## **ADVERTISED**

# THE HEIGHTS, South Dennington

## **DEVELOPMENT PLAN**

Planning Report





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### **Document Controls**

Business Name	Milward Engineering Management Pty Ltd				
Document Title	The Heights, South Dennington Development Plan – Planning Report				
Document No.		Issue	2.0	Date	08 December 2022
Document Controller	Justin Hinch, Development & Technical Services Manager – Milward Engineering Management				
Client	The Heights by Oakwood Pty Ltd				
Authorised by	Warrnambool City Council				
	(Name)	(Signature)			(Date)

### Change History

Issue	Date	Description of change	Author
2.0	08 December 2022	Revised report incorporating initial authority review, submitted with further information for approval	Justin Hinch, Development & Technical Services Manager Milward Engineering Management
1.1	27 June 2022	Working draft revision incorporating initial authority review for discussion	Justin Hinch, Senior Project Manager Milward Engineering Management
1.0	17 March 2022	Final report to be submitted for assessment and approval	Justin Hinch, Senior Project Manager Milward Engineering Management
0.1	07 March 2022	Draft report prepared	Justin Hinch, Senior Project Manager Milward Engineering Management

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### Contents

Document Controls
Change History2
Disclaimer2
Introduction 5
Development Plan Overview5
Purpose of the Development Plan 6
Structure of the Development Plan6
Strategic Context7
Planning Scheme Provisions7
Planning Policy Framework7
Local Planning Policy Framework7
Local Strategy7
Zones
Overlays
Regional Context9
Site Analysis 10
Site Overview
Topography & Landform10
Waterways & Drainage 11
Cultural Heritage 11
Vegetation & Habitat 12
Bushfire

# Traffic & WIOVement ERTISED

**The Heights, South Dennington Development Plan** *Planning Report* 



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Figure 1 - Subject Site Locality Plan (Department of Environment, Land,
Water and Planning , 2021)
Figure 2 – The Heights, South Dennington Development Plan Area
(Department of Environment, Land, Water and Planning, 2021)
Figure 3 - Development Plan Document Structure
Figure 4 - Dennington Neighbourhood Activity Precinct Structure Plan
(Hansen Partnership Pty Ltd, November 2009)
Figure 5 - Photo from Subject Site 'high-point' north towards Baynes
Street
Figure 6 - Photo from Subject Site 'high-point' south-east towards Russell
Street and Merri River floodplain 10
Figure 7 - Photo from Russell Street and Merri River floodplain toward
southern boundary and ridgeline of Subject Site
Figure 8 - Photo from Subject Site 'high-point' south-west towards Merri
River floodplain
Figure 9 - Photo of Subject Site existing drainage basin
Figure 10 - Subject Site Existing Features
Figure 11 - Proposed land use plan14
Figure 12 - Open space locations and service areas
Figure 13 - Development Plan Proposed Road, Pedestrian and Cycling
Networks16
Figure 14 - Sewerage Infrastructure Concept Plan
Figure 15 - Indicative Stage Areas



### Introduction

This report has been prepared by Milward Engineering Management Pty Ltd (the Applicant) on behalf of The Heights by Oakwood Pty Ltd (the Client/Developer/Landowner) as the Development Plan for area referred to as The Heights, South Dennington (the Subject Site).



*Figure 1 - Subject Site Locality Plan (Department of Environment, Land, Water and Planning , 2021)* 

The Development Plan relates to the future development and use of residential land and contains information regarding the precinct context, site assessment, general layout and staging of the Subject Site including environmental impacts, cultural heritage, movement network and stormwater treatments.

Subject to the approval of this Development Plan by the Responsible Authority, it is anticipated that a subsequent planning permit application for subdivision of the Subject Site will be lodged concurrently. The

**The Heights, South Dennington Development Plan** *Planning Report* 



# planning permit application win detail the intended use, form, and development of the Subject Site generally in accordance with this

development of the Subject Site generally in accordance with this Development Plan.

### Development Plan Overview

The Subject Site is zoned General Residential Zone (GRZ1) within the Warrnambool Planning Scheme (the Planning Scheme) and is subject to the Development Plan Overlay (DPO1) which specifies a Development Plan is required to be submitted and approved by the Responsible Authority prior to subdivision of the land into more than two (2) lots.



Figure 2 – The Heights, South Dennington Development Plan Area (Department of Environment, Land, Water and Planning, 2021)

### Purpose of the Development Plan

The Heights, South Dennington Development Plan will become the key strategic planning documents that will provide the short- and long-term vision for the future planning and development of this residential area.

### Structure of the Development Plan

The structure and content of this Development Plan has been prepared based on the general requirements of Clause 43.04-4, the purpose of a Development Plan is:

- to implement the State Planning Policy Framework and the Local Planning Policy Framework, including the Municipal Strategic Statement and local planning policies;
- to identify areas that require the form and conditions of future use and development to be shown on a plan before a permit can be granted to use or develop the land; and
- to exempt a planning permit application from notice and review if it is generally in accordance with an approved development plan.

The outcomes of the Development Plan align with the State Planning Policy Framework, Local Planning Policy Framework, Warrnambool Planning Scheme including the Municipal Strategic Statement and local planning policies to ensure that any future development is undertaken 'generally in accordance' with the approved Development Plan.

# •Background and context for the preparation of the

Development Plan

 Analysis and identification of key opportunities and constraints

•Sets out the vision, layout and the indicative sequencing of development

#### Figure 3 - Development Plan Document Structure

Several supporting documents have also been prepared and supplied separately which influence the approach to the design and layout of development. These documents include:

- A. Property Reports
- B. Vegetation Assessment
- C. Cultural Heritage Management Plan
- D. Stormwater Management Plan
- E. Traffic Assessment Report
- F. Infrastructure Services Report
- G. Landscaping Plan
- H. Development Plan Layout
- I. Site Feature Survey Plan



### Strategic Context

### Planning Scheme Provisions

The Development Plan needs to ensure that it is consistent with established State and Local policies and guidelines.

### Planning Policy Framework

All planning schemes in Victoria include the Planning Policy Framework (PPF) which has been developed by the State Government. Councils must take these policies into account and give effect to them when making planning decisions. State planning policies aim to provide for the fair, orderly, economic, and sustainable use, and development of land.

The following clauses have been considered in preparing this Development Plan.

- Clause 11 Settlement
- Clause 12 Environmental and Landscape Values
- Claude 15 Built Environment and Heritage
- Clause 16 Housing
- Clause 17 Economic Development
- Clause 18 Transport
- Clause 19 Infrastructure

### Local Planning Policy Framework

Clause 21 of the Warrnambool Planning Scheme contains the Municipal Strategic Statement and outlines the key strategic planning, land use and development objectives for the City of Warrnambool municipality, and the strategies and actions for achieving the objectives. It includes statements about a wide range of areas and issues and outlines key issues and trends and includes the following policies of relevance to development.

**The Heights, South Dennington Development Plan** *Planning Report* 

# The following key local policies of the Warrhamboor Planning Scheme

which are considered relevant to this Development Plan.

- Clause 22.01 Housing
- Clause 22.02 Environment
- Clause 22.04 Infrastructure

### Local Strategy

### Land Use

The Warrnambool Land Use Strategy (Parson Brinckerhoff Australia Pty Ltd, September 2004) recognises the Dennington area contained by the Merri River as having potential for future urban development, but it is considered limited and recommends short to medium term strategic planning for North Dennington as a priority.

### Housing

The Warrnambool City-Wide Housing Strategy 2013 (Warrnambool City Council, December 2013) makes key reference or has related content to the Subject Site with:

- Acknowledgement that the South Dennington Growth Area as a medium-term objective and would ultimately be subject to a Precinct Structure Plan to guide development – which has not yet been prepared; and
- Acknowledgement that the Dennington Neighbourhood Activity Centre Structure Plan 2009 will service surrounding development (both to the north and south).

### Open Space

The Warrnambool Open Space Strategy 2014 (Warrnambool City Council, August 2014) does not identify a specific open space requirements for the Subject Site which is situated in the South Warrnambool / Merrivale precinct.



The future Precinct Structure Plan for the South Dennington Growth Area will focus on opportunities to link the rail trail to open space likely to be floodplain and biodiversity corridors along the Merri River.

### Activity Centre

The Dennington Neighbourhood Activity Centre Structure Plan (Hansen Partnership Pty Ltd, November 2009) makes limited references to the future development of the South Dennington Growth Area, but does acknowledge the Subject Site:

- Has opportunity for key views from the elevated land;
- Sits within the 400m walkable catchment of the activity centre;
- Has potential to supports townhouses and duel occupancy housing on standard lots; and
- Will utilise the arterial network (Princes Highway) with major traffic control / signalised intersection as a key transport junction.



*Figure 4 - Dennington Neighbourhood Activity Precinct Structure Plan (Hansen Partnership Pty Ltd, November 2009)* 

### The Heights, South Dennington Development Plan Planning Report

# Zones ADVERTISED

The entire Subject Site is General Residential Zone (GRZ) which applies Schedule 1. The GRZ1 seeks to encourage development that respects the existing neighbourhood character, and a diversity of housing types and housing growth. Development must occur in accordance with the requirements of Clause 56 Residential Subdivision of the Victoria Planning Provisions, which has been considered throughout the preparation of the Development Plan.

There is a mix of zones surrounding the Subject Site to be considered including:

- General Residential Zone to the west and north along Baynes Street;
- Farming Zone to the west and south along unmade roads; and
- Low Density Residential Zone to the east along Russell Street.

### Overlays

Overlays are used as an additional level of control to zones, where local and site-specific requirements can be made, as necessary. The Development Plan Overlay Schedule 1 (DPO1) applies to the site triggering the requirement to prepare a Development Plan to facilitate coordinated development. This generally occurs prior to any application for planning permits for subdivision.

### Development Plan Overlay

Schedule 1 to the Development Plan Overlay has several requirements before a permit can be granted. This Development Plan will:

 Include a Site Analysis which shows the topography of the land, and the location of any existing vegetation, drainage lines, existing buildings, sites of conservation, heritage or archaeological significance and other features.



# • Show the proposed subdivision layout including lots, roads, public open space and other features of the subdivision in a manner which is responsive to the features identified in the Site Analysis.

- Identify the means by which sites of conservation, heritage or archaeological significance will be managed during the construction phase of the subdivision.
- Identify Appropriate Building Areas on the site and within individual lots that are suitable for the construction of dwellings or other buildings, which are not affected by constraints such as slope, potential for inundation, or presence of remnant vegetation to the satisfaction of the responsible authority. If there are no constraints affecting the site, all lots should be notated as Appropriate Building Areas.
- Include a Landscaping Plan showing the location of existing vegetation to be retained and proposed vegetation.
- Show suitable road and pedestrian linkages between the site and adjacent areas.
- Outline arrangements for the provision and funding of physical infrastructure.
- Identify the staging of the subdivision.

### **Regional Context**

Dennington South is located approximately 260 kilometres south-west of Melbourne situated on the edge of the Princes Highway and located five kilometres west of the Warrnambool CBD via the Princess Highway.

The population of Dennington is approximately 1,900 persons (Australian Bureau of Statistics, 2021) with 700 dwellings accommodating 500 families. Dennington is located within the City of Warrnambool municipal district that covering 120 square kilometres in south-west Victoria which has a population of 35,000 (Warrnambool City Council, 2021).



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### Site Analysis

### Site Overview

The land to which this Development Plan applies primarily covers the Subject Site, 4.8 hectares of undeveloped land and partially developed previous stages of residential land to the east. The undeveloped parcel details are as follows and as further detailed in Appendix A.

- A. Lot 34, PS636695; and
- B. Lot 97, PS636695.

For the sake of completeness, this Development Plan considers the previous stages of the "Dennington South Estate" now excised and developed to be included in this Development Plan area.

### Topography & Landform

The Subject Site is located on a dune that is rising to the north east away from the floodplain of Kelly Swamp/Merri River.

The general lay of the land at the Subject Site slopes in two (2) directions, 1) towards Baynes Street at a moderate 5 to 10% grade average referred to as the northern catchment; and 2) towards the floodplain at a steeper average grade of 20 to 25% referred to as the southern catchment.

Views from the ridgeline at approximately 32m AHD showcase the floodplain, dunes, and Dennington skyline.

A site plan with feature survey information is provided in Appendix I.

The northern portion of the Subject Site contains a substantial amount of deposited fill to create a raised surface above the natural dune landscape. The raised surface has areas of levelling and grading to create surfaces for residential dwellings. These works were undertaken as part of a previous planning permit, but not formalised / completed.

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Figure 5 - Photo from Subject Site 'high-point' north towards Baynes Street

The soil profile (Painter, November 2021) is generally a silty loam with a gradual transition to sandier loam as elevation increases. There are some larger pockets of sand underlying calcarentie accumulations within the dune landform, not found within the swampy floodplain landform which contains fill deposition and considerable ground disturbance.



*Figure 6 - Photo from Subject Site 'high-point' south-east towards Russell Street and Merri River floodplain* 





*Figure 7 - Photo from Russell Street and Merri River floodplain toward southern boundary and ridgeline of Subject Site* 

### Waterways & Drainage

While not directly adjoining the Merri River, the Subject Site has overland flow connection to river which is an integral part of the drainage corridor servicing a large area of Warrnambool and beyond.

The Merri River is also an area of high amenity with views from the Subject Site, and of high value to flora and fauna within the riparian corridor.

A flood study undertaken by the Glenelg Hopkins Catchment Management Authority (Water Technology Pty Ltd, January 2007) has identified a 1 in 100 year flood line, but it is acknowledged this does not affect the Subject Site.

The stormwater flows from previous stages of development located in the northern catchment and external upstream catchments are directed to a drainage basin on the Subject Site cut into the dune substrate.



Figure 8 - Photo from Subject Site 'high-point' south-west towards Merri River floodplain



Figure 9 - Photo of Subject Site existing drainage basin

### Cultural Heritage

The Subject Site is within an area of cultural heritage sensitivity as described in the Aboriginal Heritage Regulations 2018. A Cultural Heritage Management Plan (CHMP) is required to be prepared and approved by



the relevant Registered Aboriginal Party (RAP) prior to land being subdivided or developed.

An approved CHMP #18097 (Painter, November 2021) provided in Appendix C has been prepared for this Development Plan area.

There are no recorded Aboriginal places within the activity area (including the Subject Site and surrounding road reserves). After field investigations, no Aboriginal cultural material was located within the activity area and no areas of potential sensitivity were identified. As a result, the proposed activity is unlikely to impact on Aboriginal cultural material within the activity area; therefore, there is no known cumulative impact upon cultural heritage in the region because of these works.

### Vegetation & Habitat

A Vegetation Quality Assessment (Richdale, March 2021) including a general fauna survey has been undertaken (Appendix B) to determine whether the proposed subdivision would impact upon any existing native vegetation and fauna species.

Prior to 2002 the Subject Site was utilised for farming which most likely led to broadscale clearing of the land and the introduction of agricultural species and other weeds.

It is acknowledged that the Subject Site is highly modified and degraded, with extensive earthworks shifting soil, rocks, and gravel resulting in the land being devoid of canopy genera trees and a shrub layer, with the ground cover being almost exclusively covered in a variety of weed species, some of which are regionally restricted or controlled.

Due to the lack of native vegetation, specifically the lack of patches of native vegetation and scattered canopy trees, there was insufficient data to generate a Native Vegetation Removal (NVR) report and an offset

# would not be required should the proposed subdivision be approved. The

proposed subdivision should not significantly impact upon the areas, biodiversity value, or environs.

As no canopy native vegetation or patches of native vegetation are present, there is no requirement for a native vegetation planning permit or an offset requirement under Planning Scheme Clause 52.17.

### Bushfire

The land is within a designated Bushfire Prone Area (refer to Appendix A) but is not included within a Bushfire Management Overlay. Bushfire Prone Areas are areas that are subject to or likely to be subject to bushfires. Minimum construction standards apply to all new buildings in a bushfire prone area.

In consideration of the provisions at Clause 13.02-1S, the following bushfire protection measures to minimise bushfire risk are inherent in the site plus further measures will be incorporated into the development:

- The site already has a low fuel load as there is no significant vegetation present on site. The predominant bushfire risk would be grass fire.
- The design response has been laid out on a grid formation with good road and pedestrian accessibility, high visibility, and means of escape with compliant access requirements for heavy vehicles and emergency vehicles in the event of a fire.
- The development will be equipped with CFA compliant firefighting infrastructure such as fire plugs, hydrants with reticulated water supply.
- Dwellings will be required to have rainwater tanks installed to meet the environmental requirements which may be an additional source of water in emergency circumstances.

**The Heights, South Dennington Development Plan** *Planning Report* 



### Traffic & Movement

The Subject Site is bordered by a grid-style road network with Baynes Street to the north, the unmade extension of Lindsay Street to the west, unmade / unnamed road to the south and Russell Street to the east.

Moderate levels of traffic primarily related to property access for the local community connect to and from the Subject Site via Baynes Street, with three (3) key routes to the east, north and west connections, being:

- East from Russell Street towards Harrington Road (South Warrnambool);
- North between Lindsay Street and Russell Street, shortest connection to the arterial network (towards Warrnambool and/or Port Fairy); and
- West from Lindsay Street towards The Esplanade, left out only on to the arterial network (towards Port Fairy).

The front of the Subject Site is within a desirable 400 metres walkable distance to the Dennington Neighbourhood Activity Centre. The extent of the footpath network serving pedestrian accessibility to the Subject Site is limited, with the main connection to the arterial network on Raglan Parade and the Dennington Activity Centre following the Russell Street, Baynes Street and Graham Street route which do have nominated road crossing points. There are footpaths for the full length of Lindsay Street, but no formal connection from the Subject Site.

No dedicated provision for cyclist accessibility is currently available that connects to the Subject Site. There are dedicated bicycle lanes on Raglan Parade.



# LEGEND

- RIDGELINE HIGHPOINT TRAFFIC CONNECTIONS DEVELOPMENT PLAN AREA
- DRAINAGE BASIN OVERLAND FLOW / SLOPE DISTURBED LANDFORM AREAS

Figure 10 - Subject Site Existing Features



**The Heights, South Dennington Development Plan** *Planning Report* 

### Design Response

### Vision

The Heights by Oakwood Development Plan sets out a framework to create a new residential area, consistent with previously developed residential area and applying contemporary in urban design principles, infrastructure standards and service provisions.

The development of this area will also create a community that will be integrated with the existing Dennington township and meet the needs of all the current and future residents.

### Outcomes

The Heights by Oakwood Development Plan will inform the detailed design of the site, driven by the natural landform and adding value to the landscape character and the environmental features of the area to create a place with high quality aesthetic values by:

- Housing supply with minimum of 12 dwellings per hectare
- Creating a medium density housing opportunity
- Walkability to the neighbourhood activity centre
- Connection to the arterial road network and public transport
- Supports active transport options
- Local road and bicycle network safety improvements
- Expansion of the footpath network
- Applies a grid road network for traffic permeability
- Integration ready for future development to the west
- Maximises the amenity of the stormwater drainage features
- Creates a medium density opportunity with excellent accessibility
- Connection to local recreational open space





Figure 11 - Proposed land use plan



### Open Space

The WF O'Sullivan Reserve located along Raglan Parade with access also from Lindsay Street and Hood Street is a local recreation reserve (Warrnambool City Council, August 2014) which caters for the Development Plan area.

As a local recreation reserve, it offers a limited number of recreational opportunities, such as a small playground and a grassed area for informal uses. These types of parks are intended for frequent, short duration visits within a short walking distance of users.

Ideally local parks should be located within 400 metres safe walking distance of at least 95% of all dwellings. Based on utilising the existing open space the Development Plan proposes that:

- 50 new and existing lots (45%) of lots located are within 400m
- 110 new and existing lots (100%) of lots are located within 600m

Further passive open space is also anticipated to be accessible within 500 metres of all new and existing lots of the Merri River floodplain when residential zone land to the west is developed.

While the drainage reserve proposed within the Subject Site is not formally recognised as open space, it will be designed to provide high amenity value, providing a 'green' break in the built form with safe accessible slopes from the adjoining road reserves providing limited opportunity to provide seating within 400m of all new and existing lots.

Complimenting the access to existing open space is the requirement for an open space contribution proposed to be a percentage of the site value not exceeding 5 per cent.



Figure 12 - Open space locations and service areas

### Streetscape Landscaping

An enhanced landscape treatment is proposed along Lindsay Street as the primary access to be shared between the proposed development of the Subject Site and future development to the west. Further information can be found on the Landscaping Plan (Appendix G) relating to street tree locations, types, and installation.



### **Movement Network**

The Development Plan proposes use of conventional design and interconnection of new roads and paths with the existing networks that will allow people to safely move within and beyond the Subject Site to the surrounding neighbourhood activity centre, local recreational open space, with connections via the arterial road network towards Warrnambool and Port Fairy.

The primary vehicle and pedestrian access will be from either Lindsay Street or Russell Street in the north-south orientation feeding off Baynes Street. Permeability through the site is achieved via Rome Street and Fraser Ridge connecting roads in the east-west orientation. Other roads such as Dowell Way, Deverell Way and Keys Street provide local access functions.

A major feature of the movement network are road safety improvements on Baynes Street at the Lindsay Street and Russell Street intersections. A new roundabout will be implemented at Lindsay Street to accommodate the road extension improving safety by simplifying conflicts, reducing speeds, and providing clear indication of priority. Similarly, changes at the Russell Street intersection uses visual cues, lane narrowing and left-in / left-out treatments for local access and provisions for an on-road bicycle lane to encourage slower vehicle approach speeds that improve the safety of movement.

Safe pedestrian linkages crossing Baynes Street will be established, likely be implemented as part of the intersections works.

Further information can be found in the Traffic Assessment Report (Appendix E) relating to road cross sections, intersection treatments, and traffic calming.



Figure 13 - Development Plan Proposed Road, Pedestrian and Cycling Networks

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### Staged Construction

While the Traffic Assessment Report (Appendix E) acknowledged a roundabout is ideally constructed at the Baynes Street / Lindsay Street intersection the delivery of the roundabout without adjoining land being developed presents some challenges. The report recommends that a financial contribution (such as a Development Contribution) towards the roundabout is provided. This contribution, plus the allocation of land on the Subject Site allows for the roundabout to be constructed later when the traffic treatments are warranted and can be integrated with the development to the west.

The Traffic Assessment Report also proposes Lindsay Street is an 'Access Street' and is expected to ultimately be constructed with a 7.3m carriageway when development to the west is completed. As an interim treatment (serving one side of the road only), a 6.0m carriageway width (as per an 'Access Place') has been adopted that can be widened in the future. Both widths are consistent with the Infrastructure Design Manual.

### Servicing & Infrastructure

The Development Plan area is capable of being serviced by all major urban services. Service statements are provided below with further information contained in the Infrastructure Servicing Report (Appendix F).

### Roads & Footpaths

The proposed residential development within the entire Development Plan area (including previously constructed stages) is estimated to generate 1,100 vehicles per day, with estimated additional morning and afternoon peak traffic of 94 vehicles per hour and assessed that the development would not adversely affect traffic conditions, the safety or operation of surrounding road and footpath networks as outlined in the Traffic Assessment Report (Appendix E).

# Stormwater Drainage

The Development Plan proposes stormwater drainage systems that effectively manage how the quantity and quality of stormwater arising from and/or passing through the proposed residential development to avoid adverse impacts on people, property, and the natural environment.

The Stormwater Management Report (Appendix D) proposes to:

- collect and control all stormwater generated within the development and entering the development from external upstream catchments;
- provide an effective outlet for all collected stormwater to a natural watercourse or acceptable outfall; and
- achieve these objectives without detriment to the environment generally, surface and subsurface water quality, groundwater infiltration characteristics, adjoining landowners and landowners, and watercourses either upstream or downstream of the subdivision.

### Northern Catchment

A drainage basin has been proposed as an interim solution to manage stormwater, noting the main catchment does not have an outfall to the Merri River and currently relies on informal infiltration into the underlying sand soil profile. A piped system connection can be implemented from the drainage basin to the Merri River to coincide with future development to the west of the Subject Site.

It is proposed to formalise the drainage basin for the northern catchment utilising infiltration and detention storage to detain and treat incoming catchment flows from existing residential development to the north, the proposed subdivision, and undeveloped flows from the west.



As the current basin has sufficient capacity, it is not critical to complete the entire construction of the basin immediately and is reasonable to defer to a later stage.

To support deferral of complete construction, it is proposed to provide pre-treatment capacity as detailed in the Infrastructure Servicing Report (Appendix F) to maintain the capacity of the infiltration media. This may include provision of a sedimentation basin, or alternatively by a sacrificial filter layer within the main basin.

### Southern Catchment

Development in the southern catchment will utilise underground storage to manage outflow to pre-development levels and a linear bioswale and infiltration system to conveyed stormwater to the floodplain.

As is detailed in the Infrastructure Servicing Report (Appendix F) the drainage structure can be located entirely within the large existing road reserve, allowing unimpeded maintenance access, and avoiding undue impact on other properties. Alternatively, the structure could be located entirely within the road pavement, with a piped discharge to the constructed swale. The selected location directs all stormwater flows to an existing depression, maintaining predevelopment conditions.

The proposed drainage structure is proposed to function as a permanent solution. However, it is recognised that the broader precinct does not have a formal stormwater management strategy. By adopting a design that can utilise the existing road reserve, this provides drainage infrastructure at the lowest point of the land impacted but also creates opportunity for the drainage network to be augmented in the future to either maintain, upsize, or remove the structure.

# Water Suppry Water Suppry

Due to topography and elevation the Development Plan area will have two (2) different water pressure zones (low-level and high-level). The divide elevation between the two zones is typically 20m AHD. Servicing of lots from the high-level system requires the installation of a pressure regulating valve to ensure the lots below 20m AHD are not subject to higher than typical pressures. These lots would then be transferred over to the low-level system in the future when the surrounding growth area is developed.

### Sewerage

The previously completed stages within the Development Plan area are serviced by an existing sewerage network, gravity fed from the high point along Fraser Ridge down to Baynes Street. This network can be expended to service the remaining development areas north of Fraser Ridge.

Lots proposed to be created south of Fraser Ridge will not be able to connect to the existing network via gravity. A temporary pump station is required to connect this area. This pump station could be located on the south-west corner of the Development Plan area, ideally located on the existing government road reserve.

The proposed pump station is a temporary system and hence will be likely be removed in the future, because of this it is not necessary to locate the system in a dedicated permanent services reserve. Within the existing road reserve there is more than ample room to house the system and when the land to the west is developed the pump station may be decommissioned or relocated to the next low point with no residual land left behind.





#### Figure 14 - Sewerage Infrastructure Concept Plan

### Electricity Supply & Public Lighting

An existing 500kVA distribution substation in Fraser Ridge is well within the capacity of the supply available without the need for an additional substation.

Public lighting will be provided in accordance with the design requirements and relevant Australian Standards. All public lighting is to use of energy efficient luminaires.

**The Heights, South Dennington Development Plan** *Planning Report* 



# Gas Supply

The previously completed stages within the Development Plan area are serviced by plastic polyethylene distribution mains with planned gas assets extending along Russell Street (south of Fraser Ridge), then west along the unmade / unnamed government road to Lindsay Street.

### Telecommunications

Assets are already provided to lots within the previously completed stages within the Development Plan area. It is expected that network services as delivered by NBN Co Limited and/or Telstra will continue to service the entire development subject to the relevant service agreements being in place.

### Staging & Infrastructure Delivery

The sequencing of development across The Heights by Oakwood Development Plan area will generally continue from previously completed stages from Russell Street to Lindsay Street.

The numeric sequence of these stages is generally Stage 4 through to Stage 7, although Stage 5 and Stage 6 could be switched depending on service delivery preferences.

### Stage 4

The extension of Rome Street and Fraser Ridge will be with a new northsouth access road. Stormwater will continue to use the existing informal drainage basin at Baynes Street. Road safety improvements at the Baynes Street and Russell Street intersection to be implemented as per the Traffic Assessment Report.

### Stage 5

A local access only road created to 'loop' around Stage 5 from Fraser Ridge, using Lindsay Street, Russell Street, and the unnamed road reserve. A new stormwater will be created to drain towards the Merri River, and new pump station for sewerage connection.

### Stage 6

A new road will be created along the unmade section of Lindsay Street between Fraser Ridge and Rome Street and will eventually be connected to Baynes Street in Stage 7. Stormwater will continue to use the existing informal drainage basin at Baynes Street.

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The drainage basin at Baynes Street is to be upgraded as per the Stormwater Management Report (Appendix D).

The roundabout at the Baynes Street and Lindsay Street intersection as detailed in the Traffic Assessment Report (Appendix E) will be implemented to complete the road connection with Stage 6 and provide the additional pedestrian crossing on Baynes Street.

Implementation of the roundabout will require land provisions outside the Development Plan area and ultimately service the broader growth area.

The Development Plan proposes a financial contribution (Development Contribution) towards the roundabout under the Planning & Environment Act 1987 facilitated with a Section 173 Agreement.

This contribution, plus the allocation of land on the Subject Site proposed in Stage 7 allows for the roundabout to be constructed by others when these traffic treatments are warranted and can be integrated with the future development to the west.





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Figure 15 - Indicative Stage Areas

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### Conclusion

This report and supporting documents constitute the Development Plan submitted for assessment as required under the Development Plan Overlay (DPO1).

It is considered that the information provided in the Development Plan meets the requirements the requirements of the DPO1.

The Development Plan has also raised the key issues that will affect development of the land and has demonstrated the positive contribution implementation of future development in accordance with the proposed Development Plan will have on the surrounding area.

It is assessed that there will be no adverse impacts resulting from the proposed Development Plan. Rather, the approval of the Development Plan will facilitate orderly planning and the timely provision of affordable residential land, in-turn providing a benefit to the community and the character of the surrounding environs.

The Development Plan encompasses the commitment of landowners to delivery future development in accordance with the proposed Development Plan and reflects the considered approach to development of the land responding to all applicable aspects of the Planning Scheme and other relevant legislation.

The report and supporting documentation have been provided to the Council as the Responsible Authority for approval, trusting the information is comprehensive and considered favourably.



### References

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## APPENDIX A – Property Reports



### **PROPERTY REPORT**



### From www.planning.vic.gov.au at 07 January 2022 02:33 PM

PROPE	RTY DE	ETAILS
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Lot and Plan Number:	Lot 97 PS636695
Address:	7 DEVERELL WAY WARRNAMBOOL 3280
Standard Parcel Identifier (SPI):	97\PS636695
Local Government Area (Council):	WARRNAMBOOL
Council Property Number:	18853 (Part)
Directory Reference:	Vicroads 514 C3

www.warrnambool.vic.gov.au

Note: There are 2 properties identified for this site. These can include units (or car spaces), shops, or part or whole floors of a building. Dimensions for these individual properties are generally not available.

#### This parcel is in a designated bushfire prone area. Special bushfire construction requirements apply. Planning provisions may apply.

Further information about the building control system and building in bushfire prone areas can be found on the Victorian Building Authority website <u>https://www.vba.vic.gov.au</u>

#### SITE DIMENSIONS

All dimensions and areas are approximate. They may not agree with those shown on a title or plan.



Area: 47179 sq. m (4.72 ha) Perimeter: 1280 m For this property: - Site boundaries - Road frontages Dimensions for individual parcels require a separate search, but dimensions for individual units are generally not available.

5 overlapping dimension labels are not being displayed

Calculating the area from the dimensions shown may give a different value to the area shown above

For more accurate dimensions get copy of plan at <u>Title and Property</u> <u>Certificates</u>

#### PARCEL DETAILS

This is 1 parcel of 2 parcels comprising this property. The parcel searched for is marked with an \* in the table below

	Lot/Plan or Crown Description	SPI
	Lot 34 PS 636695	34\PS636695
*	Lot 97 PS 636695	97\PS636695

#### UTILITIES

Rural Water Corporation: Urban Water Corporation: Wannon Water Melbourne Water: Power Distributor:

Southern Rural Water Outside drainage boundary POWERCOR

#### STATE ELECTORATES

Legislative Council:	WESTERN VICTORIA
Legislative Assembly:	SOUTH-WEST COAST

### **PROPERTY REPORT**



#### PLANNING INFORMATION

 Planning Zone:
 GENERAL RESIDENTIAL ZONE (GRZ)

GENERAL RESIDENTIAL ZONE - SCHEDULE 1 (GRZ1)

Planning Overlay: DEVELOPMENT PLAN OVERLAY (DPO)

DEVELOPMENT PLAN OVERLAY - SCHEDULE 1 (DPO1)

#### Areas of Aboriginal Cultural Heritage Sensitivity:

All or part of this parcel is an 'area of cultural heritage sensitivity'.

Planning scheme data last updated on 23 December 2021.

A **planning scheme** sets out policies and requirements for the use, development and protection of land. This report provides information about the zone and overlay provisions that apply to the selected land. Information about the State and local policy, particular, general and operational provisions of the local planning scheme that may affect the use of this land can be obtained by contacting the local council or by visiting <u>https://www.planning.vic.gov.au</u>

This report is NOT a **Planning Certificate** issued pursuant to Section 199 of the **Planning and Environment Act 1987.** It does not include information about exhibited planning scheme amendments, or zonings that may abut the land. To obtain a Planning Certificate go to Titles and Property Certificates at Landata - <u>https://www.landata.vic.gov.au</u>

For details of surrounding properties, use this service to get the Reports for properties of interest.

To view planning zones, overlay and heritage information in an interactive format visit <a href="https://mapshare.maps.vic.gov.au/vicplan">https://mapshare.maps.vic.gov.au/vicplan</a>

For other information about planning in Victoria visit <u>https://www.planning.vic.gov.au</u>

#### Areas of Aboriginal Cultural Heritage Sensitivity

All or part of this parcel is an 'area of cultural heritage sensitivity'.

'Areas of cultural heritage sensitivity' are defined under the Aboriginal Heritage Regulations 2018, and include registered Aboriginal cultural heritage places and land form types that are generally regarded as more likely to contain Aboriginal cultural heritage.

Under the Aboriginal Heritage Regulations 2018, 'areas of cultural heritage sensitivity' are one part of a two part trigger which require a 'cultural heritage management plan' be prepared where a listed 'high impact activity' is proposed.

If a significant land use change is proposed (for example, a subdivision into 3 or more lots), a cultural heritage management plan may be triggered. One or two dwellings, works ancillary to a dwelling, services to a dwelling, alteration of buildings and minor works are examples of works exempt from this requirement.

Under the Aboriginal Heritage Act 2006, where a cultural heritage management plan is required, planning permits, licences and work authorities cannot be issued unless the cultural heritage management plan has been approved for the activity.

For further information about whether a Cultural Heritage Management Plan is required go to <a href="http://www.aav.nrms.net.au/aavQuestion1.aspx">http://www.aav.nrms.net.au/aavQuestion1.aspx</a>

More information, including links to both the Aboriginal Heritage Act 2006 and the Aboriginal Heritage Regulations 2018, can also be found here - <u>https://www.aboriginalvictoria.vic.gov.au/aboriginal-heritage-legislation</u>

### **PROPERTY REPORT**





### PLANNING PROPERTY REPORT



From www.planning.vic.gov.au at 07 January 2022 02:30 Pl

#### **PROPERTY DETAILS**

Lot 97 PS636695	
7 DEVERELL WAY WARRNAMBOOL 3280	
97\PS636695	
WARRNAMBOOL	www.warrnambool.vic.gov.au
18853 (Part)	
Warrnambool	Planning Scheme - Warrnambool
Vicroads 514 C3	
	Lot 97 PS636695 7 DEVERELL WAY WARRNAMBOOL 3280 97\PS636695 WARRNAMBOOL 18853 (Part) Warrnambool Vicroads 514 C3

This parcel is one of 2 parcels comprising the property. For full parcel details get the free Property report at Property Reports

#### UTILITIES

Rural Water Corporation: Urban Water Corporation: Wannon Water Melbourne Water: Power Distributor:

Southern Rural Water **Outside drainage boundary** POWERCOR

STATE ELECTORATES Legislative Council:

Legislative Assembly:

**WESTERN VICTORIA** SOUTH-WEST COAST

## OTHER

Registered Aboriginal Party: Eastern Maar Aboriginal Corporation

#### View location in VicPlan

### **Planning Zones**

GENERAL RESIDENTIAL ZONE (GRZ) GENERAL RESIDENTIAL ZONE - SCHEDULE 1 (GRZ1)



Note: labels for zones may appear outside the actual zone - please compare the labels with the legend.

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### DEVELOPMENT PLAN OVERLAY (DPO)





Note: due to overlaps, some overlays may not be visible, and some colours may not match those in the legend

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### PLANNING PROPERTY REPORT Environment, Land, Water and Planning **ICTORIA ADVERTISE** OTHER OVERLAYS Other overlays in the vicinity not directly affecting this land BUSHFIRE MANAGEMENT OVERLAY (BMO) ENVIRONMENTAL AUDIT OVERLAY (EAO) ENVIRONMENTAL SIGNIFICANCE OVERLAY (ESO) FLOODWAY OVERLAY (FO) HERITAGE OVERLAY (HO) SIGNIFICANT LANDSCAPE OVERLAY (SLO) SPECIFIC CONTROLS OVERLAY (SCO)



Note: due to overlaps, some overlays may not be visible, and some colours may not match those in the legend

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### PLANNING PROPERTY REPORT



#### Areas of Aboriginal Cultural Heritage Sensitivity

All or part of this parcel is an 'area of cultural heritage sensitivity'.

'Areas of cultural heritage sensitivity' are defined under the Aboriginal Heritage Regulations 2018, and include registered Aboriginal cultural heritage places and land form types that are generally regarded as more likely to contain Aboriginal cultural heritage.

DVFRT

Under the Aboriginal Heritage Regulations 2018, 'areas of cultural heritage sensitivity' are one part of a two part trigger which require a 'cultural heritage management plan' be prepared where a listed 'high impact activity' is proposed.

If a significant land use change is proposed (for example, a subdivision into 3 or more lots), a cultural heritage management plan may be triggered. One or two dwellings, works ancillary to a dwelling, services to a dwelling, alteration of buildings and minor works are examples of works exempt from this requirement.

Under the Aboriginal Heritage Act 2006, where a cultural heritage management plan is required, planning permits, licences and work authorities cannot be issued unless the cultural heritage management plan has been approved for the activity.

For further information about whether a Cultural Heritage Management Plan is required go to http://www.aav.nrms.net.au/aavQuestion1.aspx

More information, including links to both the Aboriginal Heritage Act 2006 and the Aboriginal Heritage Regulations 2018, can also be found here - https://www.aboriginalvictoria.vic.gov.au/aboriginal-heritage-legislation



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## PLANNING PROPERTY REPORT DVERTIS





Planning scheme data last updated on 23 December 2021.

A planning scheme sets out policies and requirements for the use, development and protection of land. This report provides information about the zone and overlay provisions that apply to the selected land. Information about the State and local policy, particular, general and operational provisions of the local planning scheme that may affect the use of this land can be obtained by contacting the local council or by visiting https://www.planning.vic.gov.au

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For details of surrounding properties, use this service to get the Reports for properties of interest.

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To view planning zones, overlay and heritage information in an interactive format visit https://mapshare.maps.vic.gov.au/vicplan

For other information about planning in Victoria visit https://www.planning.vic.gov.au

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## PLANNING PROPERTY REPORT ADVERTIS



#### **Designated Bushfire Prone Areas**

This parcel is in a designated bushfire prone area.

Special bushfire construction requirements apply. Planning provisions may apply.



Designated bushfire prone areas as determined by the Minister for Planning are in effect from 8 September 2011 and amended from time to time.

The Building Regulations 2018 through application of the Building Code of Australia, apply bushfire protection standards for building works in designated bushfire prone areas

Designated bushfire prone areas maps can be viewed on VicPlan at <u>https://mapshare.maps.vic.gov.au/vicplan</u> or at the relevant local council.

Note: prior to 8 September 2011, the whole of Victoria was designated as bushfire prone area for the purposes of the building control system.

Further information about the building control system and building in bushfire prone areas can be found on the Victorian Building Authority website <u>https://www.vba.vic.gov.au</u>

Copies of the Building Act and Building Regulations are available from http://www.legislation.vic.gov.au

For Planning Scheme Provisions in bushfire areas visit <u>https://www.planning.vic.gov.au</u>

#### **Native Vegetation**

Native plants that are indigenous to the region and important for biodiversity might be present on this property. This could include trees, shrubs, herbs, grasses or aquatic plants. There are a range of regulations that may apply including need to obtain a planning permit under Clause 52.17 of the local planning scheme. For more information see Native Vegetation (Clause 52.17) with local variations in Native Vegetation (Clause 52.17) Schedule

To help identify native vegetation on his property and the application of Clause 52.17 please visit the Native Vegetation Information Management system https://nvim.delwp.vic.gov.au/and Native vegetation (environment.vic.gov.au) or please contact your relevant council.

You can find out more about the natural values on your property through NatureKit NatureKit (environment.vic.gov.au)

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## **ADVERTISED** APPENDIX B – Vegetation Assessment





# VEGETATION QUALITY ASSESSMENT DEVERELL WAY, WARRNAMBOOL

March 2021

Bill (W.E.) Richdale: Consulting Ecologist BSc., Dip EnvSc., MAppSc. (Member of the Ecological Society of Australia) ABN: 88 825 148 662 Email: richdale@optusnet.com.au Website:https://sites.google.com/site/ecologicalconsultant/

& Aisha Richdale BA., MIR.

# **ADVERTISED**

### **Table of Contents**

Summary	3
1 Introduction	4
1.1 Site Description	5
1.1.2 Ecological Communities	6
2 Planning & Legislation	7
2.1 Planning	7
2.1.2 Planning Clause 52.17	8
2.2 EPBC Act	8
2.3 FFG Act	9
2.4 Wildlife Protection Act	9
2.5 CaLP Act	10
3 Methodology	11
3.1 Significant Fauna	12
3.2 Limitations	13
4 Results	13
4.1 Native Vegetation	14
4.2 Exotic Vegetation	15
4.3 Fauna	16
4.3.1 Threatened Fauna	17
4.4 Implications of Development	17
5 Conclusion	18
5.1 References	19

### Appendix 1

Appendix 1.1 Waypoints, Location of Native Vegetation	22
Appendix 1.2 Threatened Fauna within 5km Radius	24

Table 1 Native Flora.....14Table 2 Exotic Flora......15

Image 1 Location Image 2 Study site Image 3 Study site Image 4 EVC Image 5 Nankeen Kestrel Hunting


Milward Engineering Management requested a Vegetation Quality Assessment of an undeveloped lot of land at Deverell Way, Warrnambool, Victoria 3280. The site lies behind Deverell Way and adjacent to Baynes Street, and is zoned General Residential – Schedule 1 (GRZ1) and contains a Development Plan Overlay – Schedule 1 (DPO1). It is proposed that the site be subdivided for future development. A VQA of the site was undertaken on the 08/03/2021.

According to the Department of Environment, Land, Water and Planning (DELWP) mapping of the area, the historical pre-1750 Ecological Vegetation Class (EVC) is EVC 3 Damp Sands Herb-rich Woodland in the Warrnambool bioregion. Both have a conservation status of endangered.

The site has been subject to farming (prior to 2006) and extensive earthworks. The land is heavily degraded and modified due to (previous) broadscale clearing of vegetation and earthworks, particularly the dumping of soil and other materials. The site was found to be covered in a variety of weeds with a few isolated native flora species found throughout the site. At the time of the survey, there are no patches of native vegetation and there are no scattered canopy trees. Indeed, the study site no longer contains EVC 3 as the canopy and shrub layer have been removed and the ground covering consists almost exclusively of exotic species.

Due to the lack of patches of native vegetation and scattered canopy trees there was insufficient data to produce a Native Vegetation Removal report. Therefore, no offset would be required should the proposed subdivision be approved.



Image 1: Location

#### **1** Introduction

On the 8<sup>th</sup> of March 2021, a Vegetation Quality Assessment (VQA) was conducted at Deverell Way, Warrnambool, in an undeveloped lot of land (lot 97 or 7 Deverell Way) behind Deverell Way, or west of Russell Street, and adjacent (south) to Baynes Street.

The undeveloped lot of land is approximately 7 hectares in size and is shaped like an 'L'. It is proposed that the lot of land be subdivided into building lots. There was an original planning permit for the subdivision issued on 13.12.2005, however, this planning permit has expired.

A VQA had to be undertaken to determine the potential impact of the proposed subdivision upon any native flora growing on the property and if there is a required offset. In addition to a vegetation survey, any native diurnal vertebrate seen at the property was recorded. The purpose of the VQA was to assess the quality of the vegetation on the property (henceforth the 'study site') in accordance with the relevant planning requirements and the Department of Environment, Land, Water and Planning (DELWP) guidelines.



Image 2: study site

#### **1.1 Property Description**

The study site is a highly disturbed undeveloped lot of land. The entirety of the site appears to be covered in exotic vegetation with only a few scattered, and rather isolated, native species being recorded during the survey. Prior to 2006 the land was utilised for farming, which would have led to the introduction of agricultural species. Since then, the land has been subjected to major ground disturbances.

Topographically the site inclines and undulates south from Baynes Street and comes to a crest inline with Fraser Ridge, where it then descends into the neighbouring property. There is a drainage line at the northern end of the property, at the time of the survey no water was seen flowing through it. There is also a gravelly and sandy accessway beginning at Baynes Street and continuing up to Fraser Ridge.

Within the study site there appears to have been landscaping that occurred some time ago, which is indicated by areas (adjacent to or behind the Deverell Way) that have been flattened into development envelopes. There are also areas where soil and gravel have been deposited. In addition, at the northernmost section of the property there are construction materials and within the general site there are areas that are fenced off. It appears that this material has been there for some time.



Image 3: study site

## 1.1.2 Bioregion and Ecological Vegetation Classes (EVCs) occurring on the property

The historical pre-1750 EVC mapped as once occurring on the property is EVC 3 Damp Sands Herb-rich Woodland located within the Warrnambool Plain bioregion which has a conservation status of endangered. Today only a small portion of the study site is mapped as containing the EVC (2005) ecological vegetation class.

EVC 3 Damp Sands Herb-rich Woodland is mapped as occurring within the southernmost section of the study site and has an environmental conservation status of endangered. EVC 3 is described as a 'low, grassy or bracken-dominated eucalypt forest or open woodland to 15 m tall with a large shrub layer and ground layer rich in herbs, grasses and orchids. Occurs mainly on flat or undulating areas on moderately fertile, relatively well-drained, deep sandy or loamy topsoils over heavier subsoils (duplex soils)' (DSE 2004a).

The EVC and ecological community is non-existent, having been removed due to the presumed shifting and excavation of top soils and the prior use of the land for farming. Consequently, the area has by in large been replaced with an exotic community, with a few scattered and isolated native species found amongst the weeds.



Image 4 2005 EVC Map. Pre-1750 EVC 3 would cover the entirety of the site

# 2 Planning and Legislation

#### 2.1 Planning

The study site is situated in the Shire of Warrnambool and under the Glenelg Hopkins Catchment Management Authority (GHCMA). The lot is zoned General Residential - Schedule 1 (GRZ1). The site contains a Development Plan Overlay – Schedule 1 (DPO1). In addition, the western and southern boundary of the property is in a designated bushfire prone area.

The purpose of GRZ is:

To implement the Municipal Planning Strategy and the Planning Policy Framework.

To encourage development that respects the neighbourhood character of the area.

To encourage a diversity of housing types and housing growth particularly in locations offering good access to services and transport.

DPO1 states that a development plan must: 'Include a Site Analysis which shows the topography of the land, and the location of any existence vegetation, drainage lines, existing buildings, sites of conservation, heritage or archaelogical significance and other features' (Warrnambool Planning Scheme 2020)

#### 2.1.2 Planning Clause 52.17

Under Victorias *Planning and Environment Act 1987*, planning Clause 52.17 details native vegetation provisions. This report is carried out under the provision of Planning Clause 52.17 and DELWP requirements (DELWP 2017 a & b). And, if a permit is granted to remove native vegetation, then an appropriate offset has to be met.

Under Victorias *Planning and Environment Act 1987*, planning Clause 52.17 details native vegetation provisions. This report is carried out under the provision of Planning Clause 52.17 and DELWP requirements (DELWP 2017 a & b). And, if a permit is granted to remove native vegetation, then an appropriate offset has to be met.

Under Clause 52.17 there is the need to:

- 1. Avoid the removal, destruction or lopping of native vegetation.
- 2. Minimise impacts from the removal, destruction or lopping of native vegetation that cannot be avoided.



3. Provide an offset to compensate for the biodiversity impact if a perime is granted to remove, destroy or lop native vegetation.

Exemptions under planning clause 52.17, pertinent to the native vegetation that may occur at the study site, are:

The clearing along both sides of a fence when combined must not exceed 4 metres in width, except where land has already been cleared 4 metres or more along one side of the fence, then up to 1 metre can be cleared along the other side of the fence.

This means that native trees (vegetation) within two metres of an existing fence can be cleared without the requirement of a permit or an offset if the trees are removed.

Planted native vegetation can also be removed without the requirement of a planning permit or an offset: 'Native vegetation that is to be removed, destroyed or lopped that was either planted or grown as a result of direct seeding' (Planning Clause 52.17, DELWP 2017 b).

Under planning clause 52.17 all native vegetation that is not indigenous to Victoria are considered environmental weeds. In addition, naturally occurring nonindigenous native vegetation are considered weeds (DSE 2004). For example, the native tree Pittosporum undulatum (Sweet Pittosporum), indigenous to the forests of East Gippsland and perhaps West Gippsland (Flora Victoria), is a significant environmental weed outside of its natural range. Thus, non-indigenous native vegetation may be cleared without the need of a permit.

#### 2.2 Environment Protection and Biodiversity Conservation Act 1999

The Commonwealth Environment Protection and Biodiversity Conservation Act (1999) (EPBC Act) applies to sites where proposed developments or projects may have a significant impact on 'matters of national environmental significance' (MNES). There are currently seven MNES:

- World Heritage Properties
- National Heritage Place
- nationally listed threatened species and ecological communities
- listed migratory species
- Ramsar wetlands of international importance
- Commonwealth marine areas
- nuclear actions (including uranium mining).

Under the EPBC Act (1999), a proponent must refer proposed actions that may have a significant impact on matters on national environmental significance to the Australian Government Environment Minister (or delegate).

#### 2.3 The Victorian Flora and Fauna Guarantee Act 1998

The Flora and Fauna Guarantee Act 1998 (FFG Act) was legislated to ensure the continued survival of all Victorian species of flora and fauna and all Victorian communities of plants and animals. The FFG Act provides a number of ways to assist in achieving its objectives, including:

• listing of threatened taxa, communities of flora or fauna and potentially threatening processes, and creation of Action Statements and Management Plans for all listed taxa communities of flora or fauna and processes

• declaration of a Critical Habitat if the habitat is critical for the survival of a species or a community of flora or fauna, if listed as Critical Habitat, the Minister for Environment may then make an Interim Conservation Order (ICO) to conserve the Critical Habitat (NB: no Critical Habitat has been declared in the State)

• protection of flora and fauna through listing offences such as penalties relating to not following an ICO and taking, trading in, keeping, moving or processing protected flora without a licence (NB: this does not apply to taking protected flora from private land (other than land which is part of the critical habitat for the flora) except for taking tree-ferns, grass, trees or sphagnum moss for the purpose of sale)

• The Department of Environment, Land, Water and Planning (DELWP) is the referral authority for matters under the FFG Act.

#### 2.4 Wildlife Protection Act 1975

All native wildlife in Victoria is protected by the Wildlife Protection Act (1975) and subsequent regulations.

Under the Act a person must not hunt, take or destroy endangered, notable or protected wildlife; this includes all native vertebrate animals, all kinds of deer, non-indigenous quail, pheasants, and partridges, and all terrestrial invertebrate animals listed under the *Flora and Fauna Guarantee Act* (1988). The Wildlife Regulations 2013 provide further detail relating to the Act, including that a person not to damage, disturb or destroy any wildlife habitat (s42). Although, this does not apply if the person is authorised to do so under any other Act such as the *Planning and Environment Act* (1987).

#### 2.5 Victorian Catchment and Land Protection Act 1994

Under the CaLP Act 1999, a landowner must:

Under s 20 of the CaLP Act, all landowners, including the Crown, public authorities and licensees of Crown lands, must, in relation to their land, take all reasonable steps to:

• avoid causing or contributing to land degradation which causes or may cause damage to

land of another landowner;

- eradicate regionally prohibited weeds;
- prevent the growth and spread of regionally controlled weeds on their land;
- prevent the spread of, and as far as possible, eradicate established pest animals.

(Agriculture Victoria)

The property had an extensive coverage of weeds. The list of weeds recorded are given in Table 2.

