



11 March 2015

**Our Ref: 2130537.200**

Robertson Industries Pty Ltd  
**Attention:** Mr Peter Robertson  
P O Box 3115  
NUNAWADING VIC 3131

Dear Mr Robertson,

**RE: Novel Road, FERNTREE GULLY**

At your request Civiltest Pty Ltd attended the abovementioned site on 23 February 2015 to undertake undisturbed sampling for shrink-swell testing.

The subject site has been filled under Level 1 supervision and so is a CONTROLLED FILL with up to 10 metres depth. For sampling purposes, two boreholes were drilled; BH1 in the existing FILL, and BH2 in the adjacent location in natural soil. Shrink-swell tests on the samples taken in the FILL and the natural soil returned  $I_{ss}$  values of 1.6% and 2.0% respectively.

The subject site is within Climate Zone 2 and ignoring the effect of the cracked zone (since fill placement was completed this year) the maximum  $Y_s$  is estimated to be up to 40mm.

The site is technically a CLASS P site due to the depth of FILL. However, on the basis that the FILL is CONTROLLED FILL with potential surface movements of up to 40mm, the site can be reclassified as CLASS M site based on the provisions of AS2870 – 2011.

Should you require any further information regarding this matter, please do not hesitate to contact me at our Mornington office.

Yours faithfully

**Patrick Oai**  
**CIVILTEST PTY LTD**

**REF:** SH/PM/po



### Shrink Swell Index Report

Client :	<b>ROBERTSON INDUSTRIES PTY LTD</b>	Report Number:	<b>2130537 - 196</b>
Address :	<b>PO Box 3115, NUNAWADING, VIC, 3131</b>	Report Date :	<b>10/03/2015</b>
Project Name :	<b>NORVEL ROAD</b>	Order Number :	<b>-</b>
Project Number :	<b>2130537</b>	Test Method :	<b>AS1289.7.1.1</b>
Location:	<b>FERNTREE GULLY , VIC</b>	<b>Page 1 of 1</b>	

Sample Number :	151-1089	151-1090		
Test Number :	1	2		
Sampling Method :	AS1289.1.3.1 (3.1.3.2)	AS1289.1.3.1 (3.1.3.2)		
Sampled By :	Micham Lab	Micham Lab		
Date Sampled :	23/02/2015	23/02/2015		
Date Tested :	26/02/2015	2/03/2015		
Material Type :	VARIOUS	VARIOUS		
Material Source :	SITE DERIVED	SITE DERIVED		
Sample Location :	BORE HOLE 1 0.5-0.8m	BORE HOLE 2 0.9-1.2m		
Inert Material Estimate (%) :	10	10		
PP before (kPa) :	0	0		
PP after (kPa) :				
Shrinkage Moisture Content (%) :	19.5	23.6		
Shrinkage (%) :	2.7	2.8		
Swell Moisture Content Before (%) :	13.4	23.5		
Swell Moisture Content After (%) :	16.5	32.2		
Swell (%) :	0.4	1.7		
Unit Weight (t/m <sup>3</sup> ) :	2.140	1.990		
Shrink Swell Index Iss (%) :	<b>1.6</b>	<b>2.0</b>		
Visual Classification :	Soft Rock/Mudstone Grey Orange	Mudstone/Silty Clay, Yellow Grey		
Cracking :	Yes	Yes		
Crumbling :	5	-		
Remarks :	-			

<p style="text-align: center;">Accredited for compliance with ISO/IEC 17025.</p>	<b>APPROVED SIGNATORY</b>
	Steven Buffinton - Director NATA Accreditation Number 1407 <small>Document Code RF161-10</small>

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**Environmental Audit Report  
(53X)  
Norvel Road Quarry Ferntree Gully, Victoria**

Prepared for:  
**Robertson Industries Pty Ltd**

Prepared by:  
**Australian Environmental Auditors Pty Ltd**

Date:  
20 April 2016

AEA Ref:  
**EA0328**

EPA Service Order No.:  
**8002813**

CARMS No:  
**66238-1**



**Environmental Audit Report  
(53X)**

Norvel Road Quarry Ferntree Gully

**Prepared for:**

Robertson Industries Pty Ltd

**Prepared by:**

Australian Environmental Auditors Pty Ltd  
Suite 21, 1 Ricketts Road  
Mount Waverley, VIC 3149

**Date of Report:**

20 April 2016

**Author:**



Richard Wolfe  
Environmental Auditor (Contaminated Land)  
(Appointed pursuant to section 53S (1) of the *Environment Protection Act 1970* (Vic.))

**Version Control Record**

Document File Name	Date Issued	Version	Approved	Distribution
EA0328 - FINAL EAR	20 April 2016	Final	R Wolfe	<ul style="list-style-type: none"> <li>▪ Manager, Environmental Audit Unit, EPA Victoria</li> <li>▪ Mr Peter Robertson, Robertson Industries Pty Ltd</li> <li>▪ City of Knox, Planning Department</li> <li>▪ Australian Environmental Auditors Pty Ltd (AEA)</li> </ul>



*ENVIRONMENT PROTECTION ACT 1970*

**CERTIFICATE OF ENVIRONMENTAL AUDIT**

I, Richard Wolfe of Australian Environmental Auditors Pty Ltd, a person appointed by the Environment Protection Authority ('the Authority') under the *Environment Protection Act 1970* (the Act) as an environmental auditor for the purposes of the Act, having

1. been requested by Peter Robertson of Robertson Industries Pty Ltd to issue a certificate of environmental audit in relation to the site located at Norvel Road Quarry Ferntree Gully Victoria (the site) owned/occupied by Robertson Industries Pty Ltd.
2. had regard to, among other things,
  - (i) guidelines issued by the Authority for the purposes of Part IXD of the Act,
  - (ii) the beneficial uses that may be made of the site
  - (iii) relevant state environment protection policies/industrial waste management policies, namely,
    - State Environment Protection Policy (Air Quality Management) 2001
    - State Environment Protection Policy (Ambient Air Quality) 1999
    - State Environment Protection Policy (Prevention and Management of Contamination of Land) 2002
    - State Environment Protection Policy (Groundwaters of Victoria) 1997
    - State Environment Protection Policy (Waters of Victoria) 2003
    - Environment Protection (Industrial Waste Resource) Regulations 2009

in making a total assessment of the nature and extent of any harm or detriment caused to, or the risk of any possible harm or detriment which may be caused to, any beneficial use made of the site by any industrial processes or activity, waste or substance (including any chemical substance), and

3. completed an environmental audit report in accordance with section 53X of the Act, a copy of which has been sent to the Authority and the relevant planning and responsible authority.

I HEREBY CERTIFY that I am of the opinion that the condition of the site is neither detrimental nor potentially detrimental to any beneficial use of the site.

**Other related information**

Based on current data (May 2015) groundwater at the site is characterised by elevated concentrations of iron and manganese that are considered to be naturally occurring and an artefact of the regional geology. In accordance with section 10 of SEPP (Groundwaters of Victoria) 1997 the background water quality represents the beneficial use objective for groundwater use at the site. The use of groundwater at the site is unlikely to be realised given the very low groundwater yield and the availability of reticulated water.

The use of the groundwater extracted from the site for any purpose should be subject to testing in accordance relevant guidance to assess suitability.

In accordance with section 53ZE of the Act, the owner/occupier of the site should provide a copy of this certificate statement to any person who becomes or proposes to become an occupier of the site.

This certificate forms part of an environmental audit report (Australian Environmental Auditors Pty Ltd, Environmental Audit Report for the Norvel Road Quarry Ferntree Gully Victoria reference AEA0328, dated 20 April 2106).

Further details regarding the condition of the site may be found in the environmental audit report.

Dated 20 April 2016

Signed

A handwritten signature in blue ink that reads "Richard Wolfe". The signature is written in a cursive style with a prominent 'R' and 'W'.

Richard Wolfe  
Environmental Auditor (appointed pursuant to the *Environment Protection Act 1970*)



## Executive Summary

Richard Wolfe of Australian Environmental Auditors Pty Ltd (AEA) has completed an environmental audit (the audit) of the land located at Norvel Road Quarry Ferntree Gully, Victoria (the site) for Peter Robertson of Robertson Industries Pty Ltd (Robertson Industries) as site owner. Richard commenced the environmental audit in 2009.

The audit has been conducted in accordance with Part IXD of the Victorian *Environment Protection Act 1970* (the Act) and Victorian Environment Protection Authority (EPA Victoria) Publication 759.3 *Environmental Auditor (Contaminated Land), Guidelines for Issue of Certificates and Statements of Environmental Audit*, December 2015.

The site was a former clay quarry, which operated from the 1960s until the mid 2000s. The quarry was filled with imported siltstone and soil from 2013 and 2015 to restore the site to original ground levels in accordance with procedures to manage the environment integrity of the site as set out in a site Environmental Management Plan (EMP). This plan was prepared by Environmental Site Assessments for Robertson Industries and reviewed and accepted by the auditor before the commencement of the filling works.

The auditor has considered the reporting on compliance with the EMP, various environmental site investigations reports, other information accessed by the auditor and a number of site inspections completed by the auditor and audit support staff, in considering whether the site is suitable for the beneficial uses set out in the State Environment Protection Policies (SEPPs) for any use.

The audit has considered the field and analytical data with reference the *National Environment Protection (Assessment of Site Contamination) Measure 1999* as amended 2013. The preparation of the EMP and scoping of the initial soil and groundwater investigations was undertaken before the date set down by EPA for the transition to the NEPM 1999 (as amended in 2013) in May 2013, however the amended guidance has been adopted for the assessment of the site condition for the purpose of the audit.

The quality and completeness of the information on the site history, and the field and analytical data, were reviewed for the purpose of the audit and were considered to be adequate. The auditor has exercised professional judgment in preparing this report.

### Site location and features

The Norvel Road Quarry is located at Norvel Road Ferntree Gully Victoria some 30km to the east of the Melbourne CBD.

The site is described in the following titles:

- Volume 09381 Folio 087, Lot 1 on Title Plan 297137.
- Volume 10808 Folio 226, Lot 1 on Plan of Subdivision.
- Volume 08328 Folio 822, Lot 1 on Title Plan 574584C.

The site is rectangular and measures approximately 390m by 205m, with an area of approximately 8.0 hectares. The former quarry occupied an area of approximately 5 ha within the site.

The site is vacant with perimeter fencing and is largely un-vegetated, excepting for areas of remnant native bushland in north-eastern part of the site.

### Planning requirements

The site is zoned as SU22 (Special Use Zone – Schedule 2) under the City of Knox planning scheme. An agreement between Knox City Council as planning authority and Robertson Industries pursuant to Section 173 of the Planning and Environment Act 1987<sup>1</sup> provided for amendment to the Planning Scheme for the

<sup>1</sup> Agreement under Section 173 of the Planning and Environment Act 1987 dated 2009

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Norvel Road Quarry, Ferntree Gully, Victoria



rezoning of the site to Residential 1 Zone and a requirement for a Environment Audit Overlay.

#### Site history

The site was purchased by Robertson Industries in the 1950s and has operated as a clay quarry from the 1960s. Over the last 20 years of its operation an average of 10,000 m<sup>3</sup> of clay per annum was removed from the site and used to make bricks and other products at the Daniel Robertson Brickworks in Nunawading. Approximately 400,000 m<sup>3</sup> of material was removed from the quarry to the mid-2000s when quarrying ceased.

The southeastern corner of the site was previously a market garden with the remainder of the site natural bush prior to the excavation of the quarry. Aerial photographs identify that the market garden use occurred in the 1950s.

The site formerly extended to Blind Creek in the north. The land to the northern part of the site was transferred to Knox City Council in the late 1970s in exchange for additional extraction approvals.

Backfilling of the quarry commenced in December 2013 and was completed in April 2015 to restore the historical land form.

Topsoil from across the site, which was historically removed from the quarry area to form screening bunds has been tested, screened and reused as final cover over the former quarry area. This final capping was placed from November 2014 to February 2015, before the completion of the audit.

An area to the west of the site (Castricum Place) was an abattoir that was closed in the late 1980s prior to becoming a residential sub-division. Other land surrounding the site to the east and south was developed for residential use in the 1960s.

