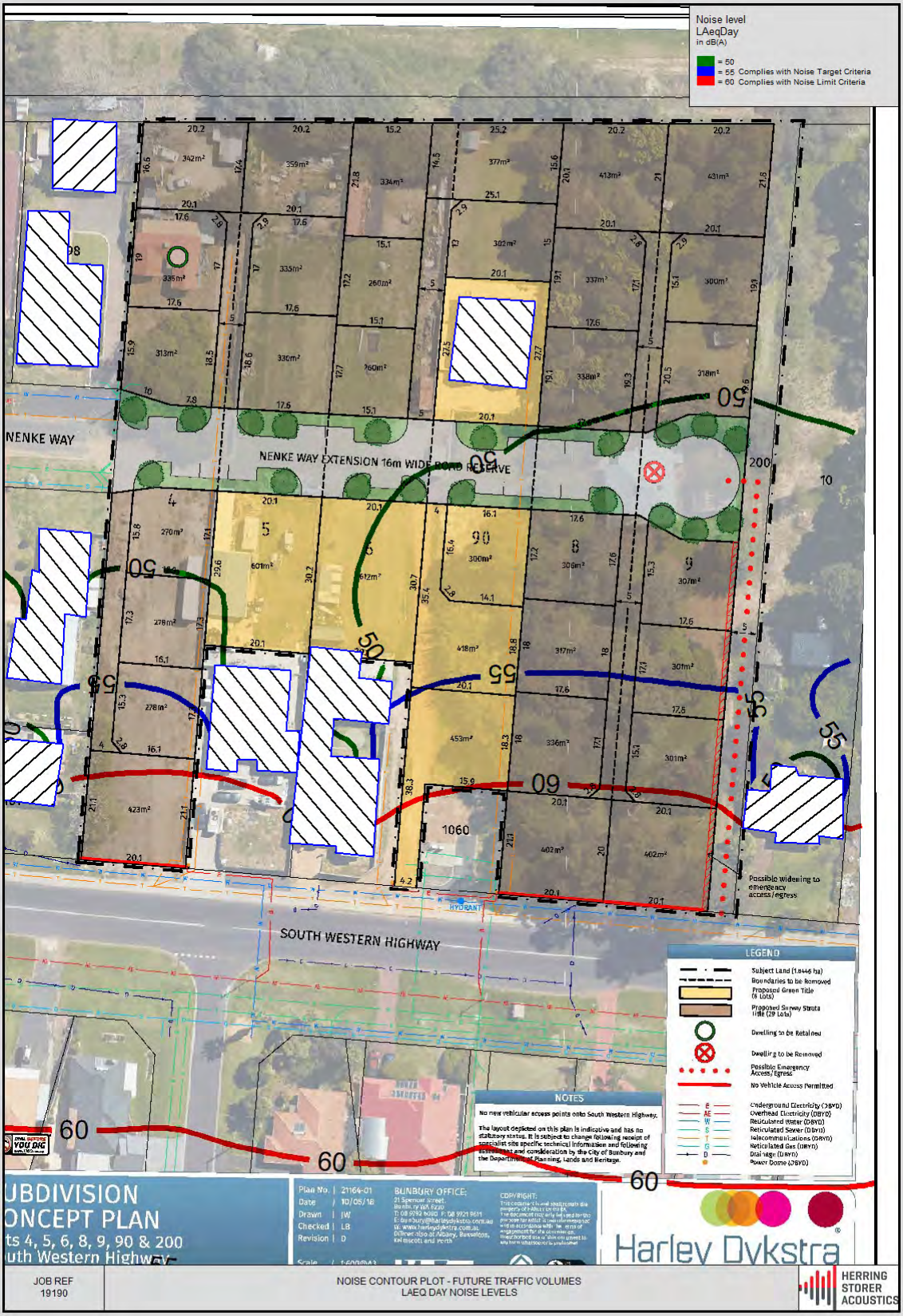
0 5m 10m 15m

NOTE: This plan has been prepared for planning purposes. Areas, Contours and Dimensions shown are subject to survey