#### **3** Methodology

The vegetation survey was carried out referring to the *Vegetation Quality Assessment Manual* – guidelines for applying the habitat hectares scoring method (Version 1.3 DSE, DELWP 2004). In addition, Kent and Coker (1995) was utilised. Kent and Coker (1995) provide the random walk methodology to survey the ground covering vegetation of the study site, whilst adhering to the Vegetation Quality Assessment Manual (DSE, DELWP 2004) and other DELWP guidelines.

The vegetation within the study site was surveyed to determine what was exotic, what was naturally growing or seeded native vegetation, and whether any EVCs were present. The survey involves traversing the study site on foot to assess the floristic structure and diversity of the site. Any indigenous native vegetation present is identified on site and through the taking of samples, using relevant keys, texts and *Flora of Victoria*.

By definition, only indigenous canopy trees can be considered either scattered, or a patch of native vegetation. A patch of native vegetation occurs when three or more canopy trees outer driplines touches the dripline of at least one tree, thus, forming a continuous patch of native vegetation. Additionally, a patch of native vegetation can be defined as an area where at least 25 percent of total perennial plant understorey cover is native (DELWP 2017a).

Any indigenous canopy genera trees (*Eucalyptus* species) within the study site were GPS waypointed. If present, patches of indigenous native vegetation were measured and marked out by GPS. Scattered or patches of indigenous understorey and canopy plants were identified.

If appropriate, a Native Vegetation Removal (NVR) report will be generated using the Native Vegetation Information Management (NVIM) system tool. The NVIM system tool can be used if the total area of land, occupied by the indigenous vegetation proposed to be removed, is less than 0.5 hectares (DELWP: <u>https://nvim.delwp.vic.gov.au/</u>). The NVIM tool generates the offset requirements for the removal of indigenous vegetation that has an area of less than 0.5 hectares in a zone 1 or 2 location. If any indigenous native vegetation present has a greater extent of 0.5 or more hectares, then the data in the form of a shapefile has to be sent to DELWP to generate an NVR report.

Large scattered indigenous canopy trees are assigned an area value of 0.0707 hectares and smaller indigenous canopy trees have an area value of 0.0314 hectares per tree (DELWP-ENSym NVR tool). If present, the large tree (*Eucalyptus* spp.) benchmark is DBH 70 centimetres or a CBH of 220 cm (EVC 3 benchmark, Warrnambool Plain bioregion – DSE 2004).

The locations of native vegetation for Victoria are as follows (DELWP location categories – DELWP 2017 a):

	Location category					
Extent of native vegetation	Location 1	Location 2	Location 3			
Less than 0.5 hectares and not including any large trees	Basic	Intermediate	Detailed			
Less than 0.5 hectares and including one or more large trees	Intermediate	Intermediate	Detailed			
0.5 hectores or more	Detailed	Detailed	Detailed			

- Location 1 includes all remaining locations in Victoria. These are low-risk areas of native vegetation loss having an impact upon the habitat for rare or threatened species (DELWP 2017 a).
- Location 2 includes locations that are mapped as endangered EVCs and or sensitive wetlands and coastal areas are not included in Location 3.
- Location 3 native vegetation includes locations where the removal of less than 0.5 hectares of native vegetation could have a significant impact on habitat for a rare or threatened species.

The study site is in Location 2 with a detailed survey required due to the EVC being classified endangered and because the proposed development area is greater than 0.5 hectares, the area of the proposed subdivision is roughly 7.11 hectares. *However*, no patches of native vegetation were found at the site nor were there any scattered canopy trees to be assessed.

#### 3.1 Significant Fauna

Threatened species records were sourced with DELWP NatureKit tool, which can be utilised to generate a Victorian Biodiversity Atlas (VBA) species list within 5 km radius of the study site. This list is cross-referenced with a EPBC Act Protected Matters Report (PMST), DELWP advisory lists, which also includes FFG listings and EPBC Act status. In addition, online sources such as Birdlife Australia and Museums Victoria are utilised. With this information it is determined whether the site provides suitable habitat for any threatened or listed native fauna.

A general fauna survey is conducted in conjunction with the vegetation quality assessment. The search effort is conducted for a minimum of 2 person hours (or longer), during this time the study site is slowly traversed, any species directly sighted or heard are recorded. Trees (if present) bearing hollows and burrows are recorded, animal scats and footprints are also noted.

Birds are identified on site with binoculars and listening for their species-specific vocalisations. Simpson and Day (1999) 'Field Guide to the Birds of Australia 6<sup>th</sup> edn' is referred to on site to make identifications, in addition, a desktop search is conducted utilising sources such as Birdlife Australia to confirm identifications.



#### **3.2 Limitations**

Limitations were GPS drift and the estimating (subjective) process of the VQA (Habitat Hectares) methodology (DSE / DELWP 2004). The survey was conducted at the beginning of March, beginning of Autumn, many species at the site lacked flowers, thus, it was difficult to make accurate identifications.

This report only takes into consideration the zoning and overlays that directly relate to the environment, and the potential impact that proposed developments may have on the environment.

#### 4 Discussion & Results

Photographs of the study site are given in Appendix 2.

During the survey 11 native species and 25 exotic species were recorded. The native species, plus two exotic species which were thought to be natives at the time of the survey, were GPS waypointed. These waypoints and their locations are given in Appendix 1.1

Overall the study site is heavily modified and disturbed due to the land being previously farmed (prior to 2002) and subsequent earthwork, including the dumping of soil and gravel, which is evident throughout the site. There are a few areas that are cleared of vegetation, primarily the dirt and gravel driveway that begins at Baynes Street and continues up to Fraser Ridge. The hills and ridges located throughout the site appear to be man made and are covered in exotic species,

There appears to have been broad scale clearing of the area, the shrub and canopy layer typical of EVC 3 Damp Sands Herb-rich Woodland has been removed some time ago (presumably prior to 2002) and has been replaced with a variety of weed species. The site can be considered a derived grassland due to the tree and shrub layer being removed, however, the area is completely dominated by exotic species. Thus, it was concluded that EVC 3 Damp Sands Herb-rich Woodland no longer exists at the site, due to the area's highly modified nature and lack of native species.

The few native species were found amongst weeds. These native species were isolated and found in certain localities throughout the site. In the south-west corner of the property there was a kept area (it appeared to have been mowed at some stage) that contained a coverage of weeds and scattered Bracken. This area of Bracken was marked out with a GPS, though it did not constitute a patch of native vegetation as it was scattered amongst mowed exotic grasses and forbs. In addition, there is some debate as to whether Bracken can be, in certain instances, classified as an environmental weed.



Due to the lack of native vegetation a Vegetation Quanty Assessment could not be undertaken in full. No offsets are required, as there are no remnant patches of native vegetation or scattered canopy trees.

#### 4.1 Native Vegetation

As aforementioned, only 11 native species were identified, all species were found to be relatively isolated in distribution, large swathes of the site (particularly the centre of the property) did not appear to contain any native vegetation. No canopy trees exist on the site. The identification of many of the species was difficult due to a lack of flowers, which is considered a limitation of the survey. Native species were marked using the gps, their location is given in Appendix 1.1.

Scientific Name	Common Name	Notes
Acacia cyclops	Cyclops Wattle	
Acacia longifolia subsp sophorae	Coastal Wattle	
Acaena nova-zelandiae	Bidgee-widgee	
Apalochlamys spectabilis	Showy Cassinia	Species identified on dead material
Atriplex semibaccata	Australian Saltbush	Identification based upon foliage
Callistemon species		Possibly a garden escapee
<i>Lepidium</i> species		Unidentified woody species, appeared to be of Lepidium species
Leucopogon parviflorus	Coast Beard-heath	Identification based upon foliage
Leptospermum laevigatum	Coast Teatree	
Pteridium esculentum	Austral Bracken	Endemic to south-west corner of property, would not constitute a patch.
Pimelea serpyllifolia	Thyme Riceflower	Identification based upon foliage

#### Table 1: Native Flora Recorded During Survey

#### 4.2 Exotic Vegetation

The site was dominated by a variety of exotic species. Under the CaLP Act 1994 regionally prohibited weeds must be eradicated and controlled. These species are given in a table below.

Tuble 2. Exotic + egetution free	or deal During Survey	
Scientific Name	Common Name	Notes
<i>Avena</i> (species)	Wild Oat	
Cenchrus clandestinus (Hochst. ex Chiov)	Kikuyu Grass	
Cynodon dactylon	Couch Grass, Bermuda Grass	
Dactylis glomerata	Cocksfoot	
<i>Dodonaea viscosa</i> 'Purpurea'	Purple Hop Bush	
Foeniculum vulgare	Fennel	Restricted GHCMA
Helminthotheca echioides	Ox-tongue	
Holcus lanatus	Yorkshire Fog	
Hypochaeris glabra	Smooth Cat's Ear	
Hypochaeris radicata	Cat's Ear	
Lagurus ovatus	Hare's-tail Grass	
Lycium ferocissimum	African Boxthorn	Controlled weed across Victoria
Lythrum hyssopifolia	Lesser or Small Loosestrife	
Malva parviflora	Cheeseweed Mallow	
Medicago polymorpha	Burr Medic	
Melilotus indicus	Yellow Sweet Clover	
Paraserianthes lophantha	Cape Wattle	
Plantago lanceolata	Ribwort, Ribgrass, Plantain	
Raphanus raphanistrum	Wild Radish	
Rumex crispus	Curly Dock, Yellow Dock	
Solanum linnaeanum	Apple of Sodom	Restricted GHCMA
Sporobolus africanus	Rat-tail Grass, Parramatta Grass	
Trifolium dubium	Suckling Clover	

					~
Tahle 20	Exotic V	Vegetation	Recorded	During	Survey
Labic 2.	LAUR	v egetation	<b>I</b> (COTUCU	During	Survey

Vhite Clover	
Great Mullein	
v Si	hite Clover reat Mullein

GHCMA: Glenelg Hopkind Catchment Management Authority

#### 4.3 Fauna

No threatened diurnal vertebrate species were recorded within the study site or adjacent areas.

Species sighted were:

Nankeen Kestrel (Falco cenchroides) hunting in the south-west corner of the property.

A small passerine bird was heard; believed to be Superb Fairy-wren (*Malurus cyaneus*). Possibly inhabits a neighbouring property

Australian White Ibis (*Threskiornis molucca*) seen flying overhead and in the neighbouring property to the west (around Merri River).

\*White Italian Snails (*Theba pisana*) were also seen throughout the study site. White Italian Snails are a pest species.



Image 5: Picture of Nankeen Kestrel Hunting for Insects

## 4.3.1 Threatened Terrestrial Fauna **DVERTISED**

Threatened and endangered species within a 5km radius of the property is given in Appendix 1.2.

Threatened native fauna includes species that are listed as critically endangered or vulnerable under the EPBC Act (1999); listed threatened under the FFG Act (1988); and listed as critically endangered, vulnerable or rare in Victoria's rare or threatened fauna advisory lists (DELWP; DSE 2009, 2013).

No threatened species were recorded within the study site.

The property in its present condition would be (highly) unlikely to provide sufficient habitat for any threatened or endangered species. Bird species may be seen flying overhead, particularly towards the coast and the Merri River. There may be some predation of italian white snails from birds, but it is unlikely.

#### 4.4 Implications of the Proposed Development

Due to the lack of native vegetation, there was no data that could be submitted to generate a DELWP NVR report and therefore, no offset would be required if the proposed subdivision is to occur. As discussed in the results, the study site has been heavily modified and disturbed due to it being former farming land and subsequent earthworks; EVC 3 Damp Sands Herb-rich Woodland has been removed from the site.

Therefore, the proposed subdivision of the site would (or should not) not impact upon any native vegetation or threatened and endangered species.

#### **5** Conclusion

It is proposed that the study site in Deverell Way, Warrnambool be subdivided into a housing estate, thus, a Vegetation Quality Assessment had to be undertaken to determine whether the proposed subdivision would impact upon any native vegetation and fauna species.

A VQA was undertaken on the 8<sup>th</sup> of March 2021. The study site is a highly modified and degraded lot of land. According to mapping the property once contained EVC 3 Damp Sand Herb-rich Woodland, however, this EVC appears to be non-existent having most likely been removed some years ago.

Prior to 2002 the land was utilised for farming which most likely led to broadscale clearing of the land and the introduction of agricultural species and other weeds. The condition of the study site further deteriorated due to what appears to be extensive earthworks, the shifting and dumping of soil, rocks and gravel. Consequently, the land is devoid of canopy genera trees and a shrub layer, with the ground cover being almost exclusively covered in a variety of weed species, some of which are regionally restricted or controlled. What few native species found were generally isolated and located amongst the weedy coverage.

Due to the lack of native vegetation, specifically the lack of patches of native vegetation and scattered canopy trees, only a partial VQA was undertaken. In other words, there was insufficient data to generate a Native Vegetation Removal (NVR) report and an offset would not be required should the proposed subdivision be approved.

The proposed subdivision should not significantly impact upon the areas biodiversity value or environs.

#### **5.1 References**

Agriculture Victoria: <u>http://agriculture.vic.gov.au/agriculture/pests-diseases-andweeds/</u> protectingvictoria-from-pest-animals-and-weeds/legislation-policy-and-permits/noxiousweedand-pestanimal-management-your-legal-roles-and-responsibilities

Blood K. 2001. Environmental Weeds, A Field Guide for SE Australia.

DELWP: Victorian Department of Environment, Land, Water and Planning

DELWP - ENSym NVR tool-spatial data standards: https://ensym.biodiversity.vic.gov.au/nvr\_tool/

DELWP 2017 a. Guidelines for the Removal, destruction or lopping of native vegetation.

DELWP 2017 b. Exemptions from requiring a planning permit to remove, destroy or lop native vegetation. Guidance.

DELWP 2018. Assessors handbook. Applications to remove, destroy or lop native vegetation.

DELWP. Native Vegetation Information Management system (NVIM): https://nvim.delwp.vic.gov.au/

DELWP. Nature Kit: https://www.environment.vic.gov.au/biodiversity/naturekit

DELWP. Victorian Biodiversity Atlas: https://www.environment.vic.gov.au/biodiversity/victorianbiodiversity-atlas

DSE: former Victorian Department of Sustainability and the Environment (now DELWP)

DSE 2004 a. EVC 3 Damp Sands Herb-rich Woodland, Warrnambool Plain Bioregion, EVC/Bioregion Benchmark for Vegetation Quality Assessment.

DSE 2004. Vegetation Quality Assessment Manual – Guidelines for applying the habitat hectares scoring method. Version 1.3

DSE (DELWP) 2009. Advisory List of Threatened Invertebrate Fauna in Victoria – 2009

DSE (DELWP) 2011. Native Vegetation Technical Information Sheet. Defining an acceptable distance for tree retention during construction works.

DSE (DELWP) 2013. Advisory List of Threatened Vertebrate Fauna in Victoria - 2013

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Flora of Victoria: https://vicflora.rbg.vic.gov.au/

Glenelg Hopkins Catchment Management Authority. 2019. Weeds of the Glenelg Hopkins Catchment. 3<sup>rd</sup> Edition.

Kent M. & Coker P. 1995. Vegetation Description and Analysis. A Practical Approach. John Wiley & Sons Ltd., Chichester, England.

Lindenmayer D.B. and Fischer J. 2006. Habitat Fragmentation and Landscape Change. An Ecological and Conservation Synthesis. CSIRO Publishing, Collingwood, 3066.

Planning Clause 52.17: http://planningschemes.dtpli.vic.gov.au/schemes/vpps/52\_17.pdf

VicPlan: https://mapshare.vic.gov.au/vicplan/

## Appendix 1



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#### Table: Waypoints (feature) and Species

Waypoint no.	Species Name	Notes
1	scattered <i>Leucopogon parviflorus</i> (x5)	Some of the shrubs would be less than 30 cm in height, all under a metre in height. Would not form a patch of native vegetation.
2	scattered <i>Leucopogon parviflorus</i> (x4)	Some of the shrubs would be less than 30 cm in height, all under a metre in height. Would not form a patch of native vegetation.
3	isolated small <i>Leucopogon parviflora</i> shrub (x1)	Would not form a patch of native vegetation.
4	Acacia longifolia subsp sophorae (x1) and Acacia cyclops shrub (x1)	
5	Dodonaea viscosa 'Purpurea'	New Zealand cultivar. Exotic
6	Callistemon species shrub (x1)	Possibly a garden escapee
7	Pimelea serpyllifolia shrub (x1)	
8	Leucopogon parviflorus plant (x1)	Under 30cm
9	Unidentified. Potentially <i>Lepidium</i> species	Small woody species under 30cm
10	Paraserianthes lophantha shrub (x1)	Exotic Species
11	Leucopogon parviflorus plant (x1)	Under 30cm
12	Leucopogon parviflorus plant (x1)	Under 30cm
13	Acaena novae-zelandiae plant (x1)	
14	<i>Leucopogon parviflorus</i> (x3) and <i>Leptospermum laevigatum</i> (1)	The shrubs are scattered with an area and would not provide 25 percent cover of perennial species and thus would not form a patch of native vegetation.
15	scattered small <i>Leucopogon parviflorus</i> (x2) shrubs and <i>Leptospermum laevigatum</i> (x5) shrubs.	Occur in the area of waypoints 14 are all under a metre in height. The area is dominated by exotic vegetation.
16	small scattered <i>Leucopogon parviflorus</i> (x2) shrubs	30cm in height
17	Leucopogon parviflorus (x1) shrub	Just under 30cms in height.
18	small Atriplex semibaccata (1) plant	

		VFRT	<b>ISF</b>	
19*	Area of scattered Pteridium es	sculentum	*outlined in bl	ue on the map

**Note**: Waypoint 5 & 10 are exotic species. In addition, one dead *Apalochlamys spectabilis* plant was also sighted. Species identification was based on dead material.



### Appendix 1.2 Threatened and Endangered Species within a Skm Kadius of the Property

Method for generating the list is given in s 3.1 and again in 4.3.1. Only terrestrial species were included in this list. It is worth noting that the 5km radius extends to the coast (Belfast Coastal Reserve) and well into the ocean to the south, it also extends to the Merri River to the west and into Kelly Swamp roughly south-west of the site. Thus, the generated list included many threatened and endangered marine, coastal and wetland species (such as Tern species, Albatross species, a variety of fish and so on) which would not inhabit the study site. Consequently, these species were ommitted from the list, however, it is worth noting that some species such as Great Egret (*Ardea modesta*), Glossy Ibis (*Plegadis falcinellus*) may be seen flying over the site to suitable habitat. Given the condition of the study site the chances of these species stopping at the site are neglible.

Table given below

Key:

No = Species habitat not present

Improbable = A small (low) chance that the species may occur Likely = Species likely to occur/or site contains suitable habitat Yes = Detected during survey

- DSE/DELWP Listed
- CR critically endangered
- EN endangered
- VU vulnerable
- NT near threatened

FFG Act Listed L listed as threatened

- atened
- EPBC ACT cr critically endangered
- en endangered
- vu vulnerable
- M migratory

				*Las	ast Victoria Biodiversity Atlas Recording of Species			
Scientific	Scientific Common Conservation Status		us	Habitat	Likely	Comments		
Name	Name					occurrence		
		DELWP	FFG	EPBC		VBA		
						records*		
Amphibians								
Litoria	Growling	EN	L	vu	Associated with dams, ponds $\&$	No	Study site	
raniformis	Grass Frog				marshes, either among sedges $\&$	1961	does not	
					other semi-aquatic vegetation.		contain	
					Occurs in both woodlands and areas		necessary	
					of improved pasture (Hero et al.,		, habitat	
					2004).			
Birds	1							
		VU	L				Study site	
Accipiter	Grey				found in coastal areas. Most forest	No	does not	
novaeholla	Goshawk				types, especially tall-closed forests,	1993	contain	
ndiae					including rainforests		necessary	
novaeholla							habitat.	
ndiae							Improbable,	
nalac							but may	
							forage in the	
							area.	
Circus	Spotted	NT			Occurs in grassy open woodland		Study site	
assimilis	Harrier				including Acacia and mallee	No	does not	
					remnants, inland riparian woodland,		contain	
					grassland and shrub steppe. It is		necessary	
					found most commonly in native		habitat But	
					grassland, but also occurs in	2001	may forago in	
					agricultural land, foraging over open	2001	may lorage in	
					habitats including edges of inland		the area.	
					wetlands.			

Δ	Π	V	F	R	27		S	F	Π	
	Ju	il <b>d.</b> a	stick n	st i	.at.	ee	in. Lys			

				Suilds a stick nest heathee and dys		
				eggs in spring (or sometimes		
				autumn), with young remaining in		
				the nest for several months.		
				Preys on terrestrial mammals (e.g.,		
				bandicoots, bettongs, and rodents),		
				birds and reptile, occasionally		
				insects and rarely carrion		
Dromaius	Emu	NT		Varied habitat, temperate to	No	Study site
novaehollan				tropical regions at all altitudes.		does not
diae				Plains, Scrublands, open woodlands,	1960	contain
				pastoral lands, semi-desert and		suitable
				margins of lakes (Atlas of Living		habitat (or
				Australia)		torrain)
Falco	Plack		*	Inhabits woodland, shruhland and	No	Study site
Lubricor		10		grassland in the arid and semi-arid		doos not
Subriger	Falcon		nomino	zones, especillav wooded (eucalynt		does not
			tod in	dominated) watercourses: it also		contain
				uses agricultural land with scattered		necessary
			2010	remnant trees. Often associated	1951	habitat. Tends
				with streams or wetlands visiting		to prefer arid
				them in search of prev. Uses dead		& semi-arid
				trees as lookout postsnests in		zones. Rare
				healthy, bird-rich riparian woodland		chance that it
				remnants. Prey: birds, small		may forage in
				mammals, insect, reptiles and		the area.
				carrion (Fauna and Flora Guarantee		
				2017 Nomination – Falco subniger).		
Hirundapus	White-	VU	vu/M	Migratory. Almost exclusively aerial.	No	This species is
caudacutus	throated			Cover over most habitats,	1986	almost
	Needletail			particularly wooded areas, open		exclusivey
	neculciali			forests and rainforests. Also occur		aerial. The
				over heathlands. Recorded to roost		study site
				in trees in forests and woodlands in		does not
				dense foliage in the canopy or		contain
				hollows (EPBC Act 1999)		
						roosting
						habitat for
						this species.
						May fly over
						site.

						_	
Neophema	Orange-	CR	L	6.	Breeds in south west Tasmana,		Study site
chrysogaste	bellied				after breeding season they migrate		does not
r	Parrot				across the Bass Strait to spend the	No	contain
					winter in mainland Australia. Adults		necessary
					leave a few weeks before juveniles.		, habitat, Rare
					Easily confused with other small		chance that it
					'grass parrots' which they often		may fly
					associate with. Non-breeding	1087	
					habitat: almost exclusively found in	1707	through the
					locations associated with coastal		area to
					saltmarshes and adjacent pastures,		adjacent
					close to free-standing water bodies.		pastureland,
					Most species forage on Beaded		saltmarshes
					Glasswort, Austral Seablight and		etc.,
					Shrubby Glasswort. Also observed		
					feeding in pastures (within 500m of		
					saltmarshes & 200m from a		
					waterbody). Roost in dense		
					shrubbery. Require a diversity of		
					foraging opportunities near coastal		
					areas. Have a very small population		
					size (DELWP 2016, National		
					Recovery Plan).		
Allinant	Parking Oud		1		N a strong of Farmed in a second	No	Ctuducaita
NINOX	Darking Owi	EIN	L		Nocturnal. Found in open	INO	Study site
Ninox Connivens	Darking Owi	EIN	L		woodlands and edges of forests,	NO	does not
Ninox Connivens	Barking Owi	EN	L		woodlands and edges of forests, often adjacent to farmland. Less		does not contain
Connivens	Darking Owi	EN	L		Nocturnal. Found in open woodlands and edges of forests, often adjacent to farmland. Less likely to use the interior of forested	1960	does not contain necessary
Ninox Connivens	Darking Owi	EN	L		Nocturnal. Found in open woodlands and edges of forests, often adjacent to farmland. Less likely to use the interior of forested habitat. Prefer habitat dominated	1960	does not contain necessary habitat
Connivens	Darking Owi	EN	L		Nocturnal. Found in open woodlands and edges of forests, often adjacent to farmland. Less likely to use the interior of forested habitat. Prefer habitat dominated by large eucalyptus species: red	1960	does not contain necessary habitat
Connivens	Darking Owi	EN	L		Nocturnal. Found in open woodlands and edges of forests, often adjacent to farmland. Less likely to use the interior of forested habitat. Prefer habitat dominated by large eucalyptus species: red gum and paperback species, that	1960	does not contain necessary habitat
Connivens	Darking Owi	EN	L		Nocturnal. Found in open woodlands and edges of forests, often adjacent to farmland. Less likely to use the interior of forested habitat. Prefer habitat dominated by large eucalyptus species: red gum and paperback species, that contain hollows for roosting.	1960	does not contain necessary habitat
Connivens	Darking Owi	EN	L		Nocturnal. Found in open woodlands and edges of forests, often adjacent to farmland. Less likely to use the interior of forested habitat. Prefer habitat dominated by large eucalyptus species: red gum and paperback species, that contain hollows for roosting. Roosting sites are often near	1960	does not contain necessary habitat
Connivens	Darking Owi	EN			Nocturnal. Found in open woodlands and edges of forests, often adjacent to farmland. Less likely to use the interior of forested habitat. Prefer habitat dominated by large eucalyptus species: red gum and paperback species, that contain hollows for roosting. Roosting sites are often near waterbodies. Prey on small-medium	1960	does not contain necessary habitat
Connivens	Darking Owi	EN	L		Nocturnal. Found in open woodlands and edges of forests, often adjacent to farmland. Less likely to use the interior of forested habitat. Prefer habitat dominated by large eucalyptus species: red gum and paperback species, that contain hollows for roosting. Roosting sites are often near waterbodies. Prey on small-medium sized mammals, birds, reptiles and	1960	does not contain necessary habitat
Connivens		EIN	L		Nocturnal. Found in open woodlands and edges of forests, often adjacent to farmland. Less likely to use the interior of forested habitat. Prefer habitat dominated by large eucalyptus species: red gum and paperback species, that contain hollows for roosting. Roosting sites are often near waterbodies. Prey on small-medium sized mammals, birds, reptiles and insects.	1960	does not contain necessary habitat
Ninox Connivens Nycticorax	Nankeen	NT	L		Nocturnal. Found in open woodlands and edges of forests, often adjacent to farmland. Less likely to use the interior of forested habitat. Prefer habitat dominated by large eucalyptus species: red gum and paperback species, that contain hollows for roosting. Roosting sites are often near waterbodies. Prey on small-medium sized mammals, birds, reptiles and insects. Frequents well vegetated wetlands,	N0 1960 No	does not contain necessary habitat
Ninox Connivens Nycticorax caledonicus	Nankeen Night-Heron	NT	L		Nocturnal. Found in open woodlands and edges of forests, often adjacent to farmland. Less likely to use the interior of forested habitat. Prefer habitat dominated by large eucalyptus species: red gum and paperback species, that contain hollows for roosting. Roosting sites are often near waterbodies. Prey on small-medium sized mammals, birds, reptiles and insects. Frequents well vegetated wetlands, and is found along shallow river	No 2019	does not contain necessary habitat Study site does not
Ninox Connivens Nycticorax caledonicus	Nankeen Night-Heron	NT	L		Nocturnal. Found in open woodlands and edges of forests, often adjacent to farmland. Less likely to use the interior of forested habitat. Prefer habitat dominated by large eucalyptus species: red gum and paperback species, that contain hollows for roosting. Roosting sites are often near waterbodies. Prey on small-medium sized mammals, birds, reptiles and insects. Frequents well vegetated wetlands, and is found along shallow river margins, mangroves, floodplains,	No 2019	does not contain necessary habitat Study site does not contain
Ninox Connivens Nycticorax caledonicus	Nankeen Night-Heron	NT			Nocturnal. Found in open woodlands and edges of forests, often adjacent to farmland. Less likely to use the interior of forested habitat. Prefer habitat dominated by large eucalyptus species: red gum and paperback species, that contain hollows for roosting. Roosting sites are often near waterbodies. Prey on small-medium sized mammals, birds, reptiles and insects. Frequents well vegetated wetlands, and is found along shallow river margins, mangroves, floodplains, swamps, and parks and gardens.	No 2019	Study site does not contain necessary habitat Study site does not contain necessary
Ninox Connivens Nycticorax caledonicus	Nankeen Night-Heron	NT	L		Nocturnal. Found in open woodlands and edges of forests, often adjacent to farmland. Less likely to use the interior of forested habitat. Prefer habitat dominated by large eucalyptus species: red gum and paperback species, that contain hollows for roosting. Roosting sites are often near waterbodies. Prey on small-medium sized mammals, birds, reptiles and insects. Frequents well vegetated wetlands, and is found along shallow river margins, mangroves, floodplains, swamps, and parks and gardens. Spends most of the day roosting	No 2019	Study site does not contain necessary habitat Study site does not contain necessary habitat
Ninox Connivens Nycticorax caledonicus	Nankeen Night-Heron	NT			Nocturnal. Found in open woodlands and edges of forests, often adjacent to farmland. Less likely to use the interior of forested habitat. Prefer habitat dominated by large eucalyptus species: red gum and paperback species, that contain hollows for roosting. Roosting sites are often near waterbodies. Prey on small-medium sized mammals, birds, reptiles and insects. Frequents well vegetated wetlands, and is found along shallow river margins, mangroves, floodplains, swamps, and parks and gardens. Spends most of the day roosting hidden among dense foilage	No 2019	Study site does not contain necessary habitat Study site does not contain necessary habitat
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Ninox Connivens Nycticorax caledonicus Mammals	Nankeen Night-Heron	NT			Nocturnal. Found in open woodlands and edges of forests, often adjacent to farmland. Less likely to use the interior of forested habitat. Prefer habitat dominated by large eucalyptus species: red gum and paperback species, that contain hollows for roosting. Roosting sites are often near waterbodies. Prey on small-medium sized mammals, birds, reptiles and insects. Frequents well vegetated wetlands, and is found along shallow river margins, mangroves, floodplains, swamps, and parks and gardens. Spends most of the day roosting hidden among dense foilage (Birdlife Australia).	No 2019	Study site does not contain necessary habitat Study site does not contain necessary habitat
Ninox Connivens Nycticorax caledonicus Mammals Pteropus	Nankeen Night-Heron Grey-	NT		VU	Nocturnal. Found in open woodlands and edges of forests, often adjacent to farmland. Less likely to use the interior of forested habitat. Prefer habitat dominated by large eucalyptus species: red gum and paperback species, that contain hollows for roosting. Roosting sites are often near waterbodies. Prey on small-medium sized mammals, birds, reptiles and insects. Frequents well vegetated wetlands, and is found along shallow river margins, mangroves, floodplains, swamps, and parks and gardens. Spends most of the day roosting hidden among dense foilage (Birdlife Australia).	No 2019	Study site does not contain necessary habitat Study site does not contain necessary habitat
Ninox Connivens Nycticorax caledonicus Mammals Pteropus poliocephal	Nankeen Night-Heron Grey- headed	NT VU		vu	Nocturnal. Found in open woodlands and edges of forests, often adjacent to farmland. Less likely to use the interior of forested habitat. Prefer habitat dominated by large eucalyptus species: red gum and paperback species, that contain hollows for roosting. Roosting sites are often near waterbodies. Prey on small-medium sized mammals, birds, reptiles and insects. Frequents well vegetated wetlands, and is found along shallow river margins, mangroves, floodplains, swamps, and parks and gardens. Spends most of the day roosting hidden among dense foilage (Birdlife Australia).	No 1960 No 2019 No	Study site does not contain necessary habitat Study site does not contain necessary habitat Site does not contain the

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					located Eastern Australia. They are typically found at elevation less than 200m but have been found at elevations as great as 700m. Prefer to roost in branches of large tree' (Atlas of Living Australia).	2014	habitat
Miniopterus	Common	CR	L	cr	'Occurs only in south-western		Site does not
schreibersii	Bent-wing				Victoria extending into the south-	No	contain the
Group* (Miniopteru s schreibersii bassanii)	Bat. Most likely Southern Bent-wing Bat				Habitat preference is associated with the availability of foraging areas and proximity to suitable roosting cavesRoosts exclusively in cave like structures' (SWIFFT)	1967	necessary habitat *VBA lists Miniopterus schreibersii Group. PMST suggests that Miniopterus schreibersii bassanii may occur within the area.
Reptiles							
Lissolepis coventryi	Swamp Skink	Vu	L		Diurnal heliothern. Mostly restricted to densely vegetated swamps and associated watercourse, and adjacent wet heaths (Melaleuca or Leptospermum thickets), sedgelands and saltmarshes (Clemann 2000, SAC 2000, Manning 2002). Can occur in assocation with freshwater and saltmarsh environment. Basks on timber, sedges and tussocks, active Sept- May. Shelters in freshwater crayfish	No 2018	Site does not contain the necessary habitat.
					burrows, rocks, logs, tussocks and sedges (SWIFFT)		

# Appendix 2 Photographs of Study Site (08/03/2021)



weed, Melilotus indicus



weed, Lagurus ovatus



side of hill covered in weeds



soil, rocks and other material dumped.



Pimelea serpyllifolia one of the few natives at the site



Leptospermum laevigatum shrub. One of the few natives at the study site



Leucopogon parviflorus shrub. One of the few native at the study site



Pteridium esculentum found in the south-west corner of the property



Dodonaea viscosa 'Purpurea' shrub a New Zealand cultivar found in drainage area located in the northern section of the property



Image taken facing north west, overlooking the majority of the site



Image taken from the southern end of the property looking west









## 7 Deverell Way, Warrnambool 3280

Cultural Heritage Management Plan 18097



SPONSOR:	
HERITAGE ADVISOR:	
AUTHOR:	
DATE:	

R L Blake Pty Ltd Annette Xiberras Leigh Painter 7 November 2021



U.C.A. PTY LTD CULTURAL HERITAGE PLANNERS www.urbancolours.com.au





Eastern Maar Aboriginal Corporation

PO Box 546 Warrnambool VIC 3280

15.11.2021

#### CULTURAL HERITAGE MANAGEMENT PLAN - NOTICE OF APPROVAL

The Eastern Maar Aboriginal Corporation, trading as Eastern Maar Aboriginal Corporation RNTBC, acting as the Registered Aboriginal Party, herby approve the Cultural Heritage Management Plan as referred to below:

CHMP Name:	Residential subdivision & Precinci	t Plan 7 Devereli Wa	y, Warrnambool
CHMP Number:	18097		
Sponsor:	R L Blake Pty Ltd	ABN:	93 079 805 066
Heritage Advisor (s):	Annette Xiberras		
Author(s):	Leigh Painter		
Cover Date:	07.11.2021	Pages:	i-ix/1-115

Eastern Maar Aboriginal Corporation are satisfied that the CHMP has been prepared in accordance with the standards prescribed for the purposes of Section 53 of the *Aboriginal Heritage Act 2006*, and the CHMP adequately addresses the matters set out in Section 61.

Pursuant to Section 64 [1] of the Aboriginal Heritage Act 2006 this Cultural Heritage Management Plan takes effect upon the granting of this approval and once a copy is logged with the Secretary \*.

Yours Sincerely,

Marcus Clarke CEO Eastern Maar Aboriginal Corporation RNTBC

"This notice of approval should be inserted after the title page and bound with the body of the cultural heritage management plan.

www.easternmaar.com.au



## Residential Subdivision & Precinct Plan

7 Deverell Way, Warrnambool 3280

Cultural Heritage Management Plan Number: 18097

Activity size	Medium
Level of Assessment	Desktop, Standard, Complex
<i>Is there registered Aboriginal cultural heritage present in the activity area?</i>	No
Sponsor	R L Blake Pty Ltd
Heritage Advisor	Annette Xiberras
Authors	Leigh Painter
Report Date	7 November 2021

#### Acknowledgements

U.C.A. Pty Ltd Cultural Heritage Planners would like to thank the following organisations for assisting with the development of this cultural heritage management plan:

- Eastern Maar Aboriginal Corporation (EMAC)
- Aboriginal Victoria.
- R L Blake Pty Ltd (Sponsor)
- Justin Hinch of Milward Engineering Management Pty Ltd (Sponsor's agent)

#### urban colours arts

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Citation: Painter, L. (2021). Residential Subdivision and Precinct Plan: 7 Deverell Way, Warrnambool 3280, Cultural Heritage Management Plan No: 18097. Unpublished report by Urban Colours Arts Pty Ltd prepared for R L Blake Pty Ltd.


#### Disclaimer

Urban Colours Arts Pty Ltd has completed this assessment in accordance with the relevant federal, state and local legislation and current industry best practice. The CHMP has been prepared to comply with the *Aboriginal Heritage Act 2006* (Vic) (No. 020, 2016) and the *Aboriginal Heritage Regulations 2018* (Vic) (No. 59, 2018). The company accepts no liability for any damages or loss incurred as a result of reliance placed upon the report content or for any purpose other than that for which it was intended.

The information contained in this CHMP references information contained in government heritage databases and similar sources and is, to the best knowledge of Urban Colours Arts Pty Ltd, true and correct at the time of report production. While this CHMP contains a summary of information it does not provide, nor does it intend to provide, an exhaustive coverage and assessment of all available research materials in relation to the activity area. Urban Colours Arts Pty Ltd does not accept liability for errors or omissions referenced in primary or secondary sources.

Any opinions expressed in this CHMP are those of Urban Colours Arts Pty Ltd and do not represent those of any third parties. Urban Colours Arts Pty Ltd have undertaken reasonable efforts to consult with Registered Aboriginal Parties and representatives of relevant Traditional Owner groups who are, to the best of our knowledge and advice, the legal and proper representatives of the local Aboriginal community relevant to the activity area. However, Urban Colours Arts Pty Ltd will not be held responsible for opinions or actions that may be expressed by dissenting persons or organisations.

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#### Abbreviations

Acronym*	Description
ACHRIS	Aboriginal Cultural Heritage Register and Information Services
Act, the	Aboriginal Heritage Act 2006 (Vic) (No. 020, 2016)
asl	Above Sea Level
AV	Aboriginal Victoria
BP	Years Before Present (1950)
CHMP	Cultural Heritage Management Plan
dGPS	Differential Global Positioning System
DPC	Department of the Premier and Cabinet (Victoria)
EMAC	Eastern Maar Aboriginal Corporation
ESC	Effective survey Coverage
EVC	Ecological Vegetation Class
GDA94	Geodetic Datum Australia 1994
GSV	Ground Surface Visibility
HA	Heritage Advisor
ha	Hectares
HV	Heritage Victoria
LCC	Land Conservation Council
LDAD	Low Density Artefact Distribution
LGA	Local Government Authority
LGM	Last Glacial Maximum
MGA	Map Grid of Australia
NOI	Notice of Intent to Prepare a Cultural Heritage Management Plan
PAD	Potential Archaeological Deposit
RAP	Registered Aboriginal Party
Regulations, the	Aboriginal Heritage Regulations 2018 (Vic) (No. 59, 2018)
RTP	Radial Test Pit
SGD	Significant Ground Disturbance
STP	Shovel Test Pit
Т/О	Traditional Owner/s
TP	Test Pit
VAHR	Victorian Aboriginal Heritage Register

\*See Glossary (Appendix 5) for explanation of some of these terms.

\*\*Throughout this report technical terms are used that may not be familiar to some readers. An extensive glossary has been included as Appendix 5 and should be referenced for an explanation of terms.



### **ADVERTISED** Executive Summary

Compliance requirements are set out in Part 1 of the Cultural Heritage Management Plan.

This cultural heritage management plan (CHMP) has been prepared in accordance with Part 4 of the Victorian *Aboriginal Heritage Act 2006* (Vic) (No. 020, 2016) and is required by the *Aboriginal Heritage Regulations 2018* (Vic) (No. 59, 2018). It has been prepared for a proposed residential development at 7 Deverell Way, Warrnambool, and is sponsored by R L Blake Pty Ltd.

The activity area is a residential block of 7.15 ha located at 7 Deverell Way, Warrnambool, approximately 225 km south-west of Melbourne CBD (Map 1). The activity area is located with the Warrnambool City Council and within the Parish of Wangoom and is currently zoned as General Residential Zone – Schedule 1 (GRZ1) and Farming Zone (FZ). The activity is a proposed residential subdivision creating around 53 new lots expanding on an existing development, along with the construction of associated precinct infrastructure, including utility services, underground drainage, an open cut drain and roadways.

The desktop assessment involved research and analysis of the known Aboriginal archaeology of the regional and local setting, a description of the ethno-history applicable to the activity area, a description of the environment, geology and geomorphology of the activity area and its surrounding landscape, and a review of the land use history of the activity area, and implications for the cultural heritage sensitivity of the activity area.

The results of the desktop assessment indicated that there are no previously recorded Aboriginal places within the current activity area. The nearest recorded Aboriginal place (7321-0003) is a shell midden whose extent comes within 330m to the west of the activity area. In total, there are 13 previously recorded Aboriginal places within a 2km radius of the activity area (Map 6). The places comprise artefact scatters (8) low density artefact distributions (3), and shell middens (2), one of which contains an earth feature component (see Table 5).

The standard assessment involved a pedestrian survey and confirmed that the activity area contained two single landforms; a dune and a swampy floodplain. The activity area is located on a dune that is rising to the north east away from the floodplain of Kelly Swamp/Merri River. The pedestrian survey noted that the northern portion of the activity area contained a substantial amount of deposited fill to create a raised surface above the natural dune landscape. In addition to this there were drainage works identified and the south of the raised surface contained obvious levelling and grading to create surfaces for residential dwellings. The lower portions of the dune was considered to be representative of the original landform and was the focus of the subsurface testing. The swampy floodplain was observed to be raised above the terrain to the south and considered to have been built up to prevent inundation. As such, a 1 x 1m stratigraphic test pit was not conducted within the swampy floodplain. No Aboriginal cultural heritage was identified during the standard assessment.

One 1 x 1 m test pit and 15 50 x 50 cm shovel test pits were excavated during the complex assessment. The soil profile contained a silty loam A1 horizon with a gradual transition to sandier loam as elevation increased. There were some larger pockets of sand underlying calcarentie accumulations within the dune landform and these were not located within the swampy floodplain landform. A culturally sterile clay was identified within the upper 600mm in all located except the sand pockets. The swampy floodplain was confirmed to contain up to 300mm of fill deposition and considerable ground disturbance which extended into culturally sterile clay in some locations. No Aboriginal cultural heritage was identified during the complex assessment.





Exec	utive Summa	ary	vi
Cont	ents		vii
	Tables	ix	
	Figures	ix	
	Maps	ix	
	Plates	x	
Part	1 – Cultural	Heritage Management Conditions	1
1	Cultural He	eritage Management Conditions	1
	1.1	General Cultural Heritage Management Conditions	1
2	Aboriginal	Cultural Heritage Management Contingencies	4
	2.1	Contingency 1 – Discovery of Unexpected Aboriginal Cultural Heritage During the Activity	4
	2.2	Contingency 2 – Removal, curation, custody and management of Aboriginal cultural heritage	6
	2.3	Contingency 3 – Unexpected Discovery of Ancestral Human Remains	7
	2.4	Contingency 4 – Dispute resolution	8
	2.5	Contingency 5 – Reviewing Compliance with the management plan	8
	2.6	Contingency 6 – Remedying non-compliance with the management plan	10
	2.7	Contingency 7 – Use of Lots	10
Part	2 – Assessm	ent	12
3	Introductio	)n	13
	3.1	Background	13
	3.2	Name of Sponsor	13
	3.3	Name of Owner and Occupier of the Activity Area	13
	3.4	Location of the Activity Area	13
	3.5	Reason for Preparing the Cultural Heritage Management Plan	13
	3.6	Notice of Intent to Prepare the Cultural Heritage Management Plan	14
	3.7	Registered Aboriginal Party Responsible for the Activity Area	14
	3.8	Aims of the Assessment	14
	3.9	Personnel Involved	14
	3.10	Report Submission	15
4	Activity De	scription	16
5	Extent of t	ne Activity Area	17
6	Document	ation of Consultation	20
	6.1	Consultation in Relation to the Assessment	20
	6.2	Participation in the conduct of the assessment	21



## 

	6.3	Consultation in relation to the conductors	21
	6.4	Summary of outcomes of consultation	22
7	Desktop A	ssessment	
	7.1	Method of Assessment	23
	7.2	The Geographic Region	23
	7.3	The Geology and Geomorphology of the Activity Area	24
	7.4	Climate	24
	7.5	Native Vegetation and Fauna	25
	7.6	Historical and Ethno-historical Accounts in the Geographic Region	29
	7.7	Land Use History	31
	7.8	Aboriginal Places in the Geographic Region	37
	7.9	Previous Studies in the Geographic Region	40
	7.10	Site Prediction Model	44
	7.11	Conclusions from the Desktop Assessment	44
8	Standard /	Assessment	45
	8.1	Introduction	45
	8.2	Aims of the Standard Assessment	45
	8.3	Methodology of the Standard Assessment	45
	8.4	Traditional Owner Information	46
	8.5	Ground Surface Visibility and Exposure	46
	8.6	Standard Assessment Results	46
	8.7	Standard Assessment Conclusion	47
9	Complex A	Assessment	56
	9.1	Complex Assessment Fieldwork	56
	9.2	Aims of Complex Assessment	56
	9.3	Fieldwork Methods	56
	9.4	Complex Assessment Limitations	57
	9.5	Complex Assessment Results	57
	9.6	Aboriginal Cultural Heritage Places	69
	9.7	Complex Assessment Conclusions	69
10	Considera	tion of s.61 Matters – Impact Assessment	70
	10.1	Introduction	70
	10.2	Consideration of impact of planned activity	70
	10.3	Are there particular contingency plans that might be necessary? [61(d)]	70
	10.4	What custody and management arrangements might be needed? [61(e)]	71
	10.5	Cumulative Impact Statement	71



References	
Appendix 1: Notice of Intent to Prepare a CHMP	76
Appendix 2: RAP Response to NOI	
Appendix 3: Concept Development Plan	
Appendix 4: Dial Before You Dig Enquiry	
Appendix 5: Glossary	95
Appendix 6: Permitted Uses General Residential Zone 1 (GRZ1)	97
Appendix 7: Permitted Uses Farming Zone (FZ)	

#### **Tables**

Table 1: Cadastral information	17
Table 2: Consultation in Relation to the Assessment	20
Table 3: Participation in the conduct of the assessment	21
Table 4: Consultation in relation to the conditions	21
Table 5: Previously registered Aboriginal places within 2 km of the activity area	37
Table 6: Location Coordinates* for Complex Assessment Excavations	58
Table 7: Test Pits (TP) 1000 x 1000 mm	60
Table 8: Shovel Test Pits (STP) 500 x 500 mm	60

### **Figures**

Figure 1: Parish of Wangoom 1891: Approximate location of activity area defined by red square (State Library of Victoria 2020).	34
Figure 2: The activity area in 1979: Proposed subdivision defined by red polygon (Landata 2021)	35
Figure 3: Aerial photography of activity area 1987: Proposed subdivision defined by red polygon (Landata 2021)	35
Figure 4: Aerial photography of activity area 2003	36
Figure 5: Test Pit 1 Stratigraphy	58

### Maps

Map 0: Compliance Inspections	3
Map 1: Location of the activity area	18
Map 2: Existing conditions of the activity area	19
Map 3: Geology of the activity area and local geographic region	26
Map 4: Geomorphology of the activity area and local geographic region.	27
Map 5: Pre-1750s biodiversity map of region.	28
Map 6: Previously registered Aboriginal places within the geographic region	39
Map 7: Standard Assessment Results	49



Map 8: Complex Assessment Results

### **Plates**

Plate 1: Facing West from unpaved gravel driveway in central portion of the activity area (Photo credit: Adam Lovett 17/08/21)	50
Plate 2: Facing Northwest from unpaved gravel driveway (Photo credit: Adam Lovett 17/08/21)	50
Plate 3: Facing South along the graded and levelled surface at the rear of the existing lots (Photo credit: Adam Lovett 17/08/21)	51
Plate 4: Facing North along unpaved gravel driveway (Photo credit: Adam Lovett 17/08/21)	51
Plate 5: Facing North into location of Drainage modification works (Photo credit: Adam Lovett 17/08/21)	52
Plate 6: Facing West towards Kelly Swamp exhibiting proposed pipeline route (Photo credit: Adam Lovett 17/08/21)	52
Plate 7: Facing East along southern boundary towards Russel Street (Photo credit: Adam Lovett 17/08/21)	53
Plate 8: Facing North from the rear of the activity area exhibiting fill deposition (Photo credit: Adam Lovett 17/08/21)	53
Plate 9: Facing East towards the end of Fraser Ridge (Photo credit: Adam Lovett 17/08/21)	54
Plate 10: Facing East from western extent of the pipeline route (Photo credit: Adam Lovett 18/08/21)	54
Plate 11: Facing East along proposed pipeline route (Photo credit: Adam Lovett 18/08/21)	55
Plate 12: Exposed calcarenite bedrock throughout undisturbed sections of the dune (Photo credit: Adam Lovett 18/08/21	).55
Plate 13: Test Pit 1 at 500mm – Base (Photo credit: Adam Lovett 17/08/21)	64
Plate 14: Shovel Test Pit 1 at 650 mm - Base (Photo credit: Adam Lovett 17/08/21)	64
Plate 15: Shovel Test Pit 3 at 460mm – Base (Photo credit: Adam Lovett 17/08/21)	65
Plate 16: Shovel Test Pit 6 at 500mm – Base (Photo credit: Adam Lovett 17/08/21)	65
Plate 17: Shovel Test Pit 7 at 400mm – Base (Photo credit: Adam Lovett 17/08/21)	66
Plate 18: Shovel Test Pit 11 at 380mm – Base (Photo credit: Adam Lovett 18/08/21)	66
Plate 19: Shovel Test Pit 12 at 800mm - Base (Photo credit: Adam Lovett 18/08/21)	67
Plate 20: Shovel Test Pit 8 at 400mm – Base (Photo credit: Adam Lovett 18/08/21)	68
Plate 21: Shovel Test Pit 14 at 560mm – Base (Photo credit: Adam Lovett 18/08/21)	68

.....59



# Part 1 – Cultural Heritage Management Conditions

These conditions become compliance requirements once the Cultural Heritage Management Plan is approved. Failure to comply with a condition is an offense under section 67A of the *Aboriginal Heritage Act 2006*.

The Cultural Heritage Management Plan must be readily accessible to the sponsor and their employees and contractors when carrying out the activity.

### **1** CULTURAL HERITAGE MANAGEMENT CONDITIONS

This section outlines the general cultural heritage management conditions, which are provided to facilitate the sponsors understanding of Aboriginal cultural heritage and guide the sponsor through implementing the CHMP.

### 1.1 General Cultural Heritage Management Conditions

#### 1.1.1 Condition 1: Activity to occur only within activity area

Any works associated with the current activity covered by this CHMP, are to be restricted to the extent of the activity area shown in Maps 1 and 2.

#### 1.1.2 Condition 2: Approved CHMP to be retained on-site

A copy of the approved CHMP must be retained on site at all times during works so that it can be referred to, if required, to ensure compliance with the recommended management conditions and contingency plans outlined within; also, a compliance checklist is included in Section 2.5.

#### 1.1.3 Condition 3: Cultural Heritage Induction

Prior to the commencement of the activity, a cultural heritage induction must be undertaken by all personnel involved in ground disturbing works. The cultural heritage induction will be conducted by a representative of EMAC and a Heritage Advisor of the Sponsors choosing, prior to undertaking any ground disturbing works within the activity area. The induction will include:

- Brief background of the Aboriginal occupation of the activity area and broader region;
- Summary of the assessments conducted during the CHMP;
- Specific details of all Aboriginal places located during the CHMP;
- Summary of the conditions and contingencies contained within the CHMP; and,
- The obligations of all personnel and Sponsors under the Victorian Aboriginal Heritage Act 2006.

An important focus of the cultural heritage induction is to present personnel with examples of Aboriginal cultural heritage that may occur in the activity area, and to explain the contingency procedures required by the CHMP, should unidentified Aboriginal cultural heritage be found during the conduct of the activity.

EMAC must be provided with at least two weeks' notice, to book and participate in the cultural heritage induction. This induction must be organised and paid for by the Sponsor.



# 1.1.4 Condition 4: Compliance Inspections ERTISED

Up to 3 compliance inspections may be required by the RAP subsequent to ground stripping within the areas containing deposited fill with the intention of identifying the extent of fill deposition and if any in-tact dune sediments will be disturbed by the activity. These will involve;

- At least one compliance inspection after stripping to the depth of proposed activity among the fill deposition; and
- At least one compliance inspection once stripping is completed for the construction of the roadway.

A HA must be notified if any Aboriginal cultural heritage is located during the ground stripping activities. Any Aboriginal cultural heritage must be recorded and registered with the VAHR. A salvage of Aboriginal cultural heritage is to be conducted on site concurrent with the works in the event that Aboriginal cultural heritage is identified.