#### Existing use of groundwater

A total of 34 registered groundwater bores were identified within a 2km radius of the site. The use of registered bores was largely identified as observation/investigation use; the nearest bore registered for domestic/stock use was located approximately 1.1 km to the south and up-gradient of the site.

The auditor is of the opinion that there is no existing or potential use of groundwater from the shallow site aquifer.

#### Filling of the quarry

Filling of the quarry was completed in accordance with an Environmental Management Plan (EMP). All fill comprised natural siltstone and was sourced from the redevelopment of Eastland shopping centre, the Knox Hospital redevelopment and the Mitcham Rail Grade Separation. Preliminary reports for the source site were considered as part of the EMP. The fill was progressively tested at the site in accordance with the EMP.

#### Site investigations and findings

Site investigations completed during the course of the audit included the following:

- Targeted and grid-based validation soil sampling of the site by Environment Site Assessment (ESA) following placement of fill.
- Testing of overburden that formed the screening bunds by ESA prior to placement over the former quarry area.
- Installation and monitoring of four (4) groundwater wells at the site by Australian Site Assessment (ASA) in 2010 and groundwater monitoring by ASA and ESA from May 2010 until May 2015.

Final validation soil sampling at the site was undertaken across the filled area, the site margins around the quarry and the former market garden area in the south-eastern of the site

Approximately 16,000 m<sup>3</sup> of material forming the screening bunds was tested in-situ in 2015. This material was considered suitable for the proposed residential use and placed as a final cap over the former quarry





area.

Naturally occurring levels of arsenic, copper and fluoride were reported in the imported siltstone fill in excess of beneficial use objectives for urban residential use. Arsenic was above NEPM 1999 (as amended in 2013) site-specific ecological investigation levels (EILs) and health investigation levels (HILs) for an urban residential use in the top 3m of the site surface. ASLP testing of this fill material identified that the arsenic was not leachable. Additionally a review of the risks to human health and ecosystems by Dr Ismail Gulec, a risk expert supporting the auditor, reported that the arsenic bioavailability in the siltstone is low and was not considered to preclude an urban residential use of the site.

The concentrations of fluoride in the imported fill and natural soils and concentrations of copper in the imported fill were below relevant HILs. Elevated concentrations of fluoride were evident in natural soil across and are considered to represent the background soil characteristics. The elevated concentrations of copper in the top 3m of soil across the site were minor and not considered to impact the urban residential use of the site.

It was further noted that the natural clays at the site and the imported siltstones were mildly acidic with pH levels ranging from 4.1 to 6.0.

Groundwater analytical data from the May 2015 monitoring event reported naturally occurring concentrations of manganese and iron that exceeded a number of beneficial use objectives set out in Table 3 of the SEPP (Groundwaters of Victoria) 1997 relating to groundwater use at the site.

The concentrations of a number of heavy metals occurring naturally in groundwater at the site further exceed the beneficial use objectives for Maintenance of Ecosystems as set out in ANZECC 2000 guidelines at the inferred point of groundwater discharge from the site is to the creek approximately 500m to the west.

#### Site setting and conceptual site model

The site falls to the northwest towards Blind Creek.

Groundwater monitoring over the period from May 2010 to May 2015 inferred that groundwater flow at the site is to the west towards Blind Creek; based on topographic and groundwater data it is inferred that groundwater discharge from the site is to the creek approximately 500m to the west. No registered groundwater bores are located down-gradient of the site.

Groundwater gradients at the site are of the order of 0.01 and groundwater flow velocities in the Humevale Formation siltstone are likely to be of the order of 1 m/year<sup>2</sup> based on 2015 gauging data. Groundwater yields are consequently very low. Groundwater discharge from the site to the creek is likely to occur after 500 years.

#### Beneficial uses of groundwater

Groundwater at the site is classified as *Segment B* and pursuant to SEPP (Groundwaters of Victoria) 1997 the following beneficial uses are to be protected:

- Maintenance of Ecosystems.
- Agriculture Parks and Gardens.
- Stock Watering.
- Primary Contact Recreation.
- Industrial use.

There are no surface waters at the site and the beneficial use of Maintenance of Ecosystems (MoE) is relevant at the inferred point of groundwater discharge at Blind Creek approximately 500m to the west of the site.

<sup>2</sup> Based on a hydraulic conductivity of 0.1 m/year (Domenc0 and Schwartz 1990) and an effective porosity of 0.1.



The elevated groundwater concentrations of iron and manganese at the site are considered to be naturally occurring and an artefact of the regional geology. In accordance with section 10 of *SEPP (Groundwaters of Victoria) 1997* the background water quality represents the beneficial use objective for groundwater use at the site.

Any use of groundwater at the site is unlikely to be realized given the low aquifer yield and location of the site within an urban residential area with a reticulated water supply area. There is no existing or likely future use of groundwater within 1 km of the site and down-gradient of the site.

Groundwater discharge from the site to Blind Creek to the west of the site is not likely to occur for over 500 years. As noted the heavy metal concentrations in groundwater at the site are considered to be naturally occurring and set the beneficial use objectives for the creek.

#### **CUTEP determination**

The auditor notified EPA Victoria that a CUTEP determination was required on 15 September 2015 and that the auditor intended to determine CUTEP.

Based a review of the site history and the groundwater analytical data for the May 2015 monitoring event naturally occurring concentrations of only iron and manganese exceeded the relevant beneficial use objectives for the aquifer set out in Table 3 of *SEPP (Groundwaters of Victoria) 1997*. The elevated concentrations of these heavy metals is however considered to be naturally occurring and associated with the regional geology of the upper aquifer and is not considered to be pollution of groundwater. In accordance with section 10 of the SEPP the background level of a water quality indicator sets the objective.

CUTEP is not relevant where pollution of groundwater has not occurred and a determination was not relevant.

#### **Audit conclusions**

Concentrations of arsenic, copper and fluoride exceeding the NEPM 1999 EILs are present in the shallow natural soil across the site. The concentrations of fluoride in the imported fill and natural soils and concentrations of copper in the imported fill were below relevant HILs. Elevated concentrations of fluoride were evident in natural soil across and are considered to represent the background soil characteristics. The elevated concentrations of copper in the top 3m of soil across the site were minor and not considered to impact the urban residential use of the site.

The naturally occurring concentrations of arsenic in fill placed across the site also exceed the NEPM 1999 (as amended in 2013) HILs with the top 3.0m of soil. Arsenic is not leachable from the soil and based on expert advice the bioavailability of arsenic in the siltstone is low and not considered to preclude an urban residential use of the site.

Groundwater at the site is classified as *Segment B* and pursuant to *SEPP (Groundwaters of Victoria) 1997* the following beneficial uses are to be protected:

- Maintenance of Ecosystems.
- Agriculture Parks and Gardens.
- Stock Watering.
- Primary Contact Recreation.
- Industrial use.

There are no surface waters at the site and the beneficial use of Maintenance of Ecosystems (MoE) is relevant at the inferred point of groundwater discharge at Blind Creek approximately 500m to the west of the site.

Groundwater data from the May 2015 monitoring event reported naturally occurring concentrations of manganese and iron above a number of beneficial use objectives for groundwater at the site a set out in Table 3 of *SEPP (Groundwaters of Victoria) 1997*. These elevated heavy metal concentrations are considered to be naturally occurring and an artefact of the regional geology. In accordance with section 10

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of SEPP the background water quality represents the beneficial use objective for groundwater use at the site.

The use of the groundwater extracted at the site for any purpose should be subject to testing in accordance relevant guidance to assess suitability.

Any use of groundwater at the site is unlikely to be realized given the low aquifer yield and the location of the site within an urban residential area with a reticulated water supply area. In this regard the auditor noted that there is no existing or likely future use of groundwater within 1 km of the site and down-gradient of the site.

The concentration of a number of heavy metal that are naturally occurring in groundwater at the site set the beneficial use objectives for Maintenance of Ecosystems for the Blind Creek, which lies approximately 500 m to the north and down-gradient of the site.

The condition of the site is neither detrimental nor potentially detrimental to any beneficial use of the site.

In accordance with EPA Victoria Publication 1147, summaries of relevant information are presented in Table 1 and Table 2.

**Table 1: Summary of audit information**

Item	Detail
EPA file reference no.	Service Order No. 8002813, CARMs No. 66238-1
Auditor	Richard Wolfe
Auditor term of appointment	25 October 2014 to 24 October 2019
Name of person requesting audit	Peter Robertson of Robertson Industries Pty Ltd
Relationship to premises/location	Robertson Industries is the site owner.
Date of request	5 June 2009
Date EPA notified of Audit	10 June 2009
Completion date of the Audit	20 April 2016
Reason for Audit	City of Knox Planning requirement for residential use of the site.
Current land use zoning	SUZ2 (Special Use Zone – Schedule 2)
EPA region	Metro
Municipality	City of Knox
Dominant – Lot on plan	Volume 09381 Folio 087, Lot 1 on Title Plan 297137.
Additional – Lot on plan(s)	Volume 10808 Folio 226, Lot 1 on Plan of Subdivision. Volume 08328 Folio 822, Lot 1 on Title Plan 574584C.
Street / Lot – Lower No.	Norvel Road
Street / Lot – Upper No.	
Street Name	As above
Street type	As above
Street suffix	As above
Suburb	Ferntree Gully
Postcode	3156
GIS Coordinate of Site Centroid	

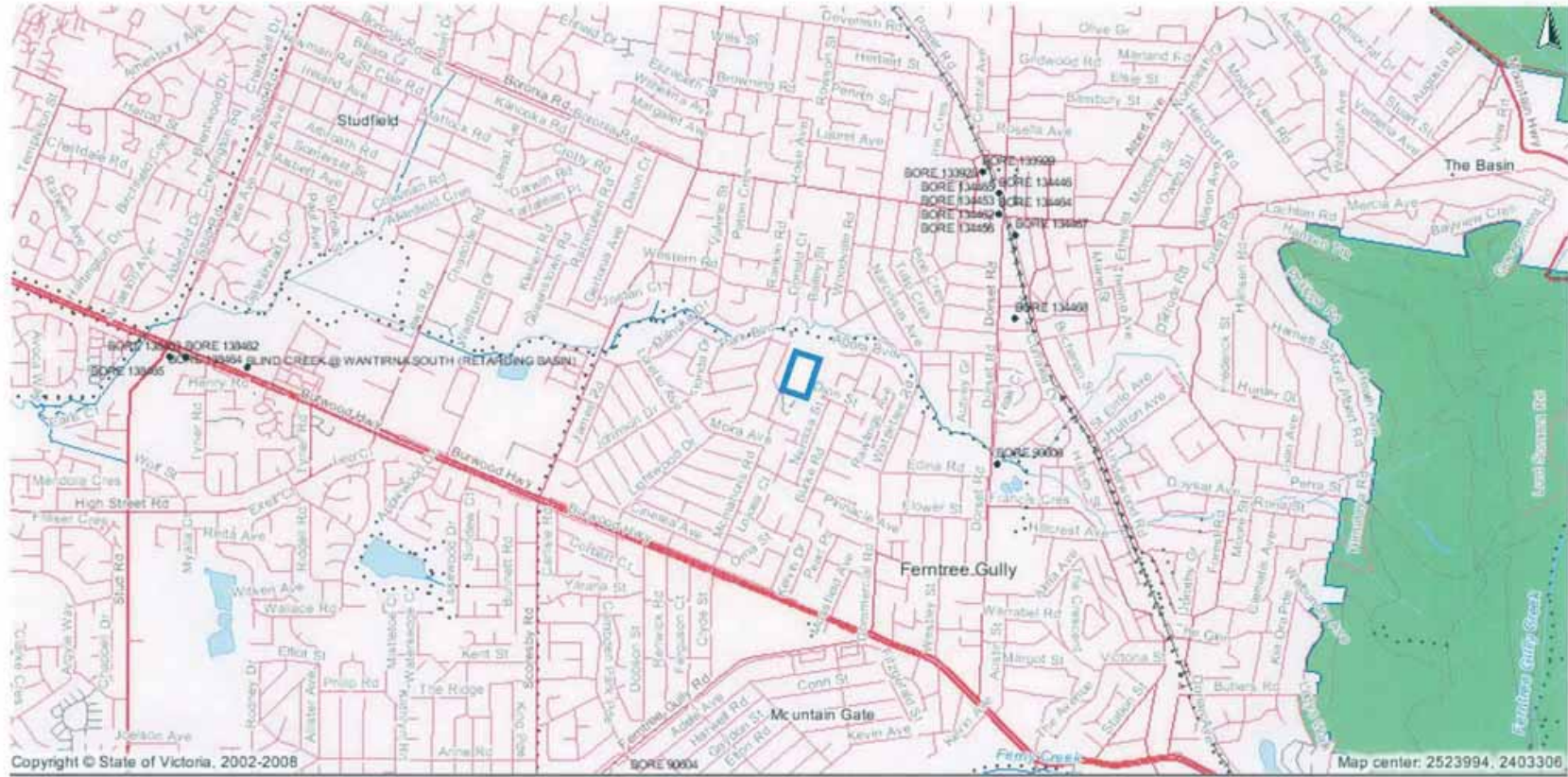
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Item	Detail
Latitude (GDA94)	37.871111 S
Longitude (GDA94)	145.273306E
Site area (hectares)	Approximately 8.0 hectares
Members and categories of support team used	Dr Ismail Gulec on human health and environment risk and Michael Wright of Eurofins on environmental chemistry.
Outcomes of the Audit	<p>Groundwater monitoring in May 2015 reported naturally elevated concentrations of iron, manganese and a number of other heavy metals and set the beneficial use objectives for groundwater at the site. Testing of groundwater should be completed in accordance with relevant guidance to assess the suitability of groundwater for any use at the site.</p> <p>Although arsenic concentrations in fill to a 3m depth exceed relevant health and environment investigation levels the arsenic bioavailability is considered to be low and does not preclude an urban residential use of the site. Levels of fluoride and copper exceed ecological investigation levels but are not considered to preclude an urban residential use of the site.</p> <p>The condition of the site is neither detrimental nor potentially detrimental to any beneficial use of the site.</p> <p>A Certificate of Environmental Audit was issued for the site on 20 April 2016.</p>
Further work or requirements	None
Nature and extent of continuing risk	None