Harley Dykstra
PLANNING & SURVEY SOLUTIONS

APPENDIX B

NOISE CONTOUR PLOTS


Noise level
LAeqDay
in dB(A)
= 50
= 55 Complies with Noise Target Criteria
= 60 Complies with Noise Limit Criteria
NENKE WAY
NENKE WAY EXTENSION 16m WIDE ROAD RESERVE
SOUTH WESTERN HIGHWAY
Possible widening to emergency access/egress
HYDRANT
LEGEND
Subject Land (1.8446 ha)
Boundaries to be Removed
Proposed Green Title (8 Lots)
Proposed Survey Strata Title (29 Lots)
Dwelling to be Retained
Dwelling to be Removed
Possible Emergency Access/Egress
No Vehicle Access Permitted
Underground Electricity (DBYD)
Overhead Electricity (DBYD)
Reticulated Water (DBYD)
Reticulated Sewer (DBYD)
Telecommunications (DBYD)
Reticulated Gas (DBYD)
Drainage (DBYD)
Power Dome (DBYD)
NOTES
No new vehicular access points onto South Western Highway.
The layout depicted on this plan is indicative and has no statutory status. It is subject to change following receipt of specialist site specific technical information and following assessment and consideration by the City of Bunbury and the Department of Planning, Lands and Heritage.
UBDIVISION
ONCEPT PLAN
ts 4, 5, 6, 8, 9, 90 & 200
uth Western Highway
Plan No. | 21164-01
Date | 10/05/16
Drawn | IW
Checked | LB
Revision | D
BUNBURY OFFICE:
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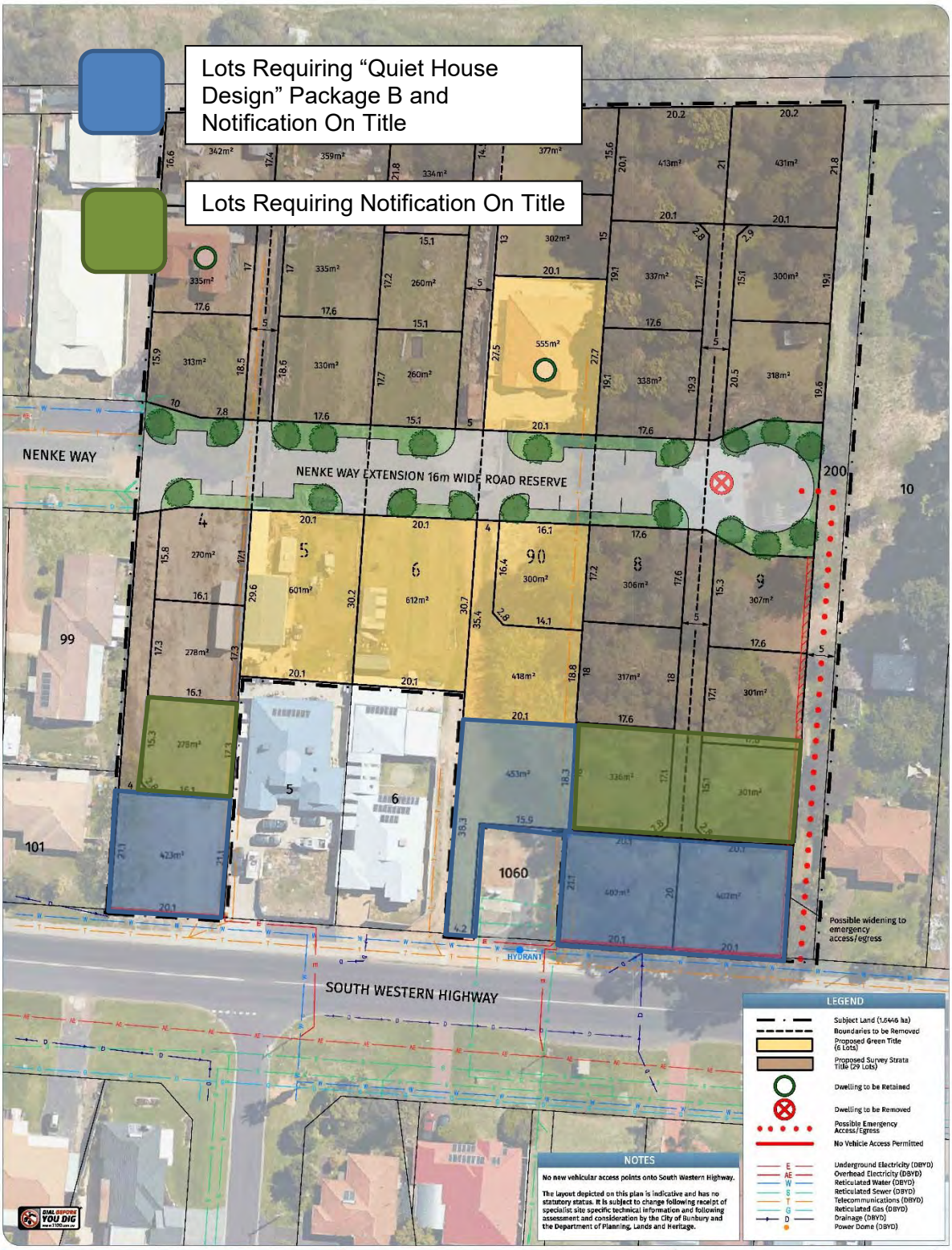
Harley Dykstra
JOB REF
19190
NOISE CONTOUR PLOT - FUTURE TRAFFIC VOLUMES
LAEQ DAY NOISE LEVELS
HERRING STORER ACOUSTICS