The Sponsor must notify EMAC, via email, at least 5 business days prior to the proposed start date of when each stage of works outlined below is expected to commence. The Sponsor must notify EMAC, via email, up to no more than 3 business days after each stage of works outlined below has been completed. The contact details for EMAC are as follows:

#### RAP Technical Specialist

Eastern Maar Aboriginal Corporation

Phone: 0427 271 937

Email: admin@easternmaar.com.au

The Sponsor must invite EMAC, via email using the booking form, to attend up to 3 compliance inspections, which the RAP may choose to attend. The compliance inspections may be required after ground stripping within the areas containing deposited fill (Map 0) and the roadway, with the intention of identifying the extent of fill deposition, if any in-tact dune sediments will be disturbed by the activity, and to identify unknown Aboriginal cultural heritage.

These will involve:

- At least one compliance inspection after stripping to the depth of fill or proposed activity (whichever is first) among the fill deposition (Map 0); and
- At least one compliance inspection once stripping is completed for the construction of the roadway (Map 0).

If Aboriginal cultural heritage is identified by the RAP during compliance inspection, a HA must be notified. The HA will undertake the recording and registration of the Aboriginal cultural heritage with the VAHR. A salvage conducted by a HA and the RAP, of the Aboriginal cultural heritage is to be conducted on site concurrent with the works.





Map 0: Compliance Inspections



# 2 ABORIGINAL CULTURAL HERITAGE MANAGEMENT CONTINGENCIES

The following contingency plans must be followed to provide protection for unexpected cultural heritage found in the activity area during works.

In accordance with Clause 13(1) Schedule 2 of the Aboriginal Heritage Regulations 2018, a CHMP must include specific contingency plans for:

- a) The matters referred to in Section 61 of the Aboriginal Heritage Act 2006;
- b) The resolution of any disputes between the Sponsor and relevant registered Aboriginal parties in relation to the implementation of the plan or the conduct of the activity;
- c) Reviewing compliance with the CHMP and mechanisms for remedying non-compliance;
- d) The management of Aboriginal cultural heritage found during the activity; and
- e) The notification, in accordance with the Act, of the discovery of Aboriginal cultural heritage during the carrying out of the activity. Contingency plans are required, even in-situations where it has been assessed that there is a low probability of ACHPs being located within an activity area.

### 2.1 Contingency 1 – Discovery of Unexpected Aboriginal Cultural Heritage During the Activity

If suspected Aboriginal cultural heritage is identified the following process applies in the event Aboriginal cultural heritage is identified during demolition or construction works associated with the proposed activity.

Discovery:

a) Relevant works within 5 m of the discovery must be suspended immediately and the place extent must be isolated from further disturbance by safety webbing or other suitable above ground barriers/temporary fencing (i.e. no subsurface component). 'No-go' signage must be fixed to the fencing at all times. The suspected cultural material must not be removed.

Notification:

- a) The supervisor must immediately contact the Sponsor of the identification of the cultural heritage.
- b) EMAC and a HA must be contacted within two working days to evaluate and record the Aboriginal cultural heritage and advise on possible management strategies. Contact details for EMAC are:

Craig Edwards Cultural Heritage and NRM Manager 0475 310 509 John Clarke General Manager Cultural Landscapes 0429 598 481 Samantha Fidge RAP Technical Specialist 0428 961 689



#### A D V F R T S E D Sector 2005 ne beson in cha

c) In accordance with the requirements of Section 24 of the Aberiginal Helmage Act 2006, the person in charge of the activity must ensure that the Secretary is notified of the discovery of any Aboriginal cultural heritage, by providing the Secretary with completed Aboriginal place registration forms (completed by a HA) as soon as is practicable but within 14 days.

Investigation of Unexpected Aboriginal Cultural Heritage:

- a) The HA, in consultation with the RAP (if appointed) and Sponsor, shall determine the most appropriate course of action to investigate the nature of the cultural heritage. This should include establishing the nature and extent of the cultural heritage through the application of minimally intrusive archaeological techniques such as surface survey, cleaning back exposed sections and augering.
- b) If, during the initial inspection and investigation, the Aboriginal cultural heritage is determined to be:
  - 1) Not part of a previously identified and recorded Aboriginal place where existing management conditions apply.

Then harm avoidance, impact mitigation or salvage measures may be required.

- c) Options for the implementation of harm avoidance, impact mitigation or salvage measures must:
  - 1) Be explored by the HA in consultation with the RAP (if appointed) and the Sponsor; and;
  - 2) Consider the application of the General Principles outlined below.

General Principles to Apply Upon discovery of Unexpected Aboriginal Cultural Heritage:

- a) Investigation of cultural heritage: further investigation may be required to confirm the nature and extent of the cultural heritage.
- b) Harm avoidance: all attempts must be made to avoid harm to cultural heritage from the activity. This must include written agreement on:

1) Management of the cultural heritage during the activity (e.g. with the installation of fencing to prevent disturbance);

2) Management of the cultural heritage during the site remediation works at the end of the activity.

- c) Impact minimisation: If protection of the cultural heritage place is not possible then consideration must be given to reducing the impact of the activity through the introduction of harm minimisation measures e.g. limiting impact on the cultural heritage so that a portion remains unaffected by the activity.
- d) Salvage of cultural material and information: If the cultural heritage cannot be protected then salvage of all or part of the Aboriginal place may be required prior to the activity resuming and the impact to cultural heritage proceeding. The following parameters must be considered during the salvage process:

For Surface Cultural Heritage

1) Recording spatial characteristics (e.g. Differential GPS records of artefact locations, mapping the place boundary, drawing detailed plans of place extent and features);

- 2) Documenting fabric/raw materials (e.g. earth feature, silcrete quarry; shell types in shell midden);
- 3) Creating a photographic record;
- 4) Collecting cultural heritage.

#### For Subsurface Cultural Heritage

1) Controlled excavation of cultural deposits; and,

- 2) Salvage excavation must be carried out in accordance with proper archaeological practice and standards, and an archaeological report detailing the methods, analysis and results of the excavation must be prepared.
- 3) The RAP must be provided with the opportunity to participate in a salvage excavation (if required). If appropriate material suitable for radiometric dating or residue and use wear analysis is retrieved (i.e. in situ organic material associated with cultural material and in situ cultural material respectively) then this material will be subject to these procedures. The cost of this process will be borne by the Sponsor.



Recommencement of Activity:

- a) The HA (with the approval of the RAP, if appointed otherwise with the approval of AV) will advise the Sponsor's representative when suspended construction works can proceed.
- b) In general, works may recommence:
  - 1) When the appropriate site minimisation or mitigation measures have been undertaken;
  - 2) Where the relevant Aboriginal cultural heritage records have been updated and/or completed;
  - 3) Where all parties agree there is no prudent or feasible course of action; or
  - 4) Once any existing dispute has been resolved.

#### Notification to AV:

AV will be notified about the Aboriginal place via the submission of the appropriate Victorian Aboriginal Heritage Registry forms and spatial data.

If a salvage excavation has been conducted, a salvage report must be submitted to AV and the RAP within 3 months of the completion of the salvage program and/or receiving results of any radiometric dates.

# 2.2 Contingency 2 – Removal, curation, custody and management of Aboriginal cultural heritage

The Act requires a Management Plan to set out the custody and management procedures for Aboriginal heritage which will be affected by an activity, for the duration of the activity (s61(e) of the Aboriginal Heritage Act 2006 (Vic) (No. 020, 2016). Custody arrangements will be applicable where Aboriginal heritage is to be salvaged either before or during an activity.

In circumstances where the Secretary has the responsibility for deciding whether or not to approve a Management Plan, the custody of Aboriginal cultural heritage (with the exception of Aboriginal Ancestral Remains or secret or sacred objects) discovered during or after an activity should comply with the requirements established by the Act and be assigned according to the following order of priority, as appropriate:

- 1) Any relevant RAP for the land from which the Aboriginal heritage is salvaged;
- 2) Any relevant registered native title holder for the land from which the Aboriginal heritage is salvaged; 3)
- 3) Any relevant native title party (as defined in the Act) for the land from which the Aboriginal heritage is salvaged;
- 4) Any relevant Traditional Owners of the land from which the Aboriginal heritage is salvaged;
- 5) Any relevant Aboriginal body or organisation which has historical or contemporary interests in Aboriginal heritage relating to the land from which the Aboriginal heritage was salvaged;
- 6) The owner of the land from which the Aboriginal heritage is salvaged;
- 7) Museum Victoria

AV encourages sponsors to take into account the willingness and the capacity of the proposed custodian to adequately and appropriately manage, protect or dispose of in accordance with Aboriginal tradition, salvaged Aboriginal heritage material, in preparing a Management Plan.

For this activity area, it will be the responsibility of the Heritage Advisor to:

- Catalogue the Aboriginal cultural heritage;
- Label and package the Aboriginal cultural heritage with reference to provenance; and
- Arrange storage of the Aboriginal cultural heritage in a secure location together with copies of the catalogue and assessment documentation.

Contact details for the Department of Premier and Cabinet are:



# The Secretary The Department of Premier and Gabinet

GPO Box 2392 Melbourne, Vic 3001 Phone: 1800 762 003 Fax: 03 8392 5399

### 2.3 Contingency 3 – Unexpected Discovery of Ancestral Human Remains

If any suspected human remains are found during any activity, works must cease. The Victoria Police and the State Coroner's Office should be notified immediately. If there are reasonable grounds to believe the remains are Aboriginal, the Coronial Admissions and Enquiries hotline must be contacted immediately on 1300 888 544. This advice has been developed further and is described in the following 5-step contingency plan.

Any such discovery at the activity area must follow these steps.

#### Discovery

- If suspected human remains are discovered, all activity in the vicinity must stop; and,
- The remains must be left in place, and protected from harm or damage.

#### Notification

- If suspected human remains have been found, the State Coroner's Office and the Victoria Police must be notified immediately;
- If there is reasonable grounds to believe the remains are Aboriginal Ancestral Remains, the Coronial Admissions and Enquiries hotline must be immediately notified on 1300 888 544;
- All details of the location and nature of the human remains must be provided to the relevant authorities;
- If it is confirmed by these authorities the discovered remains are Aboriginal Ancestral Remains, the person responsible for the activity must report the existence of them to the Victorian Aboriginal Heritage Council in accordance with section 17 of the Aboriginal Heritage Act 2006.

#### Impact mitigation or salvage

- The Victorian Aboriginal Heritage Council, after taking reasonable steps to consult with any Aboriginal person or body with an interest in the Aboriginal Ancestral Remains, will determine the appropriate course of action as required by section 18(2)(b) of the Aboriginal Heritage Act 2006;
- An appropriate impact mitigation or salvage strategy as determined by the Victorian Aboriginal Heritage Council must be implemented by the Sponsor.

#### Curation and further analysis

• The treatment of salvaged Aboriginal Ancestral Remains must be in accordance with the direction of the Victorian Aboriginal Heritage Council.

#### Reburial

- Any reburial site(s) must be fully documented by an experienced and qualified archaeologist, clearly marked and all details provided to Aboriginal Victoria;
- Appropriate management measures must be implemented to ensure the Aboriginal Ancestral Remains are not disturbed in the future.



# 2.4 Contingency 4 – Dispute resolution

Procedures for dispute resolution aim to ensure that all parties are fully aware of their rights and obligations, that full and open communication between parties occurs, and that those parties conduct themselves in good faith.

If a dispute arises in relation to the implementation of the CHMP or the conduct of the activity, the following dispute resolution procedure is required:

- a) All disputes will be jointly investigated and documented by both the RAP and the sponsor.
- b) The RAP and the sponsor must meet within one week of the initial notification of the dispute to seek agreement as to a suitable resolution.
- c) The sponsor and the RAP must arrange for authorised representatives to be present at the meeting.
- d) At the meeting, the authorised representatives of both the RAP and the sponsor must state their understanding of the issue(s) in relation to the dispute and ensure each party is aware of their position. If requested by either the RAP or the sponsor, third party mediation may be held during the meeting.
- e) If the authorised representatives of the parties reach agreement, the agreed resolution to the dispute must be recorded in writing and signed by both parties (i.e. Agreed Method Statement). If the authorised representatives of the parties do not reach agreement, the parties will participate in third party mediation of the dispute by an agreed mediator within two weeks of the first meeting to discuss the dispute. Any agreed outcome of the mediation must be recorded in writing and signed by both parties (Agreed Method Statement).

Any costs relating to the third-party mediation procedure outlined above must be met equally by the sponsor and RAP.

Regardless of the category of dispute, the dispute resolution process does not preclude:

- a) The parties seeking advice from Aboriginal Victoria to assist in resolution of the dispute; and
- b) Any legal recourse open to the parties being taken; however, the parties agree that the above resolution mechanism will be implemented before such recourse is made.

# 2.5 Contingency 5 – Reviewing Compliance with the management plan

Compliance with the conditions of an approved CHMP is a requirement of the Aboriginal Heritage Act 2006 (Vic) (No. 020, 2016). A compliance checklist is included below.

Checklist for Compliance with the Cultural Heritage Management Plan.

Date: \_\_/\_\_\_/\_\_\_ Name: \_\_\_\_\_

Position:	
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CHMP NO: 18097

Period of time covered by checklist:

Contingency	Yes/No	lf no
Have all works associated with the activity been conducted within the prescribed activity area covered by CHMP 18097 in accordance with Condition 1?		All works must immediately cease and the RAP must be contacted immediately.
Have all staff/contractors involved in ground disturbing works undertaken a cultural heritage induction in accordance with Condition 3?		All works must immediately cease and the RAP must be contacted immediately.



Is a hard copy of the CHMP available on site and accessible to all site workers and contractors as per Condition 2?	All works must mumediately cease and the RAP must be contacted immediately.
If suspected human remains have been identified, have all works immediately ceased and the Coroner and Victoria Police been contacted as per the 5-step contingency plan in Contingency 3?	All works must immediately cease and the relevant authorities must be contacted immediately.
If suspected Aboriginal Cultural Heritage other than human remains has been discovered, has the correct procedure been followed as per Contingency 1?	All works must immediately cease within 10 metres (in all directions) of the suspected heritage and the sponsor, Heritage Advisor and the RAP must be contacted immediately.
Has a review been undertaken within 7 days of any concerns being raised regarding compliance with the CHMP (Contingency 4)?	All works must immediately cease and the relevant authorities must be contacted immediately.
If the review has identified any areas of noncompliance, has AV been notified and a meeting taken place between the HA, Sponsor and AV to establish actions required to address noncompliance (Contingency 4)?	All works must immediately cease and the relevant authorities must be contacted immediately.
Has the procedure been followed for custody and management of any unexpected Aboriginal Cultural Heritage identified during the activity?	Refer to Contingency 2.

Any action carried out contrary to the conditions of an approved CHMP which causes harm to Aboriginal cultural heritage is an offence. Review of this plan can be undertaken at any time by project delegates representing the Sponsor, RAP or an agreed independent reviewer, to ensure that all parties are complying with the terms of the plan.

In order to ensure that the Cultural Heritage Management Plan (CHMP) is adhered to and to prevent possible dispute, auditing or stop-works orders, it is imperative that all steps discussed above are followed. To ensure, this the following procedure must be applied:

- 1) All relevant parties must be familiar with the (CHMP).
- 2) All relevant personnel involved in the activity/activity area must be familiar with the procedures defined in the CHMP.
- 3) A 'Compliance Review Checklist' (Section 2.5) should be completed by the Sponsor or Sponsor's delegate prior to the commencement of the activity, and at regular intervals during the course of the activity (fortnightly).
- 4) Communication between the parties must remain open and any changes to contact details be communicated to the other party immediately.
- 5) In the event of non-compliance with the CHMP, the authorised project delegates will identify the cause of the noncompliance and undertake to remedy this within the terms of the present CHMP, the *Aboriginal Heritage Act 2006* (Vic) (No. 020, 2016) and the *Aboriginal Heritage Regulations 2018* (Vic) (No. 59, 2018).



### 

- 6) Review of this plan can be undertaken at any time by a project delegate(s) representing the oponsor, a HA, an Authorised Officer or an Aboriginal Heritage Officer to ensure compliance with the management measures outlined in the plan. If concerns are raised by the EMAC, AV, HA, an Authorised Officer or another party, a project delegate(s) will review CHMP compliance within 7 working days of such concerns being raised by completing the checklist provided.
- 7) The project delegate will submit the completed checklist to the RAP, Sponsor, Site Supervisor and Heritage Advisor within 7 working days of the compliance review being undertaken.
- 8) If a compliance check or review identifies any areas of non-compliance with the CHMP AV must be notified of any non-compliance.

# 2.6 Contingency 6 – Remedying non-compliance with the management plan

Should any or all parties have any concerns regarding non-compliance with this CHMP, they are advised to immediately consult with the Heritage Advisor and with the Traditional Owners. A checklist referring to matters that must be complied with under the CHMP is included in Section 2.5.

Although no further archaeological investigation has been recommended in this CHMP, it is possible that cultural heritage material may be uncovered during the proposed works. In order to inform the Sponsor of their legal responsibilities in regard to cultural heritage management, specific legislative requirements are provided below. It should be noted that under Sections 27 and 28 of the Aboriginal Heritage Act 2006 (Vic) (No. 020, 2016), harming, or doing an act likely to harm Aboriginal cultural heritage is unlawful, except under the authority of a Cultural Heritage Permit or a CHMP. A range of penalties apply (as outlined below). The monetary value of all listed penalties is current at the time of writing.

If it appears that there has been a breach of the CHMP, the sponsor must immediately report the breach by contacting the Statewide Compliance & Enforcement Unit, Aboriginal Victoria via email to compliance.aboriginalvictoria@dpc.vic.gov.au or by telephoning 1800 762 003.

Where non-compliance with the CHMP is identified, the following actions must be taken:

Where the non-compliance harms or is likely to harm Aboriginal cultural heritage:

- 1) Work must immediately stop in the area within a buffer zone of 15 metres from the noncompliance.
- 2) The Sponsor shall provide notice of the non-compliance to AV and a HA within 24 hours of identifying the noncompliance.
- 3) The HA will facilitate the involvement of the RAP/Traditional Owners in the onsite investigation and assessment of non-compliance. This will occur as soon as possible and within a maximum of three days of the notification.
- 4) The Sponsor, the HA and the RAP/Traditional Owners must discuss the possibility of avoiding and minimising harm to Aboriginal cultural heritage. The Sponsor must avoid or minimise harm to the Aboriginal cultural heritage where possible. Where harm cannot be avoided, the HA must salvage the Aboriginal cultural heritage material.
- 5) A copy of the proposed and/or implemented actions for any non-compliance must be provided to AV within one week of identifying the non-compliance.

Where the non-compliance has not and will not harm Aboriginal cultural heritage, the Sponsor must provide a copy of the proposed and/or implemented actions for the non-compliance to the relevant HA within two weeks of identifying the non-compliance.

### 2.7 Contingency 7 – Use of Lots

Schedule 2, clause 13 (2) of the Aboriginal Heritage Regulations 2018 states -



- (2) If the activity is a subdivision referred to in Regu
  - (a) how each lot is intended to be used or developed by the sponsor; or
  - (b) if a lot is not intended to be used or developed by the sponsor, the use or development of the lot permitted by the relevant planning scheme.

Aton 49, the contingency plans in use address

The Sponsor intends developing all lots to sell for the purposes of construction of dwellings which will involve subsurface utility installations. The activity area is zoned General Residential Zone 1 (GRZ1) and Farming Zone (FZ) and will be developed in accordance with the permitted uses for GRZ1 and FZ as stated in the Warrnambool City Council Planning Scheme (Appendixes 6-7).





### Part 2 – Assessment



### **3** INTRODUCTION

### 3.1 Background

U.C.A. Pty Ltd Cultural Heritage Planners (Urban Colours) have been engaged by R L Blake Pty Ltd (Sponsor) to prepare a cultural heritage management plan (CHMP) for the proposed residential development located at 7 Deverell Way, Warrnambool, Victoria (Warrnambool City Council) (Map 1). The author of this CHMP is Leigh Painter. The Heritage Advisor for this CHMP is Annette Xiberras. Details of the qualifications of all personnel who were involved in this CHMP are provided in Section 3.9

#### 3.2 Name of Sponsor

The Sponsor of this CHMP is R L Blake Pty Ltd (ABN 93 079 805 066).

#### 3.3 Name of Owner and Occupier of the Activity Area

The activity area is owned by R L Blake Pty Ltd. The activity area is currently vacant.

### 3.4 Location of the Activity Area

The activity area is located at Lot 97 PS636695 of 7 Deverell Way, Warrnambool. Warrnambool is a semi-urban coastal suburb located approximately 225km south-west from the CBD. The activity area is bordered to the south and west by rural farms, to the northeast by residential properties, to the south east by Russel Street and to the north by Baynes Street

The activity area is located within the local government area of Warrnambool City Council (Map1) and the Parish of Wangoom (Table 1). The activity area is 7.15 hectares in area (Map 2) and is currently zoned as General Residential Zone - Schedule 1 [GRZ1] and Farming Zone [FZ].

### 3.5 Reason for Preparing the Cultural Heritage Management Plan

This CHMP has been prepared in accordance with Part 4 of the Victorian *Aboriginal Heritage Act 2006* and is required under r.7 of the Victorian *Aboriginal Heritage Regulations 2018* (s.44[e]). Under Regulation 7(1), a cultural heritage management plan is required for an activity if—(a) all or part of the activity area for the activity is an area of cultural heritage sensitivity; and (b) all or part of the activity is a high impact activity. Therefore, this CHMP is mandatory because the proposed activity is a high impact activity area is located in an area of cultural heritage sensitivity. The specific Regulations which trigger the requirement for this mandatory CHMP are as follows:

- Regulation 41 the activity area is located within an area of cultural heritage sensitivity (Sand sheet);
- Regulations 47(1)(f) the proposed activity is a high impact activity as it involves the construction of a roadway that exceeds 100m.
- Regulations 49(1) the proposed activity is a high impact activity as it involves the subdivision of land into 3 or more lots.
- Regulation 5 Part or all of the activity area has not been subject to previous significant ground disturbance as defined by the *Aboriginal Heritage Regulations 2018*.



# 3.6 Notice of Intent to Prepare the Cultural Heritage Management

#### Plan

Under s.54 of the *Aboriginal Heritage Act 2006*, the Sponsor of a CHMP must give notice of intention (NOI) to prepare a CHMP.

In accordance with s.54(1)(a) of the *Aboriginal Heritage Act 2006*, the Sponsor must submit a NOI to prepare a CHMP to the Registered Aboriginal Party (RAP). The Sponsor submitted an NOI to the RAP on 6 July 2021 (Appendix 1). The EMAC responded by email on 16 July 2021 indicating that they intend to evaluate the CHMP under s.55(2) of the *Aboriginal Heritage Act 2006* (Appendix 2).

In accordance with s.54(1)(b) of the *Aboriginal Heritage Act 2006*, the Sponsor submitted an NOI to the Secretary of the Department of Premier and Cabinet (DPC) on 5 July 2021. A response to this NOI was submitted to the Sponsor on 6 July 2021. The AV management plan identifier number for this CHMP is 18097.

In accordance with s.51(1)(c) of the *Aboriginal Heritage Act 2006* the sponsor is required to submit NOI to prepare a CHMP to the owner or occupier of any land. As the owner of the land are the Sponsors this is not required.

In accordance with s.51(1)(d) of the *Aboriginal Heritage Act 2006* the sponsor submitted a NOI to prepare a CHMP to the Warrnambool City Council on 6 July 2021. A reply was received acknowledging the notice on 6 July 2021.

### 3.7 Registered Aboriginal Party Responsible for the Activity Area

The Aboriginal Heritage Act 2006 requires consultation with any RAPs registered under the Act. The Registered Aboriginal for the Warrnambool area is the Eastern Maar Aboriginal Corporation (EMAC). The Eastern Maar Aboriginal Corporation were consulted throughout the CHMP process.

#### 3.8 Aims of the Assessment

The aims of the assessment were to:

- To determine the archaeological sensitivity of the activity area;
- To determine the location, distribution and significance of cultural heritage material or places at desktop level;
- To make an assessment of the cultural and scientific significance of any Aboriginal Places identified within the geographic region;
- To determine whether surface Aboriginal cultural heritage is present within the activity area (including scarred trees);
- To determine whether harm to Aboriginal Places is likely to occur through design or management;
- To develop a framework for managing Aboriginal cultural heritage material or places prior to, during and subsequent to proposed development related activities at 7 Deverell Way, Warrnambool, Victoria.

This CHMP has also been undertaken in accordance with the *Guide to Preparing Cultural Heritage Management Plans* (AV 2016).

### 3.9 Personnel Involved

The Heritage Advisor of this CHMP is Annette Xiberras. The author of this CHMP is Leigh Painter. Fieldork was supervised by Adam Lovett and assisted by Chloe Brodgen. Mapping was undertaken by Staci Timms. Details of the qualifications of the key personnel involved in the preparation of this CHMP are provided below.



#### Annette Xiberras

# **ADVERTISED**

Annette is the Managing Director at Urban Colours. Annette has a vast knowledge and understanding of the cultural heritage of south-eastern Australia. Annette is a Wurundjeri Elder who has worked in Aboriginal archaeology and cultural heritage management for more than 25 years. Her formal qualifications include:

- Graduate Diploma Natural and Cultural Resource Management, Deakin;
- Aboriginal Site Officers Diploma;
- Archaeological Site Management Certificate (Koorie Site Officers) Northern Metropolitan TAFE; and
- Extensive experience (>25 years) in the cultural heritage industry.

#### Leigh Painter

Leigh is a Consultant Heritage Advisor for Urban Colours. He has been a consultant archaeologist since 2017 and has worked as a project manager for large-scale complex excavations. He is skilled in survey and excavation techniques, identification of landscape sensitivity and artefact analysis. Leigh has authored over 30 CHMPs within Victoria, both in metropolitan and regional environments. Leigh's formal qualifications include:

• Bachelor of Archaeology (Honours), La Trobe University.

#### Staci Timms

Staci is Archaeologist and GIS Specialist at Urban Colours. Staci has ten years of mapping experience, working in both the private and public sectors. Staci is an expert in a range of GIS and spatial analysis facets, such as mobile technologies, desktop analysis and remote sensing. Her formal qualifications include:

- Graduate Diploma, Archaeology, La Trobe University;
- Masters of Applied Science, Spatial Analysis and GIS, James Cook University; and
- Bachelor of Applied Science, Deakin University.

#### Adam Lovett

Adam is an archaeologist and Heritage Advisor for Urban Colours. Adam has over 30 years' experience working in cultural heritage management, both in government and private sectors. He has worked on numerous archaeological projects in Victoria and New South Wales as an archaeologist, field representative, site inspector and cultural heritage officer. He is a listed Heritage Advisor with Aboriginal Victoria and has an Advanced Certificate in Archaeological Site Management and in Legal Aspects of Archaeological Site Management. He has supervised fieldwork, written CHMPs and negotiated management recommendations

#### Chloe Brogden

Chloe is an archaeological assistant for Urban Colours. Chloe is an Aboriginal woman of the Noongar people of Western Australia. Chloe has been taught cultural heritage knowledge and field skills during her life by family members. Chloe has worked as an archaeological field assistant with UCA on a number of cultural heritage management plans and salvages.

#### 3.10 Report Submission

This CHMP was submitted for approval to Eastern Maar Aboriginal Corporation (EMAC), on 9 September 2021, as per s.63 of the *Aboriginal Heritage Act 2006*. Following evaluators comments the CHMP was resubmitted for approval on the 7 November 2021



# 4 ACTIVITY DESCRIPTION

The activity area comprises of a 7.15 ha area. The proposed activity is the residential subdivision of the area into approximately 53 lots with associated infrastructure including utility services, concrete paved roadways, open cut drainage infrastructure, and drainage modification works (Appendix 3). The activity will be conducted using mechanical equipment.

The following activities will be undertaken during the construction process

- Tracked machinery during the course of all works;
- Excavation (approximately 1000mm), grading and landscape modification to construct future dwellings;
- Excavations and levelling for construction of the roadway and other sealed surfaces and pavement works;
- Landscaping works, including fencing and paving, impacting on the topsoil deposits;
- Excavation (approximately 600mm-800m) to lay the sewer and drainage utilities, including any drainage infrastructures;
- Excavation, levelling and grading (approximately 600-800mm) to complete drainage basin modification works;
- Excavation (approximately 600mm-800mm) for future service utilities; and
- It is assumed that there will be full ground disturbance to the entire activity area. The extensive nature of soil
  modification during residential development means that there is a high possibility that any Aboriginal cultural
  heritage present within the upper 1000mm will be harmed during the construction process. Areas where surface
  soils are subject to excavation and earthmoving will directly impact any surface Aboriginal places, such as
  scatters of stone tools. Overall, the development has a very high adverse impact on intact archaeological sites
  unless mitigation measures are adopted. Adverse impact can generally be minimised through design and site
  management.



# 5 EXTENT OF THE ACTIVITY AREA

The activity area is located at 7 Deverell Way, Warrnambool. Warrnambool is located approximately 225km south-west of the Melbourne CBD.

The activity area is 7.15 ha in size and is zoned as General Residential Zone - Schedule 1 (GRZ1), and Farming Zone [FZ]. The activity area is bordered to the south and west by rural farms, to the northeast by residential properties, to the south east by Russel Street and to the north by Baynes Street. The property is currently privately owned by R L Blake Pty Ltd (Sponsor) and is untenanted/vacant. The activity area has been cleared of all remnant vegetation and has been subject to substantial ground disturbances in the northern portion of the activity area due to grading and levelling works in preparation of lots for future development. There is also some modification works relating to the unpaved roadway, which has occurred prior to commencement of the *Aboriginal Heritage Act 2006* (Vic). The extent of the activity area, as well as its regional context, is shown in Map 1.

The activity area is located within the local government area of Warrnambool City Council (Map1) and the Parish of Wangoom (Table 1). As the activity area exceeds one hectare in size it is considered a medium activity as established by the definitions provided in Regulation 81 of the *Aboriginal Heritage Regulations 2018* (Vic) (No. 59, 2018).

The general location, current conditions and details of the activity area are shown in Maps 1-2.

The cadastral details for the activity area are summarised in Table1 below.

Table 1: Cadastral information.

Address	7 Deverell Way, Warrnambool 3280.
LGA	Warrnambool City Council.
Council Property Number	18853 (Part).
Parish	Wangoom.
Land Parcel Details	Lot 97 PS636695.
UTM zone	54.





Map 1: Location of the activity area.





Map 2: Existing conditions of the activity area.



# 6 DOCUMENTATION OF CONSULTATION

### 6.1 Consultation in Relation to the Assessment

In accordance with s.54(1)(b) of the *Aboriginal Heritage Act 2006*, the Sponsor submitted an NOI to the Secretary of the Department of Premier and Cabinet (DPC) on 5 July 2021. A response to this NOI was submitted to the Sponsor on 5 February 2021. The AV management plan identifier number for this CHMP is 18097.

In accordance with s.54(1)(a) of the *Aboriginal Heritage Act 2006*, the Sponsor must submit a NOI to prepare a CHMP to the Registered Aboriginal Party (RAP). The Sponsor submitted an NOI to the RAP on 6 July 2021. The EMAC responded by email on 8 July 2021 indicating that they intend to evaluate the CHMP under s.55(2) of the *Aboriginal Heritage Act 2006*.

A project inception meeting was held on 20 July 2021 between Craig Edwards (EMAC Cultural Heritage and NRM Manager), Sammy Fidge (EMAC Technical Specialist/ Heritage Advisor), John Clarke (EMAC Manager Cultural landscapes), and Leigh Painter (UCA Heritage Advisor). Details of the CHMP activity were outlined and a proposed field methodology was also discussed. It was agreed that pedestrian survey of the entire activity should be conducted and auger samples should be taken within the footprint of previous landscape modifications in order to confirm the extent of fill deposition and/or disturbance. The results were to be discussed at an onsite meeting in order to determine if the results of the auger sample indicate whether a complex assessment is required in these areas. The onsite meeting would also involve a discussion of the standard assessment results and complex testing requirements.

The onsite meeting was conducted on 18 August 2021 between John Clarke (EMAC Manager Cultural Landscapes), Adam Lovett (UCA Heritage Advisor), Mark Edwards (EMAC field representative) and Thad Chadwick (EMAC field representative). It was agreed that the northern section of the activity area contained obvious fill deposition and that no auger testing would be required. It was agreed that there were two landforms present within the activity area (dune and swampy floodplain) and that a stratigraphic test pit would not be required within the swampy floodplain due to obvious fill deposition. The complex assessment methodology was agreed upon, and would involve a series of shovel test pits along the proposed open cut sewer route, and among the lower portions of the dune that appeared to have avoided landscape modification.

Date	Personnel	Stakeholder Group	Details of Consultation
5 July 2021	Leigh Painter (UCA Heritage Advisor) VAHR	VAHR UCA	Notice of Intent to Prepare a CHMP submitted to the Secretary.
6 July 2021	Justin Hinch (Sponsor's agent) Leigh Painter (UCA Heritage Advisor) Sammy Fidge (EMAC Technical Specialist/ Heritage Advisor)	R L Blake Pty Ltd EMAC UCA	Notice of Intent to Prepare a CHMP submitted to EMAC.
6 July 2021	Warrnambool City Council Leigh Painter (UCA Heritage Advisor)	UCA Warrnambool City Council	Notice of Intent to Prepare a CHMP submitted to LGA.
8 July 2021	Sammy Fidge (EMAC Technical Specialist/ Heritage Advisor) Leigh Painter (UCA Heritage Advisor)	EMAC UCA	EMAC notify that they intent to evaluate the CHMP.
20 July 2021	Craig Edwards (EMAC Cultural Heritage and NRM Manager) Sammy Fidge (EMAC Technical Specialist/ Heritage Advisor) John Clarke (EMAC General Manager Cultural Landscapes)	EMAC UCA	Project Inception Meeting. It was agreed that pedestrian survey of the entire activity should be conducted in order to confirm the extent of significant ground disturbances present in the area subject to previous ground modifications. It was proposed that an auger probe sampling should be conducted in this area testing

Table 2: Consultation in Relation to the Assessment



### 

	Leign Painter (UCA Heritage Advisor)		be required in order to determine if the results of the auger sample indicate whether a complex assessment is required.
18 August 2021	John Clarke (EMAC General Manage Cultural Landscapes) Adam Lovett (UCA Heritage Advisor) Shane Harrison (EMAC field representative) Mark Edwards (EMAC field representative)	EMAC UCA	Onsite meeting. It was agreed that the area subject to previous landscape modification was visibly disturbed and that no auger sampling is required. The swampy floodplain was agreed to have been modified during the construction of the unpaved roadway and the motorbike tracks, and as such a stratigraphic test pit was not required as it would provide no value.

#### 6.2 Participation in the conduct of the assessment

Table 3: Participation in the conduct of the assessment

Date	HA Project Member	Stakeholder Group	Details of the Activity
17-18 August 2021	Mark Edwards (EMAC field representative) Shane Harrison (EMAC field representative)	EMAC UCA	Standard and complex assessment.
	Thad Chadwick (EMAC field representative)		
	Adam Lovett (UCA Heritage Advisor)		
	Chloe Brogden (UCA Archaeological Assistant)		

### 6.3 Consultation in relation to the conditions

A complex assessment results meeting was held on the 25 August 2021 via video conference. In attendance were Sammy Fidge (EMAC Technical Specialist/Heritage Advisor), Davina Taylor (EMAC Strategic Liaison Office), Justin Hinch (Sponsors agent) and Leigh Painter (UCA Heritage Advisor). The results of the standard assessment and the on-site meeting were discussed and agreed with. The complex assessment results were discussed and the lack of any subsurface cultural material present in the activity area was noted. It was agreed that the assessment was unclear on the extent of fill deposition within the footprint of the previously prepared residential lots. The management conditions of the CHMP were then agreed upon which consisted of a cultural heritage induction to be undertaken before the CHMP activity commences and a hard copy of approved CHMP to be kept on site during the duration of the activity. In addition to these standards conditions the RAP advised that compliance inspections may be required including one after stripping to the base of the fill and one once stripping is completed for the roadway. If any Cultural Heritage is found, it will be recorded and salvaged on site so that works may continue.

Table 4: Consultation in relation to the conditions

Date	HA Project Member	Stakeholder Group	Details of the Activity
25 August 2021	Sammy Fidge (EMAC Technical Specialist/ Heritage Advisor) Davina Taylor (EMAC Technical Specialist/ Heritage Advisor)	EMAC UCA R L Blake Pty Ltd	Standard and complex assessment results meeting. The results of the standard assessment and the on-site meeting were discussed. The complex assessment results were also discussed



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Justin Hinch (Sponsors agents)	and considered sausfactory. The
Leigh Painter (UCA Heritage Advisor)	management conditions of the CHMP were agreed upon which consisted of a cultural heritage induction to be undertaken before the CHMP activity commences and a hard copy of approved CHMP to be kept on site during the activity. The RAP also advised that compliance inspections may be required including one after stripping to the base of the fill and one once stripping is completed for the roadway. This was agreed to by the Sponsor's agent. If any Cultural Heritage is found, it was agreed that it will be recorded and salvaged on site so that works may continue.

#### 6.4 Summary of outcomes of consultation

The EMAC were consulted throughout the assessment and on completion of the complex assessment.

The standard and complex assessment methodologies were developed in conjunction with EMAC during the project inception meeting, and an onsite meeting subsequent to the standard assessment.

The management conditions were agreed upon during the CHMP conditions meeting on 25th August 2021, being:

- A cultural heritage induction to be undertaken by the RAP and a HA.
- A copy of the CHMP to be held in the activity area during works.
- Up to 3 compliance inspections may be required after stripping to the base of the fill and one once stripping is completed for the roadway.



# **ADVERTISED** DESKTOP ASSESSMENT

This section presents the results of the desktop assessment in accordance with Regulation 60(1) of the Aboriginal Heritage Regulations 2018.

### 7.1 Method of Assessment

The aims of the desktop assessment were threefold:

- to determine the level of previous investigation of the activity area and the surrounding region; •
- to determine the presence of registered Aboriginal places within the activity area; and •
- to determine the environmental context of the activity area with regards to landform and geomorphology and the . vegetation and other resources that would have characterised the area prior to European contact.

The methods used to undertake the desktop assessment included:

- using appropriate sources, including Victorian government on-line information, to review and summarise relevant environmental background;
- searches of the Victorian Aboriginal Heritage Register (VAHR) and other research sources (for example, consultancy reports, academic research, publications etc.) for information relating to the activity area and the geographic region;
- exploring historical and ethno-historical accounts of Aboriginal occupation of the geographic region and any • written and oral local history relevant to activity area;
- researching the land-use history of the activity area, particularly evidence for the extent and nature of past land disturbance; and
- review and analysis of collated information to identify and characterise the Aboriginal cultural heritage site types and locations likely to be present within the activity area in order to produce an archaeological site prediction model. The site prediction model will assist in determining the type of archaeological sites that potentially occur within the activity area, the possible contents of these sites, the possible past use of the landscape by Aboriginal people and the likely extent of ground disturbance that may affect the survival and recovery of Aboriginal cultural material.

### 7.2 The Geographic Region

Research into the Aboriginal cultural heritage of the geographic region of which the activity area forms a part has been assessed in accordance with Regulation 61(1)(b) of the Aboriainal Heritage Regulations 2018 (Vic).

The geographic region for the activity area has been selected to represent a range of landforms and resources that would be accessible from the activity area. Information about the geology and pre-Contact vegetation structure is important contextual information for Aboriginal site prediction models. Changes that have occurred to the landform and vegetation post settlement also need to be understood as they can have implications for site preservation and location.

A 2km radius was determined as a sufficient extent of the geographic region as it provided a suitable representative sample of landforms relevant to any past land use that may have occurred within the activity area. As such this area was selected as the focus for analysis of the geology (Map 3), geomorphology (Map 4), pre-1750 environmental conditions (Map 5), and registered Aboriginal places within 200m of the activity area (Map 6).



# 7.3 The Geology and Geomorphology of the Activity Area

#### 7.3.1 Geology

The underlying geology of the activity area provides a basis for predicting the age, distribution and type of Aboriginal archaeological sites that might occur in the geographic region.

The activity area is situated within the geological formation known as the Bridgewater Formation (Qxr). This geologic formation is a series of Pleistocene calcareous coastal dune ridges generally aligned parallel to the present coastline, extending along the southern Australian coastline from Victoria to South Australia and marking shoreline high stands during glacio-eustatic changes in sea level. The source of the calcareous material for these dunes is the shells and skeletons of shallow marine organisms which have been subject to vigorous wave action, breaking them down into bioclastic sand. The dunes are separated by linear interdune swamps which contain estuarine to lacustrine limestones, dolomites, marls and clays up to 13 m thick. The Bridgewater Formation is mostly between 15 and 25 m thick, but can be up to 45 m thick in places. The Bridgewater Formation is the cultural heritage sensitivity layer over much of the activity area (Map 6).

The Merri River Estuary is shaped by a core of mid-Pleistocene dunes belonging to the Bridgewater Formation which is mantled by Holocene dunes that formed with sea level stabilisation approximately 6900 years BP (Gill 1988). Aboriginal places have been found in association with dunes that are part of the Bridgewater Formation within the geographic region.

The geology of the activity area is important for establishing what stone resources would have been available to Aboriginal people. Silcrete is an important raw stone material used by Aboriginal people and found throughout many drainage lines across the western Volcanic plains. Silcrete is often formed in the presence of basalt and is the result of a chemical reaction during the weathering process. Basalt is found across the region and occurs on the surface in the region as 'floaters'. Basalt rock contains large amounts of silica and is easily weathered (Webb 1995: 11 – 12).

The current shoreline of Victoria is located 1.8km southeast of the current activity area. The current shoreline was created at the end of the last ice age, when the sea level rose, cutting the link between Victoria and Tasmania. Around 6,000–5,000 years ago, the coastline stabilised to the present conditions (Birch 2003).

#### 7.3.2 Geomorphology and Soils

The activity area comprises of a single geomorphological unit: Plains with ridges (Follett), GMU 6.2.1). This geomorphological unit is a subunit of the Western Plains and is characterised by sand sheets and dunes (some containing crests), slopes and associated plains with little relief (approximately 5 m) and poorly defined surface drainage. Occurring between 120 and 140 m, slopes are level to gently inclined and dominated by aeolian sands and silts. Plains and swamps are also prominent with swamp beds and sand sheets common in this rather subdued plains landform.

Parent material comprises Neogene marine sand & silt (Parilla Sand), Quaternary aeolian dune sand (Lowan Sand) and paludal silt & clay of swamp deposits. The underlying Parilla Sand is strongly ferruginised at the surface where infrequently exposed on areas of slight dissection. Reworking of the Parilla Sand has resulted in the younger unconsolidated siliceous sand (Lowan Sand) developing as sand plains and dunes. Swamps with younger lagoonal deposits (Qrs) consisting of expansive (cracking) dark organic clays also occur.

Acidic sandy soils with and without pans (Tenosols and Podosols) are found on dunes and sporadically on sandy plains where sodic brown, yellow and grey texture contrast soils (Sodosols) are dominant. Wind erosion is likely where dunes lack significant vegetation coverage. Cracking clay soils (Vertosols) are associated with the swamps and plains where poorly drained.

#### 7.4 Climate

The last world glacial period, which began c. 80,000 years before present (BP), lowered temperatures and sea levels. This cooling period peaked c. 18,000 BP when the sea level receded to 120 metres below its present level and the temperature dropped to between six and ten degrees Celsius colder than present temperatures (Kershaw 1995). During this phase, Tasmania was joined to the mainland by an isthmus of land, and semi-arid grasslands covered large areas of Victoria (Kershaw, 1995). As conditions ameliorated, climatic conditions became milder, although wetter. At approximately 5,000 BP,



### conditions became slightly cooler and drier, similar to the present climate (Kershaw 1995), Vast and as continued to

dominate Victoria until recently (Kershaw 1995).

These changes in climatic conditions suggest that the flora and fauna of Victoria, and therefore of the activity area, went through substantial changes during the same period. The changes must have impacted on Aboriginal subsistence and patterns of exploitation in the activity area and the surrounding region. During cooler and windier periods, especially between 18,000 and 5,000 BP, the region was exposed to strong, cold, westerly winds. It can be assumed that if the region was occupied during this period, areas with some protection from those winds were favoured during the colder periods. The generally mild but seasonably variable climate of the past 5,000 years was conducive to Aboriginal occupation throughout the year with possible seasonal movements to more sheltered locations in winter months (Hiscock 2008: 183–198).

The climate of the activity area is characterised by cool and wet winters and hot and dry summers. The average rainfall is between 700 and 1000 mm per annum; the average temperature ranges from a winter minimum of 6.9 degrees Celsius to a summer maximum of 22.8 degrees Celsius (LCC 1991: 60).

### 7.5 Native Vegetation and Fauna

Remnant vegetation is usually a good indicator of the degree of ground disturbance and therefore the likelihood of in situ Aboriginal archaeological deposits, at least in shallow deposits. In addition, it can also highlight the range of plant species available for use by the local Aboriginal groups during pre-Contact times (Murphy 2004: 6). According to ecological vegetation class (EVC) projections, prior to European contact the activity area was located within EVC 3 (Damp Sands Herb-rich Woodlands, Map 5).

Damp Sands Herb-rich Woodlands is described as a low, grassy or bracken-dominated eucalypt forest or open woodland to 15 m tall with a large shrub layer and ground layer rich in herbs, grasses, and orchids, and occurring mainly on flat or undulating areas on moderately fertile, relatively well-drained, deep sandy or loamy topsoils over heavier subsoils (duplex soils).

Character canopy species would have been dominated by Manna Gum (Eucalyptus viminalis) and Swamp Gum (Eucalyptus ovata).

The understory comprises Blackwood (Acacia melanoxylon) and a few sparse shrubs, including but not limited to Prickly Tea-tree (Leptospermum continentale), Silver Banksia (Banksia marginata), Common Heath (Epacris impressa), Prickly Moses (Acacia verticillata), Upright Guinea-flower (Hibbertia stricta s.l.) and Cranberry Heath (Astroloma humifusum).

The understorey lies above a species-rich grassy and herbaceous ground layer. Typical species within the ground layer include Annual Fireweed (Senecio glomeratus), Naked Bluebell (Wahlenbergia gymnoclada), Common Raspwort (Gonocarpus tetragynus), Small St John's Wort (Hypericum gramineum).

The area would have also comprised a rich variety of graminoid life forms including Tall Rush (Juncus procerus), Reed Bentgrass (Deyeuxia quadriseta), Pithy Sword-sedge (Lepidosperma longitudinale), Soft Twig-rush (Baumea rubiginosa s.l.), Velvet Tussock-grass (Poa rodwayi), Wattle Mat-rush (Lomandra filiformis), Tasman Flax-lily (Dianella tasmanica), Kangaroo Grass (Themeda triandra), Weeping Grass (Microlaena stipoides var. stipoides) and Love Creeper (Comesperma volubile).

Prior to European arrival, the activity area and surrounding region would have supported a great diversity of arboreal and land mammals. Some of those that were common are eastern grey kangaroo, swamp wallaby, potoroo, eastern native cat, brushtail possum, ringtail possum, horseshoe bat, tiger quoll, native rats, echidna, and koala. There is likely to have been seasonal variation, with higher numbers in summer. Aboriginal occupation may often have been focused on waterways such as the Merri River and Kelly Swamp. These water bodies would have provided a wider range of resources for Aboriginal people than the plains and a much more reliable water source, with freshwater mussels, fish, eels, waterbirds (black swans, ducks, ibis, and quail), lizards, and small marsupials a reliable food source throughout most of the year. Merri River would have provided immediate aquatic resources and potable water for at least for some of the year.





Map 3: Geology of the activity area and local geographic region.



Map 4: Geomorphology of the activity area and local geographic region.









# 7.6 Historical and Ethno-historical Accounts in the Geographic

### Region

Our understanding of the pre-contact Aboriginal population is ethnographically informed by observations made predominantly by non-Aboriginal people during the initial period of contact and subsequent settlement. It is necessary to consider the inherent bias in these accounts. However, the available early historical accounts provide some of the very few direct observations of Aboriginal land use within and surrounding the activity area.

Archaeological evidence suggests that Aboriginal people have occupied south-eastern Australia for at least 40,000 years BP (Flood 1995: 284–7). One of the oldest dated archaeological sites in Victoria is at Keilor in Melbourne where charcoal from a hearth excavated in 1973 has been dated to 31,000 years BP (Flood 1995: 286). The information used to establish presettlement Aboriginal spatial organisation is mostly based on observations made by Europeans during the initial period of contact and subsequent settlement of the activity area (see Barwick 1984; Clark 1990; Goulding 1988:14–32; Presland 1994).

The preliminary chronological data suggested that Aboriginal people have been undertaking subsistence throughout the greater Western District of Victoria region for at least the past 22,000 years BP. Tasmania was colonised at least 38,000 years BP (Cosgrove 1990), so it should be assumed that this part of what is today known as Warrnambool was probably occupied at similar timeframes, even though the ecosystems and corresponding resources were very different then to what they are today.

#### Dhauwurd wurrung

The people who occupied the activity area have been identified by Clark (1990: 54–55) as the Tarerergundidj in the Dhauwurd wurrung language area (also referred to as Gundidjmara). Clans speaking the Dhauwurd wurrung language managed the country in an area bounded by the Hopkins River in the east, the Glenelg River in the west and the Wannon River in the north (Clark 1990: 54).

The clan name 'Tarerer' referred to a large swamp between the Merri River and Tower Hill, probably the area known as Kellys Swamp today (Clark 1990: 55, 78). Previous archaeological work (see Section 5.3 above) has demonstrated that both Kellys Swamp and Tower Hill contain significant Aboriginal occupation sites. The Tarerer Swamp was described by Robinson in 1841 as a place where large gatherings of coastal clans occurred when whales were present along the coastline (Clark 1990: 78). Tower Hill is also known as a place of traditional religious significance to clans in the area. In April 1841, the clan head of the Tarerergundidj was described to Robinson as a man named Wone.der.rac. (Presland 1977: 62).

Aboriginal clans in the Western District lived a hunter-gatherer lifestyle, moving from one locality to another to make use of seasonal resources, trading opportunities and to meet ritual and kinship obligations. Ethno-historical records suggest that in some seasons Aboriginal people of the Western District lived a more settled life than Aboriginal people in other areas of south-east Australia. These beliefs are based on the presence and observations of shelters and 'villages' in the Western District (Schell 1995: 8).

Thomas received a description of a 'village' near Caramut from a local informant:

There was on the banks of the creek between 20 and 30 huts of the form of a beehive or sugar loaf, some of them capable of holding a dozen people ... These buildings were all made of a circular form, closely worked and then covered with mud (Cited in Williams 1984: 174).

Robinson observed the presence of many huts in Western Victoria (Presland 1977: 36, 38, 73, 85). He records that in the stony rises there were "plenty of huts of dirt and others built of stones" (Clark 1998b: 19). However, whether these huts or villages were inhabited on a permanent or semi-permanent basis, or were returned to seasonally, is not known.

Critchett (1992) theorises that Tower Hill Lake was an important meeting place for different clan groups and speculates that ceremonial and trading activities took place there. The freshwater source combined with mixed deposits of cultural heritage material (indicating domestic activity) and the number of burial sites in the region supports her theory.


# The diet of the Western District Aboriginal people consisted of a Eucrange of mammals, insh, birds, plant for

The diet of the Western District Aboriginal people consisted of a wide range of mammals, fish, birds, plant food and fungi (Dawson 1881: 18–22). Ethno- historical accounts suggest the daisy yam was a staple plant food, being available year-round, although less palatable in early winter (Gott 1983: 6–8).

Dawson (1881) refers to a gum which was used by the Aboriginal people near the Hopkins River; his reference reflects how the distribution and availability of a food source was affected by the arrival of the Europeans: Another kind of manna, also called buumbuul, is deposited in considerable quantities by the large dark cicadae on the stems of white gum trees near the River Hopkins. The natives ascend the trees and scrape off as much as a bucketful of waxen cells filled with a liquid resembling honey, which they mix with gum dissolved in cold water and use as a drink. They say that, in consequence of the great increase of opossums, caused by the destruction of the wild dog, they never get any buumbuul now, as the opossums eat it all (Dawson 1881:21).

Eels were seasonally exploited and would have been an important food source in the autumn months. There are numerous accounts of eel fishing and trapping and the eel trapping infrastructure remains in some places including along the Hopkins River (Schell, 1995: 9).

Plants such as myrnong, bracken and tree ferns provided staple foods for Aboriginal people, while medicines could be made from species such as Black Wattle (Acacia mearnsii), and the wood or bark from Silver Wattle (Acacia dealbata) could be used to manufacture implements. The grasses and water reeds, paperbark trees and Eucalypts all provided raw material for baskets and bark and wooden implements. The bark from stringy bark (yangoro) and mountain ash (yowork) was selected for the manufacture of bark canoes. Apart from the manufacture of implements and access to food and medicinal resources, the bark from these trees would also have been removed for other ceremonial and social non- utilitarian purposes. The roots (rhizomes or tubers) of the Cumbungi (Typha orientalis), Water ribbon (Triglochin procerum) and Common Reed (Phragmites australis) were harvested and cooked in earth ovens (Gott & Conran 1991: 8–9). In the case of the Cumbungi, after being cooked, the centre part of the rhizome was knotted then chewed to extract starch, and the remaining fibre was used for string (Gott & Conran 1991: 8). These resources would have existed within or adjacent to the activity area.