**Table 2: Physical site information**

Item	Detail
Site aquifer formation	Humevale Formation Siltstones
Average depth to groundwater	10 m
Groundwater segment	Segment B
Groundwater flow direction	West
Past use/site history	Clay quarry from 1950s and backfilled from 2013 to 2015 to restore original landform.
Surrounding land use	<p>North: Urban parkland</p> <p>South: Residential</p> <p>East: Residential.</p> <p>West: Residential</p>
Proposed future use	Sensitive Use: Other



Note: Site is indicated by blue outline.

**Figure 1: Site location - Norvel Road Quarry, Ferntree Gully**

(Source: modified from ESA SAQP 2015)

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**Read in Conjunction with Audit Report**

This Executive Summary summarises the key points of the audit report. The Executive Summary must be read in conjunction with the full Environmental Audit Report; Australian Environmental Auditors Pty Ltd, Environmental Audit Report for Norvel Road Quarry, Ferntree Gully, Victoria, Report Ref EA0328, Service Order No. 8002813, CARMs No. 66238-1, 20 April 2016 and the associated Statement of Environmental Audit.

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## Citation of State Environment Protection Policies in Text

The following style has been used for citation of State Environment Protection Policies (SEPPs) in this report.

In-text Citation	SEPP
Groundwater SEPP	State Environment Protection Policy. <i>Groundwaters of Victoria</i> . Victorian Government Gazette, S160, 17 December 1997 as varied by Victoria Government Gazette G12 21 March 2002
Land SEPP	State Environmental Protection Policy. <i>Prevention and Management of Contamination of Land</i> . Victorian Government Gazette, S95, 3 June 2002 as varied by Victorian Government Gazette G39, 26 September 2013
Air Quality SEPP	State Environment Protection Policy. <i>Ambient Air Quality</i> . Victorian Government Gazette, S19, 9 February 1999 as varied by the Victoria Government Gazette S240 on 21 December 2001
Air Management SEPP	State Environment Protection Policy. <i>Air Quality Management</i> . Victoria Government Gazette S240, 21 December 2001
Water SEPP	State Environment Protection Policy. <i>Waters of Victoria</i> . Victorian Government Gazette, 15 March 1988, as varied to Victoria Government Gazette S210 on 3 October 2004.

AEA Ref: EA0328

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## 1. Introduction

### 1.1 Background

Richard Wolfe of Australian Environmental Auditors Pty Ltd (AEA) was requested by Peter Robertson of Robertson Industries Pty Ltd to undertake an environmental audit (audit) for the Norvel Road Quarry Ferntree Gully (the site) pursuant to section 53X of the *Environment Protection Act 1970* (the Act). The audit commenced in October 2009. The site location is shown in Figure 1.

Figure 1: Locality plan

### 1.2 Purpose of the audit

The site is zoned as SU22 (Special Use Zone – Schedule 2) under the City of Knox planning scheme.

The audit was undertaken to comply with an agreement between Knox City Council as planning authority and Robertson Industries pursuant to Section 173 of the Planning and Environment Act 1987<sup>3</sup> that provides for amendment with the Planning Scheme for rezoning to Residential 1 Zone and a requirement for an Environment Audit Overlay.

### 1.3 Audit support team

The auditor has considered expert advice from Dr Ismail Gulec of EP Risk in relation to the health and ecological impacts of elevated natural arsenic levels in the fill imported from the Eastland Shopping Centre site in preparing this report.

Michael Wright of Eurofins provided expert advice to the auditor relating to the procedures for the compositing and testing of the imported siltstone for metals and fluoride.

The auditor has also been assisted by Stuart Thurlow and Caitlin Brown of AEA with site inspections and review of reports and other documents.

### 1.4 Audit requirements

Consistent with the requirements of Ministerial Directive No.1 dated 1992, rezoning of land to more sensitive land uses is subject to the issue of a Certificate or Statement of Environmental Audit by an EPA Victoria appointed auditor pursuant to Part IXD of the Act.

An audit is a total assessment of the nature and extent of any harm caused, or the risk of any potential harm or detriment that may be caused to any beneficial use of any segment of the environment including surrounding land, air, surface water and groundwater.

The beneficial uses of the land and groundwater (and where relevant, surface waters) are set out in the relevant SEPPs, namely:

- SEPP (Groundwaters of Victoria) 1997.
- SEPP (Prevention and Management of Contamination of Land) 2002.
- SEPP (Waters of Victoria) 2003.

The audit also considered the requirements of relevant SEPPs and the EPA Victoria Industrial Waste Resource Guidelines 2009 (IWRG 2009).

A number of EPA Victoria as well as national and international guidance documents set out requirements for site assessment relevant to auditing and have been referred to for the purpose of the audit. In this regard the *National Environment Protection (Assessment of Site Contamination) Measure 1999* (NEPM 1999) as amended sets out health investigation levels (HILs) for a range of land settings and ecological

<sup>3</sup> Agreement under Section 173 of the Planning and Environment Act 1987 dated 2009

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investigations levels (EILs) for soil.

A Certificate of Environmental Audit is issued where the auditor is of the opinion that the condition of the land is not detrimental or potentially detrimental to any beneficial use. The land is, for the purpose of the audit, both the soil and the groundwater at the site or attached to the site.

If the auditor is of the opinion that contamination at the site precludes any beneficial use, the auditor must issue a Statement of Environmental Audit. The auditor is then required, pursuant to the section 35Z of the Act, to issue a statement setting out:

- the reasons for declining to issue a Certificate;
- the types of uses/developments which are not precluded by contamination; and
- the terms and conditions that need to be complied with before a Certificate can be issued.

The Statement will outline the specific uses that will not be precluded by the contamination present at the site and may attach conditions relating to the uses/development of the site, including the preparation and implementation of management plans or other conditions on the site, which may restrict land use and the nature of site development.

### 1.5 Audit scope

The quarry was open at the commencement of the environmental audit in 2009 and subsequently filled from 2014 to 2015 with natural siltstone sourced from local sites. The imported material has been progressively tested by Robertson Industries at the site during filling following a review the history and preliminary testing at each of the source sites. Final validation sampling of the surface soils across the site was completed in May 2015. The bunds of overburden material was also validated and then placed across the fill area.

Groundwater monitoring at the site has been undertaken from 2010 to 2015 for the purpose of the audit.

The scope of the audit undertaken for the site included the following:

- Liaison with Robertson Industries, their environmental consultants Australian Site Assessments (ASA) and Environmental Site Assessment (ESA), as necessary, during the course of the environmental audit.
- Liaison with EPA Victoria on the procedures for filling of the quarry and review and endorsement of an EMP prepared by Robertson Industries for the filling of the quarry and progressive monitoring and testing of fill during placement.
- Review of various environment reports on the soil investigations at potential sites for sourcing fill for the quarry rehabilitation.
- Review of SAQPs (sampling and analytical quality plans) for the investigation of groundwater conditions at the site prior to and after filling of the quarry.
- Review of SAQPs for detailed site investigations, prepared by ASA and ESA, for Robertson Industries. These investigations were completed following the filling of the quarry. The ESA plans for the assessment of stockpiles and final validation sampling of the site were not provided for environmental auditor review prior to the field investigation.
- Inspections of the soil and groundwater sampling procedures undertaken by ESA as part of the further detailed site investigations in 2015.
- Review of various reports provided by ASA and ESA on the soil and groundwater conditions at the site from 2010 to 2015.
- Review and presentation of soil data for the final 3m depth of fill paced over the former quarry area of the site (this was not completed by ESA) with reference to beneficial use objectives for the site (for residential and any use).
- Review and presentation of groundwater data for the groundwater monitoring events undertaken from 2010 to 2015 with reference to existing and potential beneficial uses of groundwater and

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whether these are precluded at the site for any of the relevant beneficial uses.

- Review of site-specific EILs pursuant to guidance set out in NEPM 1999 (as amended in 2013).
- Referral of matter relating to human health and ecological risk associated with elevated arsenic concentrations in imported fill to expert support team for advice.
- Various site inspections throughout the soil import and filling period.
- A final site inspection by the environmental auditor on 3 March 2016.
- Preparation of an audit report in the form required by EPA Victoria guidelines.
- Issue of a Certificate of Environmental Audit as set out in the EPA Victoria guidance.

## 1.6 Documents Reviewed

The auditor has reviewed the following documents/information for the purpose of the audit; a number of these are reports:

- Australian Site Assessment (ASA) Groundwater Investigation Norvel Road Ferntree Gully dated 31 August 2010 (Reference ASA3856-FTG-08-011).
- ASA Groundwater Investigation – Round 2, Norvel Road Ferntree Gully (18 July 2012) dated 18 July 2012 (Reference ASA3856-FTG-08-012). Note: A draft report was issued by ASA but was not resolved to address auditor comments<sup>4</sup>;
- Environmental Site Assessments Pty Ltd (ESA) Environmental Management Plan – Norvel Road, Ferntree Gully, Revision 2 dated 30 October 2013 (Reference ESA/098/2013);
- ESA, Report of Soil Sampling & Analysis Mitcham Grade Separation dated 17 July 2014 (Reference ESA/031/2014);
- ESA, Fill Importation Sampling & Analysis – Eastland & Knox Hospital, Revision 2 dated 2 March 2015 (reference ESA/016/20140) and Revision 3 dated 12 October 2105;
- ESA, Stockpile Soil Validation Report – Norvel Road, Ferntree Revision 1 dated 4 June 2015 (Reference ESA/123/2015);
- ESA Detailed Site Investigation report – Norvel Road Ferntree Gully Revision 1 dated 19 June 2015 (Reference ESA/121/2015);
- ESA Listing of registered groundwater bores with 2km of the site dated x (issued as an addendum to the Detailed site Investigation report dated 19 June 2015);
- ESA Addendum to the Detailed Site Investigation report, Arsenic Leachability Analysis Norvel Road Ferntree Gully dated 15 September 2015;
- Victorian Water Register Licence to Decommission Works, dated 4 December 2015
- HJ Macey Final Site Surveys, dated 7 March 2016
- Robertson Industries Pty Ltd, Letter pertaining to Final Survey conducted by HJ Macey, dated 30 March 2016.