APPENDIX C

QUIET HOUSE DESIGN REQUIREMENTS



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0 5m 10m 15m

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Harley Dykstra
PLANNING & SURVEY SOLUTIONS

QUIET HOUSE DESIGN PACKAGES FOR RESIDENCE

Area	Orientation to road or rail corridor	Package A L_{Aeq},Day up to 60dB L_{Aeq},Night up to 55dB	Package B L_{Aeq},Day up to 63dB L_{Aeq},Night up to 58dB	Package C L_{Aeq},Day up to 65dB L_{Aeq},Night up to 60dB
Bedrooms	Facing	• Walls to R_w+C_{tr} 45dB • Windows and external door systems: Minimum R_w+C_{tr} 28dB (Table 6.4), total glazing area up to 40% of room floor area. [if R_w+C_{tr} 31dB: 60%] [if R_w+C_{tr} 34dB: 80%] • Roof and ceiling to R_w+C_{tr} 35dB (1 layer 10mm plasterboard) • Mechanical ventilation as per Section 6.3.1	• Walls to R_w+C_{tr} 50dB • Windows and external door systems: Minimum R_w+C_{tr} 31dB (Table 6.4), total glazing area up to 40% of room floor area. [if R_w+C_{tr} 34dB: 60%] • Roof and ceiling to R_w+C_{tr} 35dB (1 layer 10mm plasterboard) • Mechanical ventilation as per Section 6.3.1	• Walls to R_w+C_{tr} 50dB • Windows and external door systems: Minimum R_w+C_{tr} 34dB (Table 6.4), total glazing area limited to 40% of room floor area [if 20% of floor area or less, R_w+C_{tr} 31dB] • Roof and ceiling to R_w+C_{tr} 40dB (2 layers 10mm plasterboard) • Mechanical ventilation as per Section 6.3.1
	Side-on	•As above, except glazing Rw+Ctr values for each package may be 3dB less, or max % area increased by 20%		
	Opposite	• No requirements	• As per Package A 'Side On'	• As per Package A 'Facing'
Indoor living and work Areas	Facing	• Walls to Rw+Ctr 45dB • Windows and external door systems: Minimum Rw+Ctr 25dB (Table 6.4), total glazing area limited to 40% of room floor area. [if Rw+Ctr 28dB: 60%] [if Rw+Ctr 31dB: 80%] • External doors other than glass doors to Rw+Ctr 26dB (Table 6.4) • Mechanical ventilation as per Section 6.3.1	• Walls to Rw+Ctr 50dB • Windows and external door systems: Minimum Rw+Ctr 28dB (Table 6.4), total glazing area up to 40% of room floor area. [if Rw+Ctr 31dB: 60%] [if Rw+Ctr 34dB: 80%] • External doors other than glass doors to Rw+Ctr 26dB (Table 6.4) • Mechanical ventilation as per Section 6.3.1	• Walls to R_w+C_{tr} 50dB • Windows and external door systems: Minimum R_w+C_{tr} 31dB (Table 6.4), total glazing area up to 40% of room floor area. [if R_w+C_{tr} 34dB: 60%] • External doors other than glass doors to R_w+C_{tr} 30dB (Table 6.4) • Mechanical ventilation as per Section 6.3.1
	Side-on	• As above, except the glazing R_w+C_{tr} values for each package may be 3dB less, or max % area increased by 20%		
	Opposite	• No requirements	• As per Package A 'Side On'	• As per Package A 'Facing'
Other indoor areas	Any	• No requirements	• No requirements	• No requirements
Outdoor living areas	Any (Section 6.2.3)	• As per Package C, and/or • At least one ground level outdoor living area screened using a solid continuous fence or other structure of minimum 2 metres height above ground level	• As per Package C, and/or • At least one ground level outdoor living area screened using a solid continuous fence or other structure of minimum 2.4 metres height above ground level	• At least one outdoor living area located on the opposite side of the building from the transport corridor