Some stone resources used by Aboriginal people would have been available in locations near the present activity area. Silcrete, flint and quartz were favoured stone materials for the manufacture of stone implements. These materials would have been readily available from nearby sources. Quartz pebbles were widely available in riverbeds, beaches and alluvial deposits. Flint was readily available in the form of nodules originating from undersea Miocene limestones which could be collected on the beaches. Basalt was used occasionally as it was in plentiful supply along the volcanic plains but was not a preferred material as it is harder to work with due to its porous nature. The most important raw material used in the manufacture of axes was greenstone. There are accessible source points for this material, the most well-known being Mount William, near Lancefield (Coutts et al 1976)

### 7.6.1 Post-Contact History

The Aboriginal population of western Victoria was estimated to be around 3,500 at Contact; afterwards, disease, conflict and denial of access to land and resources reduced these numbers dramatically (Lourandos & Ross 1994). From 1839 to 1949, the British Government established an Aboriginal Protectorate to mediate between Aboriginal communities and European colonists, with George Augustus Robinson employed as the Chief Protector of Aborigines. Four assistant protectors were employed and each was assigned jurisdiction over an area. C. W. Sievwright was assigned to the Western District in 1841 (Cannon 1982: 365).

In 1850, William Gray, the Commissioner of Crown Lands for Portland Bay, provided a census of the Aboriginal population in the district. He recorded 20 adult males, 15 adult females and four children (Clark 1990: 45). In 1858, a Select Committee of the Legislative Council was appointed to inquire into the condition of Aboriginal people in the state. Reports from squatters in the area estimated that the Aboriginal population in the area had been reduced by 75% during the 1840s and 1850s (Clark 1990: 197–8).

Violence between Aboriginal groups and European pastoralists was common throughout the region. Aboriginal people were forced off their traditional lands with many squatters prohibiting Aboriginal people access to their runs (Clark 1998: 153– 155). There are extensive reports of 'guerrilla warfare'; between Aboriginal people and squatters and their employees throughout the 1840s (Critchett 1990). There are stories of Aboriginal people using the stony rises around Eumeralla River as a base for attacking the European settlers who had dispossessed them. This conflict has been called the Eumeralla War (Clark 1989).



# Aboriginal people in search of food and other basic nems began inving on the fringes of warnambeol, where

Aboriginal people in search of food and other basic items began wing on the fringes of Warnambool, where government rations were available from 1860 onwards (Clark 1990: 40). These people were moved to the Framlingham Aboriginal Mission when it opened in 1861. This Aboriginal reserve covered 1,400 ha near the Hopkins River, a large section of land that included the only forested area in the region, Framlingham forest. In 1867, the Board decided to close Framlingham and move the inhabitants to the new station at Lake Condah. However, the people living on the mission refused to leave and successfully protested; Framlingham was reopened in 1869.

In 1877, a census conducted by the police listed 69 Aboriginal people at the Framlingham Aboriginal Station (Barwick 1971: Table 20:2). This represents the gathering together of people at the station rather than an increase in population, as the total Aboriginal population of south-western Victoria decreased from 727 in 1863 to 236 in 1877. By 1863, the Aboriginal population of Victoria was less than 2,000, or 13% of the estimated pre-European Aboriginal population (Barwick 1971: 288). The decline of the Aboriginal population in the area following European Contact can be attributed to a number of causes: racial conflict, disease, dispossession of land and depletion of traditional food sources (Lourandos 1994: 89).

The introduction of the *Aborigines' Protection Act 1986* meant that only people considered to be full-blooded, and halfblooded people over 35 years of age, were allowed to remain on the mission stations. This decreased the labour force on the stations and increased the numbers of fringe-dwelling Aboriginal people in the Melbourne region (Presland 1994: 105, 107).

In 1890, the Colonial government reserved an area of 236 ha for the use of Aboriginal people at Framlingham, but refused to staff the station, or provide assistance such as teachers, equipment and livestock. In the 1930s, public concern was raised regarding conditions of the Aboriginal people at Framlingham. Under mounting pressure the government agreed to build an additional 12 cottages, a school was opened and residents were given weekly rations. There were multiple attempts to close Framlingham over the years, however, the residents remained strongly attached to their land and defeated attempts to remove them.

In 1970, under the Aboriginal Lands Act 1970, Framlingham was handed to the Framlingham Trust and resumed operation under Aboriginal ownership and management. In the 1980s, land rights claims were issued for 405 ha of the Framlingham Forest surrounding the mission station. The claim continued from 1980 to 1987, when the land was handing over to the Kirrae Whurrong Aboriginal Corporation at Lake Condah and Framlingham. Aboriginal people still live on the mission land and continue to manage the land there.

Today the descendants of the Dhauwurd wurrung are represented by the EMAC and the GMAC. The activity area falls within the RAP boundary of the EMAC.

## 7.7 Land Use History

A review of the land use history of the study area provides insight into the potential integrity of any surface or buried archaeological deposits. While increased and intensive land use, such as ploughing, market gardening, residential and industrial development and extractive industry, have the potential to severely disturb surface and, to a varying degree, subsurface deposits, there remains potential, even within highly disturbed contexts, for Aboriginal cultural material to be present. The cumulative effect of land use over time also means that any areas of less disturbed or undisturbed land containing Aboriginal cultural heritage become increasingly valuable in a local and regional context, and from a cultural and scientific perspective.

During the early 19<sup>th</sup> century European visitors began arriving from Tasmania on seasonal hunting expeditions. Visits by sealers to the coastal regions of south-west Victoria may have begun as early as the late 18th century. These visits appear to have been almost entirely restricted to the coastal area. Periodic visits by whalers may have begun as early as 1810. The first shore-based whaling station appears to have been that of William Dutton, who established a station at Portland in 1828 (Townrow 1997: 11).

Thomas Mitchell's account of his explorations of 'Australia Felix' provided a significant impetus to the movement of squatters to the west and south-west of Victoria. As details of his travels became known, there was a rapid influx of settlers to the region. Edmund Henty established his settlement at Portland in 1834 (Kiddle 1963: 31). From 1837 onwards squatting runs were rapidly established throughout the region. Occupation of the country progressed from several directions at once – overland from the north, from Melbourne and Geelong in the east and Portland in the west (Powell 1996).



# During the 1850–1860 gold rush the European population of Victoria dramatically increased, with demand for

During the 1850–1860 gold rush the European population of Victoria dramatically increased, whitedemand for land being particularly great among men returning from the diggings. This resulted in widespread clearance of land for sheep grazing and agriculture. This in turn destroyed many traditional hunting areas and led to conflict with Aboriginal people (Powell 1996). As a result of the districts increasing agricultural settlement, it became necessary that another port in the west should be established. During May 1845, Charles La Trobe, Superintendent of the Port Phillip District, along with a party of other prominent men from the district, visited the area, selecting the site for a township that would become known as Warrnambool. The first lots within the new township area were sold in 1847 (Osbourne 1887: 1).

Although Warrnambool grew quickly on the back of both pastoral settlement and the gold rush, due to being exposed to strong south-easterly winds, its port, unlike Geelong's, didn't flourish, whereas the railway connection from 1890 did. Warrnambool retains fine civic buildings and churches from the late nineteenth century, which have not been subject to wholesale redevelopment. Its industrial base developed on butter and cheese factories, augmented in 1947 by a Fletcher Jones trousers factory.

Warrnambool's name is thought to have been derived from an Aboriginal word with several attributed meanings, including place of plenty, running swamps and a growing tree (Victorian Places 2020: Warrnambool). Warrnambool made little progress during its first years as it was dependent on the sea for the arrival of people and goods, as the overland route to Warrnambool was slow and difficult (Beavis 1993: vii). However, by late 1848, the town had two blacksmiths, a wheelwright, a tailor, carters, carpenters, two butchers, two stonemasons, two general stores, two hotels, the commencement of a postal service and a Sunday school. A National School and a hospital opened in the following two years. The town grew steadily over the coming years and Warrnambool was declared a municipality on 6 December 1855. (O'Callaghan 2004). Today Warrnambool is the capital city of the south west coastal region of western Victoria, it is the fifth largest city in Victoria. The mainstay of the economy is agriculture and its support industries. Other major industries and services include retail, education, health, meat processing, clothing manufacture and construction (Victorian Places 2020: Warrnambool).

### 7.7.1 Land Use of the Activity Area

The activity area was surveyed prior to 1891 and was part of a larger allotment (Crown Allotment 103) owned by a Mr. W. McDowell (Figures 1). It is likely that the activity area was utilised for pastoral or agricultural purposes and may have experienced some ploughing in the past.

Analysis of aerial photography exhibits that the activity area and much of the area remained undeveloped until after 1992 (Figures 2-3). The township of Dennington appears to not have extended beyond its 1891 extent and much of the land to the south of the town has remained rural in character. The original extent of Mr McDowell's lot appears to have avoided subdivision until after 2003 (Figure 4). Russel Street was unpaved at this time and there appears to be no unpaved access ways along Rome Street and Fraser Ridge. A number of residential dwellings have been constructed along Deverell Way since 2003 under a previously granted planning application that has since lapsed. The land was purchased by the current landowner on 23 November 2009 and the contract settled on 14 July 2010 (Pers. Comm. Justin Hinch July 28 2021). Mechanical excavation and levelling of residential blocks occurred throughout the current activity area prior to 20 September 2009. A certificate of practical completion for subdivision works and major constructions occurred in 2012. The construction of the unpaved access ways through the levelled portions of the site occurred at this time. The drainage basin involved cut and fill activities and although it was designed as a large basin area the works made the basin smaller and deeper. There are some large culverts installed from a Council soakage pit to the basin and some smaller culverts from the subdivision area also lead into the basin (Pers. Comm. Justin Hinch July 28 2021).

Although it likely that the northern portion of the activity area has been subject to substantial ground disturbances in its entirety, it is unclear if these mechanical works extend to southern extent of the activity area.

The activity area currently contains a series of levelled surfaces in preparation for residential dwellings, an unpaved roadway and various construction soil stockpiles. No remnant vegetation is present and there are no dwellings or buildings currently constructed within the activity area.

A Dial-Before-You-Dig request was conducted by Leigh Painter on 10 July 2021 in order to ascertain any sub-surface utility installations that might have impacted on the subsurface within the activity area (Appendix 4). The searches revealed the presence of a NBN cable that travels along the road reserves of Rome Street, Deverell Way and Fraser Ridge. There are several trench manholes within the road reserves but none appear to enter the current activity area. Telstra cables appear to run along this trench and share assets. The searches also revealed the presence of a water main and a sewer gravity main





that run along the inside of the eastern boundary or the activity area, to the lear of the existing along Deverell Way. Council drainage pipeline enters the activity area from Baynes Street to the north and terminates in Rose Street. While a certain degree of ground disturbance is assumed relating to these service installations, it should be noted that none of these assets appear to affect the southern extent of the activity area.



This previous land use means it is possible that much of the surface cultural heritage material would either have been disturbed in some way or possibly destroyed. The potential previous uses may have involved vegetation clearance, livestock trampling, agricultural use, mechanical excavation, grading, and levelling, which implies that there is very low likelihood of identifying Aboriginal cultural heritage material within the activity area.



Figure 1: Parish of Wangoom 1891: Approximate location of activity area defined by red square (State Library of Victoria 2020).





Figure 2: The activity area in 1979: Proposed subdivision defined by red polygon (Landata 2021)



Figure 3: Aerial photography of activity area 1987: Proposed subdivision defined by red polygon (Landata 2021)





Figure 4: Aerial photography of activity area 2003



# 7.8 Aboriginal Places in the Geographic Region

The VAHR was accessed by Leigh Painter on 9 July 2021 in order to undertake a search for previously registered Aboriginal places within a 2km radius of the activity area (Map 6). The number of previous archaeological studies and Aboriginal places that have been recorded in the immediate vicinity of the activity area provides substantial information as to the places most likely to occur within the activity area. This is relevant for developing the site prediction model provided in Section 7.11.

There are no recorded Aboriginal places within the current activity area. The nearest recorded Aboriginal place (7321-0003) is a shell midden whose extent comes within 330m to the west of the activity area. In total, there are 13 previously recorded Aboriginal places within a 2km radius of the activity area (Map 6). The places comprise artefact scatters (8) low density artefact distributions (3), and shell middens (2), one of which contains an earth feature component (see Table 5).

The recording of Low Density Artefact Distributions (LDAD) was introduced in 2012. An LDAD is defined as the occurrence of stone artefacts at densities of up to 10 counted artefacts in any area of approximately 10m x 10m, or 100m2, including within a single test pit of <1m2. As such all of the artefact scatters would now be considered low density artefact distributions. Therefore, the frequency of low density artefact distributions is higher than is suggested in the data presented in Table 5.

VAHR No.	Place Name	Landform	Site Type	Description
7321- 0003	Dennington	Riverbank	Shell Midden	No information provided.
7321-0084	Warrnambool Dunes 1	Dune/Blowout	Shell Midden/ Earth Feature	<ul> <li>A severely eroded shell midden containing common occurrences of <i>Subninella</i>, <i>Brachidontes</i> and <i>Celluna species</i>, and rare occurrences of <i>Plebidonax</i>, <i>Abalone</i>, and <i>Limpett sp.</i> Some bone and charcoal was present. unworked flint was also present.</li> <li>A hearth component was recorded along with hammerstones/pitted stones/grinding stones, worked flakes, microliths, and unspecified chipped stone artefacts</li> </ul>
7321- 0107	Warrnambool Dunes 24	Dune/Hill	Artefact Scatter	<ul> <li>A 40 x 7 m surface artefact scatter located in sand containing an unspecified number of fine flint or chert chipped stone artefacts</li> <li>Shellfish species were recorded including a rare occurrences of <i>Subninella</i>, <i>Brachidontes</i> and <i>Abalone</i>, and <i>Amphineum</i>. Some bone and charcoal was present.</li> <li>The site condition was described as severely eroded by wind due to a lack of vegetation coverage.</li> </ul>
7321- 0110	Warrnambool Dunes 27	Hill	Artefact Scatter	Described as potential artefactual material in corner of carpark, considered to be slag or volcanic glass. Possibly brought in by vehicles.
7321- 0113	Merri River 1	Escarpment/Rocky Outcrop/Beach	Artefact Scatter	A surface scatter containing rare occurrences of <i>Subinella</i> species and some charcoal.
7321- 0117	Merri River 2	N/A	Artefact Scatter	A surface artefact scatter. No other information provided on VAHR site card.
7321- 0118	Merri River 3 Dennington	Dune/Hill	Artefact Scatter	A surface artefact scatter consisting of fine grained chipped flint/chert flakes and burnt stone. Some rare occurrences of <i>Subninella</i> ,

Table 5: Previously registered Aboriginal places within 2 km of the activity area.



## ADVERTISED Brachwertes, and Conditional Were recorded

				along with some charcoal.
7321- 0355	Spring Onions	Hill	Artefact Scatter	A single chert flake with cortex but no platform.
7321- 0471	Harrington Road 1	Dune/Low Rise	Artefact Scatter	A subsurface quartzite angular fragment located in the upper 200mm within soft sand subject to ploughing.
7321- 0472	Harrington Road 2	Dune	Artefact Scatter	A subsurface artefact scatter consisting of 2 coastal flint flakes and 1 quartz angular fragment located within the upper 200mm in loose sandy loam.
7321- 0505	Merrivale LDAD 1	Rise	Low Density Artefact Distribution	A silcrete distal flake with use wear located at a depth of 300mm.
7321- 0515	Spooky's Track LDAD 1	N/A	Low Density Artefact Distribution	1 coastal flint compete flake and 1 coastal flint bidirectional core containing some retouch/use wear.
7321- 0521	Dennington LDAD 1	Rise	Low Density Artefact Distribution	A subsurface artefact scatter containing 2 coastal flint complete flakes at depths of between 700 to 800mm in silty sand.





Map 6: Previously registered Aboriginal places within the geographic region



# 7.9 Previous Studies in the Geographic Region

The results of prior archaeological studies relevant to, or conducted in the vicinity of, the present activity area, along with the current regional model of site distribution, are presented in this section. This has largely been set within a 2km arbitrary boundary. A number of studies that are found within this area, but extend outside of it, are also incorporated in this assessment as they provided useful data. This information is reviewed in order to assess the archaeological sensitivity of the activity area and to inform the methodology of the field assessment program.

### 7.9.1 Regional Investigations

#### du Cros, H. 1993

du Cros (1993) investigated two areas located on Merri River closer to the coast and on either side of the existing Warrnambool Golf Course. Two specific areas were investigated, Area A, the site of a proposed golf course expansion, extended as far west as Kennedy Street, while Area B, the site of a proposed sewerage treatment plant, extended almost to Pertrobe Lane in the east. Approximately 70% of both areas were examined during a pedestrian survey, although ground surface visibility within both survey areas was relatively poor. A midden and surface artefact scatter were recorded within one area, Warrnambool Golf Course 1 (VAHR 7321-0404). The midden contained a variety of materials including charcoal, burnt shellfish, hearth stones and stone tools made of chert that consisted of a retouched flake, a core and debitage. In addition, a sandstone manuport used as a hammer stone was discovered. The study concluded that the banks of the Merri River had the potential to contain Aboriginal cultural heritage material.

#### Paynter, N., Rhodes, D. 2005

Paynter and Rhodes (2005) completed an archaeological investigation along Wollaston Road that focused on three 'sectors'. The first sector concentrated upon the Merri River corridor and floodplains, the second examined the remaining grazing lands, and the third sector focused on the residences and roads within the area. Due to a lack of pedestrian access in places, the methodology used varied between a vehicle based survey and a pedestrian based survey. The survey resulted in the identification of two isolated artefacts: VAHR 7321-0450 Wollaston Road 1 (2.1km east of the current activity area) and VAHR 7321-0451 Wollaston Road 2 (3.2km south east of the current activity area). Artefacts located included an isolated silcrete angular fragment, a silcrete core, a retouched flake, and an angular fragment. The artefacts were considered to have washed down a bank slope or having been ploughed up in a paddock and as a result were not considered to be in situ of their original depositional location. A number of landforms within the study area were noted as areas of archaeological potential; areas along the Merri River's banks, as well as a floodplain, escarpment, and stony outcrops located on a floodplain. The study noted that Aboriginal places are unlikely to be located in surface contexts due to prior ground disturbance, but that the potential for intact subsurface cultural heritage material remained high.

#### Schell, P. 2007

Schell (2007) undertook a cultural heritage assessment for a sewer pipe extension along Wangoom Road. The study area identified three geological units; scoria deposits, newer Volcanic's and phreatomagmatic deposits. Scoria deposits were described as being made up of black oxidised red-brown lapilli, while phreatomagmatic deposits were described as being created from low temperature eruptions where there is a rapid conversion of ground water to steam due to the contact with hot magma. A floodplain and escarpment landform types were identified within the activity area (Schell 2007: 3). The proposed pipeline extension route was assessed by pedestrian survey, no Aboriginal cultural material was located. Ground surface visibility was recorded as poor, and the activity area was found to have low potential to contain archaeological deposits due to modern disturbance. Previous ground disturbances were attributed to vegetation clearance, ploughing and construction activity.

### 7.9.2 Local Investigations

A number of local Aboriginal archaeological investigations have been undertaken within the geographic region and all are considered relevant to this assessment as they will form part of a site prediction model for the geographic region.

#### Dugay-Grist, L., McAlister, R. 2010 (CHMP 11321)

Dugay-Grist and McAlister (2010) prepared a CHMP for the proposed construction of a drainage basin at Harrington Road, Warrnambool, within 460m northeast of the current activity area at its closest proximity. No Aboriginal cultural heritage was



identified during the standard assessment. The complex assessment revealed that the control part of the activity area had undergone substantial disturbance due to construction of a pipeline, but outside of this area had not been subjected to any major ground disturbance. Two Aboriginal sites were located during complex assessment, both in the north-central part of the Activity Area. Both sites are artefact scatters, VAHR7321-0471 and VAHR7321-0472. It was concluded that the Activity Area was used in a transitory fashion.

#### Luebbers, R. 2011 (CHMP 11574)

Luebbers (2011) prepared a complex CHMP for the Rail Trail Development Project located at the southern end of Millers Lane, south of the Princes Highway at Dennington, approximately 1.16km southwest of the current activity area at its closest proximity. The trail is approximately 1820 metres in length with a width narrower than the usual 1.0 chain road reserve granted to colonial public roads. The standard assessment did not locate any new Aboriginal Places but concluded that the most likely zones of activity will be edges and shallows of the estuary on both sides of the wetlands. The complex assessment involved the excavation of two 1x1m test pits and nine shovel test pits but no new Aboriginal places were located.

#### Miller-Armstrong, T. 2012 (CHMP 11925)

Miller-Armstrong (2012) prepared a standard CHMP for a proposed Brine Receival Facility at the old landfill (rubbish tip) site at the corner of Braithwaite and Watson Streets, 870m to the southeast. Desktop and standard assessments were carried out, but complex assessment was not feasible due to the extent and depth of landfill. A visual inspection of the activity area from outside the perimeter fence was undertaken, and local knowledge confirmed previous use of the site as a tip. It was agreed that the likelihood of cultural material in accessible depth was extremely low due to use of the land as a rip and no further assessment was required. No cultural material was located.

#### MacManus, T., Ward, B., Power, R. 2014 (CHMP 13321)

MacManus, Ward and Power (2014) prepared a complex CHMP for a proposed water main installation at Midfields Meats, approximately 930m to the south at its closest proximity to the southwest of the current activity area. The standard assessment confirmed that landforms within the activity area consisted of undulating sandy and limestone-based rises. Three areas of potential were identified during the standard assessment: a large sandy rise in the western extent of the activity area, an undulating sandy and limestone rise in the eastern section of the activity area, and a smaller sandy and limestone rise located on Kennedy Street. No Aboriginal cultural heritage was identified during the standard assessment.

The complex assessment included one 1 m x 1 m test pit and thirty-three 40 cm x 40 cm shovel test pits excavated across the archaeologically sensitive landforms. It was determined that the entirety of the activity area had been subject to ground disturbance from previous road and rail trail construction. The stratigraphic profile recorded within the sandy rise consisted of an anthroposolic soil structure with evidence of heavy ground disturbance intermixed with a sandy fill matrix. The anthroposolic soil structure was the result of the construction of the rail trail connection, drain cuttings and the installation of services. The stratigraphic profile within the undulating rises consisted of a minimally developed calcareous sandy soil that was defined as a shelly rudosol. This was associated with the relatively young age of the underlying Pleistocene Bridgewater Formation and the extent to which wind erosion has deflated the relic dunes. Therefore, the soil stratigraphy consisted of a redeposited topsoil that consisted of a greyish brown, dry and medium grained silty sand, overlying a calcareous bedrock base. No Aboriginal cultural heritage was identified during the standard assessment.

#### Fiddian, J. and Patton, K. 2018 (CHMP 15378)

Fiddian and Patton (2018) prepared a complex CHMP for a proposed residential development at 215 Merrivale Drive, Warrnambool, approximately 1.39km southeast of the current activity area.

One area of archaeological sensitivity was noted during the standard assessment; a rise located in the northwest and western aspects of the activity area overlooking former swampland. The eastern and southern aspects of the activity area were considered to be of low archaeological sensitivity due to this are being in an area of inundation associated with a former swamp.

Two 1 m x 1 m test pits and twelve 50 cm x 50 cm shovel test pits were excavated during the complex assessment that tested the floodplain, former swamp, base, lower and mid slopes and top of the rise. The floodplain consisted of a brown clayey silt topsoil overlying a compact black silty clay. The base of the rise consisted of a dark brown slightly sandy loam with an increased sandstone presence, overlying an impenetrable sandstone base with an overall depth of 300 mm. The



# lower slope consisted of very black clayey barm max was overlying a clay basal horizon with an overlaw depth of 340 mm.

The middle slope consisted of a dark brown silt loam to a slightly clayey silt loam to a depth of 280 mm overlying a clay base. The top of the rise consisted of a stratigraphic profile of a dark brown slightly clayey loam (0 - 100 mm), overlying a dark brown slightly clayey loam (100 - 200 mm) that became increasingly clayey with depth (300 - 500 mm), until coffee rock and very compact clay dark brown to black were encountered at depths of 500 - 600 mm.

Aboriginal cultural heritage material was identified on the top of the rise that consisted of an isolated silcrete distal flake (VAHR 7321-0505) recorded at depths between 20 to 30 cm. No further Aboriginal cultural heritage material was identified on the remaining landforms present within the activity area.

#### Fiddian, J. and Patton, K. 2018 (CHMP 15636)

Fiddian and Patton (2018) prepared a complex CHMP for a proposed rehabilitation centre at 43 Atkinsons Lane Dennington, approximately 890m to the northwest of the current activity area. No aboriginal cultural heritage was identified during the pedestrian survey conducted during the standard assessment. One 1 x 1 m test pit and 15 50 x 50 cm shovel test pits were excavated during the complex assessment. The soil profile consisted of very dark brown sandy loam to 400mm on top of reddish grey sandy loam to 600mm, on top of light brown sand to 800mm. A reddish yellow to strong brown compact sand was present from 800 to 1200mm. Large calcarenite boulders were present in the test pit to around 500mm. An auger probe series was conducted that exhibited that calcarenite boulders ranged in depth (between 100 and 900mm) but were mostly concentrated around 200-400mm. No Aboriginal cultural heritage was identified during the complex assessment.

#### Matic, A. 2020 (CHMP 17090)

Matic (2020) prepared a complex CHMP for a proposed residential development at 11 Hood Street, Dennington, approximately 390m northwest of the current activity area. No aboriginal cultural heritage was identified during the pedestrian survey conducted during the standard assessment. The activity are was predominantly covered by a large bitumen tennis court and it was considered possible that Aboriginal cultural heritage may be present underlying the bitumen. Further investigation was recommended following the removal of the tennis court.

#### Strickland, J., Macklin, R., Sonego, L. 2021 (CHMP 17211)

Strickland, Macklin and Sonego (2021) prepared a complex CHMP for a proposed water main installation along Harrington Road, Shannon Road and Russell Street, Dennington. This comes within approximately 1.15km southwest of the current activity area at its closest proximity. No aboriginal cultural heritage was identified during the pedestrian survey conducted during the standard assessment which was restricted due to thick grass coverage. Two landforms were identified during the activity area; a sedimentary dune and an alluvial plain. The complex assessment involved the excavation ofthree 1 x 1 m test pits and eight 50 x 50 cm shovel test pits and revealed a soil profile consisting of dark brown silty loam, on top of loose, lighter brown silt, overlying more compact brown silty sand, on top of medium brown silty sand, overlying grey, white soft ash on top of a base on cemented calcarenite at 940mm. (7.5YR 6/4; pH 5) One new Aboriginal place was located during the complex assessment, a low density artefact distribution; VAHR 7321-0521. One chert flake and one quartz flake were located at a depth of 700-800 mm in a compact dark brown sandy silt.

#### East, E. 2020 (CHMP 17253)

East (2020) prepared a complex CHMP for a proposed residential subdivision at 87 Russell Street, Dennington, approximately 1.36km to the north of the current activity area. The standard assessment located two landforms, an open, grassed, north running hill slope located across the east of the activity area and a gently undulating plain across the west of the activity area. No new Aboriginal places were located during the standard assessment. The complex assessment involved the excavation of four 1 m x 1 m test pits and 24 50 cm x 50 cm shovel test pits and revealed a silt overlying clay deposit typical of the western Volcanic plains of Victoria. No Aboriginal cultural heritage was identified during the complex assessment.

### 7.9.3 Summary of Previous Investigations

The place types represented in the geographic region include artefact scatters (8) low density artefact distributions (3) and shell middens (2), one of which contains an earth feature component.

Shell middens are primarily located along the Merri River or in coastal dunes, and focus on coastal dune deposits (Qdl1) or the Bridgwater Formation (Qxr). Shell middens in the geographic region contain a variety of rocky platform species. The



# A DAY E RT SED

most abundant species include *Subninella* and *Brachicontes*, although *Abaone*, *Amphinearn*, *Ceilerla*, *Hebidonax*, and *Limpett sp* are also represented in smaller numbers. One shell midden contains a hearth feature (VAHR 7321-0084) and contained flint/chert hammerstones/pitted stones/grinding stones, worked flakes, microliths, and unspecified chipped stone artefacts. Three artefact scatters contain shellfish material although were not recorded as shell middens.

There are 8 artefact scatters recorded within the geographic region. However, it should be noted that many of these artefact scatters were recorded in the early 1980s and provided very little information that can be used to formulate a site prediction model. The majority of artefact scatters do not provide a catalogue or the number of artefacts present. VAHR 7321-0472 (Harrington Road 2) is the largest specified number of artefacts (2). Any recent LDADs that have been recorded exhibit no more than 2 artefacts. Therefore it is very likely that low density artefacts are predominate in the geographic region. Coastal flint is the most abundant raw material although chert, silcrete, quartzite, quartz and crystal quartz are also present. Complete flakes, snapped flakes, bidirectional cores and angular fragments have been recorded. VAHR7921-0003 was recorded as containing hammerstones/pitted stones/grinding stones, worked flakes, microliths, and unspecified chipped stone artefact, although this information should be treated speculatively. The nature of stone scatters in the region should be considered as consisting of waste flakes and manufacture debris and material., which is low density in nature. Stone scatters have been located in Coastal dune deposits (QdI1), Bridgewater Formation (Qxr) and to a lesser extent, Coastal lagoon deposits (Qg). Shell middens have also been located in either geology type. Stone scatters have been recorded within the bend of Merri River some distance away from the waterway (1.4km), while to the west of Merri River stone scatters are concentrated around swampland.

No burials have been identified within the Bridgewater Formation. However, this landform has shown the potential to contain sensitivity for burials to occur. Although no burials have been found within the geographic region, there is a possibility for this to occur, particularly within the Bridgewater Formation. No scarred trees or rock shelters have been identified within the geographic region.

There have been few complex CHMPs conducted within 1km of the activity area (MacManus, Ward and Power 2014; Dugay-Grist and McAlister 2010; Fiddian and Patton 2018). The nearest complex CHMP conducted to the activity area was prepared by Dugay-Grist and McAlister (2010) relating to the construction of a drainage basin at Harrington Road, Warrnambool, within 460m northeast of the current activity area at its closest proximity, and within the Bridgewater Formation (Qxr). The activity. The soil profile within close proximity to Harrington Road consisted of dark brown humic rich topsoil to 200mm on top of compact light brown sandy loam with limestone fragments to 500mm where a solid calcarenite base was identified. Two subsurface LDADs were located during the assessment. VAHR 7321-0471 contained a crystal quartz angular fragment located on an elevated rise within humic rich topsoil. VAHR7321-0472 contained a crystal quartz angular fragment and two coastal flint complete flakes located on an elevated rise within humic rich topsoil at a depth of 150mm.

Fiddian and Patton (2018) prepared a complex CHMP for a proposed rehabilitation centre at 43 Atkinsons Lane Dennington, approximately 890m to the northwest of the current activity area. The activity area relating to this CHMP was located on the border of the Bridgewater Formation (Qxr) and Tower Hill Tuff (Nept). The soil profile consisted of very dark brown sandy loam to 400mm on top of reddish grey sandy loam to 600mm, on top of light brown sand to 800mm. A reddish yellow to strong brown compact sand was present from 800 to 1200mm. Large calcarenite boulders were present in the test pit to around 500mm. An auger probe series was conducted that exhibited that calcarenite boulders ranged in depth (between 100 and 900mm) but were mostly concentrated around 200-400mm. No Aboriginal cultural heritage was identified during the complex assessment.

MacManus, Ward and Power (2014) prepared a complex CHMP for a proposed water main installation at Midfields Meats, approximately 930m to the south at its closest proximity to the southwest of the current activity area, within the Bridgewater Formation (Qxr). The nearest locations to the activity area tested during the complex assessment consisted of light grey to brown silty sand on top of a calcarenite base at a maximum depth of 290mm.

The results of subsurface testing conducted within 1km of the activity area suggest that sandy loam soils are present overlying either dense calcarenite deposits or solid calcarenite bases around 500mm in depth. Sands may be present underlying this dense deposit in ridges or crests. Any aboriginal cultural heritage that is present is low density in nature.



# 7.10Site Prediction Model

The results of the previous local and regional studies can be used to construct a predictive site model for the geographic region and activity area. The findings of the review of previously registered places and prior studies within the geographic region are:

- Parts of the activity area have been impacted by land clearance and construction activities.
- Shell middens may be located within coastal lagoon deposits or within close proximity to the Merri River. The primary landforms they are associated with is coastal dunes or the Bridgewater Formation.
- The most abundant species include Subninella and Brachidontes, although Abalone, Amphineum, Celluna, Plebidonax, and Limpett sp are also represented in smaller numbers.
- Dominant stone artefact types will be waste flakes, flakes, and a small component of formal tool types.
- The most common raw materials are coastal flint and chert. However, silcrete, quartzite, quartz and crystal quartz are also represented.
- Stone scatters have been located in the Coastal dune deposits (Qdl1), Bridgewater Formation (Qxr) and to a lesser extent, Coastal lagoon deposits (Qg).
- Stone scatters may be located within bend of Merri River some distance away from the waterway, while to the west of Merri River stone scatters should be concentrated around swampland.
- Burials have not been located within the Bridgwater Formation (Qxr) in the geographic region.
- The activity area is considered to have a low to moderate potential for Aboriginal cultural material due to the impact of land clearance, possible agricultural/pastoral activities, and landscape modification in preparation of the site for residential development.

## 7.11 Conclusions from the Desktop Assessment

The desktop assessment has determined that the activity area is located in an area of moderate potential for Aboriginal cultural heritage to occur. However, due to the impacts of previous land uses the activity area now likely contains low to moderate sensitivity for Aboriginal cultural heritage to occur. As the extent of disturbances cannot be determined by the scope of the desktop assessment, particularly within the southern extent of the activity area, it should be considered possible that Aboriginal cultural heritage is located within the activity area. There have been three assessments conducted within 1km of current activity area which have progressed to complex assessment and have returned Aboriginal cultural heritage (MacManus, Ward and Power 2014; Dugay-Grist and McAlister 2010; Fiddian and Patton 2018). These complex assessments have determined that shell middens and low density artefact scatters may be present within the Bridgewater Formation (Qxr) and as such may be located in-situ within undisturbed sections of the activity area, particularly within the southern extent.

The activity area has been subject to ground disturbances during vegetation clearance, previous land uses, the preparation of the area for residential development, subsurface utility installation, mechanical excavation, levelling and grading, in the creation of flat land for individual dwellings, soil movement and fill importation. As such it is likely that any Aboriginal cultural heritage that may be present will be in a disturbed context.

Although a degree of subsurface disturbance can be assumed, the desktop assessment has been unable to determine the extent of ground disturbances and it cannot be discounted that there remains in-tact ground surfaces within the activity area, particularly within the southern extent of the activity area.

On the basis of this desktop assessment it cannot be discounted that Aboriginal cultural heritage may be present within the activity area. Regulation 62(1) of the *Aboriginal Heritage Regulations 2018* states that a standard assessment is required if the results of a desktop assessment show that it is reasonably possible that Aboriginal cultural heritage is present in the activity area. As such it was determined that standard assessment is necessary.



# 8 STANDARD ASSESSMENT

### 8.1 Introduction

In accordance with Clause 8, Schedule 2 of the Aboriginal Heritage Regulations 2018 (Vic) (No. 59, 2018), this section contains the results of the standard assessment and field survey.

This section outlines the aims, methods and results of the pedestrian ground surface survey of the activity area undertaken on 17 August 2021 by Adam Lovett (UCA Heritage Advisor) along with Mark Edwards and Thad Chadwick (EMAC field representatives).

The standard assessment was conducted over a one-day period and was conducted in accordance with proper archaeological practice as set out in r.63 of the Aboriginal Heritage Regulations 2018 (Vic) (No. 59, 2018).

### 8.2 Aims of the Standard Assessment

The aims of the standard assessment were to:

- inspect all areas with ground surface visibility for Aboriginal archaeological sites within the activity area; •
- attempt to identify the presence of any previously recorded and unrecorded surface Aboriginal cultural heritage places Aboriginal cultural heritage;
- determine the cultural heritage potential of the activity area;
- undertake consultation with representative(s) of the Traditional Owners; •
- identify any areas of potential archaeological sensitivity deposit (that may require subsurface testing) and; •
- document the extent of significant ground disturbance in the activity area resulting from prior land use history. •

This information was also used to inform the complex assessment testing strategy.

### 8.3 Methodology of the Standard Assessment

The desktop assessment had indicated that there were no previously registered Aboriginal places located within the activity area and that the activity area had not been subject to prior ground surface survey.

It was possible to undertake a comprehensive pedestrian survey of the entire activity area. From the desktop assessment and examination of the existing aerial imagery, it was anticipated that there was likely to be substantial disturbance over the northern portion of the activity area due to previous levelling and landscape modification in preparation for residential blocks. Auger samples were originally intended to be conducted throughout this area to confirm the depth of disturbance as per an agreement during the project establishment meeting. However, as this area was considered to have been substantially built up it was agreed between Adam Lovett (UCA Heritage Advisor) and John Clarke (EMAC General Manager Cultural Landscapes) during an on-site meeting that auger sampling would not be required and that complex assessment should avoid this area.

The entire activity area was inspected via a systematic pedestrian survey of 2m spacing as outlined in Burke et al (2017: 88-96). Areas containing imported fill were also subject to systematic pedestrian survey. It was immediately apparent that no mature indigenous trees, caves, or rock shelters were present within the activity area, and as such did not require any consideration with regards to the survey methodology. Given that the activity area is not encompassing a large number of different landforms it was agreed that judgment sampling was not warranted and that any areas of GSV would be more intensively surveyed during the systematic pedestrian survey.

As the majority of the activity area contained a considerable amount of fill deposition, any surfaces exposed within these areas were considered to be 0% GSV. However, these exposures were more intensively inspected for any imported Aboriginal cultural heritage that may be present, and to assesses the degree of modification present. Transect spacing



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would be discarded in these instances to ensure a complete and morough coverage of any ground exposures, whether they contained obvious fill importation or not. The remainder of the activity area contained a dense grass coverage that provided 1-10% GSV. These areas were also more intensively inspected during the systematic pedestrian transect surveys.

Detailed notes were taken to assist in the assessment of Aboriginal cultural heritage places, ground conditions, landform details and in the assessment of areas of disturbance. This methodology was designed to maximise the opportunity for locating surface cultural material as well as areas of isolated exposure. The field team were able to closely assess the activity area for any areas of sensitivity. Areas of disturbance, which are unlikely to contain cultural material, were also noted.

### 8.4 Traditional Owner Information

As set out r.63(2) of the *Aboriginal Heritage Regulations 2018* (Vic) (No. 59, 2018), the standard assessment may include the collection and review of oral history relating to the activity area. The traditional owner representatives present for standard survey, Mark Edwards and Thad Chadwick (EMAC field representatives), did not provide any specific oral information about the activity area during the standard assessment.

### 8.5 Ground Surface Visibility and Exposure

Ground Surface Visibility (GSV) can be defined as how much of the surface is visible and what other factors (such as vegetation, gravels or leaf litter) may limit the detection of archaeological materials (Burke et al, 2017: 95). This can be a major factor in obscuring archaeological materials.

The higher the level of GSV, the more easily places can be identified; therefore, places with a good GSV provide a better representation of places than areas where the ground surface is obscured. The majority of the activity area contained a considerable amount of fill deposition, any surfaces exposed were considered to be 0% GSV. The remainder of the activity area contained a dense grass coverage that provided 1-10% GSV.

Effective survey coverage was calculated by determining the area surveyed and the amount of ground surface visible within the areas surveyed. GSV refers to the percentage of ground surface visible between gravel driveways, dense grass coverage, fill importation, gravel stockpiles, or obscurity of the surface by other means. The entire activity area was surveyed (a total of 71507m<sup>2</sup>); however, effective coverage was 0.31 to 3.1% (224.01 to 2240.1 m<sup>2</sup>). Map 7 exhibits the results of the standard assessment.

### 8.5.1 Standard Assessment Limitations

A major obstacle encountered by the standard assessment was poor ground surface visibility due gravel or dense grass coverage, fill importation, and construction stockpiles, which obscured the original ground surface throughout the entire activity area (see Plates 1-12).

### 8.6 Standard Assessment Results

The following section outlines the results of the standard assessment and provides discussion of the landforms, areas of disturbance, areas of archaeological potential and any cultural material identified within the activity area during the assessment.

### 8.6.1 Landforms

The standard assessment confirmed the two landforms identified within the activity area during the desktop assessment. The majority of the activity area occurs on a dune while the western extent of the activity area is located within a swampy floodplain. From a landscape perspective, the activity area is located on the edge of a dune rising away from Kelly Swamp and the Merri River floodplain, and the western extent of the activity area is located within the transition to a swampy floodplain.



### 8.6.2 Existing Conditions

Much of the activity area has undergone substantial disturbance relating to preparation for residential development (see Map 7). There has been considerable soil importation throughout the activity area, particularly within the proposed subdivision locations, and there remains various sand stockpiles throughout this area. There is obvious grading and levelling in the preparation of lots.

An unpaved gravel driveway enters the activity area from Baynes Street to the north (Plate 4) and runs along a raised section adjacent to the basin modification works in the north of the activity area (Plate 5). The unpaved gravel roadway runs west and connects to Rome Street, creating a t-intersection with the southern extent of the driveway which connects to Fraser Ridge to the south (Plates 2 and 4). This area appears to contain some grading and levelling associated with connecting the raised level of the northern section to the lower level of Fraser Ridge (Plates 8 and 9).

The basin modification works were noted in the north of the activity area (Plate 5). This area was considerably quarried and contained a large storm water drainage pipe running from Baynes Street that terminates in the basin (Plate 5). The terrain has been modified to slope down from Baynes Street so that storm water runoff would collect in this area. There is imported fill along the eastern extent of the basin to ensure storm water runoff does not flow into residential properties to the east. Storm water run has been designed to flow into the basin and then to southwest under the raised gravel roadway into rural properties towards the Merri River.

The southern extent of the activity area contains some degree of landscape modification also, although it appears to be fairly representative of the original landscape (Plates 6 and 7).

The route of the proposed pipeline contained an unpaved but fenced-off right of way track that appeared to have been graded and levelled (Plate 6). The western extent of this route contained the change to a swampy floodplain landform (Plates 10 and 11). However, this area was observed to contain substantial disturbances relating to the construction of the access track and a motorbike track on either side (north and south) of access track. There was also various landscape modifications visible in this area as the track had been raised above the landscape to prevent flooding. It was agreed between Adam Lovett (UCA Heritage Advisor) and John Clarke (EMAC Manager Cultural Landscapes) that a stratigraphic test pit would be of no value in this area.

No subsurface utilities were identified during the standard assessment other than the culverts associated with the drainage basin.

Despite the degree of ground modification and soil importation across much of the activity area, the extent of the ground disturbance was not able to be determined during the pedestrian survey. It was considered possible that sub-surface cultural material or intact dune surfaces may be present in patches where not previously disturbed, modified or containing deposited fill surfaces.

### 8.6.3 Aboriginal Cultural Heritage Identified During the Standard Assessment

No Aboriginal cultural material was located during the standard assessment.

### 8.6.4 Areas of Aboriginal Cultural Heritage Likelihood

Although the results of the standard assessment have demonstrated that the northern portion of the activity area is largely modified, the lower portion of the dune (towards the south of the activity area) might contain in-tact dune sediments. This are is considered to have a low-to-moderate potential for Aboriginal cultural heritage as predicted during the desktop assessment.

The standard assessment did not identify any new Aboriginal places within the activity area.

No mature Indigenous trees or caves/rock shelters were identified within the activity area.

### 8.7 Standard Assessment Conclusion

The lack of cultural material identified during the standard assessment is considered to reflect the lack of ground surface visibility and general landscape modification, rather than being an accurate reflection of past Aboriginal use or occupation.



The observations made during the ground surface survey confirmed the presence of two functions throughout the activity area. The activity area itself contains previous landscape modification relating to previous soil deposition and levelling works in preparation for residential development, and as such much of the northern section of the activity area is no longer representative of the natural landscape. As such it was agreed during the on-site meeting that subsurface would not be required in this area. The pedestrian survey was unable to determine the extent of ground disturbances throughout the southern portion of the activity area, which was the focus of testing during the complex assessment.

A summary of the results of the standard assessment are as follows:

- No Aboriginal cultural heritage places were identified in the activity area during the standard assessment.
- The activity area has been considerably affected through previous land use, hydrological, residential and construction activities.

Based on the combined information from the desktop and standard assessments, the southern portion of the activity area has been assessed as an area of archaeological sensitivity as it has not been determined that widespread ground disturbance has occurred. The inability to determine the extent of ground disturbances means that it is not possible to determine if any in-tact ground surfaces or in-situ subsurface Aboriginal cultural is present within the activity area. It is not possible to say that Aboriginal cultural heritage is not likely within the activity area. As such a complex assessment is required in order to enable a proper investigation of the potential for sub-surface Aboriginal cultural heritage places to be present and to identify the nature, extent and significance of any Aboriginal cultural heritage that may be present, in accordance with r.64 of the *Aboriginal Heritage Regulations 2018* (Vic) (No. 59, 2018). Regulation 64(1)(a) and (b) states that a complex assessment is required if the desktop assessment or standard assessment shows that Aboriginal cultural heritage is, or is likely to be, present in the activity area; and it is not possible to identify the extent, nature and significance of the Aboriginal cultural heritage in the activity area; and it is not possible to identify the extent, nature and significance of the Aboriginal cultural heritage in the activity area unless a complex assessment is carried out.





Map 7: Standard Assessment Results

Residential Subdivision and Precinct Plan: 7 Deverell Way, Warrnambool. Cultural Heritage Management Plan 18097 © U. C. A. Pty Ltd 2021 Page 49





Plate 1: Facing West from unpaved gravel driveway in central portion of the activity area (Photo credit: Adam Lovett 17/08/21)



Plate 2: Facing Northwest from unpaved gravel driveway (Photo credit: Adam Lovett 17/08/21)





Plate 3: Facing South along the graded and levelled surface at the rear of the existing lots (Photo credit: Adam Lovett 17/08/21)



Plate 4: Facing North along unpaved gravel driveway (Photo credit: Adam Lovett 17/08/21)





Plate 5: Facing North into location of Drainage modification works (Photo credit: Adam Lovett 17/08/21)



Plate 6: Facing West towards Kelly Swamp exhibiting proposed pipeline route (Photo credit: Adam Lovett 17/08/21)





Plate 7: Facing East along southern boundary towards Russel Street (Photo credit: Adam Lovett 17/08/21)



Plate 8: Facing North from the rear of the activity area exhibiting fill deposition (Photo credit: Adam Lovett 17/08/21)





Plate 9: Facing East towards the end of Fraser Ridge (Photo credit: Adam Lovett 17/08/21)



Plate 10: Facing East from western extent of the pipeline route (Photo credit: Adam Lovett 18/08/21)





Plate 11: Facing East along proposed pipeline route (Photo credit: Adam Lovett 18/08/21)



Plate 12: Exposed calcarenite bedrock throughout undisturbed sections of the dune (Photo credit: Adam Lovett 18/08/21)



# ADVERTISED COMPLEX ASSESSMENT

A complex assessment is required due to the determination of the desktop assessment, that the activity area is located in an area of archaeological sensitivity, likely to contain Aboriginal cultural heritage in sub-surface deposits. The standard assessment failed to provide a comprehensive assessment of the potential for, nature of and extent of Aboriginal cultural heritage within the activity area due to the poor ground visibility.

This section outlines the aims, methods and results of the subsurface testing program of the activity area. A complex assessment comprising hand excavation was carried out as part of this CHMP. The aim of the subsurface testing/excavation was to establish if the proposed activity is likely to cause harm to Aboriginal cultural heritage. The complex assessment was undertaken over two days day on 17 and 18 August 2021.

## 9.1 Complex Assessment Fieldwork

In accordance with r.65(3) of the Aboriginal Heritage Regulations 2018 (Vic) (No. 59, 2018), excavations were supervised by a qualified archaeologist (qualifications are detailed in Section 3.9) and were carried out in accordance with proper archaeological practice. The supervisor of the complex assessment of this CHMP was Adam Lovett (UCA). Adam Lovett and Chloe Brogden (UCA), Shane Harrison, Thad Chadwick and Mark Edwards (EMAC field representatives) completed the excavation of one 1 x 1 m test pit and 15 50 x 50 cm shovel test pits.

### 9.2 Aims of Complex Assessment

The aims of the complex assessment were to:

- further test the site prediction model;
- investigate the potential for and presence/absence of any Aboriginal cultural heritage within the activity area; .
- determine the nature and extent of any Aboriginal cultural heritage material that may be located in the activity • area:
- provide information regarding the extent of any soil disturbance that would affect the preservation of subsurface • Aboriginal cultural heritage;
- establish the subsurface stratigraphic composition of landforms within the activity area; and •
- enable an accurate scientific significance assessment to be made. •

### 9.3 Fieldwork Methods

### 9.3.1 Sampling Strategy

The activity are contained two landforms; a dune and a swampy floodplain. On a more localized scope the activity area is located on the edge of a dune that rises to the northeast from a swampy floodplain along the banks of the Merri River and Kelly Swamp.

Evidence from the desktop assessment suggests the activity area has experienced past ground disturbances involving landscape modification along the northern portion of the activity area in order to create raised level surfaces for residential development. The standard assessment identified that the fill distribution was widespread throughout the north of the activity area.

The sampling strategy was agreed to in consultation with John Clarke (EMAC General Manager Cultural Landscapes), Adam Lovett (UCA Heritage Advisor), Mark Edwards and Thad Chadwick (EMAC field representative) during an onsitemeeting subsequent to the standard assessment. It was agreed that only one test pit should be conducted within an undisturbed section of the dune landform, whereas no test pit was required for the swampy plain landform as this was within



# an area containing substantial disturbance and mouncation and the row de row value sector to be and the row of the row of

stratigraphy of the landform.

It was also agreed during the on-site meeting that shovel test pits would focus on the proposed open cut sewer route and the edge of the dune to the south of the visibly built up surface. The Russel Street road reserve and the northern extent of the activity area were not tested as it was agreed that landscape modification had occurred and the surface was no longer representative of the original landform.

### 9.3.2 Excavation Methodology

The complex assessment was carried out by hand and in accordance with proper archaeological practice and consistent with standards prescribed by the AV Practice Note on Subsurface Testing.

Excavation was intended to be conducted in 100mm arbitrary layers and then by stratigraphic units of no more than 100mm once stratigraphy was established (Burke et al. 2017: 241-292), in order to provide a good profile of the horizontal and vertical distribution of any cultural remains identified and the different soil layers. However, wherever fill was located it was bulked out until the extent of the fill had been reached, at which point excavation would proceed by 100mm arbitrary spits. Excavation was conducted using hand tools, including hand trowels and long-handled shovels.

All sediments were sieved through 5.0 mm mesh. Changes in soil context, soil colour (Munsell), pH levels, sediment description, disturbance and cultural material and other contents were recorded for each layer and pit. Soil descriptions were based on the Australian Soil Classifications and the standard Munsell Soil Chart. Soil pH levels were taken for each spit and soil context using a standard garden variety test kit.

This process continued until the presence of a sterile basal layer was established, impenetrable sandstone/calcarenite boulders were encountered that prevented deeper excavation, or where the depth of the proposed development did not warrant deeper excavation. Any identified features within each spit were drawn to scale on graph paper.

A photographic record of the surface, any features identified during excavation, the base of each spit and the soil section was collected. A section drawing to scale was drawn of a minimum of one wall of each test pit once excavation was completed. The location of each pit was recorded using a hand-held dGPS. By agreement with the Traditional Owners, any Aboriginal cultural heritage recovered from the excavation was to be bagged and retained for later analysis.

### 9.3.3 Radiometric Dating

No radiometric dates were taken as no Aboriginal cultural heritage material was located for an association to be made between soil samples and artefacts.

### 9.4 Complex Assessment Limitations

The complex assessment was limited by the coverage of built up surfaces, construction stockpiles, and an unpaved gravel roadway.

Complex testing was limited to areas that were deemed to have potential to contain in-tact ground surfaces.

### 9.5 Complex Assessment Results

#### 9.5.1 Location of test excavations

As agreed to during the on-site meeting subsequent to the standard assessment, one 1 x 1 m test pit was excavated within natural portions of the dune landform in order to determine the soil stratigraphy, assess the levels of subsurface disturbance, and to explore the possibility of Aboriginal cultural heritage existing within a subsurface context. No test pit was conducted within the swampy floodplain landform.