Groundwater monitoring data from a groundwater monitoring event completed by ASA in 2012 was not supported by relevant field logs and all quality assurance/quality control data and has been only considered as semi-quantitative by the auditor.

The auditor has considered expert advice for Dr Ismail Gulec relating to the risks to a residential use of the site from elevated arsenic levels in the natural siltstone imported as fill for the former quarry.

The auditor has also considered other data including the locations and other records for groundwater bores down-gradient of the site from Visualising Victoria's Groundwater database and the characteristics of the natural siltstones for the sources of the imported fill.

<sup>4</sup> Robertson Industries replaced ASA with ESA as environmental consultant.

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## 2. Site Details

### 2.1 Site Location

The audit site is located in Norvel Road, Ferntree Gully Victoria, 3156. The site is located some 30 km to the east of the Melbourne CBD in an urban residential area.

### 2.2 Site Description

The site is described in the following titles:

- Volume 09381 Folio 087, Lot 1 on Title Plan 297137.
- Volume 10808 Folio 226, Lot 1 on Plan of Subdivision.
- Volume 08328 Folio 822, Lot 1 on Title Plan 574584C.

Lot 1 on Title Plan 297137 is the dominant lot forming the site. These parcels of land are shown on Figure 2.

The Certificates of Title are attached as Appendix A.



Figure 2: Site Plan

(Source: ASA 2010)

### 2.3 Site Features

The site is rectangular and measures approximately 390 m by 205 m, with an area of approximately 8.5 hectares. The site falls to the northwest.

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The site, in part, was a former clay quarry and was filled during the course of the audit to restore the original land levels. As part of the historical works for the quarry on-site surface material were relocated to provide bunding around the quarry area under an agreement with City of Knox.

The site is vacant with perimeter fencing. All vegetation has been removed from the site.

Overburden material cleared from the former quarry before the commencement of the quarry operation to form screening bunds around the quarry perimeter was tested and then placed over the quarry area following completion of the filling.

An aerial image showing the site features and surrounding residential land prior to filling is shown in Figure 3.



**Figure 3: Site Features**

(Source: ESA EMP 2013)

## 2.4 Surrounding Land Uses

The site is surrounded by residential land to east, south and west. Remnant bushland is located to the immediate north of the site (Community Gardens and Reta Matthews Reserve) with Blind Creek approximately 200 m further to the north. Residential land lies further to the north, beyond Blind Creek.

## 2.5 Planning Requirements

An agreement between Knox City Council as planning authority and Robertson Industries pursuant to Section 173 of the Planning and Environment Act 1987<sup>5</sup> amendment to the Planning Scheme for the Robertson Land provides for rezoning to Residential 1 Zone with a Development Plan Overlay, which may

<sup>5</sup> Agreement under Section 173 of the Planning and Environment Act 1987 dated 2009



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include the use of other planning scheme provisions. The amendment complies with the Ministerial Direction<sup>6</sup> by requiring that the land to be rezoned to Residential 1 Zone be included within an Environmental Audit Overlay in the Planning Scheme in the event that one or both of the parties considers that an Environmental Audit Overlay (EAO) is necessary in the circumstances. The Robertson Land under the agreement refers Certificates of Title Volume 10808 folio 226, Volume 8328 Folio 822 and Volume 9381 Folio 087, which is the audit site.

The audit has been undertaken to satisfy the above agreement between Knox City Council and Robertson Industries. According to planning information at Land Channel (<http://www.land.vic.gov.au>), the site zoning is currently Special Use Zone (SUZ) and an Environmental Audit Overlay is not in place for the site.

## 2.6 Site Development

Robertson Industries has rehabilitated the former quarry and has requested the audit to allow for the rezoning of the site to Residential 1 Zone.

The redevelopment has been undertaken by filling of the quarry and reuse of former topsoil overburden, which was removed from across the site prior to commencement of quarrying operations and placed in bunds to form visual screening as agreed with City of Knox. No brick or other waste was placed in these bunds. The bunds were screened and placed across the filled area. These works have restored the original land surface.

## 2.7 Nearby Audits

Two audits have been completed in Ferntree Gully resulting in the issue of a Statement of Environmental Audit for each pursuant to section 53X of the Act based on a review of the EPA Victoria database.

Both audits were completed the former CSR Readymix Quarry in Ferntree Gully, which is located approximately 2.5 km to the south east of the site. Monitoring of groundwater conditions and hydrogeological settings was not routinely undertaken as for these audit sites. A desk-based study concluded that there was a very low risk of groundwater contamination and groundwater conditions were not directly investigated for these audits.

A 53X audit was completed on 13 March 2003 for open space land at a site located at the corner (south east) of Butler and Railway Roads, Ferntree Gully owned/occupied by CSR Readymix Quarries. The site history review indicated that the site had been used as a quarry for over 100 years with quarry operations ceasing in 1996. The audit resulted in issue of a Statement of Environmental Audit allowing for any use subject to conditions relating to water management associated with lake at the site.

A further 53X audit was completed on 23 September 2003 for land at the corner Butler and Railway Roads, Ferntree Gully forming part of the quarry operations. The audit resulted in the issue of a Statement of Environmental Audit allowing for any use subject to condition relating to removal of waste, a building (potentially containing asbestos) and buried infrastructure.

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<sup>6</sup> Ministerial Direction means "Direction No. 1 Potentially Contaminated Land" prepared pursuant to Section 12(2)(a) of the Act and dated 27 September 2001 (or as amended).

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### 3. Geology and Hydrogeology

#### 3.1 Regional Geology

The Geology Survey of Victoria - Ringwood (1:63,360) Map 1974 indicates that the site and surrounding area is underlain by the Devonian-age lower Humevale Formation that comprises massive to thin bedded siltstones, with thin sandstones inter-bedded near base. This formation may extend to depths of 1000 m.

#### 3.2 Site-specific Geology and Topography

The site falls from the southeastern corner to the northwest. The ground elevation in the southern part of the site is approximately 118 m (AHD) and is approximately 98 m (AHD) in the northern part of the site. A quarry occupied an area of approximately 5 hectares western part of the site. The quarry floor was excavated to depth of typically 95 m (AHD).

Logs from groundwater wells installed around the site perimeter identified weather siltstone comprising silty clays/clays to depths ranging from 6 to 10 m. The clay was underlain by siltstone to depths of 28 m.

#### 3.3 Regional Hydrogeology

A review of the South Western Victoria Water Table Aquifers Map and Melbourne Groundwater Map indicated that groundwater depths are typically 10 to 20 m within the Humevale Formation. Groundwater salinity is within the range from 1000 to 3500 mg/L.

The Melbourne Groundwater Map noted that groundwater aquifer in the general site area had a low water yield of less than 1 L/s.

#### 3.4 Site-specific Hydrogeology

The upper aquifer is unconfined and is inferred to be within the clays siltstone of the Humevale Formation. Groundwater gauging of four (4) monitoring wells across the site have identified groundwater depths ranging from approximately 3 to 22 m, with the greater depths in the south-eastern part of the site.

#### 3.5 Groundwater Flow Direction

The nearest surface water body is the Blind Creek located approximately 200 m to the north of the site.

Groundwater monitoring over the period from May 2010 to May 2015 infers that groundwater flow at the site is to the west towards Blind Creek. Based on topographic and groundwater data it is inferred that groundwater discharge from the site is to the creek approximately 500 m to the west.

#### 3.6 Groundwater Bore Search

Visualising Victoria's Groundwater database identified 34 registered groundwater bores located within a 2 km (approximate) radius of the site<sup>7</sup>. According to the Victorian Department of Environment and Primary Industries website (<http://data.water.vic.gov.au/>), there are 34 bores installed within 2 km of the site.

The bore uses include:

- Groundwater Investigation
- Miscellaneous
- Observation; and
- Domestic and Stock.

Most of the bores are listed for groundwater investigation and observation. The bore use is not listed for all registered bores.

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<sup>7</sup> A search conducted by Prensa on 2 May 2014.

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The nearest bore with groundwater quality information (B90606) is located ~1.2 km to the east, up-gradient of the site, and is listed for miscellaneous use. The nearest bore registered for domestic and stock water use (WK974723) is located ~1.1 km to the north, up-gradient of the site.

A summary of the attributes of bores within 2 km is set out in Table 3.

**Table 3: Summary of registered bores down-gradient of the site**

Bore ID	Use	Latitude	Longitude
90606	Miscellaneous	-37.87495112	145.2856429
133853	Groundwater Investigation	-37.86078605	145.2844936
133928	Groundwater Investigation	37.86078605	145.2844936
133929	Groundwater Investigation	-37.86078605	145.2844936
134444	Groundwater Investigation	-37.86192605	145.2854447
134445	Groundwater Investigation	37.86204405	145.2854987
134446	Groundwater Investigation	-37.86100305	145.2851586
134447	Groundwater Investigation	37.86120205	145.2852566
134448	Groundwater Investigation	37.86144705	145.2853646
134449	Groundwater Investigation	37.86152005	145.2853976
134450	Groundwater Investigation	37.86160105	145.2853956
134451	Groundwater Investigation	-37.86184505	145.2854697
134452	Groundwater Investigation	-37.86186405	145.2855367
134453	Groundwater Investigation	-37.86184605	145.2855147
134454	Groundwater Investigation	-37.86189105	145.2855477
134455	Groundwater Investigation	-37.86196405	145.2855917
134456	Groundwater Investigation	-37.86212705	145.2856677
134457	Groundwater Investigation	-37.86227305	145.2857437
134458	Groundwater Investigation	-37.86127105	145.2850046
134459	Groundwater Investigation	-37.86172505	145.2852337
134460	Groundwater Investigation	-37.86181505	145.2852767
134462	Groundwater Investigation	-37.86207905	145.285406
133461	Groundwater Investigation	37.86195105	145.2853417
134463	Groundwater Investigation	-37.86218805	145.2854617
134464	Groundwater Investigation	-37.86228705	145.2855047

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Bore ID	Use	Latitude	Longitude
134465	Groundwater Investigation	-37.86142505	145.2850806
134466	Groundwater Investigation	-37.86156105	145.2851467
134467	Groundwater Investigation	-37.86357705	145.2861797
134468	Groundwater Investigation	-37.86357705	145.2861797
WRK053006	Observation	-37.88278879	145.2785569
WRK973922	Not Listed	-37.88390028 1	45.2874115
WRK974723	Domestic and Stock	-37.88148163 1	45.2711512
WRK988177	Not Listed	-37.88299745	145.274959
WRK988184	Not Listed	-37.88203167	145.2742424

## 4. Site History and Identification of Potential Contamination Sources

### 4.1 Site History

The audit site was purchased by Robertson Industries in the 1950s and was operated as a quarry from the 1960s to source clay to make bricks and other products at the Daniel Robertson Brickworks in Nunawading. Quarrying ceased in the mid-2000s. Over the last 20 years of its operation an average of 10,000 m<sup>3</sup> of clay per annum was removed from the site and used at the Nunawading brickworks. An approximate total volume of material removed from the quarry is understood to be in the vicinity of 400,000 m<sup>3</sup>.

The southeastern corner of the site was previously a market garden in the 1950s with the remainder of the site being natural bushland prior to the excavation of the quarry.

The site formerly extended to Blind Creek in the north. However, this land to the northern part of the current site was transferred from Robertson Industries to Knox City Council in the late 1970s, in exchange for additional extraction approvals.

The area to the west of the site (Castricum Place) was formerly an abattoir that was closed in the late 1980s; prior to becoming a residential sub-division. Other land surrounding the site to the east and south was developed for residential use from the 1970s.

Backfilling of the site commenced in May 2014 and was completed in April 2015. Between 18 December 2013 and 20 December 2014, approximately 400,000 m<sup>3</sup> of soil (as compacted) was imported to site and placed into the former quarry area.

### 4.2 Potential Sources of Site Contamination

The only potential source of contamination identified at site is the use of the southeastern part of the site for market gardening in the 1950s. No fuel storage or other activities are known to have existed at the site during the quarrying operations from the 1960s to the late 2000s.

Filling of the quarry was undertaken between December 2013 and April 2015 in accordance with an auditor-reviewed Environmental Management Plan (EMP). Fill was sourced from the redevelopment of Eastland shopping centre, the Knox Hospital and the Mitcham Rail Grade Separation and only included natural siltstones. The fill was progressively tested at the site in accordance with the EMP.

The only potential sources of contamination of the site are considered to be the use of fertilisers and pesticides on the former market garden area in the south eastern part of the site and the spillage of fuels from trucks and other machinery operating at the site during quarrying operations. Given the nature of these activities the auditor considers that the site is not a potential source of contamination.

Contamination of the site from an off-site source is not considered to be likely by the environmental auditor based on the residential use of the land surrounding the site from the 1970s, placing the site within an established residential area. The only known industrial use of land in the vicinity of the site was an abattoir in Castricum Place to the immediate west of the site. The abattoir was closed in the 1980s and land was redeveloped as a residential sub-division. This land is considered to be down-gradient of the site based on 2010 to 2015 groundwater gauging data.

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## 5. Audit criteria

### 5.1 NEPM Requirements

The 2010 and 2011/2012 groundwater monitoring event reporting and the EMP referenced the National Environment (Assessment of Site Contamination) Measure 1999 health and ecological investigation levels. Groundwater investigations were completed from 2011 to 2015. In this regard the scoping of the preliminary soil and groundwater investigations was undertaken with reference to the NEPM (1999), before the date set down by EPA Victoria for the transition to the NEPM 1999 (as amended in 2013) in May 2013.

The further soil and groundwater assessments completed from 2013 have referenced the investigation levels set out in NEPM 1999 (as amended in 2013). As part of these investigations ESA has proposed ecological investigation levels based on the soil pH, cation exchange capacity and clay and organic carbon content.

The auditor has considered the soil and groundwater data with reference to NEPM 1999 (as amended in 2013). In this regard the auditor has also derived EILs with reference to Schedule 5Bc - Guideline on ecological investigation levels and international guidance as noted herein.

### 5.2 Land

Environment protection in Victoria is legislated under the Act. The Land SEPP provides the framework for the prevention of contamination of land in Victoria and sets environmental quality indicators and objectives for each beneficial use for land.

The SEPP defines certain land use categories and associated beneficial uses, which are required to be protected. The beneficial uses of land to be protected are dependent on the proposed land use, as shown in Table 4.

Table 4: Protected Beneficial Uses of land

Beneficial use	Land use						
	Parks and Reserves	Agriculture	Sensitive use		Recreation /Open Space	Commercial	Industrial
			High density	Other			
<i>Maintenance of Modified Ecosystems</i>							
<i>Natural</i>	✓	N/A	N/A	N/A	N/A	N/A	N/A
<i>Modified</i>	✓	✓	N/A	✓	✓	N/A	N/A
<i>Highly Modified Ecosystems</i>	N/A	✓	✓	✓	✓	✓	✓
<i>Protection of Human Health</i>	✓	✓	✓	✓	✓	✓	✓
<i>Buildings and Structures</i>	✓	✓	✓	✓	✓	✓	✓
<i>Aesthetics</i>	✓	N/A	✓	✓	✓	✓	✓
<i>Production of Food Flora and Fibre</i>	✓	✓	N/A	✓	N/A	N/A	N/A

The proposed future use of the site is residential (Sensitive Use: Other). The relevant beneficial uses of land are set out in the Land SEPP are:

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- Maintenance of Modified Ecosystems.
- Human Health.
- Buildings and Structures.
- Aesthetics.
- Production of Food, Flora and Fibre

An evaluation of risk for each beneficial use of the land for the purpose of the environmental audit is made by reference to the SEPP indicators and objectives. This has been based on a comparison of site environmental data with guidelines set out in the NEPM 1999 (as amended in 2013) or other relevant guidance as set out in Table 5.

The NEPM 1999 (as amended in 2013) sets out health investigation/screening levels relevant to human health and ecological impact for a range of chemical substances and waste. The health investigation levels (HILs) are applicable to human exposure by all relevant pathways and generally apply to soils to a depth of 3 m for residential land. Ecological investigation levels (EILs) have been developed to be protective of terrestrial ecosystems and generally apply to the top 2 m of soil.

An investigation level (IL) is defined by ANZECC 1992<sup>8</sup> as...*the concentration of a contaminant above which further appropriate investigation and evaluation will be required...*and is not a clean-up goal. Where the level of a chemical substance or waste exceeds the IL a risk-based level may be derived for the site in accordance with EPA Victoria guidelines or procedures set out in the NEPM 1999 (as amended in 2013).

Health screening levels (HSLs) and ecological screening levels (ESLs) have been derived for selected petroleum hydrocarbons within the NEPM 1999 (as amended in 2013).

In accordance with the Land SEPP a protected beneficial use may not apply at a site where the background concentration of a substance is greater than the relevant guideline designated in Table 5. Therefore, it is important to determine the concentrations of substances that occur naturally in the region of the site, in order to assess whether contamination by industrial or other site activities has occurred. The Land SEPP defines the indicators and objectives for land based on the beneficial use as set out in Table 5.

**Table 5: Relevant objectives for assessment of land**

Beneficial Use	Indicators	Relevant Objectives
Maintenance of Ecosystems	Chemical substance or waste	Contamination must not affect the maintenance of the relevant ecosystems and the level of any indicator must not be greater than: <ul style="list-style-type: none"> <li>• Ecological Investigation Levels (EILs) derived in accordance with NEPM 1999 (as amended in 2013) Schedule 5 and with reference to the NEPM EILs guidance. Soil Quality Guidelines set out by other international agencies have been referred to where no EILs are set out in the amended NEPM.</li> <li>• Levels derived using the risk assessment methodology set out in NEPM 1999 (as amended in 2013).</li> <li>• Levels approved by EPA Victoria.</li> </ul>
Human Health	Chemical substance or waste	Contamination must not cause an adverse effect on human health and the level of any indicator must not be greater than: <ul style="list-style-type: none"> <li>• The Health-based Investigation levels (HILs) in NEPM 1999 (as amended in 2013).</li> <li>• Levels derived using the risk assessment methodology set out in NEPM 1999 and NEPM 1999 (as amended in 2013).</li> <li>• Levels approved by EPA Victoria.</li> </ul>

<sup>8</sup> ANZECC/NHMRC Guidelines for the Assessment and Management of Contaminated Sites 1992 (ANZECC 1992).

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Beneficial Use	Indicators	Relevant Objectives
Buildings and Structures	pH, sulphate, redox potential, salinity or other chemical substance	Contamination must not cause the land to be corrosive to or adversely affect the integrity of structures or building materials.
Aesthetics	Any chemical substance or waste that may be offensive to the senses	Contamination must not cause the land to be offensive to the senses of human beings.
Production of Food, Flora and Fibre	Chemical substance or waste	Contamination of the land must not: <ul style="list-style-type: none"> <li>Adversely affect produce quality or yield.</li> <li>Affect the level of any indicator set out in the Australian and New Zealand Food Authority Food Standards Code.</li> </ul>

Where ILs are not set out in the NEPM 1999 (as amended in 2013), other guidelines have been referred to for the purpose of the environmental audit.

### 5.2.1 Maintenance of Ecosystems

The NEPM 1999 (as amended in 2013) EILs have been set as preliminary triggers for evaluating potential impacts on flora and fauna in an urban environment. In general, the EILs are considered to protect the ecosystems consistent with the intended land use. Where the levels of chemicals in soils are below the NEPM EILs, the condition of the land is considered to satisfy the requirements for protection of all beneficial uses<sup>9</sup> (excepting groundwater quality). These guidelines provide a basis for the further investigation of contamination for a range of chemicals and, where exceeded, a risk-based review of the potential impact from environmental exposure for the proposed use is considered appropriate.

EILs have been derived EILs in accordance with relevant guidance from NEPM 1999 (as amended in 2013)<sup>10</sup> for urban residential land; for which ESA referred soil samples collected from natural soils at the site to determine relevant soil properties.

The measured soil pH at the site ranged from typically around 6, the imported siltstone from Eastland Shopping Centre and Knox Hospital is however typically pH 7. The weathered siltstones are characterized as clays; with the clay content of the natural siltstone at the site and the imported siltstone being typically in the range from 20 to 50 percent. The soil cation exchange capacity ranged from 5-10 cmol/kg with a TOC around 0.1 percent. All metals in the fill are assumed to be aged; neither the site nor the sources of the imported siltstone have a history of industrial use. Given the site setting traffic volumes are assumed to be low.

The environmental auditor has calculated EILs from NEPM 1999 (as amended in 2013) from the data provided and are set out in Table 6.

The auditor noted that all imported materials are natural siltstones with elevated concentrations of iron, fluoride, copper and arsenic. These characteristics generally align with the natural siltstone at the site.

**Table 6: EILs for urban residential and open space for Norvel Road Quarry Ferntree Gully**

Contamination	Background concentration (mg/kg)	EILs for Urban residential land and open space use (mg/kg)	
		New	Aged
Arsenic	30	50	100
Copper	30	40	45

<sup>9</sup> Site or part thereof, where subdivision may be undertaken, as per the NEPM 1999.

<sup>10</sup> Using the NEPM EIL toolbox



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Contamination	Background concentration (mg/kg)	EILs for Urban residential land and open space use (mg/kg)	
		New	Aged
Cadmium	0	10 <sup>1</sup>	20
DDT	0	180	180
Naphthalene	0	170	170
Total PAHs	0	Not stated	Not stated
Lead	0	270	1100
Nickel	20	70	190
Chromium III	0	240	560
Zinc	20	170	420
Mercury	0	6.6 <sup>1</sup>	40

Note:

1. The auditor has referred to Canadian Environment Quality Guideline for soil quality indicators for cadmium and mercury for residential and commercial/industrial land.

### 5.2.2 Human Health

NEPM 1999 (as amended in 2013) Schedule B (1)<sup>11</sup> provides human health investigation levels (HILs) for a selected range of substances for four exposure settings based on land use as follows:

- Standard residential with gardens/accessible soil (home-grown produce contributing less than 10% of vegetable and fruit intake; no poultry); this category includes other sensitive land uses such as children's day-care centres, kindergartens, preschools and primary schools (Residential A);
- Residential with minimal opportunity for soil access; includes dwellings with fully and permanently paved yard space such as high-rise apartments and flats (Residential B);
- Parks, recreational open space and playing fields; including secondary schools (Recreational C); and
- Commercial/industrial; including premises such as shops and offices as well as factories and industrial (Commercial/industrial D).

The objective of the audit is to consider the suitability of the land for all beneficial uses, which includes a sensitive use such as standard residential use. Given that the proposed use of the site is urban residential Setting A as set out in NEPM 1999 (as amended in 2013) Schedule B (1) have been adopted as the basis for the assessment of the land condition for the purpose of the audit.

HILs consider long-term human exposure to the whole of the site and should only be applied statistically where adequate characterisation of soil contamination has been completed. This requires that, firstly, data quality is acceptable and, secondly that a representative sample of data is provided<sup>12</sup>.

The NEPM guidance requires that the mean concentration of a contamination be used as a basis for assessment. It also requires that the level of any contaminant at a discrete location should not exceed the guideline value by more than 250%, and that the standard deviation of any contaminant across the site should be less than 50 percent of the guideline value.

### 5.2.3 Buildings and Structures

Soil may adversely impact upon buildings and structures where:

- elevated soil sulphate concentrations or acidic pH conditions degrade concrete structures or steel; and

11. Table 1A(1) of Schedule B (1) of the NEPM 1999 (as amended in 2013).

12. HILs should be applied to an un-biased data set (grid-based locations across the whole of the site).

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- contaminants enter buried service lines (such as water supply pipelines).

Australian Standard AS3600 – *Concrete Structures* – states that permeable soils with a pH < 4 or groundwater containing sulfate concentrations higher than 1000 mg/L are considered aggressive and detrimental to concrete structures.