A series of 50 x 50 cm shovel test pits were excavated along the proposed pipeline route and within the proposed subdivision lots south of the artificially raised surface.



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The majority of subsurface testing locations were identified within the dane landform encompassing the majority of the activity area, while some testing was also conducted within the swampy floodplain landform to the south. Subsurface testing locations within the activity area are presented in Map 8. The location and stratigraphic composition of the excavations is detailed in Tables 6-7 and Plates 13-21.

### 9.5.2 Coordinates of test excavations

The geographic coordinates of all excavations carried out during the complex assessment are provided in Table 6. All geographic co-ordinates are in Victorian Government Standard GDA94 (Zone 54) format.

Excavation ID	Excavation Type	Dimensions	Aboriginal Cultural Material	Landform	Easting	Northing
TP01	Test Pit	1m x 1 m	None	Dune	626006	5752846
STP01	Shovel Test Pit	0.5 x 0.5 m	None	Swampy Floodplain	625649	5752886
STP02	Shovel Test Pit	0.5 x 0.5 m	None	Swampy Floodplain	625714	5752880
STP03	Shovel Test Pit	0.5 x 0.5 m	None	Swampy Floodplain	625774	5752870
STP04	Shovel Test Pit	0.5 x 0.5 m	None	Dune	625833	5752863
STP05	Shovel Test Pit	0.5 x 0.5 m	None	Dune	625871	5752854
STP06	Shovel Test Pit	0.5 x 0.5 m	None	Dune	625914	5752849
STP07	Shovel Test Pit	0.5 x 0.5 m	None	Dune	625969	5752840
STP08	Shovel Test Pit	0.5 x 0.5 m	None	Dune	626017	5752912
STP09	Shovel Test Pit	0.5 x 0.5 m	None	Dune	626015	5752882
STP10	Shovel Test Pit	0.5 x 0.5 m	None	Dune	626061	5752825
STP11	Shovel Test Pit	0.5 x 0.5 m	None	Dune	626119	5752817
STP12	Shovel Test Pit	0.5 x 0.5 m	None	Dune	626156	5752808
STP13	Shovel Test Pit	0.5 x 0.5 m	None	Dune	626199	5752813
STP14	Shovel Test Pit	0.5 x 0.5 m	None	Dune	626160	5752824
STP15	Shovel Test Pit	0.5 x 0.5 m	None	Dune	626122	5752828

Table 6: Location Coordinates\* for Complex Assessment Excavations

\*Coordinate Reference System - GDA94, MGA Zone 54



Figure 5: Test Pit 1 Stratigraphy





Map 8: Complex Assessment Results



Table 7: Test Pits (TP) 1000 x 1000 mm

STP	Context No	Soil Horizon	Depth (mm)	Munsell Colour	pН	Texture	Moisture	Structure	Consistency	Inclusions	Boundary	Artefacts
TP1	1	A1	0-250	Black – 10YR 2/1	7.5	Fine grained silty loam	Damp	Blocky angular	Firm	Bottle fragments, brick, glass, plastic, ceramic cable fragments.	Abrupt	None
	2	B1	250-500	Black – 10YR 2/1	7.5	Compact clay	Damp	Blocky Sub angular	Very Firm	Some calcarenite. Large blocks appearing at 670mm.	N/A	None

#### Table 8: Shovel Test Pits (STP) 500 x 500 mm

STP	Context No	Soil Horizon	Depth (mm)	Munsell Colour	рΗ	Texture	Moistur e	Structure	Consistency	Inclusions	Boundary	Artefacts
STP1	1	A1	0-550	Black – 10YR 2/1	7.5	Fine grained silty loam (disturbed)	Damp	Blocky angular	Firm	Grass roots, worms, modern rubbish	Abrupt	None
	2	B1	550	Black – 10YR 2/1	7.5	Compact clay	Damp	Blocky Sub angular	Very Firm		N/A	None
STP2	1	Fill	0-300	Grey – 10YR 5/1	7.5	Sand (fill)	Damp	Blocky angular	Loose	Modern rubbish, grass roots, worms, gravels, pebble quartz, brick fragments	Smooth Sharp	None
	2	A1	300-650	Black – 10YR 2/1	7.5	Fine grained silty loam (disturbed)	Damp	Blocky angular	Firm	Gravels, some pebble quartz, modern rubbish	Abrupt	None
	3	B1	650-700	Black – 10YR 2/1	7.5	Compact clay (disturbed)	Damp	Blocky angular	Very Firm	Gravels, some pebble quartz	N/A	None
STP3	1	Fill	0-300	Grey – 10YR 5/1	7.5	Sand (fill)	Damp	Blocky angular	Loose	Modern rubbish, grass roots, worms, gravels, pebble quartz, brick	Smooth Sharp	None



STP	Context No	Soil Horizon	Depth (mm)	Munsell Colour	pН	Texture	Moistur e	Structure	Consistency	Inclusions	Boundary	Artefacts
										fragments		
	2	A1	300-460	Black – 10YR 2/1	7.5	Fine grained silty loam (disturbed)	Damp	Blocky angular	Firm	gravels	Abrupt	None
	3	B1	460	Black – 10YR 2/1	7.5	Compact clay (disturbed)	Damp	Blocky Sub angular	Very Firm	Gravels, some pebble quartz	N/A	None
STP4	1	A1	0-470	Black – 10YR 2/1	7.5	Fine grained silty loam	Damp	Blocky angular	Firm	Calcarenite, grass roots,	Abrupt	None
	2	B1	470	Black – 10YR 2/1	7.5	Compact clay (disturbed)	Damp	Blocky Sub angular	Very Firm		N/A	None
STP5	1	A1	0-500	Black – 10YR 2/1	7	Fine grained sandy loam	Damp	Blocky angular	Firm	Calcarentire, sandstone	Abrupt	
	2	B1	500-750	Black – 10YR 2/1	7	Degrading basalt in N with pockets of sandy loam, crushed (impenetrable) sandstone in S	Damp	Blocky Sub angular	Very Firm	Sandstone, calcarenite, degraded basalt	Wavy	
STP6	1	A1	0-480	Black – 10YR 2/1	7	Fine grained sandy loam	Damp	Blocky angular	Firm	Snails, grass roots, calcarenite	Abrupt	None
	2	B1	480	Black – 10YR 2/1	7	Compact clay	Damp	Blocky sub angular	Very Firm		N/A	None
STP7	1	A1	0-380	Black – 10YR 2/1	7	Fine grained sandy loam	Damp	Blocky angular	Firm	Grass roots, very small calcarenite pieces	Abrupt	None



STP	Context No	Soil Horizon	Depth (mm)	Munsell Colour	pН	Texture	Moistur e	Structure	Consistency	Inclusions	Boundary	Artefacts
	2	B1	380-400	Black – 10YR 2/1 With some brown (10YR 5/3) mottling	7	Compact clay	Damp	Blocky sub angular	Very Firm		N/A	None
STP8	1	A1	0-400	Black – 10YR 2/1	7	Fine grained sandy loam	Damp	Blocky angular	Firm	Calcarenite, worms, grass roots	Abrupt	None
	2	B1	400	Black – 10YR 2/1	7	Compact clay	Damp	Blocky sub angular	Very Firm		N/A	None
STP9	1	A1	0-580	Black – 10YR 2/1	7	Fine grained silty loam	Damp	Blocky angular	Firm	Calcarenite, worms, grass roots	Abrupt	None
	2	B1	580-590	Black – 10YR 2/1	7	Compact clay	Damp	Blocky sub angular	Very Firm		N/A	None
STP10	1	A1	0-400	Black – 10YR 2/1	7	Fine grained silty loam	Damp	Blocky angular	Firm	Worms, fencing wire at 200mm, grass roots	Abrupt	None
	2	B1	400-420	Black – 10YR 2/1	7	Compact clay	Damp	Blocky sub angular	Very Firm		N/A	None
STP11	1	A1	0-380	Black – 10YR 2/1	7	Fine grained silty loam	Damp	Blocky angular	Firm	Grass roots, calcarenite	Abrupt	None
	2	B1	380	Black – 10YR 2/1	7	Compact clay	Damp	Blocky sub angular	Very Firm	Basalt	N/A	None
STP12	1	A1	0-30/80	Black – 10YR 2/1	7	Fine grained sandy loam	Damp	Blocky angular	Firm	Grass roots, calcarenite, worms, sandstone	Sharp	None



STP	Context No	Soil Horizon	Depth (mm)	Munsell Colour	pН	Texture	Moistur e	Structure	Consistency	Inclusions	Boundary	Artefacts
	2	A2	30/80-100	Black and very pale brown – 10YR 2/1 and 10YR 8/4	7	Mixed sandy loam and sand, and degraded sandstone/calcarenite powder	Damp	Blocky angular	Very Firm	Sandstone and calcarenite	Sharp	None
	3	A3	100-800	Pale brown - 10YR 8/4	7	Coarse sand	Damp	Blocky angular	Firm to loose	Sandstone and calcarenite	N/A	None
STP13	1	A1	0-600	Black – 10YR 2/1	7	Fine grained sandy loam	Damp	Blocky angular	Firm	Calcarenite, Worms,	Wavy	None
	2	B1	600-790	Black – 10YR 2/1 With some brown (10YR 5/3) mottling	7	Compact clay	Damp	Blocky sub angular	Very Firm	Calcarenite	N/A	None
STP14	1	A1	0-550	Black – 10YR 2/1	7	Fine grained sandy loam	Damp	Blocky angular	Firm	Calcarenite, grass roots, worms,	Wavy	None
	2	B1	550-560	Black – 10YR 2/1	7	Compact clay	Damp	Blocky sub angular	Very Firm		N/A	None
STP15	1	A1	0-280	Black – 10YR 2/1	7	Fine grained sandy loam	Damp	Blocky angular	Firm	Calcarenite, grass roots, worms,	Wavy	None
	2	B1	280-290	Black – 10YR 2/1 With some brown mottling	7	Compact clay	Damp	Blocky sub angular	Very Firm		N/A	None





Plate 13: Test Pit 1 at 500mm - Base (Photo credit: Adam Lovett 17/08/21)



Plate 14: Shovel Test Pit 1 at 650 mm - Base (Photo credit: Adam Lovett 17/08/21)





Plate 15: Shovel Test Pit 3 at 460mm - Base (Photo credit: Adam Lovett 17/08/21)



Plate 16: Shovel Test Pit 6 at 500mm - Base (Photo credit: Adam Lovett 17/08/21)


Plate 17: Shovel Test Pit 7 at 400mm - Base (Photo credit: Adam Lovett 17/08/21)



Plate 18: Shovel Test Pit 11 at 380mm - Base (Photo credit: Adam Lovett 18/08/21)



Plate 19: Shovel Test Pit 12 at 800mm - Base (Photo credit: Adam Lovett 18/08/21)





Plate 20: Shovel Test Pit 8 at 400mm - Base (Photo credit: Adam Lovett 18/08/21)



Plate 21: Shovel Test Pit 14 at 560mm - Base (Photo credit: Adam Lovett 18/08/21)



# 9.5.3 Results of Subsurface Testing

The soil profile within the swampy floodplain appeared fairly similar to the dune landform with the main exception being that some pockets of sand were present below calcarenite accumulations within the dune landform. The swampy floodplain landform did not contain any sand pockets or large calcarenite accumulations (Plates 14 and 15). However, for the most part the top soil was fairly similar, with a general transition to sandier loam in higher portions of the dune (Plate 20), and lower portions further away from Merri Creek (Plates 19 and 21). The A1 horizon was fairly shallow above a culturally sterile clay B horizon that was encountered at a maximum depth of 600mm at the furthest testing location from Merri River. However, there seems to be no broader correlation between the depth of the A1 horizon and the proximity from Merri River, or the elevation of the dune landform. The areas closest to the Merri River contained fill deposition to a depth of 300mm which likely relates to building up the track the prevent inundation during flood periods.

Most excavations encountered culturally sterile clay. STP5 was abandoned at 750mm due to degrading basalt parent material and crushed impenetrable sandstone that prevented deeper excavation, while STP13 was abandoned at 800mm as deeper excavation was not warranted given the proposed development plan (Plate 19).

No subsurface utilities were identified during the complex assessment.

### 9.6 Aboriginal Cultural Heritage Places

No Aboriginal cultural heritage sites were recorded during the complex assessment.

### 9.7 Complex Assessment Conclusions

The results of the desktop and standard assessment predicted that southern portion of subdivision footprint contained in-tact ground surfaces in areas not visibly disturbed. This was confirmed during the complex assessment. The prediction regarding substantial disturbance to the areas within the swampy floodplain landform was also confirmed during the complex assessment. Fill deposition was encountered to a depth of 300mm in the westernmost portion of the proposed open cut sewer route. Disturbance was noted extending into the culturally sterile B1 horizon in this area.

The dune landform contained a fair amount of silt which would indicate flooding events contribute to the dune formation in these lower areas. Calcarenite was not located in close proximity to Merri River which is likely to relate to the the division between the two landforms.

The results of the subsurface testing are somewhat contrasting with the complex assessment conducted during the course of the nearest assessment, located 450m to the east. Dugay-Grist and McAlister (2010) identified a shallow topsoil on top of a light brown sandy loam to a general depth of 500mm, where a calcarenite base was located. No calcarenite base was identified during the course of this assessment and generally black silty to sandy loam is dominant depending on the position on the dune. No shell material was identified which also contrasted the nearest study.

From a landscape perspective it appears as if the activity area is located on the edge of a dune rising away from Merri River/Kelly Swamp where a swampy floodplain is present. The complex assessment has focused on the lowest portions of the dune that have likely been effected by flooding in the past, and as such were of low site selection preference. There are no natural sections of the upper slope of the dune as it rises away from these low lying areas, due to previous landscape modifications permitted under a since lapsed planning application. These areas are visibly built up and modified and any Aboriginal cultural heritage that may be present will likely be located below the depth of disturbance proposed by the activity. The lower portion of the slope was shown to have a low potential to contain Aboriginal cultural heritage.

Although the desktop assessment indicated that it was reasonably possible for Aboriginal cultural heritage to be present within the activity area, the high degree of previous ground disturbance and modification associated with the preparation of the site for suburban development has ensured that any Aboriginal cultural heritage that may be present in the northern section of the activity area is located in disturbed contexts, or buried at a considerable depth that will likely not experience ground disturbance. The complex assessment has demonstrated that the undisturbed sections of the activity area are located in an area which would have been of low site selection preference, and as such it is very unlikely that any Aboriginal cultural heritage will be impacted by the proposed activity.



# 10 CONSIDERATION OF S.61 MATTERS - IMPACT ASSESSMENT

### 10.1 Introduction

This section assesses the potential for the planned activity to impact Aboriginal cultural heritage. A CHMP is required to address matters raised in s.61 of the Aboriginal Heritage Act 2006 (Vic) (No. 020, 2016). These matters concern the management of Aboriginal cultural heritage prior to, during, and after the activity. A discussion of these matters is provided below. Details of site-specific and general cultural heritage management conditions are presented in Part 1 of this CHMP.

The assessment has not identified any surface or subsurface archaeological evidence for Aboriginal cultural heritage material. The evaluation undertaken as part of this CHMP has determined that it is unlikely that Aboriginal heritage values will be impacted by the activity.

### 10.2 Consideration of impact of planned activity

As there is no known Aboriginal cultural heritage within the activity area, there will be no impact from the planned activity and Section 61 matters do not apply.

### 10.2.1 Will the activity be conducted in a way that avoids harm to Aboriginal heritage? [s61(a)]

No known heritage will be harmed.

### 10.2.2 Will the activity be conducted in a way that minimises harm to Aboriginal heritage? [s61(b)]

No Aboriginal cultural heritage was identified within the activity area as part of the assessment.

In the unlikely event that Aboriginal cultural heritage is uncovered during the course of the proposed activity, harm minimization can be considered then, in accordance with the contingency plans (see Section 2).

# 10.2.3 Are specific measures required for the management of Aboriginal cultural heritage likely to be affected by the activity, before, during and after the activity? [s61(c)]

No specific measures are needed for the management of Aboriginal cultural heritage. No Aboriginal cultural heritage was identified within the activity area during the assessment and it is considered unlikely that Aboriginal cultural heritage will be identified during the proposed works.

# 10.3Are there particular contingency plans that might be necessary? [61(d)]

In the Part 1, procedures are outlined in detail for some factors that may affect the conduct and progress of the activity. These include procedural guidelines in the event that further cultural material is uncovered or suspected human remains are discovered, dispute resolution, reviewing compliance and remedying non-compliance, processes to be followed in relation to delays and other obstacles, and requirements for safeguarding sensitive information.



### 10.4What custody and management arrangements might be needed? [61(e)]

No Aboriginal cultural heritage was identified during the conduct of this CHMP and, therefore, no custody and management arrangements for Aboriginal cultural heritage are required. However, there must be a procedure in place for the unexpected discovery of Aboriginal cultural heritage during the proposed works. The custody and management of any Aboriginal cultural heritage identified during the conduct of the proposed activity are addressed in Part 1.

### 10.5Cumulative Impact Statement

No Aboriginal cultural material was located within the activity area and no areas of potential sensitivity were identified. As a result, the proposed activity is unlikely to impact on Aboriginal cultural material within the activity area; therefore, there is no known cumulative impact upon cultural heritage in the region because of these works.



References

# ADVERTISED

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Legislation

Aboriginal Heritage Act 2006

Aboriginal Heritage Regulations 2018



# Appendix 1: Notice of Intent to Prepare a CHMP



### Notice of Intent to prepare a Cultural Heritage Management Plan for the purposes of the Aboriginal Heritage Act 2006

This form can be used by the Sponsor of a Cultural Hantage Management Plan to complete the notification provisions pursuant to a 54 of the Abong/nal Hantage Act 2006 (the "Act").

For clarification in any of the following please contact Victorian Aboriginal Heritage Regiater (VAHR) enquiries on 1800-725-003.

### SECTION 1 - Sponsor information

Sponsor	FI L Blake Pty Ltd			
ABN/ACN:	40 990 253 166			
Contact Name:	N/A N/A			
Postal Address	340 Port Campbell Road Cobden VIC 3266			
Business Number:	N/A	Mobile:	N/A	
Email Address:	justin@milward.com.au			

### Sponsor's agent (if relevant)

Company;	Milward Engineering Management Pty Ltd AFT Milward Family Trust			
Contact Name:	Justin Hinch 6 Wright Street Koralt VIC 3282			
Postal Address				
Business Number:	0429080282	Mobile:	0429080282	-
Email Address:	justin@milward.com.au			

### SECTION 2 - Description of proposed activity and location

Project Name: Municipal district: Residential Subdivision: 7 Deverell Way Warmambool Warmambool City Council

Cleany identify the proposed activity for which the cultural heritage managment plan is to be prepared (ve. Mining, road construction, housing subivision)

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30	vu	I٧	9	621	

SECTION 3 - CU	tural Heritage Advi:	sor		
annette xiberras	Lirbar Herite	colours Arts Cultural ge Consultants	bunjilin@bigpond.com Email address	
Name	Comp	any		
SECTION 4 - Exp	pected start and fini	sh date for the cult	ural heritage management plan	
Start Date:	05-Jul-2021	Finish Date:	05-Jul-2022	

automotives are the dual able t





Premier and Cabinet

### SECTION 5 - Why are you preparing this cultural heritage management plan?

A cultural heritage management plan is required by the Aboriginal Heritage Regulations 2007 What is the high Impact Activity as it is listed in the regulations?

Is any part of the activity an area of cultural heritage sensitivity, as listed in the regulations? 1

	Other	Reasons	(Voluntary)
--	-------	---------	-------------

An Environment Effects Statement is required

A Cultural Heritage Management Plan is required by the Minister for Aboriginal Atlairs.

An Impact Management Plan or Comprehensive Impact Statement is required for the activity

### SECTION 6 - List the relevant registered Aboriginal parties (if any)

This section is to be completed where there are registered Aboriginal parties in relation to the management plan. EASTERN MAAR Aboriginal Corporation RNTBC

SECTION 7A - List the relevant Aboriginal groups or Aboriginal people with whom the Sponsor intends to consult (if any)

This section is to be completed only if the proposed activity in the management plan is to be carried out in an area where there is no Registered Aboriginal Party.

Eastern Maar Aboriginal Corporation

### SECTION 7B - Describe the intended consultation process (if any)

This section is to be completed only if the proposed activity in the management plan is to be carried out in an area where there is no Registered Aboriginal Party.

Desktop, Standard, Complex

### SECTION 8 - State who will be evaluating this plan (mandatory)

The plan is to be evaluated by:

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~	τ.

Joint - Registered Aboriginal Party AND The Secretary

A Registered Aboriginal Party

If checked, list the relevant Registered Aboriginal Party Evaluating:

The Secretary

Victorian Aboriginal Heritage Council

### SECTION 9 - Preliminary Aboriginal Heritage Tests (PAHTs)

List the Reference Number(s) of any PAHTs conducted in relation to the proposed activity:

SECTION 10 - Notification checklist

Submiked on: 05 Jul 2021





Premier and Cabinet

Ensure that any relevant registered Aboriginal partyles is also notified. A copy of this notice with a map attached may be used for this

purpose. (A registered Aboriginal party is allowed up to 14 days to provide a written response to a notification specifying whether or not it intends to evaluate the management plan.)

In addition to notifying the Deputy Director and any relevant registerd Aboriginal partyles, a Sponsor must also notify any owner and/or occupier of any land within the area to which the management plan relates. A copy of this notice with a map attached may be used for this purpose.

Ensure any municipal council, whose municipal district includes an area to which the cultural heritage management plan relates, is also notified. A copy of this notice, with a map attached, may also be used for this purpose.

Submitted an: 65 Jul 2021







# Appendix 2: RAP Response to NOI



Eastern Maar Aboriginal Corporation

PO Box 546 Warrnambool VIC 3280

08 July 2021

RL Blake Pty Ltd 340 Port Campbell Road Cobden VIC 3266

Ngattanwarre RL Blake Pty Ltd,

### EASTERN MAAR ELECTS TO EVALUATE CHMP 18097 – RESIDENTIAL SUBDIVISION: 7 DEVERELL WAY WARRNAMBOOL (555).

I refer to your notice of intent to prepare a cultural heritage management plan (CHMP), received on 06 July 2021, for Residential Subdivision: 7 Deverell Way Warmambool. The Eastern Maar Aboriginal Corporation, as the Registered Aboriginal Party (RAP) for the area, elects to evaluate the CHMP.

As part of the CHMP process, Easter Maar Aboriginal Corporation expects that Sponsors and Heritage Advisors will make reasonable efforts to consult with us before the design phase and during the preparation of the CHMP (s.59(2) of the Act). Eastern Maar Aboriginal Corporation expect consultation to take place in the form of cultural heritage meetings, typically three meetings, which will allow us to discuss assessment methodology, reburial and repatriation of artefacts, Aboriginal Place registration, CHMP conditions, and most imporatantly harm avoidance or minimisation of harm to cultural heritage values.

Please contact Sammy Fidge (<u>samantha\_fidge@easternmaar.com.au</u>) to arrange an initial inception meeting (Tuesday and Wednesday Only), using the booking form attached, no sooner than two weeks after providing a copy of the completed desktop assessment and relevant mapping.

To book field representatives please complete the booking form attached and forward to <u>Craig.Edwards@easternmaac.com.au</u> with your preferences. Note that assessments can only be undertaken once consultation has occured.

A copy of the Eastern Maar Aboriginal Corporation schedule of fees is attached for your reference.

I look forward to consulting with you to protect our Aboriginal cultural landscape as an integral part of your project.

Yours sincerely,

Sammy Fidge RAP Technical Specilalst/ Heritage Advisor Eastern Maar Aboriginal Corporation Ph. 0428 961 689 Samantha, Fidge@easternmaar.com.au

Attached: Booking Form and Schedule of Fees

www.easternmaar.com.au



# Appendix 3: Concept Development Plan



### **Proposed Subdivision Plan**



Residential Subdivision and Development, 7 Deverell Way, Warrnambool. Cultural Heritage Management Plan 18097 © U. C. A. Pty Ltd 2021

# Appendix 4: Dial Before You Dig Enquiry



Residential Subdivision and Development, 7 Deverell Way, Warrnambool. Cultural Heritage Management Plan 18097. © U. C. A. Pty Ltd 2021



### **ADVERTISED** YOU DIG

The Essential First Step.

Water Gravity Sewer

Pipes

Pressure Sewer

Roof Water

Other Assets

Private Pipe

**Disused** Pipe

COLOUR

Scale: 1:1000

Expires: 07 Aug 2021

Cement

.

**Disused Asbestos** 

Surface Fitting/Manhole



Residential Subdivision and Development, 7 Deverell Way, Warrnambool. Cultural Heritage Management Plan 18097. © U. C. A. Pty Ltd 2021



Residential Subdivision and Development, 7 Deverell Way, Warrnambool. Cultural Heritage Management Plan 18097.

© U. C. A. Pty Ltd 2021





### Residential Subdivision and Development, 7 Deverell Way, Warrnambool. Cultural Heritage Management Plan 18097. © U. C. A. Pty Ltd 2021



Residential Subdivision and Development, 7 Deverell Way, Warrnambool. Cultural Heritage Management Plan 18097. © U. C. A. Pty Ltd 2021



Residential Subdivision and Development, 7 Deverell Way, Warrnambool. Cultural Heritage Management Plan 18097. © U. C. A. Pty Ltd 2021











Archaeology: The study of the material remains of the human past.

Archaeological site: A place/location of either Aboriginal or non-Aboriginal origin that contains material remains relating to the human past

Artefact: Any product made by human hands or caused to be made through human actions.

Artefact scatter: A surface scatter of stone artefacts is defined as being the presence of items of cultural material within a given area.

Backed blade (geometric microlith): Backing is the process by which one or more margins contain consistent retouch opposite to the sharp working edge. A backed blade is a blade flake that has been abruptly retouched along one or more margins opposite the sharp working edge. Backed pieces include backed blades and geometric microliths. Backed blades are a feature of the Australian Small Tool Tradition dating from between 5,000 and 1,000 years ago in southern Australia (Mulvaney 1975).

Blade: A long parallel sided flake from a specially prepared core. Blade flakes retain observable and complete fracture planes, platform, lateral margins and termination and are twice as long as they are wide. A broken blade is any stone artefact retaining partial diagnostic features of a blade.

Bipolar: A core or a flake which, presumably, has been struck on an anvil. That is, the core from which the flake has been struck has been rotated before the flake has been struck off. Bifacial platforms often indicate that the flake has come off a heavily worked core.

BP: Before Present. The present is defined as 1950.

Core: An artefact from which flakes have been detached using a hammerstone. Core types include blade, single platform, multiplatform and bipolar forms. These artefacts exhibit a series of negative flake scars, each of which represents the removal of a flake.

Cortex: Original or natural (unflaked) surface of a stone. This may be further divided into nodule, pebble and terrestrial cortex indicating the original source of the material.

Ethnography: The scientific description of living cultures.

Flake: Broken flake: Any stone retaining partial diagnostic features of a flake

Complete/whole flake: An artefact exhibiting a ventral surface (where the flake was originally connected to the core), dorsal surface (the surface that used to be part of the exterior of the core), platform, termination and bulb of percussion.

Distal flake: Any flake on which the breakage removes the platform but retains the termination

Proximal flake: Any flake on which the breakage removes the termination but retains the platform.

Primary flake: The first flakes struck off a core in order to create a platform from which other flakes can then be struck.

Secondary flaking/retouch: Secondary working of a stone artefact after its manufacture. This was often done to resharpen stone tools after use, or in the production of formal tool types such as blade flakes and scrapers.

Focal platform: This is a term used to describe the shape of the platform on a flake. A focal platform is narrower than the body of the flake. Focal platform flakes are produced when flakes are struck off near the edge of the platform on a core.

Geometric microlith: Artefacts less than 80 mm in maximum dimension which are backed at one or other end, sometimes at both ends, and sometimes on one lateral margin as well, the result being a form that is symmetrical around its transverse axis.

Hammerstone: A cobble or cobble fragment exhibiting pitting and abrasion as a result of percussion.

Hearth: Usually a subsurface feature found eroong out of a river or creck bank or in a sand dance it indicates a place where Aboriginal people cooked food. The remains of a hearth are usually identifiable by the presence of charcoal and sometimes clay balls (like brick fragments) and hearth stones. Remains of burnt bone or shell are sometimes preserved within a hearth.

Historic site: Sites/areas that contain extant (standing) remains of pre-1950 non-Aboriginal occupation. Historic sites may or may not also contain archaeological remains (Aboriginal and/or historic).

Holocene, recent or postglacial period: The time from the end of the Pleistocene Ice Age (c. 10,300 BP) to the present day.

Implement: A general term for tools, weapons etc. made by people.

Microlith: Small (1–3 cm long) stone tools with evidence of retouch. Includes 'Bondi Points' segment, scrapers, backed blades, triangles and trapezoids.

In situ: Refers to cultural material that is discovered as being undisturbed and considered to be in its original context. That is, material which, when identified is considered to be in the same location as when the site was abandoned.

Lithic: Anything made of stone.

Pleistocene: The dates for the beginning and end of the Pleistocene generally correspond with the last Ice Age. That is from 3.5 to 1.3 million years ago. The period ends with the gradual retreat of the ice sheets, which reached their present conditions around 10,300 BP.

Retouch: Scalar: Shallow scale like scars on margin with feather terminations, usually small rounded scars.

Step: Small, abrupt flake scars on margin, with step terminations.

Rock shelter/cave: These are sites that are located within a rock shelter/overhang or cave. The archaeological deposits within such sites can vary considerably but are often predominantly lithic. Depending on their location, the archaeological deposits may also include midden deposits of shellfish, fish or terrestrial fauna. Due to the often undisturbed deposits at these sites, they are potentially very valuable sites and are generally considered of high scientific significance. Instances where rock shelter sites also possess artwork on the stone walls are considered rock shelters/art sites combined.

Scarred tree: Scars on trees may be the result of removal of strips of bark by Aborigines for the manufacture of utensils, cances or for shelter; or resulting from small notches chopped into the bark to provide toe and hand holds for climbers after possums, koalas and/or views of the surrounding area. A scar made by humans as opposed to being naturally made by branches falling off etc. is distinguished by the following criteria: symmetry and rounded ends, scar does not extend to the ground, some regrowth has occurred around the edges of the scar, and no holes or knots are present in the heartwood.

Silcrete: A sedimentary rock that is 'formed through the impregnation of a sedimentary layer with silica of quartz grains in a matrix of either amorphous or fine-grained Silica' (Holdaway and Stern 2004: 24)

Stratigraphy: Layering.

Stone artefact: A piece of stone that has been formed by Aboriginal people to be used as a tool or is a by-product of Aboriginal stone tool manufacturing activities. Stone artefacts can be flaked such as points and scrapers or ground such as axes and grinding stones.

Scraper: A tool used for scraping. A flake with one or more margins of continuous retouch.

Thumbnail scraper: A small flake with a convex scraper edge, shaped like a thumbnail and located opposite the flake's platform.

Raw material: Organic or inorganic matter that has not been processed by people.

Use-wear: Tiny flakes or chips that have been broken off the edges of a stone artefact during use.

# Appendix 6: Permitted Uses General Residential Zone 1 (GRZ1)

#### VICTORIA PLANNING PROVISIONS

32.08	GENERAL RESIDENTIAL ZONE
VC148	Shown on the planning scheme map as GRZ, R1Z, R2Z or R3Z with a number (if shown).
	Purpose
	To implement the Municipal Planning Strategy and the Planning Policy Framework.
	To encourage development that respects the neighbourhood character of the area.
	To encourage a diversity of housing types and housing growth particularly in locations offering good access to services and transport.
	To allow educational, recreational, religious, community and a limited range of other non-residential uses to serve local community needs in appropriate locations.

#### Neighbourhood character objectives

32.08-1 2703/3017 VC118

32.08-2

24/01/2009 VC160

A schedule to this zone may contain neighbourhood character objectives to be achieved for the area

#### Table of uses

Section 1 - Permit not required

Use	Condition
Bed and breakfast	No more than 10 persons may be accommodated away from their normal place of residence.
	At least 1 car parking space must be provided for each 2 persons able to be accommodated away from their normal place of residence.
Community care accommodation	Must meet the requirements of Clause 52.22-2.
Dependent person's unit	Must be the only dependent person's unit on the lot.
Domestic animal husbandry (other than Domestic animal boarding)	Must be no more than 2 animals.
Dwelling (other than Bed and breakfast) Home based business Informal outdoor recreation	
Medical centre	The gross floor area of all buildings must not exceed 250 square metres.
	Must not require a permit under Clause 52.06-3.
	The site must adjoin, or have access to, a road in a Road Zone.
Place of worship	The gross floor area of all buildings must not exceed 250 square metres.
	The site must adjoin, or have access to, a road in a Road Zone.
Racing dog husbandry	Must be no more than 2 animals.
Bailterat	

Page 1 of 11

VICTORIA PLANNING PROVISIONS

Use	Condition
Residential aged care facility	
Rooming house	Must meet the requirements of Clause 52.23-2
Tramway	
Any use listed in Clause 62.01	Must meet the requirements of Clause 62.01.

### Section 2 - Permit required

Use	Condition
Accommodation (other than Community care accommodation, Dependent person's unit, Dwelling, Residential aged care facility and Rooming house)	
Agriculture (other than Animal production, Animal training, Apiculture, Domestic animal husbandry, Horse husbandry and Racing dog husbandry)	
Car park	Must be used in conjunction with another use in Section 1 or 2.
Car wash	The site must adjoin, or have access to, a road in a Road Zone.
Convenience restaurant	The site must adjoin, or have access to, a road in a Road Zone.
Convenience shop	
Domestic animal husbandry (other than Domestic animal boarding) – if the Section 1 condition is not met	Must be no more than 5 animals.
Food and drink premises (other than Convenience restaurant and Take away food premises)	
Grazing animal production	
Leisure and recreation (other than Informal outdoor recreation and Motor racing track)	
Market	
Place of assembly (other than Amusement parlour, Carnival, Cinema based entertainment facility, Circus, Nightclub and Place of worship)	
Plant nursery	
Service station	The site must either:
	<ul> <li>Adjoin a commercial zone or industrial zone.</li> </ul>
	<ul> <li>Adjoin, or have access to, a road in a Road Zone.</li> </ul>
	The site must not exceed either:

Page 2 of 11

VICTORIA PLANNING PROVISIONS

Use	Condition	
	<ul> <li>3000 square metres.</li> <li>3600 square metres if it adjoins on two boundaries a road in a Road Zone.</li> </ul>	
Store	Must be in a building, not a dwelling, and used to store equipment, goods, or motor vehicles used in conjunction with the occupation of a resident of a dwelling on the lot.	
Take away food premises	The site must adjoin, or have access to, a road in a Road Zone.	

and Telecommunications facility)

Any other use not in Section 1 or 3

Section 3 - Prohibited

### Use

Amusement parlour
Animal production (other than Grazing animal production)
Animal training
Brothel
Cinema based entertainment facility
Domestic animal boarding
Extractive industry
Horse husbandry
Industry (other than Car wash)
Motor racing track
Nightclub
Office (other than Medical centre)
Retail premises (other than Convenience shop, Food and drink premises, Market, and Plant nursery)
Saleyard
Transport terminal
Warehouse (other than Store)

32.08-3 31/07/2018 VC148

### Subdivision

### Permit requirement

A permit is required to subdivide land.

An application to subdivide land that would create a vacant lot less than 400 square metres capable of development for a dwelling or residential building, must ensure that each vacant lot created less than 400 square metres contains at least 25 percent as garden area. This does not apply to a lot created by an application to subdivide land where that lot is created in accordance with:



- An approved precinct structure plan or an equivalent strategic plan;
- · An incorporated plan or approved development plan, or
- · A permit for development.

An application to subdivide land, other than an application to subdivide land into lots each containing an existing dwelling or car parking space, must meet the requirements of Clause 56 and:

- . Must meet all of the objectives included in the clauses specified in the following table.
- . Should meet all of the standards included in the clauses specified in the following table.

Class of subdivision	Objectives and standards to be met	
60 or more lats	All except Clause 56.03-5.	
16 – 59 lots	All except Clauses 56.03-1 to 56.03-3, 56.03-5, 56.06-1 and 56.06-3.	
3 - 15 lots	All except Clauses 56.02-1, 56.03-1 to 56.03-4,	
	56.05-2, 56.06-1, 56.06-3 and 56.06-6.	
2 lots	Clauses 56.03-5, 56.04-2, 56.04-3, 56.04-5, 56.06-8 to 56.09-2.	

### VicSmart applications

Subject to Clause 71.06, an application under this clause for a development specified in Column 1 is a class of VicSmart application and must be assessed against the provision specified in Column 2.

Class of application	Information requirements and decision guidelines Clause 59.01	
Subdivide land to realign the common boundary between 2 lots where: The area of either lot is reduced by less than 15 percent. The general direction of the common boundary does not change.		
Subdivide land into lots each containing an existing building or car parking space where:	Clause 59.02	
<ul> <li>The buildings or car parking spaces have been constructed in accordance with the provisions of this scheme or a permit issued under this scheme.</li> </ul>		
<ul> <li>An occupancy permit or a certificate of final inspection has been issued under the Building Regulations in relation to the buildings within 5 years prior to the application for a permit for subdivision.</li> </ul>		
Subdivide land into 2 lots if:	Clause 59.02	
<ul> <li>The construction of a building or the construction or carrying out of works on the land:</li> </ul>		
<ul> <li>Has been approved under this scheme or by a permit issued under this scheme and the permit has not expired.</li> </ul>		
- Has started lawfully.		
<ul> <li>The subdivision does not create a vacant lot.</li> </ul>		

Page 4 of 11



VICTORIA PLANNING PROVISIONS

32.08-4 15/05/2018 VC143

32.08-5

31/07/2018 VC148

### Construction or extension of a dwelling or residential building

### Minimum garden area requirement

An application to construct or extend a dwelling or residential building on a lot must provide a minimum garden area as set out in the following table:

Lot size	Minimum percentage of a lot set aside as garden area	
400 - 500 sqm	25%	
Above 500 - 650 sqm	30%	
Above 650 sqm	35%	

#### This does not apply to:

- An application to construct or extend a dwelling or residential building if specified in a schedule to this zone as exempt from the minimum garden area requirement;
- · An application to construct or extend a dwelling or residential building on a lot if:
  - The lot is designated as a medium density housing site in an approved precinct structure plan or an approved equivalent strategic plan;
  - The lot is designated as a medium density housing site in an incorporated plan or approved development plan; or
- An application to alter or extend an existing building that did not comply with the minimum garden area requirement of Clause 32.08-4 on the approval date of Amendment VC110.

### Construction and extension of one dwelling on a lot

### Permit requirement

A permit is required to construct or extend one dwelling on:

- · A lot of less than 300 square metres.
- A lot of between 300 square metres and 500 square metres if specified in a schedule to this zone.

A permit is required to construct or extend a front fence within 3 metres of a street if:

- The fence is associated with one dwelling on:
  - A lot of less than 300 square metres, or
  - A lot of between 300 and 500 square metres if specified in a schedule to this zone, and
- The fence exceeds the maximum height specified in Clause 54.06-2.

A development must meet the requirements of Clause 54.

### No permit required

No permit is required to:

- · Construct or carry out works normal to a dwelling.
- Construct or extend an out-building (other than a garage or carport) on a lot provided the gross
  floor area of the out-building does not exceed 10 square metres and the maximum building
  height is not more than 3 metres above ground level.
- Make structural changes to a dwelling provided the size of the dwelling is not increased or the number of dwellings is not increased.


#### VicSmart applications

Subject to Clause 71.06, an application under this clause for a development specified in Column 1 is a class of VicSmart application and must be assessed against the provision specified in Column 2.

Cla	iss of application	Information requirements and decision guidelines
Co	nstruct an outbuilding or extend a dwelling if the development:	Clause 59.14
Me	ets the minimum garden area requirement of Clause 32.08-4.	
•	Does not exceed a building height of 5 metres.	
•	is not visible from the street (other than a lane) or a public park.	
•	Meets the requirements in the following standards of Clause 54:	
	<ul> <li>A10 Side and rear setbacks.</li> </ul>	
	<ul> <li>A11 Walls on boundaries.</li> </ul>	
	<ul> <li>A12 Daylight to existing windows.</li> </ul>	
	<ul> <li>A13 North-facing windows.</li> </ul>	
	<ul> <li>A14 Overshadowing open space.</li> </ul>	
	<ul> <li>A15 Overlooking.</li> </ul>	
For	the purposes of this class of VicSmart application, the Clause 54 standards cified above are mandatory.	
If a req to t	schedule to the zone specifies a requirement of a standard different from a uirement set out in the Clause 54 standard, the requirement in the schedule he zone applies and must be met.	
Co	nstruct or extend a front fence within 3 metres of a street if the fence is sociated with one dwelling.	Clause 59.03

#### 32.08-6 Construction and extension of two or more dwellings on a lot, dwellings on common attenzional property and residential buildings

#### Permit requirement

A permit is required to:

- · Construct a dwelling if there is at least one dwelling existing on the lot.
- · Construct two or more dwellings on a lot.
- · Extend a dwelling if there are two or more dwellings on the lot.
- · Construct or extend a dwelling if it is on common property.
- · Construct or extend a residential building.

A permit is required to construct or extend a front fence within 3 metres of a street if:

- · The fence is associated with 2 or more dwellings on a lot or a residential building, and
- The fence exceeds the maximum height specified in Clause 55.06-2.

A development must meet the requirements of Clause 55. This does not apply to a development of five or more storeys, excluding a basement.

Page 6 of 11



An apartment development of five or more storeys, excluding a basement, must meet the requirements of Clause 58.

A permit is not required to construct one dependent person's unit on a lot.

#### VicSmart applications

Subject to Clause 71.06, an application under this clause for a development specified in Column 1 is a class of VicSmart application and must be assessed against the provision specified in Column 2

Class of application	Information requirements and decision guidelines
Construct or extend a front fence within 3 metres of a street if the fence is associated with 2 or more dwellings on a lot or a residential building.	Clause 59.03

#### Transitional provisions

Clause 55 of this scheme, as in force immediately before the approval date of Amendment VC136, continues to apply to:

- An application for a planning permit lodged before that date.
- An application for an amendment of a permit under section 72 of the Act, if the original permit application was lodged before that date.

Clause 58 does not apply to:

- An application for a planning permit lodged before the approval date of Amendment VC136.
- An application for an amendment of a permit under section 72 of the Act, if the original permit application was lodged before the approval date of Amendment VC136.

#### 32.08-7 Requirements of Clause 54 and Clause 55 27/03/2017 VC 110

A schedule to this zone may specify the requirements of

- Standards A3, A5, A6, A10, A11, A17 and A20 of Clause 54 of this scheme. .
- Standards B6, B8, B9, B13, B17, B18, B28 and B32 of Clause 55 of this scheme. .

If a requirement is not specified in a schedule to this zone, the requirement set out in the relevant standard of Clause 54 or Clause 55 applies.

#### 32.08-8 Residential aged care facility 26/10/2018 VC152

#### Permit requirements

A permit is required to construct a building or construct or carry out works for a residential aged care facility.

A development must meet the requirements of Clause 53.17 - Residential aged care facility.

#### 32.08-9 Buildings and works associated with a Section 2 use 04/12/2020 VC188

A permit is required to construct a building or construct or carry out works for a use in Section 2 of Clause 32.08-2.

Page 7 of 11



#### VicSmart applications

Subject to Clause 71.06, an application under this clause for a development specified in Column 1 is a class of VicSmart application and must be assessed against the provision specified in Column 2

	decision guidelines
Construct a building or construct or carry out works where:	Clause 59.04

- secondary school and have an estimated cost of up to \$100,000; or
- The building or works are associated with a primary school or secondary school and have an estimated cost of up to \$500,000; and
- The requirements in the following standards of Clause 54 are met, where the land adjoins land in a residential zone used for residential purposes:
  - A10 Side and rear setbacks.
  - A11 Walls on boundaries
  - A12 Daylight to existing windows.
  - A13 North-facing windows.
  - A14 Overshadowing open space.
  - A15 Overlooking.

For the purposes of this class of VicSmart application, the Clause 54 standards specified above are mandatory.

If a schedule to the zone specifies a requirement of a standard different from a requirement set out in the Clause 54 standard, the requirement in the schedule to the zone applies and must be met.

#### 32.08-10 Maximum building height requirement for a dwelling or residential building 26/10/2018 VC152

A building must not be constructed for use as a dwelling or a residential building that:

- · exceeds the maximum building height specified in a schedule to this zone; or
- contains more than the maximum number of storeys specified in a schedule to this zone.

If no maximum building height or maximum number of storeys is specified in a schedule to this zone:

- . the building height must not exceed 11 metres; and
- the building must contain no more than 3 storeys at any point.

A building may exceed the applicable maximum building height or contain more than the applicable maximum number of storeys if:

- It replaces an immediately pre-existing building and the new building does not exceed the building height or contain a greater number of storeys than the pre-existing building.
- There are existing buildings on both abutting allotments that face the same street and the new building does not exceed the building height or contain a greater number of storeys than the lower of the existing buildings on the abutting allotments.



- It is on a corner lot abutted by lots with existing buildings and the new building does not exceed
  the building height or contain a greater number of storeys than the lower of the existing buildings
  on the abutting allotments.
- It is constructed pursuant to a valid building permit that was in effect prior to the introduction
  of this provision.

An extension to an existing building may exceed the applicable maximum building height or contain more than the applicable maximum number of storeys if it does not exceed the building height of the existing building or contain a greater number of storeys than the existing building.

A building may exceed the maximum building height by up to 1 metre if the slope of the natural ground level, measured at any cross section of the site of the building wider than 8 metres, is greater than 2.5 degrees.

A basement is not a storey for the purposes of calculating the number of storeys contained in a building.

The maximum building height and maximum number of storeys requirements in this zone or a schedule to this zone apply whether or not a planning permit is required for the construction of a building.

#### Building height if land is subject to inundation

If the land is in a Special Building Overlay, Land Subject to Inundation Overlay or is land liable to inundation the maximum building height specified in the zone or schedule to the zone is the vertical distance from the minimum floor level determined by the relevant drainage authority or floodplain management authority to the roof or parapet at any point.

#### 32.08-11 Application requirements

26/10/2018 VC152

An application must be accompanied by the following information, as appropriate:

- For a residential development of four storeys or less, the neighbourhood and site description and design response as required in Clause 54 and Clause 55.
- For an apartment development of five or more storeys, an urban context report and design response as required in Clause 58.01.
- For an application for subdivision, a site and context description and design response as required in Clause 56.
- Plans drawn to scale and dimensioned which show:
  - Site shape, size, dimensions and orientation.
  - The siting and use of existing and proposed buildings.
  - Adjacent buildings and uses.
  - The building form and scale.
  - Setbacks to property boundaries.
- The likely effects, if any, on adjoining land, including noise levels, traffic, the hours of delivery
  and despatch of good and materials, hours of operation and light spill, solar access and glare.
- Any other application requirements specified in a schedule to this zone.

If in the opinion of the responsible authority an application requirement is not relevant to the evaluation of an application, the responsible authority may waive or reduce the requirement.



#### 32.08-12 Exemption from notice and review

#### Subdivision

26/10/2018 VC152

24/01/2020 VC160 An application to subdivide land into lots each containing an existing dwelling or car parking space is exempt from the notice requirements of section 52(1)(a), (b) and (d), the decision requirements of section 64(1), (2) and (3) and the review rights of section 82(1) of the Act.

#### 32.08-13 Decision guidelines

Before deciding on an application, in addition to the decision guidelines in Clause 65, the responsible authority must consider, as appropriate:

#### General

- The Municipal Planning Strategy and the Planning Policy Framework.
- The purpose of this zone.
- The objectives set out in a schedule to this zone.
- Any other decision guidelines specified in a schedule to this zone.
- The impact of overshadowing on existing rooftop solar energy systems on dwellings on adjoining lots in a General Residential Zone, Mixed Use Zone, Neighbourhood Residential Zone, Residential Growth Zone or Township Zone.

#### Subdivision

- · The pattern of subdivision and its effect on the spacing of buildings.
- · For subdivision of land for residential development, the objectives and standards of Clause 56.

#### Dwellings and residential buildings

- For the construction and extension of one dwelling on a lot, the objectives, standards and decision guidelines of Clause 54.
- For the construction and extension of two or more dwellings on a lot, dwellings on common
  property and residential buildings, the objectives, standards and decision guidelines of Clause
  55. This does not apply to an apartment development of five or more storeys, excluding a
  basement.
- For the construction and extension of an apartment development of five or more storeys, excluding a basement, the objectives, standards and decisions guidelines of Clause 58.

#### Non-residential use and development

- Whether the use or development is compatible with residential use.
- Whether the use generally serves local community needs.
- · The scale and intensity of the use and development.
- · The design, height, setback and appearance of the proposed buildings and works.
- The proposed landscaping.
- · The provision of car and bicycle parking and associated accessways.
- Any proposed loading and refuse collection facilities.
- · The safety, efficiency and amenity effects of traffic to be generated by the proposal.

#### Signs

32.08-14 2610/2018 VC152

Sign requirements are at Clause 52.05. This zone is in Category 3.

Page 10 of 11



#### 32.08-15 Transitional provisions

26/10/2018 VC152

The minimum garden area requirements of Clause 32.08-4 and the maximum building height and number of storeys requirements of Clause 32.08-9 introduced by Amendment VC110 do not apply to:

- A planning permit application for the construction or extension of a dwelling or residential building lodged before the approval date of Amendment VC110.
- Where a planning permit is not required for the construction or extension of a dwelling or residential building:
  - A building permit issued for the construction or extension of a dwelling or residential building before the approval date of Amendment VC110.
  - A building surveyor has been appointed to issue a building permit for the construction or extension of a dwelling or residential building before the approval date of Amendment VC110. A building permit must be issued within 12 months of the approval date of Amendment VC110.
  - A building surveyor is satisfied, and certifies in writing, that substantial progress was made on the design of the construction or extension of a dwelling or residential building before the approval date of Amendment VC110. A building permit must be issued within 12 months of the approval date of Amendment VC110.

The minimum garden area requirement of Clause 32.08-3 introduced by Amendment VC110 does not apply to a planning permit application to subdivide land for a dwelling or a residential building lodged before the approval date of Amendment VC110.

Page 11 of 11

# Appendix 7: Permitted Uses Farming Zone (FZ)

#### VICTORIA PLANNING PROVISIONS

35.07 35572018 VC148

#### FARMING ZONE

35.07-1

26/05/2620 VC 175

Shown on the planning scheme map as FZ with a number (if shown).

#### Purpose

To implement the Municipal Planning Strategy and the Planning Policy Framework.

To provide for the use of land for agriculture.

To encourage the retention of productive agricultural land.

To ensure that non-agricultural uses, including dwellings, do not adversely affect the use of land for agriculture.

To encourage the retention of employment and population to support rural communities.

To encourage use and development of land based on comprehensive and sustainable land management practices and infrastructure provision.

To provide for the use and development of land for the specific purposes identified in a schedule to this zone.

#### Table of uses

Section 1 - Permit not required

Use	Condition
Agriculture (other than Animal production, Apiculture, Domestic animal husbandry, Racing dog husbandry, Rice growing and Timber production)	
Bed and breakfast	No more than 10 persons may be accommodated away from their normal place of residence.
	At least 1 car parking space must be provided for each 2 persons able to be accommodated away from their normal place of residence.
Cattle feedlot	Must meet the requirements of Clause 53.08.
	The total number of cattle to be housed in the cattle feedlot must be 1000 or less.
	The site must be located outside a special water supply catchment under the Catchment and Land Protection Act 1994.
	The site must be located outside a catchment area listed in Appendix 2 of the Victorian Code for Cattle Feedlots – August 1995.
Dependent person's unit	Must be the only dependent person's unit on the lot.
	Must meet the requirements of Clause 35.07-2.
Domestic animal husbandry (other than Domestic animal boarding)	Must be no more than 5 animals.
Dwelling (other than Bed and	Must be the only dwelling on the lot.
breakfast)	The lot must be at least the area specified in a schedule to this zone. If no area is specified, the lot must be at least 40 hectares.

Page I of 8

# **ADVERTISED**

VICTORIA PLANNING PROVISIONS

Use	Condition
	Must meet the requirements of Clause 35.07-2.
Grazing animal production Home based business Informal outdoor recreation	
Poultry farm	Must be no more than 100 poultry (not including emus or ostriches).
	Must be no more than 10 emus and ostriches.
Primary produce sales	Must not be within 100 metres of a dwelling in separate ownership.
	The area used for the display and sale of primary produce must not exceed 50 square metres.
Racing dog husbandry	Must be no more than 5 animals.
Railway	
Rural industry (other than	Must not have a gross floor area more than 200 square metres.
Abattoir and Sawmill)	Must not be within 100 metres of a dwelling in separate ownership.
	Must not be a purpose listed in the table to Clause 53.10 with no threshold distance specified.
	The land must be at least the following distances from land (not a road) which is in an Activity Centre Zone, Capital City Zone, Commercial 1 Zone Docklands Zone, residential zone or Rural Living Zone, land used for a hospital, an education centre or a corrective institution or land in a Public Acquisition Overlay to be acquired for a hospital, an education centre or a corrective institution:
	<ul> <li>The threshold distance, for a purpose listed in the table to Clause 53.10.</li> </ul>
	<ul> <li>30 metres, for a purpose not listed in the table to Clause 53.10.</li> <li>Must not:</li> </ul>
	<ul> <li>Exceed a fire protection quantity under the Dangerous Goods (Storage and Handling) Regulations 2012.</li> </ul>
	<ul> <li>Require a notification under the Occupational Health and Safety Regulations 2017.</li> </ul>
	<ul> <li>Require a licence under the Dangerous Goods (Explosives) Regulations 2011.</li> </ul>
	<ul> <li>Require a licence under the Dangerous Goods (HCDG) Regulations 2016.</li> </ul>
Rural store	Must be used in conjunction with Agriculture.
	Must be in a building, not a dwelling and have a gross floor area of less than 100 square metres.

Page 2 of 8

# **ADVERTISED**

VICTORIA PLANNING PROVISIONS

Use	Condition
	The plantation area must not exceed any area specified in a schedule to this zone. Any area specified must be at least 40 hectares.
	The total plantation area (existing and proposed) on contiguous land which was in the same ownership on or after 28 October 1993 must not exceed any scheduled area.
	The plantation must not be within 100 metres of:
	<ul> <li>Any dwelling in separate ownership.</li> </ul>
	<ul> <li>Any land zoned for residential, commercial or industrial use.</li> </ul>
	<ul> <li>Any site specified on a permit which is in force which permits a dwelling to be constructed.</li> </ul>
	The plantation must not be within 20 metres of a powerline whether on private or public land, except with the consent of the relevant electricity supply or distribution authority.
Tramway	
Any use listed in Clause 62.01	Must meet requirements of Clause 62.01.

Use	Condition
Abattoir	
Animal production (other than Broiler farm, Cattle feedlot and Grazing animal production)	
Broiler farm - if the Section 1 condition to Poultry farm is not met	Must meet the requirements of Clause 53.09.
Camping and caravan park	
Car park	Must be used in conjunction with another use in Section 1 or 2.
Cattle feedlot - if the Section 1 condition is not met	Must meet the requirements of Clause 53.08.
	The site must be located outside a catchment area listed in Appendix 2 of the Victorian Code for Cattle Feedlots – August 1995.
Cemetery	
Crematorium	
Dependent person's unit – if the Section 1 condition is not met	Must meet the requirements of Clause 35.07-2.
Domestic animal boarding	
Dwelling (other than Bed and breakfast) – if the Section 1 condition is not met	Must meet the requirements of Clause 35.07-2.

Page 3 of 8

# **ADVERTISED**

VICTORIA PLANNING PROVISIONS

Use	Condition
Emergency services facility	
Freeway service centre	Must meet the requirements of Clause 53.05.
Group accommodation	
Host farm	
Industry (other than Rural industry)	
Landscape gardening supplies	
Leisure and recreation (other than Informal outdoor recreation)	
Manufacturing sales	
Market	
Place of assembly (other than Amusement parlour, Carnival, Cinema based entertainment facility, Circus and Nightclub)	
Primary school	
Racing dog husbandry – if the Section 1 condition is not met	Must meet the requirements of Clause 53.12.
Renewable energy facility (other than Wind energy facility)	Must meet the requirements of Clause 53.13.
Residential hotel	
Restaurant	
Rice growing	
Sawmill	
Secondary school	
Timber production - if the Section 1 condition is not met	Must meet the requirements of Clause 53.11.
Trade supplies	
Utility installation (other than Minor utility installation and Telecommunications facility)	
Warehouse (other than Rural store)	
Wind energy facility	Must meet the requirements of Clause 52.32.
Winery	
Annu athen used in Constinue d as 2	

Page 4 of 8



#### Section 3 - Prohibited

#### Use

Accommodation (other than Bed and breakfast, Camping and caravan park, Dependent person's unit, Dwelling, Group accommodation, Host farm and Residential hotel)

Amusement parlour

Brothel

Cinema based entertainment facility

Education centre (other than Primary school and Secondary school)

Nightclub

Office

Retail premises (other than Market, Landscape gardening supplies, Manufacturing sales, Primary produce sales, Restaurant and Trade supplies)

35.07-2 01/07/2021

#### Use of land for a dwelling

A lot used for a dwelling must meet the following requirements:

- Access to the dwelling must be provided via an all-weather road with dimensions adequate to accommodate emergency vehicles.
- Each dwelling must be connected to reticulated sewerage, if available. If reticulated sewerage
  is not available all wastewater from each dwelling must be treated and retained within the lot
  in accordance with the requirements of the Environment Protection Regulations under the
  Environment Protection Act 2017 for an on-site wastewater management system.
- The dwelling must be connected to a reticulated potable water supply or have an alternative
  potable water supply with adequate storage for domestic use as well as for fire fighting purposes.
- The dwelling must be connected to a reticulated electricity supply or have an alternative energy source.

These requirements also apply to a dependent person's unit.

## 35.07-3 Subdivision

A permit is required to subdivide land.

Each lot must be at least the area specified for the land in a schedule to this zone. If no area is specified, each lot must be at least 40 hectares.

A permit may be granted to create smaller lots if any of the following apply:

- The subdivision is to create a lot for an existing dwelling. The subdivision must be a two lot subdivision.
- The subdivision is the re-subdivision of existing lots and the number of lots is not increased.
- The subdivision is by a public authority or utility service provider to create a lot for a utility installation.

#### VicSmart applications

Subject to Clause 71.06, an application under this clause for a development specified in Column 1 is a class of VicSmart application and must be assessed against the provision specified in Column 2.



Class of application	Information requirements and decision guidelines
Schull idealand to mailing the common houseday, between 21sta where:	Ciaura 60.01

vide land to realign the common boundary between 2 lots where:

- Each new lot is at least the area specified for the land in the zone or the schedule to the zone.
- The area of either lot is reduced by less than 15 percent.
- The general direction of the common boundary does not change.

Subdivide land into 2 lots where each new lot is at least the area specified Clause 59.12 for the land in the zone or the schedule to the zone.

35.07-4 05/06/2019 VC159

#### **Buildings and works**

A permit is required to construct or carry out any of the following:

- A building or works associated with a use in Section 2 of Clause 35.07-1. This does not apply . to:
  - An alteration or extension to an existing dwelling provided the floor area of the alteration or extension is not more than the area specified in a schedule to this zone or, if no area is specified, 100 square metres. Any area specified must be more than 100 square metres.
  - An out-building associated with an existing dwelling provided the floor area of the out-building is not more than the area specified in a schedule to this zone or, if no area is specified, 100 square metres. Any area specified must be more than 100 square metres.
  - An alteration or extension to an existing building used for agriculture provided the floor area of the alteration or extension is not more than the area specified in a schedule to this zone or, if no area is specified, 200 square metres. Any area specified must be more than 200 square metres. The building must not be used to keep, board, breed or train animals.
  - A rainwater tank
- Earthworks specified in a schedule to this zone, if on land specified in a schedule.
- A building which is within any of the following setbacks:
  - The setback from a Road Zone Category 1 or land in a Public Acquisition Overlay to be acquired for a road, Category 1 specified in a schedule to this zone or, if no setback is specified, 50 metres.
  - The setback from any other road or boundary specified in a schedule to this zone.
  - The setback from a dwelling not in the same ownership specified in a schedule to this zone.
  - 100 metres from a waterway, wetlands or designated flood plain.
- · Permanent or fixed feeding infrastructure for seasonal or supplementary feeding for grazing animal production constructed within 100 metres of:
  - A waterway, wetland or designated flood plain.
  - A dwelling not in the same ownership.
  - A residential or urban growth zone.

Page 6 of 8



#### VicSmart applications

Subject to Clause 71.06, an application under this clause for a development specified in Column 1 is a class of VicSmart application and must be assessed against the provision specified in Column 2.

Class of application	Information requirements and decision guidelines
Construct a building or construct or carry out works associated with a Section 1 use in the Table of uses of the zone with an estimated cost of up to \$500,000. Any works must not be earthworks specified in the schedule to the zone.	Clause 59.13
Construct a building or construct or carry out works associated with a Section 2 use in the Table of uses of the zone with an estimated cost of up to \$500,000 where the land is not:	Clause 59.13
<ul> <li>Used for Domestic animal husbandry, Intensive animal production, Pig farm, Poultry farm, Poultry hatchery, Racing dog husbandry or Rural industry.</li> </ul>	
<ul> <li>Within 30 metres of land (not a road) which is in a residential zone.</li> <li>Any works must not be earthworks specified in the schedule to the zone.</li> </ul>	

#### Application requirements for dwellings

An application to use a lot for a dwelling must be accompanied by a written statement which explains how the proposed dwelling responds to the decision guidelines for dwellings in the zone.

#### 35.07-6 Decision guidelines

31/67/2018 VC148 Before deciding on

35.07-5

15/01/2006 VC37

> Before deciding on an application to use or subdivide land, construct a building or construct or carry out works, in addition to the decision guidelines in Clause 65, the responsible authority must consider, as appropriate:

#### General issues

- · The Municipal Planning Strategy and the Planning Policy Framework.
- Any Regional Catchment Strategy and associated plan applying to the land.
- The capability of the land to accommodate the proposed use or development, including the disposal of effluent.
- How the use or development relates to sustainable land management.
- Whether the site is suitable for the use or development and whether the proposal is compatible with adjoining and nearby land uses.
- · How the use and development makes use of existing infrastructure and services.

#### Agricultural issues and the impacts from non-agricultural uses

- · Whether the use or development will support and enhance agricultural production.
- Whether the use or development will adversely affect soil quality or permanently remove land from agricultural production.
- The potential for the use or development to limit the operation and expansion of adjoining and nearby agricultural uses.
- The capacity of the site to sustain the agricultural use.

Page 7 of 8



- The agricultural qualities of the land, such as soil quality, access to water and access to rural
  infrastructure.
- Any integrated land management plan prepared for the site.

#### **Dwelling issues**

- . Whether the dwelling will result in the loss or fragmentation of productive agricultural land.
- Whether the dwelling will be adversely affected by agricultural activities on adjacent and nearby land due to dust, noise, odour, use of chemicals and farm machinery, traffic and hours of operation.
- Whether the dwelling will adversely affect the operation and expansion of adjoining and nearby agricultural uses.
- The potential for the proposal to lead to a concentration or proliferation of dwellings in the area
  and the impact of this on the use of the land for agriculture.

#### Environmental issues

- The impact of the proposal on the natural physical features and resources of the area, in particular
  on soil and water quality.
- The impact of the use or development on the flora and fauna on the site and its surrounds.
- The need to protect and enhance the biodiversity of the area, including the retention of vegetation
  and faunal habitat and the need to revegetate land including riparian buffers along waterways,
  gullies, ridgelines, property boundaries and saline discharge and recharge area.
- The location of on-site effluent disposal areas to minimise the impact of nutrient loads on waterways and native vegetation.

#### Design and siting issues

- The need to locate buildings in one area to avoid any adverse impacts on surrounding agricultural uses and to minimise the loss of productive agricultural land.
- The impact of the siting, design, height, bulk, colours and materials to be used, on the natural
  environment, major roads, vistas and water features and the measures to be undertaken to
  minimise any adverse impacts.
- The impact on the character and appearance of the area or features of architectural, historic or scientific significance or of natural scenic beauty or importance.
- The location and design of existing and proposed infrastructure including roads, gas, water, drainage, telecommunications and sewerage facilities.
- Whether the use and development will require traffic management measures.

## 35.07-7 Signs

Sign requirements are at Clause 52.05. This zone is in Category 4.

Page 8 of 8

## **ADVERTISED** APPENDIX D – Stormwater Management Plan





## Dennington South Estate

## **Stormwater Management Report**

## Prepared for: Milward Engineering

2 February 2022



#### **Table of Contents**

1		Introduction	3
2		Site Description	3
3		External Catchment Context	7
4		Developed Scenario	8
2	1.1	1 Infiltration Rate	9
5		Developed Flows	9
6		Future Flows From Harrington RB	17
7		Water Quality	19
7	7.1	1 Water Quality Objectives	20
7	7.2	2 Water Quality Treatment Train	21
7	7.3	3 Treatment Element Parameters	23
7	7.4	4 Treatment Train Results	24
8		Lots South Of Fraser Ridge	26
9		Filter Media Specification	
10		Maintenance of WSUD Assets	
11		Summary	34
Арр	per	ndix 1 – Falling Head Tests	35

#### FIGURES

Figure 1: Site 3	
Figure 2: Plan of Subdivision	4
Figure 3: Basin looking south from Baynes St	5
Figure 4: Basin looking north towards Baynes St	6
Figure 5: Regional Catchment Context	7
Figure 6: Concept Developed Site Drainage	8
Figure 7: Catchment Plan	10
Figure 8: C5 Existing Flows	11
Figure 9: C7 Existing Flows	12
Figure 10: Hydraulic Model for Northern Detention Basin	14
Figure 11: Hydraulic Model Long Section	15
Figure 12: Hydraulic Model Long Section	15
Figure 13: Reference Basin Construction	16
Figure 14: Harrington Flows and New Outfall	17
Figure 15: Detention Basin Stage-Time curve -1200lps Option	17
Figure 16: Outlet flows - 1200Is option	18
Figure 17: Outlet flow - 1200Is option	18
Figure 18: Bio-basin at base of retardation basin	19
Figure 19: Rainfall and Evaporation Summary	19
Figure 20: Rainfall and Evaporation Plot	20
Figure 21: MUSIC Model Layout	22
Figure 22: WSUD Layout	26
Figure 23: Fraser Place South Pre-Development Flows	26
Figure 24: Fraser Place South - Post-Development Flows	27
Figure 25: Fraser Place South – Retarded Post Development Flows	
Figure 26: Fraser Place South – Storage Stage / Time	29
Figure 27: Fraser Place South – WSUD Plan View	
Figure 28: Fraser Place South – WSUD Plan Iso View	31

**Document Control** 

Version	Date	Description	Prepared	Client Review
1	14 September 2021	Issue	MN	JH
2	13 January 2022	Update	MN	JH
3	2 February 2022	Final	MN	JH

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## **1** Introduction

Noyce Environmental Pty Ltd was engaged by Milward Engineering Management Pty Ltd to develop a holistic Stormwater Management Plan and water sensitive urban design for the Dennington South Estate, Warrnambool (Estate).

This report supports the approval of a Development Plan for the Dennington South Estate area and details the planned stormwater infrastructure, with calculations that demonstrate the proposed solution will manage stormwater such that a no-worsening outcome occurs for developed flows up to the 1 in 100year AEP event.

Water sensitive urban design features incorporated into this site will showcase "best practice" environmental management through the use of proven, natural treatment mechanisms that provide a high level of filtration and pollutant removal.

Opportunities to future-proof the site for additional inflows from the Warrnambool West Retarding Basin will be explored in this report.

While the final Development Plan may differ from the figures in this SMP, if the general density of development remains consistent, this SMP will provide adequate holistic stormwater management.

## 2 Site Description

As shown in Figure 1, the subject site is currently a partially developed residential subdivision. The site is bounded by Baynes Street to the north, Russell Street to the east and farmland to the west and south.



Figure 1: Site



The site is described as:	CA 103(Parts)
	Vol 10423 Fol 453 & 454
Centre co-ordinates:	Lat: -38.36161 Long: 142.44378
Responsible Municipality:	Warrnambool Council (Council)
Total site area:	8.1ha approx.

A concept Plan of Subdivision exists for the site:



Figure 2: Plan of Subdivision

In the north west corner of the concept site Plan of Subdivision, a 1,969m2 drainage reserve has been created next to an L shaped Public Open Space (POS) reserve of 3,973m2 area.



Registered on title, the total subdivision includes:

TYPE	AREA (ha)	DEVELOPED IMP %
Residential Lots 1 – 76	4.57	0.45
Including 2 existing lots		
Residential Lots 77 – 92	1.63	0.25
Reserves	0.59	0
Roads	1.31	0.9
Total	8.10	

It is proposed that additional development will occur in the POS area abutting Baynes Street subject to Council approval and final sizing of the required drainage facilities outlined in this Report.

The current drainage reserve area forms a natural basin for the site and surrounding area's drainage from the north, west, east and most of the southern site area.

The drainage basin in the northern section of the property has a surveyed floor level of RL 6.0m AHD and surrounding topography along Baynes Street varies from RL 13.5 to 8.5m AHD.



Figure 3: Basin looking south from Baynes St

Beyond the drainage basin further to the south, the development's highest point, along the south west boundary, reaches RL 35.0m AHD.



Looking back to Baynes Street from within the property:



Figure 4: Basin looking north towards Baynes St

The development site includes a drainage catchment that does not fall towards the Baynes Street basin. The southern catchment includes land south of Fraser Ridge and falls to the south from RL 23.5m AHD to RL 4.0m AHD in the south west corner of the site.

Figure 5 shows the major drainage catchments applicable to this development.



## **3 External Catchment Context**

The subject site is positioned within a natural basin context. A catchment plan from a previous drainage concept study shows that the site has multiple catchments:



Figure 5: Regional Catchment Context

The site is not subject to flooding from any major waterway.

Situated approximately 360m to the west of the site is the Merri River.

Lots south of Fraser Ridge drain towards existing farm land and will require a separate drainage solution.

Herein, the modelling approach used in this report is a more direct method which considers the estimated fraction imperviousness of the catchment, slope, infiltration characteristic and applies the Laurenson method of routing combined with Australian Rainfall and Runoff hydrograph templates.



## 4 Developed Scenario

It is proposed to develop the remaining lots within the subdivision and construct a local retarding basin and treat stormwater via a sediment basin and bioretention system.

A concept subdivision layout with piped flows to a retarding basin was undertaken by others for a previous stormwater design investigation which included an option to take flows from the Harrington Retarding Basin located to the east. The concept layout is shown below:



Figure 6: Concept Developed Site Drainage

As shown in Figure 6, lots south of Fraser Road were not part of the proposed drainage system.

In the above preliminary plan, all low flows were to be directed into a sediment basin before overflowing into a larger detention basin.



A pipeline from the basin is also shown in this option through land to the west not owned by the developer for a future option to provide a gravity solution to the Merri River for pumped flows from the Harrington Road Retarding Basin.

For the purposes of this report, the piped outfall will be modelled as an option only. There is no intention as part of this proposed development to deliver the outfall to the Merri River, but to design the drainage system to be adapted in the future when development to the west occurs.

Typically, pre-development flow rates are determined to provide mitigated stormwater flows to the receiving waterway or drainage system. This site is unique in that no piped stormwater exists and all stormwater infiltrates into the underlying sandy limestone.

The site is effectively a natural basin for the wider catchment discussed earlier.

The objective for stormwater management of the developed scenario therefore becomes:

- Size a retarding basin to meet the infiltration rate of the basin
- Provide adequate pre-treatment of stormwater flows to minimise the risk of blockage of the basin's infiltration capacity

### 4.1 Infiltration Rate

Bore logs and falling head tests were undertaken in November 2006 and provided for this report. See Appendix for a copy.

The adopted soil conductivity of the basin was deemed to be 192mm/hr noting that under head, the flow rate increased to 956mm/hr.

The infiltration rate will be used as the controlling outflow for the entire catchment.

## **5** Developed Flows

XPStorm was used to determine the inflows to a basin from the surrounding catchments determined in Figure 3.

The catchments were labelled from C0 to C7 within the hydraulic model:





Figure 7: Catchment Plan

BoM recommended values for the site infiltration were:

Initial loss: 24mm

Continuing loss: 4.6mm



Adopting the BoM loss model above can lead to an under representation of runoff for minor events. As a conservative approach, all catchments were modelled with 10mm and 2mm.

The above values are likely to be conservative given the sandy nature of the surrounding soils, however with less initial losses, the model will generate higher flows and therefore represent a more conservative approach to pipe sizing and retardation.

ARR temporal patterns for the site were downloaded into the hydraulic model from the BoM data hub for the 10year AEP and the 100year AEP storms with the following durations:

15min, 20min, 25min, 30min and 45min.

Original modelling for the subdivision adopted time of concentration of 20minutes duration.

Laurenson's method of flood routing was selected for the modelling to reconfirm the critical storm duration.

Average catchment slopes of 2% were adopted for the external catchments.

Developed catchments external to the site and the subject site itself were modelled with a 45% fraction imperviousness representing a developed scenario as XPStorm uses a direct fraction impervious percentage rather than a co-efficient of runoff.

For the 100year event, peak flows occur for the shorter 10minute event and are similar to the 20minute duration peak which accords with previous stormwater modelling undertaken by others. Results for the C5 catchment to the north of the subject site for the 10 and 100yr AEP are shown below:



Figure 8: C5 Existing Flows



Runoff from the undeveloped land to the west is slower to develop peak flows due to the 100% pervious fraction characteristic. The Laurenson method of routing provides a good representation of this developing flow.



Figure 9: C7 Existing Flows

Graphs for each sub catchment are not necessary to show, however the peak existing values for each sub catchment and critical duration taken from the model are show in the following table.

#### **NOYCE DVERT environmenta DVERT** consulting **12 Welsh Crescent Cycle North Store 2076 ABN: 21 523 433 060** ACN: 141 136 432

Catchment	10yr	Critical Duration	100yr	Critical Duration
CO	0.631	45min	1.148	10min
C1	0.353	45min	0.647	10min
C2	0.161	45min	0.301	10min
C3 & 4	0.025	45min	0.058	45min
C5	0.807	45min	1.460	10min
C6	0.178	45min	0.331	10min
C7	0.183	45min	0.476	45min
Sth East External	0.042	45min	0.084	15min

Using the developed flows from above, a hydraulic model connecting all catchments to a sedimentation basin and then larger retarding basin was modelled to determine the maximum holding volume required.

Outflow is typically determined by the capacity of existing Council pipes or matching predevelopment conditions. In this unique case, outflow from the basin in based on the capacity of infiltration into the underlying sandy soils.

Darcy's equation was used to determine the capacity of a basin outflow based on the measured conductivity of the basin floor multiplied by the floor area.

For an initial trial, a basin floor footprint of 750m2 was trialled which provides an infiltration rate of 120 litres per second or 0.12m3/s.





Figure 10: Hydraulic Model for Northern Detention Basin

No outflow link was provided in the above model which represents the current basin scenario and all outflow is via constant infiltration.

A future longer term solution may involve a high level relief to the west that flows to the Merri River. This will be discussed in later sections of the report.

Baynes Street Road level:	RL9.0m AHD
Upstream soak pit invert at Baynes Street:	RL7.48m AHD
Current basin floor level:	RL6.0m AHD
The configuration of the basin used in the mod	el:
Sediment basin floor:	RL 6.8m AHD ( Raised floor )
Sediment Basin weir flow crest:	RL 8.5m AHD
Bio Basin invert:	RL 6.8m AHD
Bio Basin overflow invert:	RL 9.0m AHD



Node - Detention Basin





In the peak 45minute storm events, the detention basin reaches a maximum depth of 1.78m for the 100year event which is considered to be acceptable for a retarding basin.



Figure 12: Hydraulic Model Long Section



	1-							
Name	Storm	Volume of User	Max Volume	Max Water Elev	Max Water Dep	Invert Elevation	Ground Elevati	Max Surface Ar
Detention Basin	SSM_10pct_10min_1	-1728.000	0.000	6.800	0.000	6.800	9.000	750.000
Detention Basin	SSM_10pct_15min_1	-1728.000	202.897	7.051	0.251	6.800	9.000	869.930
Detention Basin	SSM_10pct_30min_1	-1728.000	565.006	7.425	0.625	6.800	9.000	1065.770
Detention Basin	SSM_10pct_45min_1	-1728.000	780.987	7.618	0.818	6.800	9.000	1174.320
Detention Basin	SSM_1pct_10min_1	-1728.000	849.814	7.676	0.876	6.800	9.000	1207.860
Detention Basin	SSM_1pct_15min_1	-1728.000	1205.874	7.952	1.152	6.800	9.000	1374.550
Detention Basin	SSM_1pct_20min_1	-1728.000	1501.537	8.158	1.358	6.800	9.000	1505.590
Detention Basin	SSM_1pct_30min_1	-1728.000	1889.725	8.404	1.604	6.800	9.000	1600.000
Detention Basin	SSM 1pct 45min 1	-1728.000	2164.350	8.576	1.776	6.800	9.000	1600.000

Maximum levels within the basin are 8.58m AHD thus providing 400mm of freeboard to the nominated basin surface level of 9.0m AHD.

Industry practice for retarding basins varies across Victoria, however temporary storage of water within a 1 - 3m depth range over short periods of time is common practice.

Where the basin is either fenced or has safe batters, the depth of water is less critical from a safety perspective.

Total outflow over the simulation time is 1,728m3 infiltrated through the basin floor.

To scale, including batters, the sediment basin and main biobasin fits within the allocated drainage reserve area.

The basin will be adjacent to proposed residential development. A reference basin configuration with safety fencing is shown below.



Figure 13: Reference Basin Construction



## 6 Future Flows From Harrington RB

It is understood that Council is interested in an option to achieve a gravity outfall for up to 1,200 litres per second flow (1.2m3/s) pumped from the Harrington Road retarding basin to the east. To route flows through the site are considered to be more economical than to traverse the hill to the west along Baynes Street.

To model this scenario, a constant 1.2m3/s was added to the upstream road inlet with a 280m long 900mm diameter piped outfall from the detention basin to the Merri River.



Figure 14: Harrington Flows and New Outfall

Performance for the basin flows show that the basin does not overtop given the relief from the 900mm diameter outlet.



Figure 15: Detention Basin Stage-Time curve -1200lps Option



The basin fills from the incoming storm events and constant inflow which is 10 times higher than the infiltration rate of the basin.

The resulting flow of 1.0m3/s are then conveyed downstream via a proposed 900mm outlet pipe to Merri River.



Figure 16: Outlet flows - 1200Is option

Outfall for the basin commences at RL 8m AHD allowing for 1m of inflow for the catchment retardation before engaging a 900mm diameter outfall pipe which has the capacity to flow to Merri River reaching pipe full capacity only near the outlet.



Figure 17: Outlet flow - 1200Is option



## 7 Water Quality

Water quality objectives will be met from the site via a sediment and bioretention basin in the base of the retarding basin on site similar to the arrangement below:



Figure 18: Bio-basin at base of retardation basin

The long-term MUSIC data for Warrnambool was used from the MUSIC Link feature in the water quality program and in line with recommended parameters contained within the Warrnambool Council MUSIC Guidelines 2013.

Total average rainfall and evaporation for the site:

Г	Rainfall/Day	Evapo-Transpiration
mean	2.329	4.423
median	0.300	3.870
maximum	61.700	6.160
minimum	0.000	2.600
10 percentile	0.000	3.030
90 percentile	7.600	6.100
L		
Γ	Rainfall	Evapo-Transpiration
mean annual	850	1615

### Figure 19: Rainfall and Evaporation Summary

Average long-term rainfall for the area is 850mm per annum.



The rainfall sequence is taken from the Warrnambool Post Office gauge (90082).



## Figure 20: Rainfall and Evaporation Plot

The 10year record provides a long-term assessment of treatment performance.

## 7.1 Water Quality Objectives

Best Practice environmental outcomes are measured by the following pollutant reductions:

Parameter	Best Practice % removal standard	
Total suspended solids	80	
Total Phosphorus	45	
Total Nitrogen	45	



### 7.2 Water Quality Treatment Train

As described in the hydraulic section of the report, flows from the catchments will enter a sediment pond before flowing into a bio-basin located within the base of the retardation basin.

It is assumed that from a water quality perspective, the model only needs to consider the development catchment for pollutant removal modelling purposes, however in reality, without treating the two external residential catchments to the north, there is an increased risk of blocking the base of the infiltration pond.

Hence, from a risk perspective, it is considered appropriate to treat the low flows for the existing residential development and for undeveloped catchments to the west,

Flows from the majority of the development site come from roof runoff and roadways.

**MUSIC Input Parameters:** 

Soil Store Capacity = 30 millimetres

Field Capacity = 20 millimetres

Catchment nodes will be modelled with the typical values for fraction imperviousness in-line with the hydraulic model and with reference to the table below.

Zone Code	Description	Normal range	Typical Value
R1Z	Moderate range of densities (Lot size 800m <sup>2</sup> - 4000m <sup>2</sup> )	0.40 - 0.50	0.45
R2Z	Normal densities (Lot size 500m <sup>2</sup> - 800m <sup>2</sup> )	0.50 - 0.70	0.60
	Medium densities (Lot size 350m <sup>2</sup> - 500m <sup>2</sup> )	0.70 - 0.80	0.75
	High Densities (Lot size < 350m <sup>2</sup> )	0.80 - 0.95	0.85
LDRZ	Low densities (0.4 ha min)	0.10 - 0.30	0.20
MUZ	Mix of residential commercial, industrial and hospitals.	0.60 - 0.90	0.70
TZ	Small townships with no specific zoning structures	0.40 - 0.70	0.55
	R1Z R2Z LDRZ MUZ TZ	Zone Code         Description           R1Z         Moderate range of densities (Lot size 800m² - 4000m²)           R1Z         Normal densities (Lot size 500m² - 800m²)           R2Z         Medium densities (Lot size 500m² - 800m²)           Medium densities (Lot size 350m² - 500m²)         High Densities (Lot size < 350m²)	Zone CodeDescriptionNormal rangeR1ZModerate range of densities (Lot size 800m² - 4000m²)0.40 - 0.50R1ZNormal densities (Lot size 500m² - 800m²)0.50 - 0.70R2ZMedium densities (Lot size 500m² - 500m²)0.50 - 0.70Medium densities (Lot size 350m² - 500m²)0.70 - 0.80LDRZLow densities (0.4 ha min)0.10 - 0.30MUZMix of residential commercial, industrial and hospitals.0.60 - 0.90TZSmall townships with no specific zoning structures0.40 - 0.70

As recommended in the Guideline, all catchment nodes pollutant concentration were retained as per default values.

No exfiltration is assumed within the sediment basin.


The bioretention basin is assumed to engage as the sediment basin overflows to treat the finer colloidal fraction and soluble pollutants.

The biobasin infiltrates directly to the underlying sands and overflows into the wider detention basin.

Model configuration:



Figure 21: MUSIC Model Layout



#### 7.3 Treatment Element Parameters

#### Sed Pond

Location Sedimentation Basin 100m2		
Inlet Properties		
Low Flow By-pass (cubic metres per sec)	0.00000	
High Flow By-pass (cubic metres per sec)	100.0000	
Storage Properties		
Surface Area (square metres)	100.0	
Extended Detention Depth (metres)	1.00	
Permanent Pool Volume (cubic metres)	50.0	
Initial Volume (cubic metres)	50.00	
Exfiltration Rate (mm/hr)	0.00	
Evaporative Loss as % of PET	75.00	
Estimate I	Parameters	
Outlet Properties		
Equivalent Pipe Diameter (mm)	50	
Overflow Weir Width (metres)	5.0	
Notional Detention Time (hrs) 4.77		
Use Custom Outflow and Storage Relations	nip	

#### Biobasin

Location Bioretention 100m2			Products >>
Inlet Properties		Lining Properties	
Low Flow By-pass (cubic metres per sec)	0.000	Is Base Lined?	Tes 🔽 No
High Flow By-pass (cubic metres per sec)	100.000	Vegetation Properties	
Storage Properties			
Extended Detention Depth (metres)	0.30	<ul> <li>Vegetated with Effective Nutrient Removal Plant</li> </ul>	ants
Surface Area (square metres)	100.00	C Vegetated with Ineffective Nutrient Removal	Plants
Filter and Media Properties		C Unvegetated	
Filter Area (square metres)	100.00		
Unlined Filter Media Perimeter (metres)	1.00	Outlet Properties	
Saturated Hydraulic Conductivity (mm/hour)	100.00	Overflow Weir Width (metres)	2.00
Filter Depth (metres)	0.60	Underdrain Present?	🔽 Yes 🥅 No
TN Content of Filter Media (mg/kg)	800	Submerged Zone With Carbon Present?	Tes 🔽 No
Orthophosphate Content of Filter Media (mg/kg)	60.0	Depth (metres)	0.45
Infiltration Properties		1	
Exfiltration Rate (mm/hr)	100.00	Fluxes Notes	More

Recommended hydraulic conductivity of 100mm/hr was adopted for the model. In reality, the bioretention basin media typically starts 300mm/hr and drops to around 180mm/hr as a longer-term value. The adopted 100mm/hr allows for a conservative blockage factor.

#### **Detention Basin**

Location Detention Basin			
Inlet Properties			
Low Flow By-pass (cubic metres per sec)	0.00000		
High Flow By-pass (cubic metres per sec)	100.0000		
Storage Properties			
Surface Area (square metres)	900.0		
Extended Detention Depth (metres)	2.00		
Exfiltration Rate (mm/hr) 192.			
Evaporative Loss as % of PET	100.00		
Outlet Properties			
Low Flow Pipe Diameter (mm)	300		
Overflow Weir Width (metres)	2.0		
Notional Detention Time (hrs)	1.69		
Use Custom Outflow and Storage Relationship			



#### 7.4 Treatment Train Results

Treatment results at the bioretention basin show better then Best Practice outcomes:

	Sources	Residual Load	% Reduction
Flow (ML/yr)	42.2	17.5	58.4
Total Suspended Solids (kg/yr)	8320	397	95.2
Total Phosphorus (kg/yr)	16.7	2.64	84.2
Total Nitrogen (kg/yr)	121	34.2	71.7
Gross Pollutants (kg/yr)	1760	0	100

Comparison of the results with the guidelines shows that the measures proposed will result in a compliant outcome:

Parameter	Best Practice % removal standard	Modelled outcome % removal	Target Achieved
Total suspended solids	80	95.2	YES
Total Phosphorus	tal Phosphorus 45		YES
Total Nitrogen 45		71.7	YES

All targets for water quality will be met and exceeded.

Results for the total catchment:

	Sources	Residual Load	% Reduction
Flow (ML/yr)	46.9	0.00981	100
Total Suspended Solids (kg/yr)	9010	1.98	100
Total Phosphorus (kg/yr)	18.2	0.013	99.9
Total Nitrogen (kg/yr)	133	0.269	99.8
Gross Pollutants (kg/yr)	1760	0	100

The result indicates that the basin is effectively removing all pollutant and flow due to the infiltration into the underlying sandy soils.



Further inspection of the water balance for the detention basin:

	Flow (ML/yr)	TSS (kg/yr)	TP (kg/yr)	TN (kg/yr)	GP (kg/yr)
Flow In	22.251	1086.970	4.154	46.411	0.000
ET Loss	0.000	0.000	0.000	0.000	0.000
Infiltration Loss	22.232	493.812	3.213	42.284	0.000
Low Flow Bypass Out	0.000	0.000	0.000	0.000	0.000
High Flow Bypass Out	0.000	0.000	0.000	0.000	0.000
Pipe Out	0.010	1.984	0.013	0.269	0.000
Weir Out	0.000	0.000	0.000	0.000	0.000
Transfer Function Out	0.000	0.000	0.000	0.000	0.000
Reuse Supplied	0.000	0.000	0.000	0.000	0.000
Reuse Requested	0.000	0.000	0.000	0.000	0.000
% Reuse Demand Met	0.000	0.000	0.000	0.000	0.000
% Load Reduction	99.956	99.817	99.687	99.420	0.000

Total flow of 22.5ML pa is infiltrated into from the basin with no weir flows recorded from the node indicating that based on a 10 year rainfall record, the basin is sized correctly for WSUD considerations and confirms the hydraulic sizing for the peak flood event modelling.

A Gross Pollutant Trap could be added to the treatment train to remove debris from upstream catchments. This element has not been modelled as the sediment basin would effectively capture all floating debris. The development loads are generally not large enough to warrant a dedicated GPT in our opinion, however given the wider catchment input, and the need to maintain infiltration rates, it is recommended at this unique location.



### 8 Lots South Of Fraser Ridge

For lots south of Fraser Place, the land slopes at a 10.7 degree slope to the south west corner.



Figure 22: WSUD Layout

Pre-development flows for the 2.057ha vacant land were calculated with 0% impervious for the existing conditions and an adopted 10mm initial and 2mm continuing loss.

Peak 10year and 100year AEP flows were calculated as:







Existing peak flows were:

10yr AEP: 0.168m3/s – 20min critical storm

100yr AEP: 0.479m3/s - 10min critical storm

For the developed scenario, a higher lot density and average fraction impervious of 60% impervious was adopted including the road (1.7ha residential and 0.357ha road) in accordance with Table 16 of the Engineering Design and Construction Manual for Subdivision in Growth Areas April 2011.

Table 16: Land use fraction impervious

ZONE	ZONE CODE	BRIEF DESCRIPTION / EXAMPLES	NORMAL RANGE	TYPICAL VALUE
Residential Zone	es:			
Residential 1 & 2 Zone	R1Z	Normal range of densities. (Allotment size 600m2 – 1000m2)	0.40 - 0.60	0.50
	R2Z	Medium densities. (Allotment size 450m2 – 600m2)	0.50 - 0.70	0.60
		High densities. (Allotment size <450m2)	0.70-0.90	0.80

Post Development flows conditions without retardation:



Figure 24: Fraser Place South - Post-Development Flows

Developed peak flows are modelled as:

10yr AEP: 0.340m3/s - 10min critical storm

100yr AEP: 0.962m3/s - 15min critical storm



As the above flows are higher than pre-development, it is required that detention be provided to reduce the post development flows to match the previously calculated existing conditions flows.

To facilitate the retardation of flows, storage of flows in upsized pipes is proposed within the road reserve.

XPStorm was used to model different storage configurations to suit both the 10year and 100year flows.

Through iteration, it was found that a combination of a 140m3 storage controlled by two outlets can closely match pre-development flows for the 10 year and 100 year events.



Figure 25: Fraser Place South – Retarded Post Development Flows

Tank depth: 1m	Assumed invert: 6m AHD
Low Flow Orifice Invert: 6.0m AHD	Low Flow Orifice diameter: 180mm
High Flow Orifice Invert: 6.5m AHD	High Flow Orifice diameter: 225mm
Storage stage-discharge.	



Figure 26: Fraser Place South – Storage Stage / Time

The configuration provides for storage within 1050mm diameter stormwater pipes connected via a common header to form a single storage and the outlet will be controlled by two vertical orifice holes in a pit wall as shown in the sketch below.

Outfall from the tank will flow into a 20m long bioswale that infiltrates into the underlying sands and higher flows will continue to follow the natural fall of the land along the wider road reserve towards the Merri River.





#### Figure 27: Fraser Place South – WSUD Plan View



A sketch of the facility in isometric view looking east:



Figure 28: Fraser Place South – WSUD Plan Iso View

Further detailed design will be required for the civil components of the tank storage system to include inspection access and maintenance pits at the ends of each pipe for cleaning. A small GPT may be warranted upstream of the tanks to avoid costly cleanout of the pipe storages should rubbish accumulate over time.

The bioswale was modelled in MUSIC with a 0.3m extended detention and hydraulic conductivity coefficient representative of the sand at 360mm/hr as a nominal hydraulic conductivity.

Inlet Properties		Lining Properties	
Low Flow By-pass (cubic metres per sec)	0.000	Is Base Lined?	🔽 Yes 🥅 No
High Flow By-pass (cubic metres per sec)	100.000	Vegetation Properties	
Storage Properties		C Venetated with Effective Network Removal Riv	
Extended Detention Depth (metres)	0.30	<ul> <li>Vegetated with Enective Nuthent Removal Fig</li> </ul>	nits
Surface Area (square metres)	20.00	C Vegetated with Ineffective Nutrient Removal F	lants
Filter and Media Properties		C Unvegetated	
Filter Area (square metres)	20.00		
Unlined Filter Media Perimeter (metres)	1.00	Outlet Properties	2.00
Saturated Hydraulic Conductivity (mm/hour)	360.00	Overflow Weir Width (metres)	J2.00
Filter Depth (metres)	0.50	Underdrain Present?	🔽 Yes 🥅 No
TN Content of Filter Media (mg/kg)	800	Submerged Zone With Carbon Present?	🗌 Yes 🔽 No
Orthophosphate Content of Filter Media (mg/kg)	60.0	Depth (metres)	0.45
Infiltration Properties			
Exfiltration Rate (mm/hr)	0.00	Fluxes Notes	More



The model results of this scenario shows that a 20m2 bioswale has the capability of exceeding best practice environmental targets for this small catchment.

	Sources	Residual Load	% Reduction
Flow (ML/yr)	9.55	9.49	0.6
Total Suspended Solids (kg/yr)	1920	70.4	96.3
Total Phosphorus (kg/yr)	3.82	1.4	63.3
Total Nitrogen (kg/yr)	27.5	7.67	72.1
Gross Pollutants (kg/yr)	422	0	100

### 9 Filter Media Specification

The recommended filter media profile and specification shall comply with Melbourne Water Guidelines as outlined below.

Layer	Depth (mm)			Material description <sup>3</sup>
	Basic Contained	Pipeless	Submerged zone	
Filter	Min. 400; Min. 700 for trees		Min. 300	Washed well graded sand, particle size diameter 0.05- 3.4mm with hydraulic conductivity of 100-300mm/hr and low nutrient content Total Nitrogen <1,000mg/kg and available phosphate (Colwell) <80mg/kg
Transition <sup>4</sup>	Min. 100			Well graded coarse sand containing <2% fines, for example A2 filter sand
Drainage <sup>4</sup>	Dia of underdrain pipe + 50 cover above pipe	n/a	Min. 150	Fine gravel, for example 2- 7mm washed screenings (not scoria)
Submerged zone	n/a	n/a	Min. 300-	Sand or fine aggregate mixed with 5% by volume low nutrient carbon source, for example 6-10mm hard wood chips, pine chips without bark, sugar cane mulch, pine saw dust



### **10 Maintenance of WSUD Assets**

The ongoing maintenance of the sediment basin, wetland and retarding basins will be the responsibility of the Council as it performs a wider catchment function.

Detailed maintenance plans for the proposed drainage assets and water treatment facilities outlined in this report will be prepared at the detailed design stage of the works.

Typical activities will include:

accumulation

if found.



No proprietary maintenance requirements are proposed for either catchment and hence, the work is within the capability of the Council Asset Management team.



### **11 Summary**

Using ARR 2019 methods, detailed modelling of the post-developed scenarios for the proposed development determined that all flows from the site and surrounding catchments will cater for all flows up to and including the 100 year AEP event.

Based on tested infiltration rates for the basin area and hydraulic modelling, a 750m2 detention basin floor has the ability to detain all incoming catchment flows from existing residential development to the north, the proposed subdivision and undeveloped flows from the west.

Water quality treatment of the existing residential development to the north and the subject site can be accommodated with a 100m2 sedimentation basin providing initial collection of sands and larger pollutants as pre-treatment for a 100m2 bioretention basin installed to remove further finer particles and provide further protection and longevity of the infiltration properties of the basin.

As part of the planning process for development on land west of the subject site, modelling shows that the basin could also be configured to accept an additional 1.2m3/s from the Harrington Road RB system if an overflow pipeline of at least 900mm diameter is provided as an outfall pipeline from RL 7.0m AHD to the Merri River.

The option for additional flows would only be available if permission was granted by the adjoining land owner to the west. Should additional development flow be included in the outfall pipeline, the sizing may need to be remodelled to confirm capacity.

This report has also found that increased development density to the south of Frasers Place can be undertaken with the inclusion of a 140m3 underground storage to manage outflow to pre-development levels with a two-stage outlet to a linear bioswale and infiltration system of 20m2. Higher flows are able to be conveyed safely to the west via roadside drainage.

It is recommended that Council approve this Stormwater Management Plan to support the Development Plan associated with the Dennington South Estate.

Marc Noyce Noyce Environmental Pty Ltd 0417 133 243



Appendix 1 – Falling Head Tests



#### Soak Test Nov. 06 -3

Location:	Borehole 3 - Detention Pond	Date:	24-Nov-06
Method:	300 dia. Auger & Water Cart By:		SDT & PAW
Site Conditions:	Grassed Paddocks at shallow to flat grades		
Recent Weather:	Dry		

Soak Well Properties		Round Well
Diameter	0.34	m
Depth	5.700	m
Vol.	517.51	L

#### Falling Head Test

k <sub>h</sub> =	1.15r <sub>o</sub> /	(t2 - t1)	log <sub>10</sub> [	[ h <sub>1</sub> + r <sub>o</sub> /2 / h <sub>2</sub> + r <sub>o</sub> /2 ]	
k <sub>h</sub> =	1.15r。/	(t <sub>2</sub> - t <sub>1</sub> )	log <sub>10</sub> [	$[h_1/h_2]$	

Low Water Table High Water Table (Within Auger Ho

For sandy soils  $t_1 \& t_2$  should be selcted for the average of  $h_1 \& h_2 \sim 0.85h_0$  (ie.  $h_2 = 70\%h_1$ )  $0.85h_0 = 4.845 m$  $h_2 = 2x0.85xh_1 - h_1$  3.99 m

Water		Time	Water	k <sub>h</sub> Soil Co	onductivity	Comments
Source	(min)	(sec)	Depth (m)	m/sec	mm/hr	
	23.58	1414.8	5.700			
	24	1440	5.000			
	25	1500	3.800			
	26	1560	3.270			
	27	1620	3.000	2.66E-04	956.1	k <sub>h</sub> @ 0.85 h <sub>o</sub>
	28	1680	2.770			
	29	1740	2.540			
	30	1800	2.440			
	31	1860	2.320			
	32	1920	2.240			
	33	1980	2.190			
	34	2040	2.120			
5	36	2160	2.040			
ic	37	2220	1.990			
rai	38	2280	1.960			
	39	2340	1.930			
	40	2400	1.910			
	41	2460	1.890			
	42	2520	1.880			
	43	2580	1.850		1	
	44	2640	1.840			
	45	2700	1.830			
	46	2760	1.820			
	47	2820	1.810			
	48	2880	1.800			
	49	2940	1.790			
	50	3000	1.780			
	55	3300	1.740	5.34E-05	192.4	k <sub>h</sub> @ 28mins

# **APPENDIX E – Traffic Assessment Report**





# THE HEIGHTS South Dennington

### **DEVELOPMENT PLAN**

**Traffic Assessment Report** 



### Document Controls

Business Name	Milward Engineering Management Pty Ltd				
Document Title	The Heights South Dennington Development Plan – Traffic Assessment Report				
Document No.		Issue	1.1	Date	07 January 2022
Document Controller	Rhyce Milward				
Client	The Heights by Oakwood Pty Ltd				
Authorised by					
	(Name)	(Signature)		(Da	nte)

#### **Change History**

Issue	Date	Description of change	Author
1.1	07 January 2022	Finalised report for Development Plan	Justin Hinch, Milward Engineering Management
1.0	12 November 2021	Updated draft report incorporating Warrnambool City Council comments	Justin Hinch, Milward Engineering Management
0.3	27 September 2021	Draft report circulated to Warrnambool City Council for review	Justin Hinch, Milward Engineering Management
0.2	17 September 2021	Draft report circulated to Document Controller for review	Justin Hinch, Milward Engineering Management
0.1	08 July 2021	Draft report commenced	Justin Hinch, Milward Engineering Management

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Document Controls	2
Change History	2
Disclaimer	2
Introduction	6
Existing Conditions	7
Subject Site	7
Road Network	8
Public Transport	13
Parking	13
Pedestrians & Cyclists	13
Crash History	14
Proposed Development	15
Development Plan	15
Subdivision Layout	15
Road Network	17
Pedestrian & Cycle Network	18
Traffic Assessment	20
Existing Traffic Volumes	20
Traffic Count Survey	21
Traffic Impacts	22
Traffic Generation	22
Traffic Distribution	22
Traffic Impact Response	24
Primary Intersection Treatments	24
Baynes Street / Russell Street Intersection	24
Baynes Street / Lindsay Street Intersection	25
Traffic Calming	29
Modified T-Intersection	29
Design Preparation	30
Conclusion	31
Recommendation 1a – Baynes St / Lindsay St Intersection Roundabout Works	31
Recommendation 1b – Baynes St / Lindsay St Intersection Land Acquisition	31
Recommendation 1c – Baynes St / Lindsay St Intersection Development Contribution	31
Recommendation 2 – Baynes Street / Russell Street Intersection Traffic Calming	32

Contents



## 

Recommendation 3 – Lindsay Street m	iterim Treatment	32
Recommendation 4 – Road Hierarchy (	Changes for Lindsay Street	32
Recommendation 5 – Local Traffic Caln	ming, Modified T-Intersection	32
References		33
Appendix A – Historical Traffic Count Dat	а	34
Appendix B – Traffic Count Survey Data		35
Appendix C – Preliminary Cost Estimate (	Roundabout)	36

Figure 1 - Subject Site Locality Plan (Department of Environment, Land, Water and Planning, 20	21).7
Figure 2 – South Dennington Development Plan Area (Department of Environment, Land, Water	rand
Planning, 2021)	7
Figure 3 - Photo: Russell Street looking south towards Baynes Street and Rome Street intersection	ons.8
Figure 4 - Photo: Baynes Street looking west towards the Russell Street intersections	10
Figure 5 - Photo: Baynes Street looking east towards the Lindsay Street intersection (Google, 20	21)
	10
Figure 6 - Dennington Neighbourhood Activity Precinct Structure Plan, Key Design Principles (Ha	insen
Partnership Pty Ltd, November 2009)	11
Figure 7 - Photo: Lindsay Street looking south towards the Baynes Street intersection (Google, 2	2021)
	12
Figure 8 - Aerial & Photo: The Esplanade and Raglan Parade Intersection (Google, 2021)	12
Figure 9 - Location of closest bus stop to the Subject Site	13
Figure 10 - Existing Footpath Network (image extract) (Warrnambool City Councilx, August 2017	')14
Figure 11 - Planning Scheme Zones and Development Plan Overlay	15
Figure 12 - Old Subdivision Plan (2005)	16
Figure 13 - Typical Road Profile, Access Street (Local Government Infrastructure Design Associat	ion,
March 2020)	17
Figure 14 - Typical Road Profile, Access Place (Local Government Infrastructure Design Association	on,
March 2020)	17
Figure 15 – Development Plan Proposed Road, Pedestrian and Cycling Networks	19
Figure 16 - Road hierarchy (external roads) and historic traffic count data	20
Figure 17 - Existing Traffic Conditions during AM(PM) Surveys	21
Figure 18 - Predicted daily traffic volume changes resulting from the proposed development	23
Figure 19 - Predicted traffic volume changes at intersections during AM(PM) resulting from the	
proposed development	23
Figure 20 - Concept Intersection Treatment, Baynes Street / Russell Street	24
Figure 21 - Baynes Street / Lindsay Street intersection, existing conditions	26
Figure 22 - Concept Intersection Treatment, Baynes Street / Lindsay Street	26
Figure 23 - Example of sharrow pavement markings at a roundabout (VicRoads, December 2016	i)27
Figure 24 – Proposed Development Contribution Areas for the Baynes St / Lindsay St Roundabout	ut
Construction	29
Figure 25 - Modified T-Intersection Concept	30

Table 1 - Subdivision Lots Created (old and proposed plans)	15
Table 2 – Historic traffic count data, last 5 years	20



Table 3 - Intersection volumes below which capacity analysis is unnecessary	21
Table 4 - AM Peak Traffic Distributions	22
Table 5 - PM Peak Traffic Distributions	22
Table 6 - Proposed Development Contributions	28



### Introduction

Milward Engineering Management Pty Ltd (the Consultant) has been engaged by The Heights by Oakwood Pty Ltd (the Client/Landowner) to undertake this Traffic Assessment Report to inform and support the approval of the Development Plan for the proposed residential subdivision known as The Heights, South Dennington (the Subject Site).

The Consultant has prepared this Report which addresses (at a level of detail appropriate for the Development Plan) the impact and management of traffic on the internal and external road networks associated with the planned development.

The assessment considers:

- current and predicted traffic volumes;
- the proposed internal road hierarchy and functions;
- the proposed major road layout and major intersection treatments;
- pre-development agreements required for off-site traffic management;
- requirements for upgrading external roads and intersections;
- the potential impacts on public transport networks;
- the potential impacts of staged development;
- pedestrian and cyclist movements; and
- any proposed road closures.

Various supporting information is contained in this Report as per the attached appendices that includes:

- A. Historic Traffic Count Data
- B. Traffic Count Survey Data
- C. Preliminary Cost Estimate



### **Existing Conditions**

#### Subject Site

The Heights, South Dennington is located approximately 260 kilometres south-west of Melbourne situated on the edge of the Princes Highway and located five kilometres west of the Warrnambool CBD via the Princess Highway.