The NEPM 1999 proposes an interim urban soil investigation level of 2000 mg/kg for sulfate for built structures.

#### 5.2.4 Aesthetics

The NEPM 1999 (as amended in 2013) specifies that the soils should not be discoloured, exhibit offensive odour or be of abnormal appearance (given the site setting). The beneficial use of Aesthetics is considered, for the purpose of the audit, to impact the site use where the soil contains waste, is stained or causes odours, which are not typical in an urban setting and are considered to be offensive.

#### 5.2.5 Production of Food, Flora and Fauna

The beneficial use of Production of Food, Flora and Fauna may not apply to all residential use of land, thus has however been considered as relevant for the proposed development. The NEPM EILs are relevant to the review of the detrimental impact of contamination of land on plant growth.

### 5.3 Groundwater

The Groundwater SEPP provides for the protection of existing and potential beneficial uses of groundwater throughout Victoria. Groundwater quality objectives are established with reference to potential beneficial uses based on relevant groundwater segment, which is based on groundwater salinity. The beneficial uses of groundwater to be protected are set out in Table 7.

Table 7: Protected Beneficial Uses

Beneficial use	Segments (mg/L TDS)				
	A1 (0–500)	A2 (501–1000)	B (1001–3500)	C (3501–13,000)	D (>13,000)
<i>Maintenance of Ecosystems</i>	✓	✓	✓	✓	✓
<i>Potable Water Supply – desirable</i>	✓	N/A	N/A	N/A	N/A
<i>Potable Water Supply – acceptable</i>	✓	✓	N/A	N/A	N/A
<i>Potable Mineral Water</i>	✓	✓	✓	N/A	N/A
<i>Agriculture, Parks and Gardens</i>	✓	✓	✓	N/A	N/A
<i>Stock Watering</i>	✓	✓	✓	✓	N/A
<i>Industrial Water Use</i>	✓	✓	✓	✓	✓
<i>Primary Contact Recreation</i>	✓	✓	✓	✓	N/A
<i>Building and Structures</i>	✓	✓	✓	✓	✓

The beneficial use of Maintenance of Ecosystems must, under the provisions of the Groundwaters SEPP, be protected for all groundwater, regardless of the salinity.

The Victorian Mineral Water Committee (VMWC) has the responsibility for the protection and management of the State's natural mineral water assets. The aquifer at the site is not designated as a potable mineral water resource by the VMWC; therefore this beneficial use is not relevant at the site.

An assessment of the likelihood of the particular beneficial uses of groundwater being realised should be based on an evaluation of whether an owner/occupier of the site, or in the vicinity of the site, may

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reasonably expect to use, or be able to use groundwater for the above purposes, having regard for existing and future land use. The Groundwater SEPP defers to the *Australian Water Quality Guidelines for Fresh and Marine Waters* (ANZECC 1992) for the definition of indicators and objectives for the majority of beneficial uses of groundwater and to the Water SEPP for objectives for Maintenance of Ecosystems. It is noted that the *Australian and New Zealand Guidelines for Fresh and Marine Water Quality* (ANZECC 2000) supersedes the ANZECC (1992a) guidelines and has been used as the primary reference for determining the relevant audit criteria.

#### 5.4 Surface Waters

The nearest surface water to the site is Blind Creek; which lies approximately 200 m to the north. Blind Creek is a tributary of Dandenong Creek.

Relevant beneficial use objectives for Blind Creek are set out under *Schedule F6 - Waters of the Port Phillip Bay* to the Water SEPP. The creek forms part of the Dandenong Valley and is classified with the *General* segment of the schedule. The beneficial use for this segment for Maintenance of Ecosystems (MoE) is *slightly modified* and a 95% level of protection is relevant under ANZECC 2000.

The beneficial uses for this segment, in addition to Maintenance of Ecosystems, are:

- Primary and secondary Contact Recreation.
- Aesthetics.
- Passage of indigenous fish.
- Commercial and recreational use of edible fish and crustacean and other commercial purpose, namely, industrial water use.
- Navigation.

## 6. Importation of Fill

### 6.1 Scope

#### 6.1.1 General

Backfilling of the site commenced in December 2013 and was completed in April 2015. Between 18 December 2013 and 20 December 2014, approximately 400,000 m<sup>3</sup> of soil (as compacted) was imported to the site, placed and compacted into the former quarry.

Filling of the quarry was completed in accordance with an Environmental Management Plan (EMP) prepared by Robertson Industries and endorsed by the auditor.

Fill was sourced from the redevelopment of Eastland shopping centre, Knox Hospital and the Mitcham Rail Grade Separation and only included natural siltstones. The fill was progressively tested at the site in accordance with the EMP.

#### 6.1.2 Environmental Management Plan

Procedures for the testing of imported fill from the Mitcham grade separation at the audit site was generally agreed with EPA Victoria. Testing of soil at the source site in accordance with EPA Victoria Publication IWRG 702 was impractical because there was no space available for stockpiling of material for testing. Testing at the audit site was agreed on the basis that the imported material would be natural and the testing would generally comply with EPA Victoria publication IWRG 720.

This approach was also based on the compositing of samples for the purpose of non-volatile analyses following advice on the appropriate analytical procedures from Michael Wright of Eurofins as a member of the auditor's expert panel.

These procedures were set out in an EMP. The plan was reviewed and endorsed by the auditor subject to conditions. The basis for the EMP was that the proposed source sites would not be potentially contaminated and that material other than natural material at the source site would be segregated from fill imported to the audit site. The intention was that only natural siltstone be imported to the audit site, where the natural geology was characterized by Humevale Formation siltstone.

The EMP provided for the following:

- Review of the assessment(s) of the soil at the source site.
- Verification that fill was segregated at the source site and only natural material was imported (to the audit site).
- Inspection of imported material during placement and reporting.
- Testing of soil following placement in 300 mm layers compaction at a rate on of one sample for each 250 m<sup>3</sup> of placed soil. Samples were collected in a systematic grid pattern by ESA.
- Field observation and logging of field PID measurement for each sample.
- Recording of sample locations on a sampling field form using a GPS device.
- Four samples were combined at the laboratory to form one composite sample for analysis of inorganics.
- For every nine samples collected, eight were composited and analysed for fluoride and heavy metals (arsenic, barium, beryllium, boron, cadmium, chromium, cobalt, copper, lead, manganese, mercury, nickel, selenium, vanadium and zinc).
- A ninth sample was not composited and was analysed for the EPA IWRG621 suite of contaminants including organics.
- Two quality control samples were collected and analysed for every eighteen samples collected. One sample (blind replicate) was analysed by the primary laboratory ALS whilst the other (split sample) was analysed by Eurofins MGT. The quality control samples were not composited and

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were analysed for the EPA IWRG621 suite of contaminants.

- Other quality assurance/quality control samples namely field rinsate, field blanks and trip blanks were collected for analysis as part of the quality assurance/quality control in accordance with relevant guidance.

Composite samples were prepared by the primary laboratory, ALS by homogenising the subsamples in accordance with documented quality assurance/quality control procedures and expert advice provided to the auditor.

All soil was imported from the three source sites by Earth Solutions Group (ESG). ESA completed and documented on-site reviews on a monthly basis to assess the compliance of the cartage contractor, ESG with the EMP. These reports are presented in the ESA fill reports. The auditor has considered these ESA compliance reports in the review of the evaluation of data quality and completeness.

## 6.2 Mitcham

### 6.2.1 General

This source of fill was the Mitcham Grade Separation Project in Rooks Road, Mitcham. An environmental investigation of the source was undertaken by Compass Environmental Pty Ltd (Compass) in 2012. The results of the investigation are set out in the Compass report, *Soil Investigation Proposed Mitcham and Rooks Road Rail Grade Separation Project, Mitcham Victoria* dated 21 December 2012.

Fill from Mitcham was imported between 18 December 2013 and 4 March 2014. During this time a total volume of 24,600 m<sup>3</sup> (loose) of siltstone was imported to site. The compacted volume is estimated to be 18,000 m<sup>3</sup> (solid).

The imported fill material was placed in 300 mm layers at the southern end of the former quarry void, beginning at the deepest point at approximately 92 m (AHD) and gradually building up to approximately 96 m AHD. All imported fill material from Mitcham was placed at depths greater than 3 m below the final surface level in this area of the former quarry.

### 6.2.2 Findings – In situ investigations

A total of 103 primary soil locations were logged and sampled as set out in the EMP; the sampling frequency complied with EPA Victoria IWRG621 minimum rate of 1:250 m<sup>3</sup> (solid). Soil sampling locations across the quarry area are shown in Figure 4.



Figure 4: Soil sampling locations - quarry area

(Source: ESA DSI 2014)

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The soils encountered during the intrusive soil investigation works consisted of natural clays and siltstone. There was no solid inert waste observed within any of the samples.

All primary (and duplicate and other quality assurance/quality control) samples were sent to ALS for analysis. ALS is NATA-accredited for the relevant analyses.

Key findings of the analysis were as follows:

- One individual sample<sup>13</sup> reported for hexavalent chromium at a concentration 1.2 mg/kg in excess of fill criteria set out in IWRG621 of 1 mg/kg however duplicate analysis reported concentrations below the laboratory level of reporting (LoR) of 0.5 mg/kg. The laboratory concluded that the varied results were due to sample heterogeneity.
- A number of individual samples<sup>14</sup> reported fluoride concentration from 450 mg/kg to 650 mg/kg and in excess of the fill criteria set out in IWRG621 of 450 mg/kg with a number of composite samples<sup>15</sup> reporting fluoride concentrations of 350 mg/kg to 360 mg/kg and in excess of the amended criteria (4 part composite) of 340 mg/kg.

The concentrations of other heavy metals were below the relevant assessment criteria. The concentrations of all volatile organic compounds were reported below the relevant LoRs.

### 6.2.3 Auditor comments

Fluoride is naturally occurring in siltstone at the site. Four samples of natural clay and siltstone collected from the Norvel Road site on in July 2013 reported naturally elevated naturally concentration of fluoride ranging 190 mg/kg to 500 mg/kg.

The auditor noted that NEPM 1999 (as amended in 2013) does not propose a HIL or EIL for fluoride. USEPA Region 9 has set a health screening level for fluoride in soil of 3100 mg/kg based on child exposure. All fluoride concentrations were significantly below this screening level.

The concentration of hexavalent chromium was generally below the fill criteria of 1 mg/kg and retesting of the sample reported concentrations were below the criteria. The relevant NEPM 1999 (as amended in 2013) human health screening level for hexavalent chromium is 80 mg/kg.

The fill sourced from the Mitcham Grade Separation is placed at depths greater than 3 m below the finished site level. The Mitcham fill being typically placed 6 to 11 m below the finished surface level and future human health and ecological exposure is not considered to be relevant to a future urban residential land use.

In this regard future exposure either human or ecological receptors is considered to be relevant for material at depths to 3 m below the finished surface level. Given the proposed residential land use future exposure to human and ecological receptors is considered to be unlikely. This is consistent with NEPM 1999 (as amended in 2013) guidance.

## 6.3 Eastland Shopping Centre and Knox Hospital

### 6.3.1 Eastland Shopping Centre

This source of fill was the Eastland Shopping Centre extension and redevelopment located at 149B – 197 Maroondah Highway, Ringwood.

Environmental investigations of the material to be excavated at the source site were undertaken by Liability and Risk Management Consulting Pty Ltd (LRM) in April 2013 and Alliance EPM Pty Ltd (Alliance EPM) in March 2014. The investigation scope and findings are set out in the following reports:

<sup>13</sup> Sample no SCR/1/0-015.

<sup>14</sup> Samples SCR/2/0-015/S, SCR/4/0-015/S, SCR/6/0-0.15/S, SCR/7/0-0.15/S and SCR/9/0.6-0.75/S and SCR/11/0-0.15/S.

<sup>15</sup> Composite #12, Composite #14, Composite #16 and Composite #17

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- LRM Limited Environmental Site Assessment Phase 2, Eastland Stage 5 Development, 149B-197 Maroondah Highway, Ringwood dated April 2013; and
- Alliance EPM EPA IWRG Soil Classification Letter – Eastland Redevelopment Stage 5 Area 3 – Natural Soils at depth dated March 2014.