Figure 1 - Subject Site Locality Plan (Department of Environment, Land, Water and Planning , 2021)

The entire Subject Site is General Residential Zone (GRZ) with a mix of surrounding zones including General Residential Zone to the west and north, Farming Zone to the west and south, and Low Density Residential Zone to the east.



Figure 2 – South Dennington Development Plan Area (Department of Environment, Land, Water and Planning, 2021)



The Subject Site has an area of approximately 4.8 hectares bordered by baynes Street to the north (200 metres), the unmade extension of Lindsay Street to the west (400 metres), unmade / unnamed road to the south (200 metres) and Russell Street to the east (400 metres).

#### Road Network

#### Russell Street

Along the west boundary of the Subject Site, in a north-south alignment is Russell Street. This road is an 'Access' road with 'Category 3' footpath (Warrnambool City Council, November 2017) managed by Warrnambool City Council and the function of carrying moderate volumes of traffic and primarily serve as property access roads for the local community (Warrnambool City Council, July 2017).

Russell Street is the connection point for internal roads from the Subject Site to the exterior road network. The road carriageway is fully constructed to a sealed surface width of 7.0 metres plus 'semi-mountable' kerbs on both sides (a 7.6m carriageway width) from Baynes Street over the crest through to an existing internal road, Fraser Ridge totalling 318 metres. Russell Street takes the form of an unmade and partly vegetated road reserve further south through to Braithwaite Street.

There are three (3) existing intersections along Russell Street being at Baynes Street, Rome Street and Fraser Ridge. The intersections with internal roads (Rome Street and Fraser Ridge) are typical 'T' configurations, whereas the external intersection with Baynes Street is a 'crossroad' intersection with 'give-way' signage and markings.

A 1.5m wide concrete footpath has been constructed on the Subject Site side of Russell Street being General Residential Zone, with no footpath on the Low-Density Residential Zone side. There are road crossing points for the internal roads, whereas none located at the Baynes Street intersection.

As there is no posted speed limit and it is a built-up area in the vicinity of the Subject Site, hence the default speed limit is 50 km/h.



Figure 3 - Photo: Russell Street looking south towards Baynes Street and Rome Street intersections



#### **Baynes Street**

Along the northern boundary of the Subject Site, in an east-west alignment is Baynes Street. This road is an 'Connector' road with 'Category 3' footpath (Warrnambool City Council, November 2017) managed by Warrnambool City Council and the function to carry significant volumes of traffic and provide access by connecting residential areas to the link roads. They also provide links between the various arterial roads. (Warrnambool City Council, July 2017).

All traffic from the Subject Site connects to Baynes Street, providing external connections to the east, north and west. The road carriageway is fully constructed to a sealed surface width of 8.0 metres plus 'barrier' kerbs on both sides (an 8.6m carriageway width) between The Esplanade and Harrington Road.

Three (3) key sections along Baynes Street service the east, north and west connections, being:

- East from Russell Street towards Harrington Road, heading uphill to a crest and cutting
- North between Lindsay Street and Russell Street, shortest connection to the arterial network
- West from Lindsay Street towards The Esplanade, left out only on to the arterial network

There are three (3) existing intersections along Baynes Street (related to the Subject Site) being the 'crossroad' intersection at Russell Street and 'T' intersections at Graham Street for local access and at Lindsay Street as a connection to the aerial network. The current intersection configuration of Baynes Street and Lindsay Street as an unsignalised 'T' intersection, given both are local roads is considered appropriate (GTA Consultants (VIC) Pty Ltd, March 2017).

A 1.5m wide concrete footpath has been constructed on the Subject Site side of Baynes Street between Russell Street and Graham Street as the extent of previous subdivision stages completed on the Subject Site. The closest footpath network (Warrnambool City Councilx, August 2017) beyond the Subject Site is on either side of Lindsay Street and either side of Graham Street which then connects to 'Category 2' medium use footpath networks in prominent areas.

A posted speed limit of 60 km/h applies along Baynes Street east of the Subject Site between Russell Street and Harrington Road. There is no posted speed limit, and it is a built-up area in the vicinity of the Subject Site between Russell Street and Lindsay Street, hence the default speed limit is 50 km/h.





Figure 4 - Photo: Baynes Street looking west towards the Russell Street intersections



Figure 5 - Photo: Baynes Street looking east towards the Lindsay Street intersection (Google, 2021)

#### Lindsay Street

The Dennington Neighbourhood Activity Centre Structure Plan (Hansen Partnership Pty Ltd, November 2009) makes limited references to the future development of the South Dennington Growth Area but does acknowledge the Subject Site is within a 400m walkable distance to the Activity Centre.





Figure 6 - Dennington Neighbourhood Activity Precinct Structure Plan, Key Design Principles (Hansen Partnership Pty Ltd, November 2009)

With the signalisation now implemented at the Raglan Parade and Lindsay Street intersection, this is the intended strategic transport link to the Subject Site for vehicles and pedestrians.

This road is an 'Access' road with 'Category 3' footpath (Warrnambool City Council, November 2017) managed by Warrnambool City Council and the function of carrying moderate volumes of traffic and primarily serve as property access roads for the local community (Warrnambool City Council, July 2017). The road hierarchy will be further discussed later in this Report.

The road carriageway is fully constructed to a sealed surface width of 8.0 metres plus 'semimountable' kerbs on both sides (an 8.6m carriageway width) from Raglan Parade (and Russell Street South Service Road) over the crest on approach to Baynes Street totalling 183 metres.

A 1.5m wide concrete footpath has been constructed on both sides of Lindsay Street connecting with pedestrian crossings as part of the Raglan Parade signalised intersection.

As there is no posted speed limit and it is a built-up area in the vicinity of the Subject Site, hence the default speed limit is 50 km/h.





Figure 7 - Photo: Lindsay Street looking south towards the Baynes Street intersection (Google, 2021)

#### The Esplanade

The intersection of Raglan Parade and The Esplanade provides for 'left-in' and 'left-out' movements, which would likely suit vehicles travelling west away from the Subject Site towards Port Fairy or local access from the westbound land from Raglan Parade. It functions as a continuation of Baynes Street through to Raglan Parade.

This road is an 'Connector' road (Warrnambool City Council, November 2017) managed by Warrnambool City Council and the function to carry significant volumes of traffic and provide access by connecting residential areas to the link roads. They also provide links between the various arterial roads. (Warrnambool City Council, July 2017). The road hierarchy will be further discussed later in this Report.

There is no footpath connecting to or in The Esplanade.

As there is no posted speed limit and it is a built-up area in the vicinity of the Subject Site, hence the default speed limit is 50 km/h.



Figure 8 - Aerial & Photo: The Esplanade and Raglan Parade Intersection (Google, 2021)

#### Harrington Road

An alternative route between Dennington and Warrnambool is via Harrington Road through an industrial precinct.





Warrnambool City Council and the function to carry significant volumes of traffic and provide access by connecting residential areas to the link roads. They also provide links between the various arterial roads (Warrnambool City Council, July 2017).

There is no footpath connecting to or in Harrington Road.

A posted speed limit of 60 km/h applies along Harrington between Baynes Street and Braithwaite Street.

#### Public Transport

No bus routes are currently operating on roads adjacent to the Subject Site. The closest bus stop is 300 metres from the Lindsay Street / Baynes Street intersection, west of the Raglan Parade / Lindsay Street intersection which is serviced by the Warrnambool to Dennington (Route No. 1) and Warrnambool to Port Fairy (Route No. 8) bus routes (Public Transport Victoria, 2021).



Figure 9 - Location of closest bus stop to the Subject Site

#### Parking

On-street parking provisions are included within the road carriageway widths, with parking typically permitted on both sides unless otherwise marked / signed. No dedicated off-street parking provisions service the Subject Site.

#### Pedestrians & Cyclists

The extent of the footpath network serving pedestrian accessibility to the Subject Site is limited, with the main connection to the arterial network on Raglan Parade and the Dennington Activity Centre following the Russell Street, Baynes Street and Graham Street route which do have nominated road crossing points. There are footpaths for the full length of Lindsay Street, but no formal connection from the Subject Site.

No dedicated provision for cyclist accessibility is currently available that connects to the Subject Site. There are dedicated bicycle lanes on Raglan Parade.





Figure 10 - Existing Footpath Network (image extract) (Warrnambool City Councilx, August 2017)

#### Crash History

The VicRoads Open Data website (Department of Transport, 2021) details all casualty crashes along major roads throughout Victoria. Scrutiny of these records indicate that no casualty crash has occurred along the roads adjacent to the Subject Site, in the last five (5) year period.

There is no crash statistics indicated surrounding the Subject Site, suggesting that the roads adjacent to the Subject Site are not resulting in traffic safety issues that requires urgent remedial action.



### Proposed Development

#### Development Plan

Schedule 1 to the Development Plan Overlay (DPO1) applies to the Subject Site, and the Development Plan is required to show suitable road and pedestrian linkages between the site and adjacent areas (among other requirements).

The Development Plan recognises that stages of development have already been completed as part of a previous planning permit. This Report is representative of the whole Development Plan area, inclusive of the stages completed.



Figure 11 - Planning Scheme Zones and Development Plan Overlay

#### Subdivision Layout

The traffic assessment is based on an old subdivision proposal (2005) used to inform the previous planning permit for a residential development comprising 94 new and existing residential lots. It is noted that the Client has expressed an intent to review the requirements and layout of the public open space and drainage reserves with potential to create up to a further six (6) lots of higher density living (i.e. units) as well as provided a further 12 lots in Stage 6 by reducing the 1,000m<sup>2</sup> lots down to 600m<sup>2</sup>. These changes would achieve a total of 110 new and existing residential lots with two (2) lots removed to accommodate a new road connection.

#### Table 1 - Subdivision Lots Created (old and proposed plans)

Stage	Old Subdivision Plan	Proposed Changes
Pre-development	2 existing	2
Stage 1	4 lots – completed	4
Stage 2	11 lots – completed	11
Stage 3	26 lots – completed	26
Stage 4	23 lots – proposed	22 lots – reduced for new road
Stage 5	12 lots – proposed	11 lots – reduced for new road
Stage 6	16 lots – proposed	28 lots – lot sizes reduced
POS / Drainage Reserve		6 lots – POS changed to lots
TOTAL RESIDENTIAL LOTS	94	110



### ERTISED



Figure 12 - Old Subdivision Plan (2005)



#### Land Use

# **ADVERTISED**

The use of all lots aligns with the provisions of the existing General Residential Zone, each lot expected to contain a single dwelling and garage. On-street car parking provisions will be integrated with the road carriageway widths.

#### Road Network

#### Intersections

The primary access points connecting the Subject Site to the existing external road network will be via the Baynes Street / Lindsay Street and Baynes Street / Russell Street intersections. Modifications to these 'four-way' intersections are expected and further discussed later in this Report. All other intersections (new and existing) will adopt the 'T' intersection configuration.

#### External (Perimeter) Roads

Construction of both Lindsay Street and Russell Street will be completed south of Baynes Street around the full perimeter of the Subject Site (including the unnamed road along the southern boundary) using existing road reserves which are at least 20m in width.

It is proposed that Russell Street will continue as an 'Access Street' adopting a minimum 7.3m carriageway width consistent with the Infrastructure Design Manual and the road constructed as part of Stage 2.



Figure 13 - Typical Road Profile, Access Street (Local Government Infrastructure Design Association, March 2020)

The extension of Lindsay Street needs to consider the adjacent land to the west, which also has a Development Plan Overlay aligning with the General Residential Zone for approximately 200m (50%) with the remaining length adjoining Farming Zone. Warrnambool City Council's Warrnambool Municipal Road Hierarchy Review and Traffic Management Plan (GTA Consultants (VIC) Pty Ltd, March 2017) considers the future impact of the South Dennington Growth Area, expected to create 156 lots, and generate 1,400 vehicles per day. Hence The Heights, South Dennington Development Plan would account for approximately 60% of the growth area potential.

It is proposed Lindsay Street is also an 'Access Street' and is expected to ultimately be constructed with a 7.3m carriageway when development to the west is completed. As an interim treatment (serving one side of the road only), a 6.0m carriageway width (as per an 'Access Place') has been adopted that can be widened in the future. Both widths are consistent with the Infrastructure Design Manual.



Figure 14 - Typical Road Profile, Access Place (Local Government Infrastructure Design Association, March 2020)



#### Internal Roads

# **ADVERTISED**

The construction of internal roads includes extending Rome Street through to Fraser Ridge completing an internal 'loop', maintaining the 'Access Place' profile with a 6.0m carriageway width consistent with the Infrastructure Design Manual and the road constructed as part of Stage 3.

Fraser Ridge will connect between Lindsay Street and Russell Street as an 'Access Street' adopting a 7.3m carriageway width consistent with the Infrastructure Design Manual.

To assist with permeability of vehicles to Baynes Street and connection to Lindsay Street, there is an opportunity to extend Rome Street through to Lindsay Street. This is not a critical link, however noting a proposed layout of potential lots in the previously designated public open space area is not finalised this may be advantageous.

#### Pedestrian & Cycle Network

#### Footpaths

Warrnambool City Council's Sustainable Transport Strategy 2010-2020 (Warrnambool City Council, 2010) identifies a need for new footpath in Baynes Street from Russell Street to The Esplanade on the south side and further footpath in Baynes St from Lindsay Street to Graham Street on the north side continuing both sides through to Harrington Road.

Safe pedestrian linkages crossing Baynes Street will need to be considered as part of the design phase and will likely be included in intersections works.

All proposed internal roads will be provided with footpaths on either side to provide pedestrian connectivity to the surrounding area consistent with the Infrastructure Design Manual. External (perimeter) roads will provide footpath connections on one side servicing the new lots, with further footpath on the other side anticipated to coincide with adjacent development or Council's footpath works program in the future.

To assist with permeability of pedestrians to Baynes Street and connection to Lindsay Street, footpath through the drainage reserve is proposed.

#### Bicycles

Warrnambool City Council's Sustainable Transport Strategy 2010-2020 (Warrnambool City Council, 2010) identifies a need for line marking of on-street bicycle lanes between Harrington Road and Tylden Street which will be incorporated into any Baynes Street intersection changes.





Figure 15 – Development Plan Proposed Road, Pedestrian and Cycling Networks



### Traffic Assessment

#### **Existing Traffic Volumes**

Traffic volume counts undertaken by Warrnambool City Council have been provided for Lindsay Street, Baynes Street and Harrington Road (Appendix B1) which provide a representation of historical traffic data across the three (3) key connections to Harrington Road (east), Lindsay Street (north) and The Esplanade (west).



Figure 16 - Road hierarchy (external roads) and historic traffic count data

Count date	Asset Description	24hr Vehicle Count	85% Speed	% Cars	Cars	% Trucks	Trucks
09/04/2019	Baynes St: Graham - Russell	661	65	90.0%	595	10.0%	66
07/03/2018	Baynes St: Russell - Harrington	760	63	92.9%	706	7.1%	54
27/07/2016	Baynes St: Tylden - Hood	415	54	92.8%	385	6.0%	25
10/07/2018	Lindsay St: Raglan - Drummond	1061	45	87.0%	923	12.9%	137
23/05/2019	Harrington Rd: Braithwaite - Baynes	790	73	91.4%	722	8.6%	68

#### Table 2 – Historic traffic count data, last 5 years

Typically, 'Connector' roads carry between 2,500 and 6,000 vehicles per day with a 11.6 metre carriageway, whereas 'Access' roads carry less than 2,500 vehicles per day with a 7.3 metre carriageway. The historical traffic count data suggests that surrounding road networks such as Baynes Street are well below traffic volumes related to their designated operational functions (Local




Government Infrastructure Design Association, March 2020). Baynes Street, Russen street and Harrington Road remain classified as Collector/Connector Level 1 Roads however they continue to experience traffic volumes similar to a local road as identified in the previous review (GTA Consultants (VIC) Pty Ltd, March 2017).

### Traffic Count Survey

The Consultant has undertaken traffic count surveys to validate the existing traffic conditions of the surrounding road network specifically along Baynes Street at the Lindsay Street and Russell Street intersections. Turning movement count data (Appendix B2) was captured on Friday 30<sup>th</sup> July 2021 between 8:30am – 9:30am and 3:00pm – 4:00pm which cannot be confirmed as peak volumes but presents a mix of school pick-up / drop-off and commuters. Note that there were no travel restrictions in place related to COVID at the time of the survey.



Figure 17 - Existing Traffic Conditions during AM(PM) Surveys

At un-signalised intersections with minor roads where there are relatively low volumes of cross and turning traffic, capacity considerations are usually not significant, and capacity analysis is unnecessary. Intersection volumes can be used to establish if capacity analysis is unnecessary. (Austroads, August 2009)

Table 3 - Intersection volumes below which capacity analysis is unnecessary

Type of road	Light cross and turning volumes Maximum design hour volumes Vehicles per hour (two-way)						
Two-lane major road	400 500 650						
Cross road	250 200 100						

Some key observations from the traffic count information are:

• Baynes Street / Lindsay Street intersection has the most diverse movement types, with traffic generated from all three directions. Adding a fourth leg to the intersection is expected to warrant traffic control treatment.



- Baynes Street / Russell Street intersection appears to only be used for local acc
- Baynes Street / Russell Street intersection appears to only be used for local access, with the vast majority being through traffic on Baynes Street.

### Traffic Impacts

This Report includes a review on the traffic generated impact from the proposed development for the existing road network adjacent to the site.

### Traffic Generation

The Infrastructure Design Manual (IDM) and the RTA Guide to Traffic Generating Developments 2002 (RTA Guide) were used to estimate traffic generation from low density residential subdivision development, as follows for residential houses (conventional lots).

- a daily trip rate of 10 trips per dwelling (IDM)
- a weekday peak hour rate of 0.85 trips per dwelling (RTA Guide)

The proposed subdivision is estimated to yield up to 110 residential lots at full development. This is estimated to result in a total traffic generation of 1,100 vehicles per day (vpd) to and from the development, with morning and afternoon peaks of 94 vehicles per hour (vph).

### Traffic Distribution

The distribution across traffic directions is expected to remain consistent across the current AM and PM peaks. It is adopted that the traffic movements would predominately travel north to the arterial network of Raglan Parade via Lindsay Street (45%) towards the Dennington Neighbour Activity Centre or connection to Port Fairy and Warrnambool. Some traffic movements are expected to travel west to the arterial network of Raglan Parade via The Esplanade for connection to Port Fairy only (20%) with the remaining traffic movements travelling towards the east to Harrington Road (35%) connecting to Warrnambool.

It is expected that the AM peak will have a higher 'out bound' distribution related to commuters and school activity, with a smaller differential between AM and PM traffic distribution for the PM peak with many residents returning to the Subject Site after school and work but acknowledging 'out bound' traffic still occurring for shopping and other extracurricular activities.

Traffic Direction	Inbound	Outbound	Total
	(to the Subject Site)	(from the Subject Site)	
The Esplanade (west)	5%	15%	20%
Lindsay Street (north)	10%	35%	45%
Harrington Road (east)	5%	30%	35%
Totals	20%	80%	100%

#### Table 4 - AM Peak Traffic Distributions

#### Table 5 - PM Peak Traffic Distributions

Traffic Direction	Inbound	Outbound	Total
	(to the Subject Site)	(from the Subject Site)	
The Esplanade (west)	5%	15%	20%
Lindsay Street (north)	25%	20%	45%
Harrington Road (east)	20%	15%	35%
Totals	50%	50%	100%



### Proposed Distribution

It is expected that from the traffic generated by the proposed development, 50% (550 vpd) will use the Baynes Street / Russell Street intersection for access, 40% (440 vpd) via the Baynes Street / Lindsay Street intersection and 10% (110 vpd) have direct frontage / access to Baynes Street.



Figure 18 - Predicted daily traffic volume changes resulting from the proposed development



Figure 19 - Predicted traffic volume changes at intersections during AM(PM) resulting from the proposed development

It is worth noting that of the lot access via the Baynes Street / Russell Street intersection and those with direct access on to Baynes Street, 38 lots (potentially 380 vpd) and five (5) lots (potentially 50 vpd) respectively have already been created under previous planning permits.

The increase in traffic volumes do not warrant any road capacity upgrades, however opportunities to manage speed and improve safety at intersections is highly recommended.



### Traffic Impact Response

### Primary Intersection Treatments

### Baynes Street / Russell Street Intersection

It is expected that an extra 59 vph will use this intersection resulting from the proposed development, with some of these movements already occurring subsequent to previous stages. Based on the expected distribution, 65% of development traffic is expected to travel to and from the west direction (via Lindsay Street and The Esplanade) and the other 35% to and from the east direction (via Harrington Road).

The main safety risk relates to the right-turns in and out of Russell Street, calculated to be 14 vph. Given the low traffic volumes of right-turning vehicles expected, with the available queuing space and the 50km/h posted speed limit the treatment recommended uses visual cues, lane narrowing and left-in / left-out treatments for local access and provisions for an on-road bicycle lane to encourage slower vehicle approach speeds that improve the safety of movement.



Figure 20 - Concept Intersection Treatment, Baynes Street / Russell Street

### Traffic Lane Widths

Adoption of standard traffic lane widths of 3.5m is desirable in urban areas. Urban road widths can be reduced to 3.0m for low-speed roads with low truck movements (Austroads, February 2021). Given the 50km/h posted speed limit and intent to discourage trucks from using Baynes Street, this reduction is considered acceptable at this intersection.

### On-Road Bicycle Lanes

In local streets it is usually not necessary to provide separated facilities for cyclists, as the lower speed of motor traffic should enable cyclists to safely share the road with other users. On local streets that carry less than 3,000 vehicles per day, bicycles and motor vehicles can generally share the road (Austroads, February 2021).

The useable width of Baynes Street is constrained to the existing 8.6m carriageway width. Adopting a road stereotype for an urban local collector, single carriageway, two-lane two-way operating with



an AADT of between 1,000 and 8,000 a bicycle lane wheth of 1.3m is an acceptabl is based on traffic lane widths of 3.0m (Austroads, August 2020).

It is acknowledged that a desirable bicycle lane width of 1.5m to 1.8m cannot be achieved without an increase in carriageway width that cannot be justified as a development related project given limited nexus between the two and the low volume of traffic and practicalities of reconstructing only part of the road in question.

### Left-in/left-out (LILO) turn treatments

A left-in/left out turn treatment (LILO) is a form of channelised left turn treatment that also incorporates right-turn bans. Incorporating LILO treatments for the section of Russell Street north or Baynes Street will improve safety by reducing the number of conflict points, acknowledging that traffic count information does suggest these are not significant. If a right-turn movement to the existing residential area is required, it can be accommodated at Graham Street under the existing T-intersection configuration. If supported by Council, removing the left-in would provide a higher level of control however resident access and waste service impacts would need to be considered further.

### Baynes Street / Lindsay Street Intersection

It is expected that an extra 67 vph will use this intersection resulting from the proposed development. The expected distribution of travel to and from the Subject Site is 20% west via The Esplanade, 45% north via Lindsay Street and 35% east via Harrington Road.

The creation of a fourth intersection leg, evolving from a standard T-intersection to a four-way intersection requires consideration of suitable treatment to address both the additional traffic generated and the range of movements safely. While the use of stop signs or give-way signs are most likely to be an appropriate treatment on collector and local road intersections with low traffic volumes, a roundabout may also be suitable treatments (Austroads, April 2020).

### Treatment Selection

The treatment selected is influenced by the existing conditions of the site and available land. There is not sufficient space to achieve an outcome with a roundabout without obtaining additional land both on the Subject Site and to the undeveloped land west of Lindsay Street, south of Baynes Street (the latter would need to be part of a future Development Plan). A steep embankment at 9 Lindsay Street and existing power infrastructure on the northeast corner would limit any encroachment into the northern verge on Baynes Street.





Figure 21 - Baynes Street / Lindsay Street intersection, existing conditions

It may be practical to allocate land on the Subject Site sufficient to accommodate an ultimate treatment for the whole growth area and have in place appropriate interim treatments to service the proposed development.

A roundabout provides the most advantageous solution as it can be used at a wide range of situations and improve safety by simplifying conflicts, reducing speeds, and providing clear indication of priority. There are also various right-turning traffic movements spread across each road-leg. A roundabout is also suited to act as a local area traffic management device (i.e., reducing vehicle speeds) but acknowledge suitable pedestrian treatments would also need to be provided.



Figure 22 - Concept Intersection Treatment, Baynes Street / Lindsay Street



### Approach Speed & Geometry

The desired driver speed on the fastest leg prior to the roundabout is ideally less than 40km/h. To achieve this, the concept plan adopts a minimum central island radius of 5m with a driveable encroachment area to an 8m radius. The outer radius inclusive of the carriageway is 14.7m which accommodates a design right-turn for a 12.5m single unit vehicle.

Further consideration will be needed to address the approach speeds of eastbound traffic from The Esplanade. With the roundabout positioned / offset to the south to utilise the existing kerb alignment on the north side of Baynes Street this has reduced the amount of deflection the traffic needs to negate. Some minor alterations to include kerb outstands, flat top speed humps or incorporation of a pedestrian crossing at this approach would achieve further reduction in speeds, noting the traffic movements are quite low with no traffic able to enter The Esplanade from the highway.

#### On-Road Bicycle Lanes

The constraints of the site from the existing road widths and positioning of the roundabout further south do not provide sufficient provisions to formalise a dedicated on-road bicycle lane like that proposed at the Baynes Street / Russell Street intersection. The roundabout concept would require further consideration of bicycle safety in design.

In a 'mixed traffic' scenario for cyclists the addition of bicycle symbols (advisory lane markings or "sharrows") in the general-purpose lanes on the approach and possibility within the circulating carriageway section encourages mixing between the modes. There is strong evidence that lane markings encourage cyclists to "claim the lane" and recommended where speeds are equitable (less than 40km/h) (Austroads, May 2014).

Sharrows are pavement markings consisting of a bicycle symbol and two chevron markings and may be used on the approach to an intersection where a bicycle lane or similar facility terminates prior to the intersection, and cyclists are required to merge into the main traffic lane. The intention of sharrows is to position cyclists into the centre of the traffic lane at individual intersections and encourage them to mix with through traffic.



Figure 23 - Example of sharrow pavement markings at a roundabout (VicRoads, December 2016)



#### Pedestrian Crossings

As a minimum to service the proposed development and to create a safe crossing point connecting north to the Dennington Neighbourhood Activity Precinct, a pedestrian crossing directly east of the Baynes Street / Lindsay Street intersection is preferred.

Should the land west of the Subject Site be developed in the future, the roundabout is to be designed to enable footpath connections to the north from this land and to the Subject Site.

#### Land Requirements

The constraints of the site from the existing road widths have resulted in the roundabout being positioned / offset further south and will require land acquisition from both the Subject Site and the future development land to the west to implement this intersection treatment.

While it is accepted the Subject Site can partially meet the land provisions, the roundabout relies on further land acquisition to the west. As such, it is recommended that the 4<sup>th</sup> intersection leg which completes the connection from the Subject Site to Baynes Street from Lindsay Street is not created until all land requirements are provided.

#### Implementation

Acknowledging the challenges in delivering the roundabout without adjoining land being developed, it is recommended that a financial contribution (such as a Development Contribution) towards the roundabout is provided. This contribution, plus the allocation of land on the Subject Site allows for the roundabout to be constructed later when the traffic treatments are warranted and can be integrated with the development to the west.

A cost estimate for the construction of a roundabout at the Baynes Street / Lindsay Street intersection has been prepared (Appendix D) for consideration. The estimated \$410,717 project scope has been prepared with the following assumptions and exclusions.

- Existing road pavement will be generally retained with a new asphalt overlay.
- New pavement areas allow 300mm depth plus subgrade improvement and asphalt overlay.
- Each leg of the roundabout is assumed to need drainage and street lighting.
- Retains existing kerb and channel along Baynes Street (north side) and in Lindsay Street.
- 30% contingency adopted at concept design stage.

The existing, but undeveloped General Residential Zone land areas have been used to calculate Development Contribution areas as lot yields and subsequent traffic volumes generated are not yet known. While existing (pre-development) traffic could be factored into the contributions, it is expected that Council would require development to fully fund the infrastructure.

	Contributing Residential Area (Ha)	Roundabout - Development Contribution	Recommended Payment Period
The Heights development	8.14	\$246,916	Upon creation of the 4 <sup>th</sup> intersection leg or last stage of subdivision (whichever is first)
Future development (land to the west)	5.40	\$163,801	Upon completion of the first stage of subdivision
Total	13.54	\$410,717	

#### Table 6 - Proposed Development Contributions





Figure 24 – Proposed Development Contribution Areas for the Baynes St / Lindsay St Roundabout Construction

The concept of sharing development infrastructure costs across these two (2) areas is also proposed for the construction of Lindsay Street with an interim treatment (serving one side of the road only) funded and delivered by The Heights development and the widened to achieve the ultimate treatment funded and delivered by the development to the west in the future.

### Traffic Calming

Austroads Guide to Traffic Management Part 8: Local Area Traffic Management indicates that road section lengths (i.e., between slow or near-stop conditions) should be kept below 200 metres to 250 metres for target speeds of around 50 km/h. All road sections between intersections are less than 250 metres and no further local traffic management treatments warranted.

### Modified T-Intersection

The primary traffic 'loop' through the Subject Site is connected via Lindsay Street, Fraser Ridge and Russell Street that serviced by a minimum 7.3m carriageway. All other roads are proposed have a 'local access' function with a 6.0m carriageway.

There is opportunity to introduce modified T-intersections that maintain the 'loop' road as the priority, slow traffic speeds, and create a threshold treatment discouraging general traffic use.





Figure 25 - Modified T-Intersection Concept

### **Design Preparation**

It is expected that design of the roads, footpaths and traffic impact treatments identified as part of the Subject Site development will be guided by industry accepted practices such as those detailed in the Infrastructure Design Manual (IDM), Austroads publications and Australian Standards.



### Conclusion

The traffic assessment undertaken is intended to inform and support the approval of the proposed residential development. The subsequent content to be included in the associated the Development Plan may be subject to further changes.

The property forms part of the South Dennington Growth Area and is considered a walkable distance to the Dennington Neighbourhood Activity Centre Structure Plan and public transport connections.

Several transport planning documents identify need for new footpaths and on-street bicycle lanes to service the area because of network gaps and to meet road safety objectives.

The traffic count data suggests that the surrounding road networks have capacity as they are operating below their designated function and there are no crash statistics indicating traffic safety issues that requires urgent remedial action.

The proposed residential development comprising up to 110 new and existing lots which will generate 1,100 vehicles per day to and from the development, with estimated additional morning and afternoon peak traffic of 94 vehicles per hour. The distribution of traffic is spread across three (3) key connections, being:

- East Harrington Road (35%)
- North Lindsay Street (45%)
- West The Esplanade (20%)

Provided the recommendations of this report are implemented, it has been assessed that the proposed development:

- would not adversely affect traffic conditions, the safety or operation of surrounding road and footpath networks;
- would be designed and generally comply with the relevant traffic requirements set out in the Warrnambool Planning Scheme and the Infrastructure Design Manual; and
- would not prohibit or restrict further development that may occur in surrounding areas subject to further traffic assessment at the time of development.

### Recommendation 1a – Baynes St / Lindsay St Intersection Roundabout Works

A roundabout is proposed for the Baynes Street / Lindsay Street intersection which provides a superior local area traffic management treatment simplifying conflicts, reducing speeds, and providing clear indication of priority.

### Recommendation 1b – Baynes St / Lindsay St Intersection Land Acquisition

In addition to land being provided on the Subject Site for the future construction of the roundabout, until further land acquisition to the west of the Subject Site is secured the 4<sup>th</sup> intersection leg which completes the connection from the Subject Site to Baynes Street via Lindsay Street is not created.

### Recommendation 1c – Baynes St / Lindsay St Intersection Development Contribution

A financial contribution (Development Contribution) of \$246,916 is made towards the construction of the roundabout, allowing for the roundabout to be constructed later when the traffic treatments are warranted and can be integrated with the development to the west of the Subject Site.



### Recommendation 2 – Baynes Street / Russell Street Intersection Traffic Calming

### At the Baynes Street / Russell Street intersection treatment proposes uses visual cues, lane narrowing and left-in / left-out treatments for local access and provisions for an on-road bicycle lane to encourage slower vehicle approach speeds that improve the safety of movement.

### Recommendation 3 – Lindsay Street Interim Treatment

Lindsay Street is proposed as an 'Access Street' and is expected to ultimately be constructed to a 7.3m carriageway when development to the west of the Subject Site is completed. As an interim treatment a 6.0m carriageway width is proposed that can be widened in the future.

### Recommendation 4 – Road Hierarchy Changes for Lindsay Street

The primary connection from Baynes Street to the arterial network on Raglan Parade should be recognised formally as a "Collector" road. This change may also consider if the existing road hierarchy of Baynes Street (west of Lindsay) and The Esplanade should retain the "Collector" road designation.

### Recommendation 5 – Local Traffic Calming, Modified T-Intersection

Use modified T-intersections that maintain the 'loop' road connecting Baynes Street via Lindsay Street, Fraser Ridge and Russell Street as the priority route through the Subject Site.



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Count date	Asset Description	24hr Vehicle Count	85% Speed	% Cars	Cars	% Trucks	Trucks	% Other	Other
09/04/2019	Baynes St: Graham - Russell	661	65	90.2%	596	10.0%	66	-0.2%	(1)
07/03/2018	Baynes St: Russell - Harrington	760	63	92.9%	706	7.1%	54	0.0%	0
27/07/2016	Baynes St: Tylden - Hood	415	54	92.8%	385	6.0%	25	1.2%	5
18/12/2013	Baynes St: Russell - Harrington	696	62	92.0%	640	5.9%	41	2.2%	15
30/04/2012	Baynes St: Russell - Harrington	489	66	90.0%	440	10.0%	49	0.0%	0
17/08/2011	Baynes St: Russell - Harrington	537	64	90.7%	487	9.3%	50	0.0%	0
17/08/2011	Baynes St: Russell - Harrington	537	64	90.7%	487	9.3%	50	0.0%	0
10/07/2018	Lindsay St: Raglan - Drummond	1061	45	87.0%	923	12.9%	137	0.1%	1
23/05/2019	Harrington Rd: Braithwaite - Baynes (CH 194 - CH 739)	790	73	91.4%	722	8.6%	68	0.0%	0
07/11/2018	Harrington Rd: Braithwaite - Baynes (CH 194 - CH 739)	764	72	91.0%	695	9.0%	69	0.0%	0
28/12/2016	Harrington Rd: Braithwaite - Baynes (CH 194 - CH 739)	741	75	94.1%	697	5.0%	37	0.9%	7
27/07/2016	Harrington Rd: Braithwaite - Baynes (CH 194 - CH 739)	675	75	94.4%	637	4.4%	30	1.2%	8
06/06/2016	Harrington Rd: Braithwaite - Baynes (CH 194 - CH 739)	794	75	90.9%	722	4.4%	35	4.7%	37
09/03/2016	Harrington Rd: Braithwaite - Baynes (CH 194 - CH 739)	794	74	90.9%	722	3.9%	31	5.2%	41

# Appendix A – Historical Traffic Count Data



# Appendix B – Traffic Count Survey Data



						AM						PM			
Movement	From	Direction	То	Direction	Intersection	8:30 -	8:45 -	9:00 -	9:15 -	Total	3:00 -	3:15 -	3:30 -	3:45 -	Total
						8:45	9:00	9:15	9:30	TOLAI	3:15	3:30	3:45	4:00	Total
M1	Baynes St	East Bound	Baynes St	East Bound	Lindsay St	12	4	2	3	21	7	4	5	6	22
M2	Baynes St	East Bound	Lindsay St	North Bound	Lindsay St	7	2	2	1	12	2	0	1	5	8
M3	Lindsay St	South Bound	Baynes St	West Bound	Lindsay St	0	2	1	0	3	0	1	3	6	10
M4	Lindsay St	South Bound	Baynes St	East Bound	Lindsay St	9	7	3	2	21	5	4	8	8	25
M5	Baynes St	West Bound	Lindsay St	North Bound	Lindsay St	10	4	4	4	22	5	9	8	7	29
M6	Baynes St	West Bound	Baynes St	West Bound	Lindsay St	6	3	4	4	17	4	3	6	7	20
M7	Baynes St	East Bound	Russell St	North Bound	Russell St	0	0	0	0	0	0	0	0	0	0
M8	Baynes St	East Bound	Baynes St	East Bound	Russell St	13	9	5	6	33	6	9	6	6	27
M9	Baynes St	East Bound	Russell St	South Bound	Russell St	1	3	0	0	4	4	1	4	5	14
M10	Russell St	South Bound	Baynes St	West Bound	Russell St	0	0	0	0	0	0	0	0	0	0
M11	Russell St	South Bound	Russell St	South Bound	Russell St	0	0	0	0	0	0	0	0	0	0
M12	Russell St	South Bound	Baynes St	East Bound	Russell St	0	2	1	0	3	1	1	0	1	3
M13	Baynes St	West Bound	Russell St	North Bound	Russell St	0	0	1	1	2	1	0	2	2	5
M14	Baynes St	West Bound	Baynes St	West Bound	Russell St	7	6	7	7	27	9	8	11	10	38
M15	Baynes St	West Bound	Russell St	South Bound	Russell St	1	1	2	1	5	4	1	3	4	12
M16	Russell St	North Bound	Baynes St	East Bound	Russell St	2	4	0	3	9	3	0	1	3	7
M17	Russell St	North Bound	Russell St	North Bound	Russell St	0	0	0	0	0	0	0	0	0	0
M18	Russell St	North Bound	Baynes St	West Bound	Russell St	5	0	3	1	9	4	3	6	2	15

	Bayr	nes St	Bayr	ies St	Bayn	ies St	Bayr	nes St	Linds	ay St	Russ	ell St
Movement (mid-Block)	Hood Linds	d St to say St	Lindsa Grah	iy St to am St	Graha Russ	m St to ell St	Russe Harrinį	ll St to gton Rd	Paglan Bayr	Pde to ies St	Bayne Ron	es St to ne St
	AM	PM	AM	PM	AM	PM	AM	PM	AM	PM	AM	PM
M1	21	22	21	22								
M2	12	8							12	8		
M3	3	10							3	10		
M4			21	25					21	25		
M5			22	29					22	29		
M6	17	20	17	20								
M7					0	0						
M8					33	27	33	27				
M9					4	14					4	14
M10					0	0						
M11											0	0
M12							3	3				
M13							2	5				
M14					27	38	27	38				
M15							5	12			5	12
M16							9	7			9	7
M17											0	0
M18					9	15					9	15
Total	53	60	81	96	73	94	79	92	58	72	27	48
Est AADT	7/	06	11	29	11	06	10	82	84	17	54	55



Appendix C – Preliminary Cost Estimate (Roundabout)



#### PRELIMINARY COST ESTIMATE

Banyes Street / Lindsay Street Intersection, South Dennington Roundabout Construction - Concept Stage

0	ALLIANCE MANAGEMENT COSTS	Qty	Unit	Rate	Total	\$39,069.00
0.1	Professional Fees - Survey, Geotech, Design & Approvals	260,460	Item	10.00%	\$26,046.00	
0.2	Project Management (including stakeholder engagement), Plan Checking	260,460	Item	5.00%	\$13,023.00	
	& Supervision - Council					
1	GENERAL PRELIMINARIES		lt e se	¢25,000,00	¢25,000,00	\$66,750.00
1.1	Site Establishment and Removal (Includes but not limited to; site	1	Item	\$25,000.00	\$25,000.00	
	identification, proving and protection, survey establishment & control					
	etc.)					
1.2	Site Management and Supervision - Contractor	8	Week	\$2,500.00	\$20,000.00	
1.3	Provision and Implementation of Traffic Management Strategy and/or	8	Week	\$1,750.00	\$14,000.00	
	Traffic Management Plan in accordance with Works Within the Road					
	Reserve Guidelines, including permits for local road detours.					
				A1 750 00	A1 750 00	
1.4	Preparation and administration of an IMS Management System	1	Item	\$1,750.00	\$1,750.00	
	(including Quanty, Occupational Health & Safety and Environment).					
1.5	Production of 'As Built' drawings and supporting handover	1	ltem	\$2,500.00	\$2,500.00	
	documentation.	-		+_,	+_,	
1.6	Road Safety Audit - During Construction to confirm Traffic Management	1	Item	\$3,500.00	\$3,500.00	
	Plan and Traffic Guidance Schemes have been implemented correctly;					
	and post opening.					
2	FORMATION CONSTRUCTION	_				\$3,780.00
2.1	Stripping of Topsoil: Topsoil shall be stockpiled neatly on site to	70	m3 (solid)	\$5.00	\$350.00	
	satisfaction of Council and strictly managed in accordance with					
	environmental management requirements. Based on minimum of					
2.2	100mm topsoil depth.	210	(امنامه) 2 مح	¢15.00	¢2 150 00	
2.2	Estimated Cut volume: All areas where excavation is necessary to	210	m3 (solia)	\$15.00	\$3,150.00	
	establish new design subgrade levels. Include box out of pavement.					
23	Reinstate site won tonsoil to disturbed areas (100mm thick) and disposal	70	m3 (solid)	\$4.00	\$280.00	
2.0	of excess material.	,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,		¢ 1.00	\$200.00	
3	PAVEMENT CONSTRUCTION					\$27.950.00
3.1	Profile existing seal to an aggregate size of not greater than 20mm and	90	m3 (solid)	\$50.00	\$4,500.00	
	re-use in subbase pavement.					
3.2	Subgrade Compliance: Condition, compact, test roll pavement subgrade.	1420	m2	\$0.50	\$710.00	
3.3	SubBase Construction (Granular Overlay): Supply and lay 200mm thick	170	m3 (solid)	\$75.00	\$12,750.00	
	layer of 20mm Class 3 Fine Crushed Rock (FCR), shape, trim and compact					
	in two (2) equal layers.		a (	400.00	40.000.00	
3.4	Base Construction (Granular Overlay): Supply and lay 100mm thick layer	110	m3 (solid)	\$80.00	\$8,800.00	
25	Dropprotion of povement surface for cooling	1100	m2	¢1.00	¢1 100 00	
3.5 A	SURFACING	1190	1112	Ş1.00	\$1,190.00	\$49 980 00
4.1	Supply and place size 7mm thick Class A primer seal.	1190	m2	\$7.00	\$8,330.00	Ş <del>4</del> 3,500.00
4.2	Supply and place 40mm thick, size 14 Type H asphalt wearing course.	1190	m2	\$35.00	\$41,650.00	
	The second se				. ,	
5	LINEMARKING					\$5,000.00
5.1	Supply and install (2 coat water-based) line marking.	1	Item	\$5,000.00	\$5,000.00	
6	INCIDENTAL CONSTRUCTION - Drainage Works					\$33,400.00
6.1	Modify existing pit to suit new levels.	4	no.	\$250.00	\$1,000.00	
6.2	Supply and install new side entry pit.	4	no.	\$1,100.00	\$4,400.00	
6.3	Supply and install new junction pit.	2	no.	\$1,000.00	\$2,000.00	
6.4	Supply and install 300mm Reinforced Concrete Pipe (RCP).	130	m	\$200.00	\$26,000.00	654 400 00
7.1	Supply and place P2 Type Keyle & Changed intervention	120		¢110.00	¢12 200 00	\$51,100.00
/.1	supply and place B2 Type Kerb & Channel, Inicuaing Ag-arain pipe and	120	IU II	\$110.00	\$13,200.00	
7 1	Supply and place M1 Type Kerb & Channel including Ag-drain pipe and	50	m	\$110.00	\$5 500 00	
<sup></sup>	connections - outer centre island.			÷110.00	\$3,300.00	
7.2	Supply and place 150mm Reinforced Concrete (RC) pavement. outer	160	m2	\$140.00	\$22,400.00	
	centre island and splitter islands.					
7.3	Supply and install DDA compliant pedestrian crossing.	8	no.	\$1,250.00	\$10,000.00	
8	INCIDENTAL CONSTRUCTION - Other Works					\$22,500.00
8.1	Landscaping - Centre Island.	1	Item	\$2,500.00	\$2,500.00	
8.2	Street lighting - new lights.	4	no.	\$5,000.00	\$20,000.00	
9	Provisional Sum Items					\$78,138.00
9.1	Dayworks - Construction Contingency	\$260,460.00	Item	30%	\$78,138.00	
10	Provisional Quantity Items			A	400	\$33,050.00
10.1	Excavate and remove unsuitable subgrade material. Supply, place and	280	m3	\$110.00	\$30,800.00	
10.2	compact CL3 FIRE Crushed ROCK (FCR).	20	m2 (colid)	67E 00	\$2 250 00	
10.2	Crushed Rock (ECR) to 140mm below Finished Surface Level	30	113 (SUIIU)	\$15.00	.µ∠,∠30.00	
	a usine notice for to realistic below finished surface revel.					
		TOTAL PRELU	MINARY CO	ST ESTIMATE		\$410.717.00
						,







# THE HEIGHTS South Dennington

### **DEVELOPMENT PLAN**

Infrastructure Servicing Report



### Document Controls

Business Name	Milward Engineering Management Pty Ltd							
Document Title	The Heights South Dennington Development Plan – Infrastructure Servicing Report							
Document No.		Issue 2.0 Date 08 December 2022						
Document Controller	Justin Hinch, Development & Tec	Justin Hinch, Development & Technical Services Manager – Milward Engineering Management Pty Ltd						
Client	The Heights by Oakwood Pty Ltd							
Authorised by	Milward Engineering Manageme	ent Pty Ltd						
	(Name)	(Signature)			Date)			

#### **Change History**

Issue	Date	Description of change	Author
2.0	08 December 2022	Revised report incorporating initial comments and further information requested	Justin Hinch, Milward Engineering Management
1.0	24 January 2022	Final report prepared to support Development Plan	Justin Hinch, Milward Engineering Management
0.1	11 January 2022	Draft report commenced	Justin Hinch, Milward Engineering Management

### Disclaimer

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Document Controls
Change History2
Disclaimer2
Introduction
Subject Site5
Development Plan6
Subdivision Layout6
Infrastructure Servicing
Roads & Footpaths8
Stormwater Drainage8
Northern Catchment8
Southern Catchment9
Water Supply9
Sewerage10
Northern Catchment
Southern Catchment
Electricity Supply11
Public Lighting
Gas Supply12
Telecommunications12
nbn™ Assets12
Telstra12
Conclusion13
Appendix A – Existing Drainage & Trees
Appendix B – Existing Electricity
Appendix C – Existing Gas
Appendix D – Existing Telecommunications
Appendix E – Existing Water & Sewerage18
Appendix F – Information to Assist Development Plan

Figure 1 - Subject Site Locality Plan (Department of Environment, Land, Water and Planning, 202	1).5
Figure 2 - Dennington South Development Plan Area (Department of Environment, Land, Water a	and
Planning, 2021)	6
Figure 3 - Old Subdivision Plan (2005)	7
Figure 4 - Water Supply Infrastructure Concept Plan	10

Contents



Figure 5 - Sewerage Infrastructure Concept Plan 11

Table 1 - Subdivision Lots Created (old and proposed	d plans)6
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### Introduction

Milward Engineering Management Pty Ltd (the Consultant) has been engaged by The Heights by Oakwood Pty Ltd (the Client/Landowner) to outline arrangements for the provision and funding of physical infrastructure that will inform and support the approval of the Development Plan for the proposed residential subdivision known as The Heights, South Dennington (the Subject Site).

The information provided in this Report reflects the documentation from and discussions with various servicing authorities and agencies associated with enabling the development. It is acknowledged that this Report is a guide with the final form of the development, the servicing requirements and service agreements subject to referrals and approvals actioned as part of the planning permit application process.

This Report includes:

- Roads & Footpaths;
- Stormwater Drainage;
- Water Supply;
- Sewerage;
- Electricity Supply;
- Gas Supply; and
- Telecommunications.

### Subject Site

The Heights, South Dennington (Subject Site) is located approximately 260 kilometres south-west of Melbourne situated on the edge of the Princes Highway and located five kilometres west of the Warrnambool CBD via the Princess Highway.



Figure 1 - Subject Site Locality Plan (Department of Environment, Land, Water and Planning , 2021)

The entire Subject Site is General Residential Zone (GRZ) with a mix of surrounding zones including General Residential Zone to the west and north, Farming Zone to the west and south, and Low Density Residential Zone to the east.





Figure 2 - Dennington South Development Plan Area (Department of Environment, Land, Water and Planning, 2021)

The Subject Site has an area of approximately 4.8 hectares bordered by Baynes Street to the north (200 metres), the unmade extension of Lindsay Street to the west (400 metres), unmade / unnamed road to the south (200 metres) and Russell Street to the east (400 metres).

### Development Plan

Schedule 1 to the Development Plan Overlay (DPO1) applies to the Subject Site, and the Development Plan is required to outline arrangements for the provision and funding of physical infrastructure (among other requirements).

### Subdivision Layout

An old subdivision proposal (2005) used to inform the previous planning permit for a residential development comprising 94 new and existing residential lots. It is noted that the Client has expressed an intent to review the requirements and layout of the public open space and drainage reserves with potential to create up to a further six (6) lots of higher density living (i.e. units) as well as provided a further 12 lots in Stage 6 by reducing the 1,000m<sup>2</sup> lots down to 600m<sup>2</sup>. These changes would achieve a total of 110 new and existing residential lots with two (2) lots removed to accommodate a new road connection.

Stage	Old Subdivision Plan	Proposed Changes
Pre-development	2 existing	
Stage 1	4 lots – completed	
Stage 2	11 lots – completed	
Stage 3	26 lots – completed	
Stage 4	23 lots – proposed	22 lots – reduced for new road
Stage 5	12 lots – proposed	11 lots – reduced for new road
Stage 6	16 lots – proposed	28 lots – lot sizes reduced
POS / Drainage Reserve		6 lots – POS changed to lots

#### Table 1 - Subdivision Lots Created (old and proposed plans)



### ERTISED



Figure 3 - Old Subdivision Plan (2005)



### Infrastructure Servicing

### Roads & Footpaths

Milward Engineering Management Pty Ltd has prepared a Traffic Assessment Report which suggests that the surrounding road networks have capacity as they are operating below their designated function and there are no crash statistics indicating traffic safety issues that requires urgent remedial action.

The proposed residential development will generate 1,100 vehicles per day, with estimated additional morning and afternoon peak traffic of 94 vehicles per hour and assessed that the development would not adversely affect traffic conditions, the safety or operation of surrounding road and footpath networks.

The Responsible Authority, Warrnambool City Council have been consulted and provided comment on the Traffic Assessment Report.

### Stormwater Drainage

Noyce Environmental Pty Ltd have prepared a holistic Stormwater Management Plan and water sensitive urban design for the Subject Site which details the planned stormwater infrastructure, with calculations that demonstrate the proposed solution will manage stormwater such that a no-worsening outcome occurs for developed flows up to the 1 in 100year AEP event.

Water sensitive urban design features incorporate "best practice" environmental management using proven, natural treatment mechanisms that provide a high level of filtration and pollutant removal plus opportunities to future-proof the site for additional inflows from the Warrnambool West Retarding Basin are explored.

The Responsible Authority, Warrnambool City Council have been consulted and provided comment on the Stormwater Management Plan. In response to an initial review, further information was requested regarding the delivery of the northern catchment drainage basin and the location of the southern catchment drainage structure.

Information to Assist Development Plan has been included in this report as Appendix F.

### Northern Catchment

A drainage basin has been proposed as an interim solution to manage stormwater, noting the main catchment does not have an outfall to the Merri River and currently relies on informal infiltration into the underlying sand soil profile. A piped system connection can be implemented from the drainage basin to the Merri River to coincide with future development to the west of the Subject Site.

It is proposed to formalise the drainage basin for the northern catchment utilising infiltration and detention storage to detain and treat incoming catchment flows from existing residential development to the north, the proposed subdivision, and undeveloped flows from the west.

As the current basin has sufficient capacity, it is not critical to complete the entire construction of the basin immediately and is reasonable to defer to a later stage.

To support deferral of complete construction, it is proposed to provide pre-treatment capacity as detailed in the Information to Assist Development Plan (Appendix F) to maintain the capacity of the infiltration media. This may include provision of a sedimentation basin, or alternatively by a sacrificial filter layer within the main basin.



### Southern Catchment

Development in the southern catchment will utilise underground storage to manage outflow to predevelopment levels and a linear bioswale and infiltration system to conveyed stormwater to the floodplain.

As is detailed in the Information to Assist Development Plan (Appendix F) the drainage structure can be located entirely within the large existing road reserve, allowing unimpeded maintenance access, and avoiding undue impact on other properties. Alternatively, the structure could be located entirely within the road pavement, with a piped discharge to the constructed swale. The selected location directs all stormwater flows to an existing depression, maintaining predevelopment conditions.

The proposed drainage structure is proposed to function as a permanent solution. However, it is recognised that the broader precinct does not have a formal stormwater management strategy. By adopting a design that can utilise the existing road reserve, this provides drainage infrastructure at the lowest point of the land impacted but also creates opportunity for the drainage network to be augmented in the future to either maintain, upsize, or remove the structure.

### Water Supply

The completed stages of development are serviced by a 100mm PVC pipe network in Rome Street, with a larger capacity of 150mm to the high point of the Subject Site in Fraser Ridge along both Deverell Way and Russell Street.

Due to topography and elevation this area has two different water pressure zones (low-level and high-level). The divide elevation between the two zones is typically 20m AHD. Preliminary advice from Wannon Water is they will allow servicing of the lower elevation lots in Stage 6 from the high-level system to avoid construction of a significant length of connecting main from the low-level system over the ridge.

Servicing of Stage 6 lots from the high-level system would require the installation of a pressure regulating valve to ensure the lots below 20m AHD are not subject to higher than typical pressures. These lots would then be transferred over to the low-level system in the future when the surrounding growth area is developed.

Some road reserves will have sufficient width to consider "duplication" of water mains with appropriate offsets from other underground services which will be considered in the design phase and require Wannon Water approval.

Water main works to service this development would be wholly funded by the developer.





#### Figure 4 - Water Supply Infrastructure Concept Plan

The location and spacing of fire hydrants and fire plugs will be in accordance with the Country Fire Authority's publication "Requirements for water supplies and access for subdivisions in Residential 1 and 2 and Township Zones" (October 9, 2006) or as amended; and the marking of fire hydrants and fire plugs should be in accordance with Fire Service Guidelines on "Identification of Street Hydrants for Firefighting Purposes".

### Sewerage

### Northern Catchment

The completed stages of development are serviced by a 150mm PVC pipe network, gravity fed from the high point along Fraser Ridge down to Baynes Street typically via lot easements connecting near the proposed drainage reserve / open space, before heading further north.



### Southern Catchment

Lots proposed to be created to the south of Fraser Ridge will not be able to connect to the gravity pipe network servicing the northern portion of the Subject Site. Either a pumped system would need to be provided or an extension of the network.

Preliminary advice from Wannon Water is that a network extension would need to be aligned with future development in the south and/or west, acknowledging no plans for this to occur. To enable the Subject Site to develop would require a temporary pump station to connect to the gravity system in the northern catchment. This pump station could be located on the south-west corner of the catchment and located on the existing government road reserves subject to Council approval.



Figure 5 - Sewerage Infrastructure Concept Plan

The proposed pump station is a temporary system and hence will be likely be removed in the future. It is not necessary to locate the system in a dedicated permanent services reserve. Within the existing road reserve there is more than ample room to house the system and when the land to the west is developed the pump station may be decommissioned or relocated to the next low point with no residual land left behind (refer to Information to Assist Development Plan – Appendix F).

### **Electricity Supply**

A 500kVA distribution substation exists in Fraser Ridge connecting the high voltage supply from Russell Street to the low voltage cable distributing supply to the completed stages with an existing demand of 70kVA. An additional 67 lots at an allowable 4kVA per lot is an incremental load of



268kVA, well within the capacity of the supply available without the ne substation but will be confirmed at the design and master plan stage.

It is expected a service agreement will be entered into for Powercor as the Responsible Authority to extend the electricity supply to each dwelling. Any electricity supply within newly constructed roads is to be provided in underground conduits. No overhead power is to be constructed.

### Public Lighting

The completed stages of development have installed standard lantern and pole street lighting with the following configurations:

- Mid-block using 42W CFL Sylvania lantern at 5.5m on a VicRoads manufactured pole; or
- Intersections using 150W HPS Sylvania lantern at 7.5m on a Saferoads manufactured pole.

All roads within the new subdivision are to be provided with public lighting in accordance with the requirements of the relevant Australian Standards. New lighting should be located outside the Clear Zones wherever possible and meet the standards for Category V or Category P lighting, as appropriate and is anticipated to be of similar type and standard used in the completed stages.

All public lighting is to incorporate the use of energy efficient luminaires. Energy-efficient fluorescent-tube devices (such as T5 units), noting LED units are now considered to represent a more cost-effective and environmentally responsible option.

### Gas Supply

The Responsible Authority for gas supply serving is AusNet Gas Services Pty Ltd.

The completed stages of development are serviced by a 63mm plastic polyethylene distribution mains.

Plans provided indicate planned gas assets extending along Russell Street (south of Fraser Ridge), then west along the unmade / unnamed government road to Lindsay Street. This is assumed to be a representation of network demand for the future development of the subject site, and as such can be suitably serviced.

### Telecommunications

### nbn™ Assets

Assets are already provided to lots within the completed stages, typically Copper/RF/Fibre cables in 100mm PVC conduits owned by Telstra with individual lots provided with cables through a 20mm conduit terminating inside the lot boundary.

It is expected that network services as delivered by NBN Co Limited will continue to combine service infrastructure with Telstra and are able to service the entire development subject to the relevant service agreements being in place.

### Telstra

It is recognised that Telstra assets are in a shared utility trench via 100mm PVC conduits with another carrier telecommunication cable / asset (nbn<sup>™</sup>).

It is expected that network services as delivered by Telstra will continue to combine service infrastructure with NBN Co Limited and are able to service the entire development subject to the relevant service agreements being in place.



### Conclusion

Based on the preliminary high-level investigations, documentation and discussions with various servicing authorities and agencies there appears no impediment to providing infrastructure that service The Heights, South Dennington development.

Infrastructure	Status	Summary
Roads & Footpaths	Available	A Traffic Assessment Report suggests that the surrounding road networks have capacity with no traffic safety issues. The development will generate 1,100 vehicles per day and would not adversely affect traffic conditions, the safety or operation of surrounding road and footpath networks.
Stormwater Drainage	Available	A Stormwater Management Plan will manage stormwater such that a no-worsening outcome occurs for developed flows up to the 1 in 100year AEP event. Water sensitive urban design features provide a high level of filtration and pollutant removal.
Water	Available	The development can be accommodated by extending the existing high-level and low-level water supply networks with mains design is to limit the number of 'dead-end' services, connecting mains through reserves if necessary.
Sewerage	Available	The entire site will discharge via the northern catchment serviced by existing gravity mains. The southern catchment will require a temporary pump station until such time the gravity network is extended in the future.
Electricity	Available	Overhead HV power lines are present in Russell Street and with underground LV connected to lots via the existing sub- station which has sufficient capacity to support the development.
Gas	Available	Gas supply is available to this area. Contributions will be subject to timing and extent of external works, hence cannot be confirmed until a formal application has been made.
Telecommunications	Available	The subject site is within the NBN Co. service area. Service agreements will be required between NBN Co. and the developer for the delivery of infrastructure.













Plans generated by SmarterWX<sup>™</sup> Automate



Plans generated by SmarterWX<sup>™</sup> Automate



Plans generated by SmarterWX<sup>™</sup> Automate

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#### Job # 31173070

Seq # 206847313

Provided by Warrnambool City Council



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Citipower/Powercor responses are based on this location. It is the responsibility of the enquirer to ensure the accuracy of the DBYD Work Area.





Citipower/Powercor responses are based on this location. It is the responsibility of the enquirer to ensure the accuracy of the DBYD Work Area.



This map represents the location of the submitted DBYD Work Area and all Citipower/Powercor responses are based on this location. It is the responsibility of the enquirer to ensure the accuracy of the DBYD Work Area. Date: 11 Jan 2022





This map represents the location of the submitted DBYD Work Area and all Citipower/Powercor responses are based on this location. It is the responsibility of the enquirer to ensure the accuracy of the DBYD Work Area.





This map represents the location of the submitted DBYD Work Area and all Citipower/Powercor responses are based on this location. It is the responsibility of the enquirer to ensure the accuracy of the DBYD Work Area.



Citipower/Powercor responses are based on this location. It is the responsibility of the enquirer to ensure the accuracy of the DBYD Work Area.



Citipower/Powercor responses are based on this location. It is the responsibility of the enquirer to ensure the accuracy of the DBYD Work Area.



Citipower/Powercor responses are based on this location. It is the responsibility of the enquirer to ensure the accuracy of the DBYD Work Area.







All planned mains shall be treated as live mains, as mains under pressure may be in existence.

..... Requested Area















DIAL BEFORE Sequence No: 206847310 YOU DIG Job No: 31173070 ww.7100.com.as WannonWATER Location: 7 Deverell Way, Warrnambool, VIC 3280 The Essential First Step. 150 mm PVC 26 PVC 3.0 Asset Types шш 225 mm RC Water 33 150 28 **Gravity Sewer** Hood Street PVC 32 100 mm PVC Pressure Sewer 150 mm **Roof Water** 9 Other Assets 32 Feature Types PVC 34 35-37 Pipes 150 mm PVC Lindsay Street шш Private Pipe 7 8 **Disused Pipe** 34 **Disused Asbestos** 36 100 mm PVC 39 Cement 41 20 Surface Fitting/Manhole • PVC 150 m¦m 5 5 **Estimated Offset** ▶ 3.1◀ 36 шш PLANS MUST BE PRINTED IN 43 225 COLOUR 20 Scale: 1:1000 38 150 mm VC Expires: 08 Feb 2022 150 m 2 1 2 40 **DISCLAIMER:** While reasonable measures E 45 have been taken to ensure the accuracy of the information contained in this plan 47 response, neither Wannon Water nor 150-mW-PVG-PelicanCorp shall have any liability whatsoever in relation to any loss, damage, 42 2.6 cost or expense arising from the use of this 23 plan response or the information contained 25 in it or the completeness or accuracy of 27 such information. Use of such information W Baynes Street is subject to and constitutes acceptance of 4.3 these terms. 300 mm DICL Wannon Water does not have an obligation õ to maintain the information, however, we use our best endeavours with available resources to maintain the information, subject to current and accurate information being provided to Wannon Water. The 1.0 information has not been verified by 150 mm PVC Wannon Water and may be incomplete, PVC inaccurate, obsolete, superseded or duplicated. It is for the user to satisfy 150<sub>4</sub>mm themselves that the information is appropriate for the proposed use and to Tile No: 1 satisfy themselves of the accuracy or otherwise of the information.



















Sequence No: 206847310 Job No: 31173070 Location: 7 Deverell Way, Warrnambool, VIC 3280 ADVERTSE2.0 Degend

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#### AU.Wannon Water - Response Plan.docx (06 Apr 2020)

otherwise of the information.

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The Essential First Step.

Asset Types

Feature Types

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Water Gravity Sewer Pressure Sewer Roof Water Other Assets

Pipes Private Pipe Disused Pipe Disused Asbestos

Cement

Surface Fitting/Manhole

**Estimated Offset** 

PLANS MUST BE PRINTED IN COLOUR

Scale: 1:1000 Expires: 08 Feb 2022 DISCLAIMER: While reasonable measures have been taken to ensure the accuracy of the information contained in this plan response, neither Wannon Water nor PelicanCorp shall have any liability whatsoever in relation to any loss, damage, cost or expense arising from the use of this plan response or the information contained in it or the completeness or accuracy of such information. Use of such information is subject to and constitutes acceptance of

Wannon Water does not have an obligation to maintain the information, however, we

use our best endeavours with available

resources to maintain the information, subject to current and accurate information being provided to Wannon Water. The

information has not been verified by

Wannon Water and may be incomplete, inaccurate, obsolete, superseded or duplicated. It is for the user to satisfy themselves that the information is appropriate for the proposed use and to

satisfy themselves of the accuracy or



 Sequence No:
 206847310

 Job No:
 31173070

 Location:
 7 Deverell Way, Warrnambool, VIC 3280













#### 12/10/2022

Our ref:	W.SUB-15780_Complimentary information to design report
Doc rev:	A
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	Development\15780 The Heights,
	Dennington\W.SUB-15780 Complimentary
	information to design report.docx

### **Information to Assist Development Plan**

#### **Document Revision Summary**

Revision	Date	Description
Rev A	12/10/2022	Initial Report



### **1 CONTENTS**

1	CONTENTS	2
2	INTRODUCTION	3
	2.1 SITE FIELD INVESTIGATION	3
3	SEWER DESIGN	3
4	STORMWATER NORTH	5
5	STORMWATER SOUTH	6

Figure 1: Proposed Sewer Pump Station	3
Figure 2: Proposed location of sewer pump well	
Figure 3: Output from Civil Site Design	5
Figure 4: Sketch of Proposed Basins Layout	5
Figure 5: Detention/Infiltration system cross section	6
Figure 6: Detention/Infiltration system Plan View	6
Figure 7: Isometric view of proposed Bio-swale and Storage	7
Figure 8: Existing flow path to Merri River	



#### **2** INTRODUCTION

This report has been compiled by PM Design to provide complimentary information to the Development Plan created by Milward Engineering Management.

#### 2.1 Site Field Investigation

Existing site conditions was surveyed by PM Design on the 25/7 - 26/7 and is depicted in the drawings titled W.SUB-15780 Survey Rev B

#### **3 SEWER DESIGN**

To the south of Fraser Ridge there is no existing Sewer infrastructure and due to the site's topography it is not feasible to connect this via gravity into the existing infrastructure on the North of the ridge. As a result we recommend a temporary sewer pump station to manage the wastewater from the 28 lots that lie to the south of Fraser Ridge. Figure 1 depicts the proposed cross section of the pump well, with a minimum operating volume of 900 Litres based on a desirable 5 pump starts per hour and an appropriate pump rate of 2 Litres/Sec.







The emergency storage is based on a 2 hour storage of the Peak Dry Weather Flow and has a depth of 2.40m in the wet well.

The proposed pump station is a temporary system and hence will be likely be removed in the future, because of this it is not necessary to locate the system in a dedicated permanent services reserve. Within the existing road reserve there is more than ample room to house the system and when the land to the west is developed the pump station may be decommissioned or relocated to the next low point with no residual land left behind. Figure 2 shows the proposed location of the pump well in the road reserve in the South-West corner of the development, this is recommended as the most viable option.



Figure 2: Proposed location of sewer pump well



#### 4 STORMWATER NORTH

North of Fraser Ridge there is an existing storm water detention basin partially constructed, this basin currently has more than adequate volume to detain all storm water runoff from the proposed development adopting the flows calculated in the Noyce Environmental Consulting report. The existing basin has a capacity of approximately 3,712 kL with a top detention water level of 8.4 m AHD, suitable to infiltrate all required runoff as is supported by the Noyce Environmental Consulting report, with well over 300mm freeboard provided to any neighbouring properties or roads.

Figure 3 depicts the storage volume as calculated using Civil Site Design and the existing surface.

Net volume FILL	3,712.420
Area Summary	
Total Cut Area	0.195
Total Fill Area	2,267.814
	2 2 2 2 0 0 0 0
Iotal Area	2,268.009

As the current basin has sufficient capacity, it is not critical to complete the entire construction of the basin immediately, and is reasonable to defer to a later stage.

Typical WSUD design for a similar system includes provision of a sedimentation basin prior to the main treatment node. In these systems, the sedimentation basin will act to remove gross pollutants and suspended solids prior to discharge into the main infiltration area.

#### Figure 3: Output from Civil Site Design

To support deferral of complete construction, it is proposed to provide similar pre-treatment capacity, to maintain the capacity of the infiltration media. This may be provided by a sedimentation basin, or alternatively by a sacrificial filter layer within the main basin.



#### Figure 4: Sketch of Proposed Basins Layout


### ADVERTISED 0A10

#### 5 STORMWATER SOUTH

To the south of Fraser Ridge there is no existing drainage infrastructure and runoff follows the existing topography to the West towards the Merri River. As noted within Noyce Environmental Consulting report it is proposed to construct a detention system consisting of 4/No. 1050Ø R.C Pipes and a 20m long bio-swale for treatment and infiltration. An approximate cross section of the proposed system is detailed in Figure 5. A Gross Pollutant Trap will be located immediately prior to the detention system.



Figure 5: Detention/Infiltration system cross section



Figure 6: Detention/Infiltration system Plan View

Figure 7 depicts the proposed detention/infiltration system and how the bio-swale will work in relation to the surrounding topography.



### ADVERTISED QA10



Figure 7: Perspective view of proposed Bio-swale and Storage

The structure is able to be located entirely within the large existing road reserve, allowing unimpeded maintenance access and avoiding undue impact on other properties. Alternatively, the structure could be located entirely within the road pavement, with a piped discharge to the constructed swale.

The selected location directs all stormwater flows to an existing depression, maintaining predevelopment conditions, as can be seen in Figure 8. Figure 8: Existing flow path to Merri River



### ADVERTISED 0A10



Figure 8: Existing flow path to Merri River

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Reviewed By:

Tom Browne Civil Team Leader PM DESIGN GROUP Engineering Solutions

Email: tom.browne@pmdesign.com.au



### APPENDIX G – Landscaping Plan

**The Heights, South Dennington Development Plan** *Planning Report* 









### LANDSCAPING PLAN All Stages

Created: 19 September 2022 Version: 2

#### LEGEND



#### Planting & Maintenance Schedule

50

0

25

Species	Pot size	Growing Height
Banksia 'Sentinel'	50 cm	2.5 x 1 m
Silver Banksia	50 cm	5 x 4 m
Pin-cushion Hakea	50 cm	2-3 m

75

100 m

# **APPENDIX H – Development Plan Layout**





#### LEGEND



FOOTPATH INFRASTRUCTURE ROAD CARRIAGEWAY INFRASTRUCTURE KEY SEWERAGE INFRASTRUCTURE DEVELOPMENT PLAN AREA



KEY DRAINAGE INFRASTRUCTRUE RESIDENTIAL LOTS (>500m<sup>2</sup>) RESIDENTIAL LOTS (MEDIUM DENSITY) INTERSECTION TREATMENT

### **ADVERTISED** APPENDIX I – Site Feature Survey Plan





## SURVEY NOTES

LAND TO BE SERVICED: LOT 97, NO. 7 DEVERELL WAY, WARRNAMBOOL VIC 3280 97\PS636695. SURVEY DATUMS: WANGOOM PM 769 - 29.46m WANGOOM PM 124 - 12.99m WANGOOM PM 126 - 12.62m LEVELS ARE TO AHD PROJECTION METHOD: MGA 2020 ZONE 54 PURPOSE OF SURVEY: PLAN OF SUBDIVISION: SOURCED FROM ROD BRIGHT & ASSOCIATES PTY LTD DRAWING TITLED "PROPOSED 62 LOT SUBDIVISION", DATED: 06/03/2022. CADASTRAL DATA:

Sheet List Table		
Sheet Number	Sheet Title	
C000	FACE SHEET	
C001	SITE PLAN	
C002	PART SITE PLAN – SHEET 1 OF 2	
С003	PART SITE PLAN – SHEET 2 OF 2	

				PROJECT:	DWG No. : C000
			DESIGNER HK www.pmdesign.com.au Engineering Solutions MULTI DISCIPLINE CONSULTING ENGINEERS	THE HEIGTS, DEMNINGTON	TITLE : FACE SHEET
			DRAWN HK GEELONG • HORSHAM • PORTLAND •		
	B     27.09.2022     MF     TB     ISSUED TO CLIENT       A     07.09.2022     HK     TB     ISSUED FOR REVIEW		CHECKED TB CHECKED TB	PM PROJECT No. : W.SUB-15780	X:\ENGINEERING\000-W\SUB SUBDIVISIONS LAND DEVELOPMENT\15780 THE
SCALE @ A1	REV DATE BY APP REVISION DESCRIPTION	REV DATE BY APP REVISION DESCRIPTION	APPROVED TB EMAIL: admin@pmdesign.com.au WEB: www.pmdesign.com.au	CLIENT: RODGER CONSTRUCTIONS PTY LTD	HEIGHTS, DENNINGTON\C- DRAWING SET\W.SUB-15780_SURVEY - REV B.DWG

WARNING BEWARE OF UNDERGROUND AND OVERHEAD SERVICE THE LOCATIONS OF UNDERGROUND SERVICES ARE APPROXIMATE ONLY AND THEIR EXACT POSITION SHOULD BE PROVEN ON SITE. NO GUARANTEE IS GIVEN THAT ALL EXISTING SERVICES ARE SHOWN.



### ADVERTISED

LOCALITY PLAN 20 0 20 40 60 80 100





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	GAS	G G			
	TELSTRA				
	ELECTRICITY	EE			
	KERB & CHANNEL				
	SURFACE CONTOUR MAJOR	22.5			
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	TOP OF BATTER				
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	PERMANENT SURVEY MARK	不			
	EXISTING SURFACE LEVEL	× 9.38m			
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HEIGTS, DENNINGTON	DWG NO.: LUUZ				
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$\begin{array}{c} 46.55m \\ 225.95m \\ 225.95m \\ 225.17m \\ 19.56m \\ 19.61m \\ 20.32m \\ 19.56m \\ 220.64m \\ 220.64m \\ 221.92m \\ 221.92m \\ 221.92m \\ 222.74m \\ 22$	*26.22m $-26.37m26.75m$ $-26.37m26.35m$ $+25.90m$ $-26.47m26.35m$ $+26.47m\times 24.2110m \times 22.06m2m$ $-21.84m$ $-2m$	m 	$\frac{28.00m}{228.00m} \times \frac{28.58m}{28.58m} \times \frac{28.63m30.63m}{28.63m30.63m} \times \frac{29.97m}{28.63m30.63m} \times \frac{29.97m}{28.52m30.25m} \times \frac{29.97m}{29.92m} \times \frac{28.52m30.25m}{29.81m} \times \frac{29.97m}{29.92m} \times \frac{28.52m30.25m}{29.81m} \times \frac{29.97m}{29.97m} \times \frac{25.74m}{25.74m} \times \frac{27.40m}{25.98m} \times \frac{26.97m}{20.97m} \times \frac{26.96m}{27.15m} \times \frac{27.10m}{27.15m} \times \frac{26.96m}{27.15m} \times \frac{26.96m}{27.15m} \times \frac{27.10m}{27.15m} \times \frac{27.15m}{27.15m} \times 27.15$	A8m 
$\begin{array}{c} & & & & & & & & & & & & & & & & & & &$	26.22m $26.37m26.75m$ $26.37m26.35m$ $25.90m$ $26.35m$ $26.47m26.35m$ $26.47m24.2129m$ $222.06m2m$ $222.06m$	m -+ 26.2 m + 26.2 m	26.6928.47m   *28.63m30.63m     26.6928.47m   *28.63m30.63m     6m   *27.93m     6m   *27.93m     77.28.40m   *28.53m30.25m     77.28.40m   *28.53m30.25m     77.28.40m   *28.53m30.25m     77.28.40m   *28.53m30.25m     77.28.40m   *28.53m30.25m     ×25.74m   *27.40m     ×24.26m   *25.98m     ×24.26m   *25.78m     ×24.35m   *25.78m     ×24.35m   *25.78m     ×24.40m   *25.78m     ×24.35m   *25.78m     ×24.40m   *25.98m     ×24.40m   *25.78m     ×24.40m   *25.78m     ×24.40m   *25.78m     ×24.40m   *25.78m     ×24.40m   *25.78m     ×24.40m   *25.78m	A8m 30.22m 30.22m 30.22m 27.60m 28.23m 28.11m 28.53m 2
*26,55m   *22,75m     *25,95m   *21,53m     *25,95m   *21,53m     *25,95m   *21,53m     *19,56m   *19,61m     *19,56m   *19,61m     *18,34m   *19,69m     *16,43m   *16,65m     *16,43m   *16,65m     *15,13mt   *17,50m     *15,13mt   *14,14m     *15,08m   *16,02m     *16,02m   *14,14m     *15,08m   *16,02m     *16,02m   *16,02m     *17,80m   *17,80m	26.22m $26.37m26.75m$ $26.37m26.35m$ $25.90m$ $26.35m$ $26.47m26.35m$ $225.90m$ $26.47m26.47m26.47m26.47m26.47m26.47m26.47m26.47m26.47m26.47m26.47m26.47m26.47m26.95m27.95m$	m -* 26.2 m * 26.2 m	$\frac{1}{26.00m} + 28.58m + 28.63m 30.63m - 29.97m + 28.63m 30.63m - 29.97m + 28.63m 30.63m - 29.97m + 28.53m 30.25m + 29.97m + 28.53m + 29.97m + 28.53m + 29.97m + 29.97m + 28.53m + 29.97m + 28.53m + 29.97m + 2$	A88m 
46.55m   22.59m   x21.53m   x23.94m   x23.08m   x23.29m   x24.28m	26.22m $26.37m26.75m$ $26.37m26.35m$ $25.90m$ $26.35m$ $26.47m26.35m$ $225.90m$ $26.47m26.47m26.47m24.2129m$ $222.06m2m$ $222.06m2m$ $222.06m2m$ $222.06m2m$ $222.06m2m$ $222.06m2m$ $222.06m$	m -+ 26.2 m + 26.2 m + 26.2	$\frac{1}{26.89} + \frac{1}{21} + \frac{1}{22} + \frac{1}{2$	A8m - 1 - 2 - 1 - 2 - 1 - C + C + C + C + C + C + C + C + C + C
$\begin{array}{c} & & & & & & & & & & & & & & & & & & &$	26.22m $26.37m26.75m$ $26.37m26.35m$ $25.90m$ $26.35m$ $26.47m26.35m$ $225.90m$ $26.47m26.47m24.2129m$ $222.06m2m$ $222.06m2m$ $222.06m2m$ $222.06m2m$ $222.06m2m$ $222.06m2m$ $222.06m$	m -* 26.2 m * 26.2 m	$\frac{28.58m}{226.69840} + 1 m + 28.58m} + 28.63m30.653m} + 28.53m30.653m} + 28.53m3m} + 2$	A9m - 29.91m - 30.36m - 30.22m - 30.42m - 27.60m - 29.45m -
$\begin{array}{c} & \begin{array}{c} & & & & & & & & & & & & & & & & & & &$	26.22m $26.37m26.75m$ $26.37m26.35m$ $25.90m$ $26.35m$ $26.47m26.35m$ $225.90m$ $26.47m26.47m26.47m26.47m224.2129m$ $222.06m21.84m$ $22.06m2m$ $22.06m2m$ $22.06m2m$ $22.06m2m$ $22.06m$	m -+ 26.2 m + 26.2 m + 26.2	$\frac{34}{28.63m_{30}} + \frac{34}{28.58m_{30}} + \frac{34}{28.63m_{30}} + \frac{34}{28.63m_{30}} + \frac{3002m_{30}}{28.53m_{30}} + \frac{3002m_{30}}{28.53m_{30}} + \frac{3002m_{30}}{28.53m_{30}} + \frac{3002m_{30}}{28.53m_{30}} + \frac{30045m_{30}}{28.53m_{30}} + \frac{30045m_{30}}$	A9m 
**6.55m   *21.53m   *23.98m   *23.08m   *23.28m   *24.28m   *24.78m     *10.50m   *25.13m   *24.28m   *24.28m   *24.28m   *24.78m     *10.50m   *19.61m   *20.94m   *21.92m   *24.28m   *24.78m     *16.30m   *17.41m   *17.61m   *18.34m   *20.64m   *21.92m   *22.74m     *16.30m   *16.43m   *16.65m   *14.41m   *12.60m   *14.741m   *20.94m   *21.00m     *16.30m   *16.65m   *14.41m   *16.65m   *20.94m   *21.00m   *20.94m   *20.94m   *21.00m     *16.30m   *16.56m   *17.41m   *16.65m   *20.94m	26.75m 26.75m 26.75m 26.35m 25.90m 26.35m 25.90m 26.35m 26.47m 26.47m 26.47m 24.21 29m 22.06m 21.84m 21.84m 21.84m 21.84m 21.84m 20.95m 20.95m $\times 19.65m$	m -+ 26.2 m + 26.2 m	$\frac{1}{28.500} + \frac{1}{28.50} + \frac{1}{28.50} + \frac{1}{28.53} + \frac{1}{28.53} + \frac{1}{28.53} + \frac{1}{28.53} + \frac{1}{29.51} +$	49m - × 30.36m 30.22m - × 30.36m - × 30.36m - × 29.91m - × 2
*16:59m   *21:53m   *21:53m   *23:99m   *23:99m   *23:99m   *23:99m   *24:25m   *22:25m	26.22m $26.37m26.75m$ $26.37m26.35m$ $25.90m$ $26.35m$ $26.47m26.35m$ $25.90m$ $24.2126.35m$ $222.06m24.2129m$ $222.06m21.84m$ $221.84m$ $20.95m\times 19.65m\times 19.65m$	m + 26.2 m * 26.2 m	$\frac{24.26}{410} + \frac{24.26}{410} + \frac{24.26}{410$	ABR 
**45.55m   *21.53m   *21.53m   *23.98m   *23.98m   *23.98m   *23.98m   *23.98m   *24.28m   *24.78m     **19.55m   *25.55m   *25.55m   *25.55m   *24.28m	26.22m $26.37m26.75m$ $26.37m26.35m$ $25.90m$ $26.37m26.35m$ $25.90m$ $26.37m26.35m$ $25.90m$ $20.95m24.2124.20$	m + 26.2 m × 26.7 m	x28.58m x28.63x30.63m   x25.78m x28.63x30.63m   x25.74m x27.40m   x24.26m x25.78m   x24.35m x25.78m   x24.35m x25.78m   x24.35m x25.78m   x24.35m x25.78m   x23.92m x25.73m   x24.35m x25.73m	ABR 
46,55m   421,53m   424,78m     425,55m   421,53m   424,78m     425,55m   421,53m   424,78m     425,55m   421,53m   424,78m     425,55m   424,78m   424,78m     425,55m   424,78m   424,78m     425,55m   424,78m   424,78m     425,55m   424,78m   424,78m     410,55m   419,56m   424,78m     410,65m   424,78m   424,78m     410,65m   424,78m   424,78m     410,65m   424,78m   424,78m     410,65m   422,74m   424,78m     410,65m   422,74m   424,78m     416,33m   416,34m   420,45m     416,43m   416,45m   412,41m     416,43m   416,45m   412,41m     416,43m   416,45m   416,45m     416,43m   416,45m   416,45m     416,43m   416,45m   416,20m     416,43m   416,39m   417,91m     416,02m   417,80m   417,80m     410,05m   419,90m   412,86m	26.22m $26.37m26.75m$ $26.37m26.35m$ $25.90m26.35m$ $25.90m26.35m$ $225.90m26.35m$ $224.2126.47m24.2129m$ $222.06mm$ $222.06mm$ $221.84m$ $-1111$ $111$ $111111$ $111$ $111111$ $111$ $111111$ $111$ $111111$ $111$ $111111$ $111$ $111111$ $111$ $111111$ $111$ $111111$ $111$ $111111$ $111$ $111111$ $111$ $111111$ $111$ $111111$ $111$ $111$ $111111$ $111$ $111$ $111111$ $111$ $111$ $111111$ $111$ $111$ $111$ $111111$ $111$ $111$ $111$ $111$ $111$	m + 26.2 m + 225.5	x28.58m x28.63m30.63m30.63m   x28.58m x28.63m30.63m   x28.58m x28.63m30.63m   x29.92m x28.53m30.63m   x29.92m x28.53m30.63m   x29.92m x29.92m   x29.92m x29.92m   x21.39m x25.78m   x21.39m x24.56m   x21.39m x24.56m	Adm 1 1 2 1 2 1 2 1 1 2 1 1 2 1 1 2 1 1 2 1 1 2 1 1 2 1 2 1 1 2 1 1 2 1 1 2 1 1 2 1 1 2 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1
46:55m   421:53m   424:75m   424:75m     477.01m   425:55m   421:53m   424:75m   424:75m     477.01m   425:55m   421:53m   424:75m   424:75m     477.01m   425:55m   424:75m   424:75m   424:75m     477.01m   419:56m   421:75m   424:75m   424:75m     478.75m   424:75m   424:75m   424:75m   424:75m     478.75m   419:56m   421:75m   424:75m   424:75m     478.76m   420:02   420:04m   421:92m   424:75m     478.76m   419:56m   422:74m   424:75m   424:75m     478.76m   416:30m   412:80m   419:69m   420:70m     471.483m   415:34m   412:80m   419:69m   420:70m     414:630m   415:38m   416:39m   417:62m   419:60m     410:65m   413:50m   416:39m   416:39m   417:62m   417:60m     410:65m   419:90   419:90   417:80m   418:65m   417:60m   417:60m     410:65m   419:90   419:90   416:39m   416:3	×26.22m ×26.75m ×26.37m ×26.37m ×25.90m ×24.21 ×24.21 ×24.21 ×24.21 ×24.21 ×24.21 ×24.21 ×24.21 ×24.21 ×24.21 ×24.21 ×24.21 ×24.21 ×24.21 ×24.31 ×24.31 ×24.31 ×21.84m ×19.65m	m + 26.2 m + 22.5	*28.00m *28.58m *28.63m30.63m2   *28.658m *28.63m30.63m2   6m *22.78m   *25.74m *23.92m30.75m   *25.74m *25.74m   *25.74m *25.98m   *25.74m *25.98m   *26.66m*27.10m   *24.26m *25.78m   *25.74m *25.98m   *26.66m*27.15m   *24.26m *25.78m   *25.74m *25.78m   *26.66m*27.15m   *26.66m*27.14m   *23.92m *26.66m*27.14m   *23.92m *25.73m   *23.92m *25.73m   *24.56m *25.73m   *21.39m *23.48m	ABR 1 1 2 1 2 1 2 1 CFIT POLE 332.693h 30.22h 30.22h 30.22h 29.91m 30.42m 29.91m 20.42m 27.60m 28.45m 28.45m 28.11n 28.60m 28.60m 28.60m 28.60m 28.60m 27.92m 40m 28.93m 29.93m 20.
42.55m   22.55m   22.57m	$26.75m$ $\sim 26.37m$ $26.75m$ $\sim 26.37m$ $26.35m$ $\sim 25.90m$ $\sim$ $26.35m$ $\sim 25.90m$ $\sim$ $\sim 24.21$ $10m$ $\sim 22.06m$ $m$ $\sim 21.84m$ $\sim$ $\sim 19.46m$ $\sim 20.95m$ $\sim 19.65m$ $\sim 18.13m$	m -++ 26.2 m ++ 26.1 m	$\frac{444}{225,000} - \frac{226,58m}{226,58m} + 28,63m3(6,53m) + 29,97m}{226,58m} + 28,63m3(6,53m) + 29,97m}{226,97m} + 28,52m3(2,25m) + 29,97m}{226,92m} + 29,97m}{226,92m} + 28,52m3(2,25m) + 29,97m}{226,92m} + 26,73m$	ABR 1 7 2 1GFT POLE 332.623h 30.36m 30.22h 30.42m 27.9629.05m C 29.7 m 27.60m 28.11m 28.53m 28.23m 28.23m 28.66m × 30.25m 28.66m × 29.23m 27.92m 40m 27.92m 40m 25.2324.61m
42.5 50m   22.5 50m   22.5 50m   22.5 50m   22.5 50m   22.4 78m     42.5 50m   25.5 50m   22.5 50m   22.5 50m   22.4 28m   24.2 28m   24.2 28m     45.5 50m   19.5 60m   19.5 60m   10.6 50m   20.6 4m   21.9 2m   22.4 28m   20.4 1m     41.8 7.6m   20.6 4m   21.9 2m   20.9 4m   20.9 4	$26.75m$ $\sim 26.37m$ $26.75m$ $\sim 26.37m$ $26.35m$ $\sim 25.90m$ $\sim$ $26.35m$ $\sim 25.90m$ $\sim$ $\sim 24.21$ $9m$ $\sim 22.06m$ $m$ $\sim 21.84m$ $\sim$ $\sim 19.46m$ $\sim 20.95m$ $\sim 19.65m$ $\sim 18.13m$		***28.00m   **28.58m   **28.63m30.63m     ***28.00m   **28.58m   **28.63m30.63m     ***27.93m   **28.58m   **29.81m     ************************************	ABR 1 1 2 2 1 CFT POLE 332.623h 30.36m 30.221 29.91m 30.221 27.60m 28.17m 28.23n 28.23n 28.23n 28.23n 28.23n 28.23n 28.66m × 30.25m 28.66m × 30.25m 40m × 25.23n 61m
48.59   22.59   22.50   22.150   22.150   22.170	$26.75m$ $\sim 26.37m$ $26.75m$ $\sim 26.37m$ $26.75m$ $\sim 26.37m$ $26.35m$ $\sim 25.90m$ $\sim$ $\sim 24.21$ $10m$ $\sim 22.06m$ $m$ $\sim 21.84m$ $\sim$ $\sim 19.46m$ $\sim 20.95m$ $\sim 19.65m$ $\sim 18.13m$	m + 26.2 m + 26.2 m + 26.2	***28.00m   **28.58m   * 28.63m30.63m     ***28.00m   **28.58m   * 28.63m30.63m     661   **27.93m   **28.52m30.72m     ***27.93m   **28.52m30.72m   **39.97m     ************************************	ABM 1 1 7 9 LIGHT POLE 332,623h 30.22h 30.22h 30.22h 229,91m 30.42m 229,91m 30.42m 27.60m 28.60m 28.60m 28.66m 28.66m 28.66m 28.66m 27.92p 40m 40m 40m 40m 40m 40m 40m 40m
46.55n   +21.53m   +22.75n     47.701n   +23.58m   +23.28m     47.701n   +23.58m   +24.28m     47.701n   +19.50m   +23.28m     47.701n   +19.50m   +23.28m     47.701n   +19.50m   +24.28m     47.701n   +19.50m   +23.28m     47.701n   +19.50m   +24.28m     47.701n   +19.50m   +24.28m     47.71n   +24.28m   +24.7m     47.71n   +19.50m   +24.28m     47.71n   +24.28m   +24.7m     47.71n   +19.50m   +21.92m     47.71n   +18.34m   +21.92m     47.41m   +17.51m   +21.92m     47.41m   +16.59m   +21.92m     47.41m   +16.29m   +47.20m     47.41m   +17.20m   +47.20m     47.51m   +13.25m   +14.14m     47.50m   +16.02m   +17.80m     47.80m   +13.86m   +16.53m     47.80m   +13.86m   +16.53m     47.80m   +13.86m   +16.53m     47.80m </td <td>×26.22m ×26.75m ×26.37m ×26.37m ×26.47m ×24.21 9m ×22.06m m ×21.84m ×19.465m ×19.65m ×18.13m</td> <td></td> <td>*28.63m3&amp;63m<sup>2</sup> *28.63m3&amp;63m<sup>2</sup> *28.63m3&amp;63m<sup>2</sup> *28.63m3&amp;63m<sup>2</sup> *28.63m3&amp;63m<sup>2</sup> *28.63m3&amp;63m<sup>2</sup> *28.63m3&amp;63m<sup>2</sup> *28.63m3&amp;20m<sup>2</sup> *28.93m<sup>2</sup> *28.93m<sup>2</sup> *28.93m<sup>2</sup> *28.93m<sup>2</sup> *28.93m<sup>2</sup> *28.93m<sup>2</sup> *28.93m<sup>2</sup> *28.93m<sup>2</sup> *28.93m<sup>2</sup> *28.93m<sup>2</sup> *28.93m<sup>2</sup> *28.93m<sup>2</sup> *28.93m<sup>2</sup> *28.93m<sup>2</sup> *28.93m<sup>2</sup> *28.93m<sup>2</sup> *28.93m<sup>2</sup> *28.93m<sup>2</sup> *28.93m<sup>2</sup> *28.93m<sup>2</sup> *28.93m<sup>2</sup> *28.93m<sup>2</sup> *28.93m<sup>2</sup> *28.93m<sup>2</sup> *28.93m<sup>2</sup> *28.93m<sup>2</sup> *28.93m<sup>2</sup> *28.93m<sup>2</sup> *28.93m<sup>2</sup> *28.93m<sup>2</sup> *28.93m<sup>2</sup> *28.93m<sup>2</sup> *28.93m<sup>2</sup> *28.93m<sup>2</sup> *28.93m<sup>2</sup> *28.93m<sup>2</sup> *28.93m<sup>2</sup> *28.93m<sup>2</sup> *28.93m<sup>2</sup> *28.93m<sup>2</sup> *28.93m<sup>2</sup> *28.93m<sup>2</sup> *28.93m<sup>2</sup> *28.93m<sup>2</sup> *28.93m<sup>2</sup> *28.93m<sup>2</sup> *28.93m<sup>2</sup> *28.93m<sup>2</sup> *28.93m<sup>2</sup> *28.93m<sup>2</sup> *28.93m<sup>2</sup> *28.93m<sup>2</sup> *28.93m<sup>2</sup> *28.93m<sup>2</sup> *28.93m<sup>2</sup> *28.93m<sup>2</sup> *28.93m<sup>2</sup> *28.93m<sup>2</sup> *28.93m<sup>2</sup> *28.93m<sup>2</sup> *28.93m<sup>2</sup> *28.93m<sup>2</sup> *28.93m<sup>2</sup> *28.93m<sup>2</sup> *28.93m<sup>2</sup> *28.93m<sup>2</sup> *28.93m<sup>2</sup> *28.93m<sup>2</sup> *28.93m<sup>2</sup> *28.93m<sup>2</sup> *28.93m<sup>2</sup> *28.93m<sup>2</sup> *28.93m<sup>2</sup> *28.93m<sup>2</sup> *28.93m<sup>2</sup> *28.93m<sup>2</sup> *28.93m<sup>2</sup> *28.93m<sup>2</sup> *28.93m<sup>2</sup> *28.93m<sup>2</sup> *28.93m<sup>2</sup> *28.93m<sup>2</sup> *28.93m<sup>2</sup> *28.93m<sup>2</sup> *28.93m<sup>2</sup> *28.93m<sup>2</sup> *28.93m<sup>2</sup> *28.93m<sup>2</sup> *28.93m<sup>2</sup> *28.93m<sup>2</sup> *28.93m<sup>2</sup> *28.93m<sup>2</sup> *28.93m<sup>2</sup> *28.93m<sup>2</sup> *28.93m<sup>2</sup> *28.93m<sup>2</sup> *28.93m<sup>2</sup> *28.93m<sup>2</sup> *28.93m<sup>2</sup> *28.93m<sup>2</sup> *28.93m<sup>2</sup> *28.93m<sup>2</sup> *28.93m<sup>2</sup> *28.93m<sup>2</sup> *28.93m<sup>2</sup> *28.93m<sup>2</sup> *28.93m<sup>2</sup> *28.93m<sup>2</sup> *28.93m<sup>2</sup> *28.93m<sup>2</sup> *28.93m<sup>2</sup> *28.93m<sup>2</sup> *28.93m<sup>2</sup> *28.93m<sup>2</sup> *28.93m<sup>2</sup> *28.93m<sup>2</sup> *28.93m<sup>2</sup> *28.93m<sup>2</sup> *28.93m<sup>2</sup> *28.93m<sup>2</sup> *28.93m<sup>2</sup> *28.93m<sup>2</sup> *28.93m<sup>2</sup> *28.93m<sup>2</sup> *28.93m<sup>2</sup> *28.93m<sup>2</sup> *28.93m<sup>2</sup> *28.93m<sup>2</sup> *28.93m<sup>2</sup> *28.93m<sup>2</sup> *28.93m<sup>2</sup> *28.93m<sup>2</sup> *28.93m<sup>2</sup> *28.93m<sup>2</sup> *28.93m<sup>2</sup> *28.93m<sup>2</sup> *28.93m<sup>2</sup> *28.93m<sup>2</sup> *28.93m<sup>2</sup> *28.93m<sup>2</sup> *28.93m<sup>2</sup> *28.93m<sup>2</sup> *28.93m<sup>2</sup> *28.93m<sup>2</sup> *28.93m<sup>2</sup> *28.93m<sup>2</sup> *28.93m<sup>2</sup> *28.93m<sup>2</sup> *28.93m<sup>2</sup> *28.93m<sup>2</sup> *28.93m<sup>2</sup> *28.93m<sup>2</sup> *28.93m<sup>2</sup> *28.93m<sup>2</sup> *28.93m<sup>2</sup> *28.93m<sup>2</sup> *28.93m<sup>2</sup> *28.93m<sup>2</sup> *28.93m<sup>2</sup> *2</td> <td>ABM 1 1 1 7 9 HEHT POLE 332:623h </td>	×26.22m ×26.75m ×26.37m ×26.37m ×26.47m ×24.21 9m ×22.06m m ×21.84m ×19.465m ×19.65m ×18.13m		*28.63m3&63m <sup>2</sup> *28.63m3&63m <sup>2</sup> *28.63m3&63m <sup>2</sup> *28.63m3&63m <sup>2</sup> *28.63m3&63m <sup>2</sup> *28.63m3&63m <sup>2</sup> *28.63m3&63m <sup>2</sup> *28.63m3&20m <sup>2</sup> *28.93m <sup>2</sup> *2	ABM 1 1 1 7 9 HEHT POLE 332:623h 
48,950   *21,530     42,950   *21,530     42,950   *21,530     42,950   *21,530     42,950   *21,920     42,950   *21,920     42,950   *21,920     42,950   *21,920     42,950   *21,920     42,950   *24,920     42,950   *24,920     42,950   *24,920     42,950   *24,920     42,950   *24,920     42,950   *24,920     42,950   *24,920     42,950   *24,920     *16,900   *12,910     *16,900   *12,910     *16,900   *12,910     *16,900   *14,910     *14,900   *14,920     *14,900   *14,920     *14,900   *14,920     *14,900   *14,920     *14,920   *14,920     *14,920   *14,920     *14,920   *14,920     *14,920   *14,920     *14,920   *13,920     *14,920   *13,920     *14,920	×26.22m ×26.75m ×26.37m ×26.37m ×26.47m ×24.21 9m ×22.06m ×24.21 9m ×22.06m ×19.65m ×19.65m ×19.65m	-× 26.2 -× 26.2 m	*28.00m   *28.03m   *28.63m3(63) <sup>20</sup> *26.05##147m   *28.53m   *28.63m3(63) <sup>20</sup> 64n   *22.78m   *28.93m3(53) <sup>20</sup> *39.513m   *27.93m   *28.92m3(75m)     *25.74m   *27.10m   *26.66m*27.15m     *24.26m   *25.78m   *26.66m*27.15m     *24.26m   *25.78m   *26.66m*27.15m     *24.26m   *25.73m   *26.66m*27.14m     *23.92m   *25.73m   *26.46m*27.14m     *23.92m   *25.73m   *26.46m*27.14m     *21.39m   *24.56m   *25.73m	ABm   I   I   9   9   IFT POLE   332:623h
42:55m   +21:5m   +21:5m   +22:2m	×26.22m ×26.75m ×26.37m ×26.37m ×26.47m ×24.21 9m ×22.06m ×24.21 9m ×22.06m ×19.65m ×19.65m ×19.65m ×19.65m ×18.13m		**28-00n   *28.58m   *28.63m36.53m <sup>2</sup> *26.68#4.47m   *28.58m   *28.63m36.53m <sup>2</sup> 64n   *22.78m   *29.81m   *28.93m30     **28.43m   *25.55m300.25m   *30.45m     **28.43m   *25.74m   *27.10m     *24.26m   *25.74m   *27.10m     *24.26m   *25.78m   *26.68m*27.15m     *24.26m   *25.78m   *26.68m*27.14m     *23.55m   *26.78m   *26.78m     *23.92m   *25.73m   *26.48m*27.14m     *23.92m   *25.73m   *26.48m*27.14m     *23.92m   *25.73m   *26.78m*27.14m     *23.92m   *25.73m   *26.78m*27.14m     *21.39m   *24.56m   *25.73m     *21.39m   *23.48m   *25.73m     *21.39m   *23.48m   *25.73m     *21.39m   *23.48m   *25.73m	ABA ABA ABA ABA ABA ABA ABA ABA
42.51m   +21.53m   +21.53m   +21.53m   +22.53m	×26.22m ×26.75m ×26.35m ×25.90m ×24.21 09m ×22.06m ×24.21 09m ×22.06m ×19.65m ×19.65m ×19.65m ×19.65m ×18.13m	× 26.2 × 26.2 × 26.2 × 26.1 × 22.5 × 22.5	************************************	ABB SUCHT POLE X32:63m X 29.91m 30.22h X 29.91m X 29.91m X 29.91m X 29.91m X 29.91m X 29.91m X 29.91m X 29.91m X 29.92m X 20.92m X
42.51m   +21.53m   +21.53m   +22.53m   +22.42mm   +22.42mm   +22.42mm   +22.42mm   +24.22mm   +22.72mm   +24.22mm   +22.72mm   +24.22mm   +22.72mm   +24.22mm   +22.72mm   +24.22mm   +22.72mm   +22.	×26.22m ×26.75m ×26.35m ×25.90m ×24.21 09m ×24.21 09m ×22.06m 2m ×21.84m ×19.46m ×19.65m ×19.65m ×19.65m ×18.13m ×18.13m		28.000m   ×28.58m   ×28.63x38 83x38 83x388 83x38 83x388 83x38 83x38 83x38 83x38 83x38 83x38 83x38 83x38 8	ABB SUCHT POLE X32:6331 X 30.36m 30.22h X 29.91m 30.42m X 29.91m X 29.91m X 29.91m X 29.91m X 29.91m X 29.92m X 29.92m X 29.92m X 29.92m X 29.92m X 29.523m X 29.525m X 29.525m X 29.52m X 29.525m X 20.55m X 20.5
46.55m   +21.53m   +21.53m   +22.45m	×26.22m ×26.75m ×26.35m ×26.35m ×25.90m ×24.21 09m ×22.06m ×19.46m ×19.65m ×19.65m ×19.65m ×19.65m Kallon	т - ×26.2 т - ×26.7 т - ×26.7 т - ×22.5 т - ×22.5	28.00m   *28.58m   *28.83x08.53x2     28.00m   *28.58m   *28.83x08.53x2     6m   *27.78m   *27.93m   *28.53x307.55m     6m   *27.78m   *27.93m   *28.53x307.55m     6m   *27.78m   *27.93m   *28.53x307.55m     6m   *25.74m   *25.98m   *26.90m     *24.26m   *25.78m   *26.86m* 27.16m     *24.26m   *25.78m   *26.86m* 27.16m     *24.20m   *25.78m   *26.48m* 27.14m     *23.92m   *25.73m   *26.48m* 27.14m     *23.92m   *25.73m   *26.48m* 27.14m     *24.56m   *24.56m   *26.48m* 27.14m     *21.39m   *23.48m   *25.50m     *21.39m   *23.48m   *25.73m     *21.39m   *23.48m   *25.50m     *21.39m   *23.48m   *25.50m     *21.00m   Engineering Solutions     MULTI DISCIPLINE CONSULTING ENGINEERS   Engineering Solutions     GELONG • HORSHAM • PORTLAND •   WARRNAMBOOL     PHONE:   1300 02 02 84	48m   9LCHT POLE   \$32,663m     × 30,36m   30.22h   1     × 29.91m   30.42m   1     × 27.9689.0mc   × 29.7m   1     × 28.53m   × 28.53m   1     × 27.92m   1   × 28.53m     Value   × 28.66m   × 30.25m     Value   × 27.92m   Value     40m   × 25.83m   × 28.66m     × 27.92m   Value   × 28.66m     Value   × 28.66m   × 30.25m     Value   × 28.66m   × 28.66m     × 27.92m   × 28.66m   × 28.66m     × 28.53m   × 28.66m   × 28.66m     × 27.92m   × 28.66m   × 28.66m     × 28.65m   × 28.65m   × 28.65m     × 28.65m   × 28.65m   × 28.65m
46.59n   +21.53n   +21.53n   +21.53n   +21.53n   +21.53n   +22.47an   +22.27an   +22.47an   +22.47	×26.22m ×26.75m ×26.37m ×26.37m ×26.37m ×26.37m ×26.37m ×26.37m ×26.37m ×26.37m ×26.37m ×26.37m ×26.37m ×26.47m ×24.21 09m ×24.21 09m ×22.06m 		24.00m   ×28.58m   ×28.68m   ×28.68m   ×28.68m   ×28.68m   ×28.68m   ×28.68m   ×28.68m   ×28.68m   ×28.68m   ×28.97m   ×26.97m   ×27.19m	PROJECT: THE HEIGTS, DENNINGTON PM PROJECT No. : W.SUB-15780 CLIENT: RODGER CONSTRUCTIONS PTY LTD

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× 29.7 Mt × 29.23m 28.53m m × 28.66m × 30.25m 61m 61m	LEGEND STORMWATER DRAIN / PIT WATER GAS TELSTRA ELECTRICITY KERB & CHANNEL SURFACE CONTOUR MAJOR SURFACE CONTOUR MINOR TOP OF BATTER TOE OF BATTER PERMANENT SURVEY MARK EXISTING SURFACE LEVEL	(EXISTING)
T: EIGTS, DENNINGTON	DWG No. : C003	
JECT No. : W.SUB-15780	PARI SILE PLAN - SHEET X:\ENGINEERING\000-W\SUB_SUBDIVISIONS L. HEIGHTS, DENNINGTON\C- DRAWING SET\W.SU	Z UF Z AND DEVELOPMENT\15780_THE B-15780_SURVEY - REV B.DWG REV: <b>B</b>