These reports were considered by the auditor in determining if the material was acceptable for the site.

Fill was imported from Eastland Shopping Centre from 21 March 2014 to 20 January 2015. During this time a total of 437,000 m<sup>3</sup> of loose fill. The compacted volume (allowing for 30% compaction) is estimated to be 320,000 m<sup>3</sup> (solid).

Alliance EPM reported that arsenic concentration ranged from 16 mg/kg to 150 mg/kg and fluoride concentration ranged from 50 mg/kg to 810 mg/kg in samples collected from the natural siltstone from the source site. Alliance EPM considered the concentrations of these analytes to be representative of background soil. They further concluded that ASLP testing for arsenic was not required as the soil concentration was below the leachability threshold of 20 times the Category C ASLP limit (0.7 mg/kg) set out in IWRG621.

The imported fill material was placed in 300 mm layers across the former quarry to the final surface level. The final surface of the quarry ranged from approximately 93 m (AHD) in the northwest of the site to 107 m (AHD) in the south-east of the site. Much of the fill was placed at depths greater than 3.0 m. Fill from Eastland Shopping Centre and Knox Hospital was however placed across the top 3.0 m of the quarry area.

As noted this area of filling was subsequently capped by approximately 300 mm depth of overburden topsoil material from the screening bunds formed from the original pre quarry activity topsoil following testing and screening.

### 6.3.2 Knox Hospital

Fill was imported from Knox Hospital located in Mountain Highway, Wantirna from 14 November 2014 to 19 December 2014.

Prensa completed a preliminary site investigation for Healthscope in April 2014 as part of the redevelopment of the hospital. The site history indicated that the land was formerly residential land and a car park. The site history did not identify any potential sources of contamination.

During this time a total of approximately 15,000 m<sup>3</sup> of loose fill was imported. The compacted volume (allowing for 30% compaction) is estimated to 11,000 m<sup>3</sup> (solid). This is equivalent to a depth of compacted material of approximately 300 mm across the quarry area.

The fill from Knox Hospital was placed across the top 2m of the former quarry area together with fill from Eastland Shopping Centre.

### 6.3.3 Findings

ESA completed routine sampling of the Eastland Shopping Centre and Knox Hospital fill as placed in the 300mm layers as set out in the EMP.

A total of 1345 primary soil locations were logged and sampled; this sampling frequency complied with EPA Victoria IWRG621 minimum rate of 1:250 m<sup>3</sup> (solid as noted). Each 300 mm layer of material placed and compacted across the quarry floor was progressively tested. Soil sampling locations are shown in Figure 4. Samples were composited for analysis of inorganics. Discrete samples were also progressively collected and tested for the full suite of inorganic and organics analyses.

The soils encountered during the intrusive soil investigation works by ESA consisted of natural clays and siltstone. There was no solid inert waste observed within any of the samples. All PID readings were reported as 0 ppm.

All primary (and duplicate and other quality assurance/quality control) samples were sent to ALS for



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analysis. ALS is NATA-accredited for the relevant analyses.

The discrete sample analysis reported no organics were reported above the laboratory limits of reporting (LoR).

The findings of the ESA testing of all fill imported from Eastland Shopping Centre and Knox Hospital from the composite samples across the full depth of filling were as follows:

- Fluoride concentrations ranged from 106 to 880 mg/kg with a mean concentration of 405 mg/kg.
- Arsenic concentrations ranged from 5 to 483 mg/kg with a mean concentration of 49 mg/kg.
- Copper concentrations ranged from 5 to 72 mg/kg with a mean concentration of 8 mg/kg.
- The maximum reported concentration of lead, nickel and zinc were below relevant HILs and EILs in all composite samples.
- Concentrations of mercury and cadmium were below the LoRs (0.1 mg/kg and 1 mg/kg respectively) in all composite samples

The maximum reported concentrations of arsenic and copper exceeded the relevant NEPM 1999 (as amended in 2013) EILs, whilst the maximum concentration of arsenic also exceeded the HIL. ESA evaluated the composite data with reference to modified assessment criteria based on the sample compositing and the background concentrations.

The auditor noted in this regard that based on the IWRG 621 soil characterisation threshold for fluoride as fill of 450 mg/kg for a discrete sample the modified assessment threshold for a 4-part composite analysis would be say 115 mg/kg however analysis of 41 discrete samples from the top 3 m of fill as placed reported fluoride concentrations ranging from 190 to 600 mg/kg with a mean concentration of 465 mg/kg. All fluoride concentrations were significantly below the USEPA health screening level of 3100 mg/kg.

The leachability threshold for arsenic based on the IWRG 621 guidance is 140 mg/kg and the concentration reported on the natural soil reported in the Alliance EMP source site assessment in 2014 exceeded the ASLP threshold. Subsequent testing of fill samples at the audit site by ESA in September 2015 at the request of the auditor reported the leachability of arsenic (by ASLP) at less than the laboratory LoR of 0.1 mg/L.

#### 6.3.4 Auditor comments

ESA did not segregate the data for the imported fill for the discrete or composite samples for the top 3 m of the fill as placed consistent with the requirements of NEPM 1999 (as amended in 2013) as a basis for reviewing compliance with HILs for an urban residential land use. In this regard Schedule B1 of NEPM 1999 (as amended in 2013) recommends that the top 3m of soil be considered when assessing the health impact from contamination for a residential use and the top 2m when considering potentially ecological exposure (to terrestrial ecosystems).

A further analysis of the arsenic, copper and fluoride concentrations in discrete samples for the top 3.0m of fill collected by grid-based sampling during placement of the imported was completed by the auditor and is set out in Table 8. A review of this data was not completed by ESA for Robertson Industries.

**Table 8: Selected analysis of fill for top 3 m of quarry area**

Sample location	Sample Number	Sample depth below final fill level (m)	Arsenic concentration (mg/kg)	Copper concentration (mg/kg)	Fluoride Concentration (mg/kg)
SP1	SCR/141	0.8	27	31	630
	SCR/139	1	28		
	SCR /134	1.3	10		
	SCR /127	2	10		

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Sample location	Sample Number	Sample depth below final fill level (m)	Arsenic concentration (mg/kg)	Copper concentration (mg/kg)	Fluoride Concentration (mg/kg)
	SCR /122	2.2	28		
SP2/1	SCR / 149	0.3	24	22	510
	SCR /130	1.5	22		
	SCR /137	1.3	10		
SP2/4	SCR /84	2.2	10		400
SP2/5	SCR /145	0.6	35		480
SP2/6	SCR /126	1.4	63		
SP2/9	SCR /92	1.3	146		520
	SCR /85	1.6	10		520
	SCR /83	2	21		
SP2/10	SCR /76	2.2	27		
SP2/12	SCR /156	0.1	44		
SP2/13	SCR /138	1.3	26		450
SP2/14		1.3			
SP2/15	SCR /121	1.3	50	16	540
SP2/18	SCR /70	1.3	135	24	370
SP2/10	SCR /47	2.2	54	10	380
SP2/20	SCR /109	1.3	19	13	520
SP2/21	SCR /157	0.4	14	10	540
	SCR /129	0.4	15	3	210
SP2/22	SCR /104	1.2	53	27	460
SP3	SCR /132	1.6	42	27	490
SP3/1	SCR /151	0.6	62	94	560
	SCR /115	2.4	80	31	480
SP3/2	SCR/125	1.6	84	24	360
SP3/3	SCR /120	1.6	16	17	540
	SCR /113	2	64	31	560
SP3/5	SCR /153	0.1	33	21	430
	SCR /108	2.2	35	20	480
SP3/6	SCR /116	2.4	108	34	550
SP3/9	SCR /117 Dup	2	120	37	560
SP4/1	SCR /144	0.6	10	17	350
SP4/4	SCR /95	2.5	70	35	530
SP4/8	SCR /119	1.6	36	25	520
	SCR /112	2.2	53	21	510
	SCR /106	2.8	58	29	510

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Sample location	Sample Number	Sample depth below final fill level (m)	Arsenic concentration (mg/kg)	Copper concentration (mg/kg)	Fluoride Concentration (mg/kg)
SP4/9	SCR /136	0.3	9	6	330
	SCR /110	2	49	21	530
	SCR/101	2.4	93	51	510
SP5	SCR /142	0.6	28	5	190
SP8	SCR /146	0.1	43	39	500
SP9	SCR /118	2.8	42	20	490
SP10	SCR /140	0.3	29	24	500
	SCR /135	0.7	38	17	380
	SCR /128	1.2	5	3	190
	SCR /123	1.6	5	3	230
SP11	SCR /119	1.2	29	26	600
SP12	SCR /133	0.4	29	24	660
No of results			51	36	41
Maximum			146	94	660
Mean			42	24	465
Standard Deviation			33	16	113
95UCL (Chebyshev)			50	29	495

The analysis of fill imported for discrete samples from the Knox Hospital and Eastland Shopping Centre for the top 3.0 m as placed reported arsenic concentrations ranging from 10 to 180 mg/kg with a mean concentration of 42 mg/kg and a 95 percent upper confidence limit of the mean (95 UCL) of 66 mg/kg. The 95UCL concentrations for copper and fluoride were respectively 36 and 540 mg/kg.

Key findings of the analysis of the fill as placed from Eastland Shopping Centre and Knox Hospital based on the discrete sampling was as follows:

- Arsenic was reported in discrete fill sample analysis for the top 3.0 m up to a maximum concentration of 146 mg/kg; the mean arsenic concentration was reported as 42 mg/kg.
- Fluoride concentration in discrete samples<sup>16</sup> within the top 3.0 m of fill ranged from 210 to 660 mg/kg; the mean fluoride concentration 465 mg/kg. Four discrete samples reported arsenic concentration above the NEPM 1999 (as amended in 2013) HIL and EIL of 100 mg/kg.
- Copper concentrations in discrete samples<sup>17</sup> within the top 3.0 m of fill ranged from 3 to 39 mg/kg, with one exception of 94 mg/kg; the mean copper concentration was 24 mg/kg. The concentrations of copper in the fill were below NEPM 1999 (as amended in 2013) HILs for copper and generally less than the site specific EIL of 45 mg/kg.

Generally, where composite samples are being evaluated against assessment criteria the value stipulated in the guideline is divided by the number of primary samples forming the composite sample as per NEPM (amended 2013). In the case of this sampling program, all composite samples consist of four primary samples, therefore the assessment criteria would be divided by four to define a modified criteria. This

<sup>16</sup> 41 discrete fill samples were collected for analysis from depths from 0.1 to 2.8 m during fill placement.

<sup>17</sup> 36 discrete samples were collected from the fill from depths from 0.1m to 2.8 m during fill placement.

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approach does not account for any natural mineralisation and the auditor has considered that background concentrations of selected analytes should be taken into consideration for the assessment criteria for composite samples and adjusted accordingly. The elevated arsenic and fluoride concentrations are characteristic of the siltstone. The auditor has considered the logs and analysis of approximately 120 composite sampling from the top 3 m of the fill placed across the quarry area. Key findings from this auditor review are as follows:

- Arsenic concentration in the composite analysis ranged from 10 to 298 mg/kg. The mean arsenic concentration was 36 mg/kg.
- Fluoride concentrations in composite samples ranged from 290 to 750 mg/kg; with a mean concentration of 450 mg/kg.
- Copper concentrations were all less than 45 mg/kg, the NEPM 1999 (as amended in 2013) EIL, with the exception of one result reporting a copper concentration of 72 mg/kg. The mean copper concentration was 19 mg/kg.
- The concentrations of lead nickel and zinc were all below the EILs
- The concentration of cadmium and mercury were reported below the LoR in all composite samples.

The natural concentrations of fluoride in the siltstone regionally exceed the IWRG 621 fill criteria of 450 mg/kg. The auditor noted that the fluoride HIL is 3100 mg/kg, which significantly exceeds the reported fluoride concentrations at the source and audit sites.

The presence of high concentrations of arsenic on the proposed residential site use is further discussed in Section 9 of this report. Note that further sampling of the top 3.0 m of the quarry area was completed for the purpose of the audit as part of the site validation investigation as set out in Section 7 of this report.

## 7. Environmental Investigations

### 7.1 Scope of Environment Site Assessments

A number of environmental investigations have been undertaken at the site from 2010 to assess the condition the condition of soil and groundwater at the site further to the ongoing assessment of the condition of the imported fill placed at the site in 2014/2015.

The following further site investigations have been completed during the course of the audit:

- Groundwater monitoring at up and down-gradient locations at the site prior to and after placement of fill over four (4) events from May 2010 to May 2015. The locations of the groundwater monitoring wells are shown in Figure 5.
- Assessment of overburden soil in screening bunds located around the margin of the former quarry in April 2015. The volume of stockpiled material was estimated to be 16,000 m<sup>3</sup>.
- Assessment of the condition of the soil in the former market garden area in the southeastern part of the site in May 2015.
- Validation sampling of the top 3.0 m of fill placed across the former quarry area in May 2015
- Assessment of the condition of the soil along the western and northern margins of the quarry area.
- Leachate testing of soil collected from 3.0 m of fill placed in the former quarry area in September 2015.

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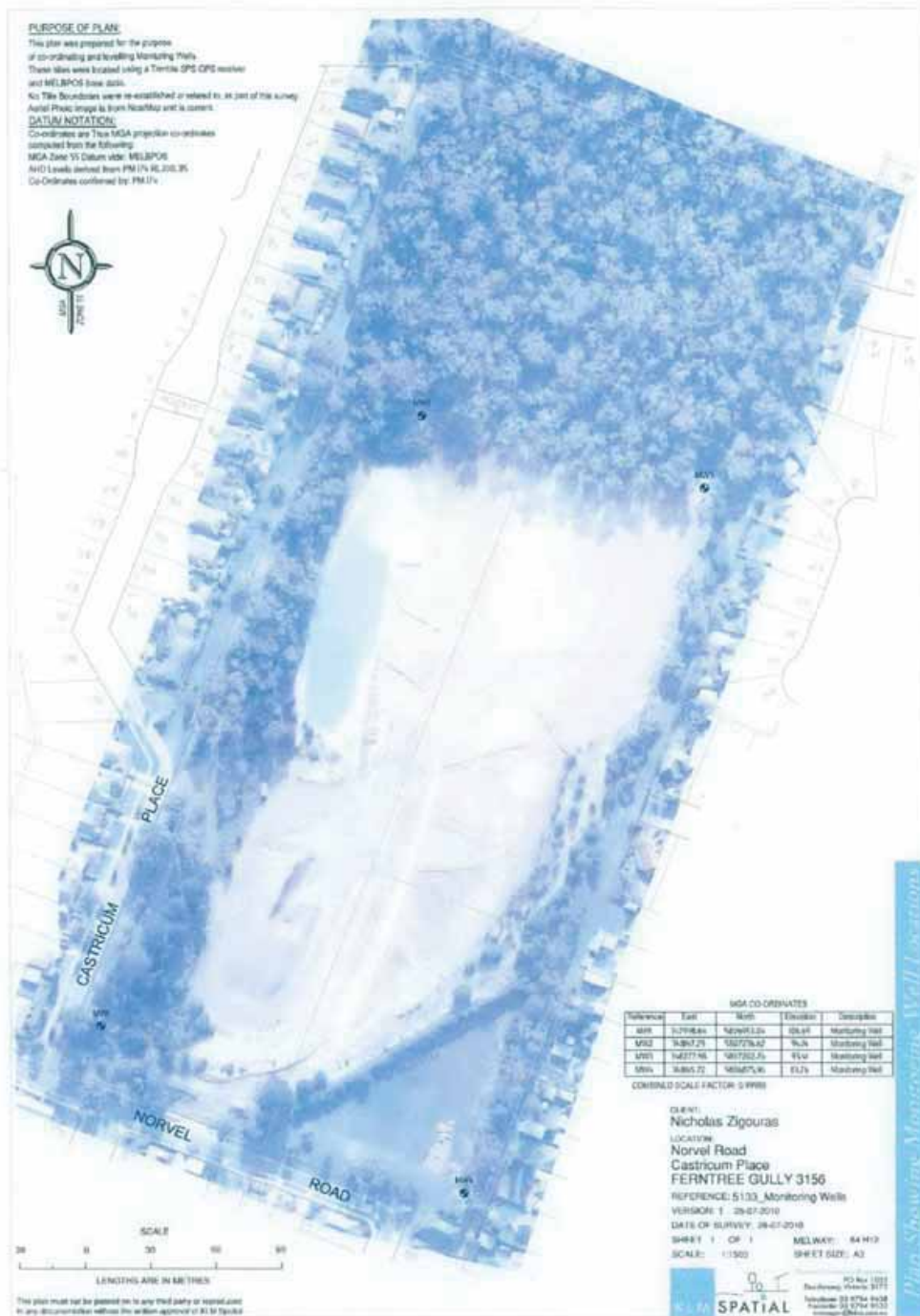
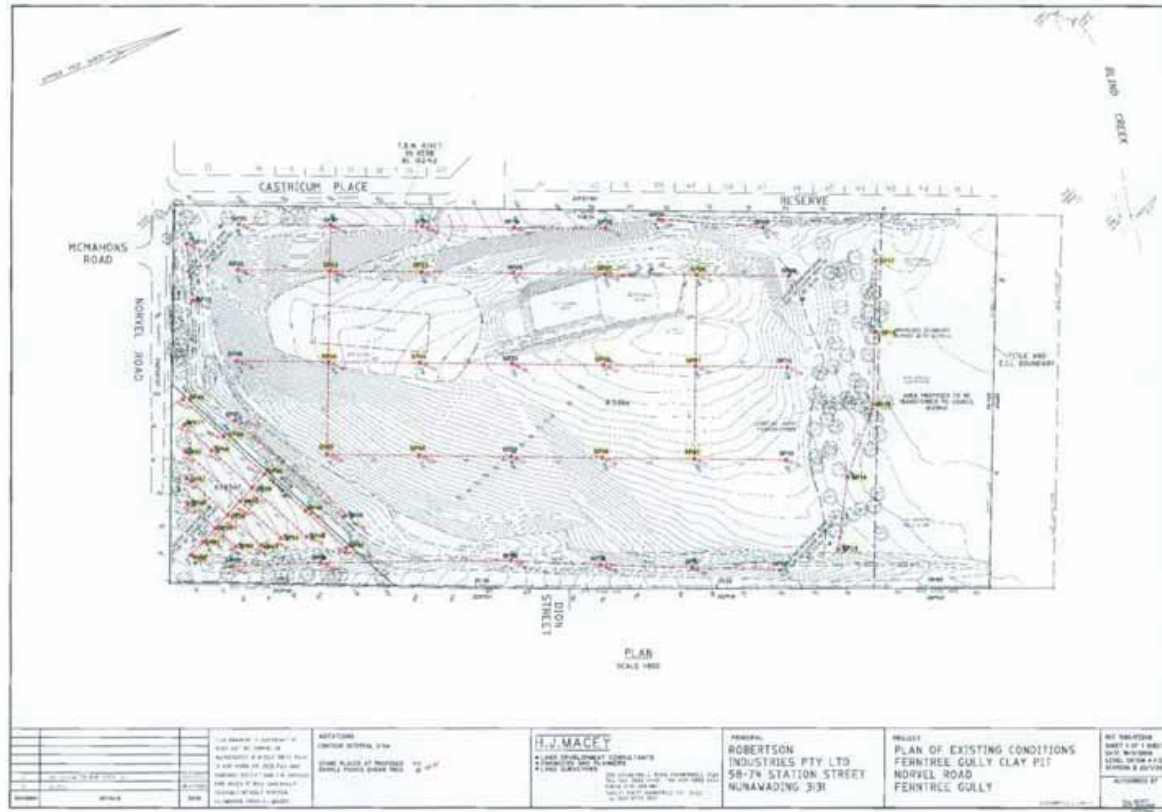


Figure 5: Location of groundwater monitoring wells  
 (Source: ASA Groundwater Investigation 2010)

The locations of the sampling of the screening bunds, validation sampling of the quarry area the former market garden and the western and northern margins is shown in Figure 6. All sampling locations were surveyed (by a register surveyor) prior to sampling.



**Figure 6: Sampling locations**  
 (Source: ESA DSI 2014)

As noted, the ASA groundwater monitoring undertaken in December 2011 and June 2012 was not supported by relevant field data and quality assurance/quality control and has not been considered further for the purpose of the audit. The ESA investigations were generally supported by data quality assurance/quality control consistent with NEPM 1999 (as amended in 2013) guidance.

Robertson Industries screened the overburden material from the screening bunds following testing and placed this material across the former quarry area from November 2015 to February 2016. The screening was undertaken to remove oversize and vegetative material. This provided a capping of approximately 300 mm thickness over the imported fill across the quarry area. A further survey was completed to record the final site levels.

A final environmental auditor inspection was subsequently completed on 3 March 2016.

All groundwater bores installed at the site to monitor groundwater conditions were decommissioned in accordance with relevant guidance.

## 7.2 Soil Investigations

### 7.2.1 Summary of Investigations

A summary of the scope of the ESA soil investigation completed in 2015 following the completion of filling of the quarry is set out in Table 9. All investigations were undertaken by ESA for Robertson Industries.

The quality assurance/quality control and evaluation of data quality and completeness was generally consistent with NEPM 1999 (as amended in 2013) guidance. An evaluation of data quality and completeness was completed by the auditor for the soil and groundwater investigations as set out in Section 9 of this report.

**Table 9: Summary of site investigations**

Objective	Scope
Assessment of screening bunds	<ul style="list-style-type: none"> <li>Collection of soil samples at 12 unbiased transects (SP01 to SP12)<sup>18</sup> along the extent of the bunds with sub-sampling from an excavator bucket.</li> <li>Samples for non-volatile analysis were collected for every 250 m<sup>3</sup> of the bund material (4 samples at each location).</li> <li>Samples for volatiles analysis were collected by push tube at depths up to 2.5 m. Re-sampling of the bunds for volatiles analysis was completed at the request of the auditor.</li> <li>Visual assessment and logging of contamination was completed at each location based on observation of the soil and PID measurement.</li> <li>The non-volatile samples were composited for analysis by ALS.</li> <li>Field quality assurance/quality control sampling including collection of duplicates and rinsate, field and trip blanks.</li> <li>Analysis of composite samples for heavy metals, fluoride, sulfate and pH by ALS.</li> <li>Analysis of volatile samples for PAHs, TRHs, OCPs and PCBs, phenols, BTEX and chlorinated hydrocarbons and quality assurance/quality control samples by ALS.</li> <li>Analysis of triplicate samples by Eurofins.</li> <li>Reporting.</li> </ul>
Validation sampling of imported fill across former quarry area	<ul style="list-style-type: none"> <li>Collection of soil samples at 20 unbiased locations (SP23 to SP42) across the area of the former quarry in April 2015.</li> <li>Samples were collected by push tube at depths of 0 - 0.15m (nominal surface), 0.35 - 0.5 m and 1.35 - 1.5 m.</li> <li>Visual assessment and logging of contamination was completed at each location based on observation of the soil and PID measurement.</li> <li>Analysis of all samples for heavy metals<sup>19</sup>, sulfate, pH, hexavalent and trivalent chromium,</li> </ul>

<sup>18</sup> This nomenclature duplicates that adopted by ESA for the areal sampling of the audit site and has been noted by the auditor.

<sup>19</sup> NEPM 1999 (as amended in 2013) heavy metal as set out in Schedule B1 Table 1A(1) – Health investigation levels for soil contaminants.



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Objective	Scope
	cyanide, OCPs and PCBs, organophosphorus pesticides (OPPS), atrazine, pyrethroids, PAHs, TPHs and TRHs, BTEX and phenolics by ALS. <ul style="list-style-type: none"> <li>• Field quality assurance/quality control sampling including collection of duplicates and rinsate, field and trip blanks and analysis by ALS.</li> <li>• Collection and analysis of triplicate samples by Eurofins.</li> <li>• Reporting.</li> </ul>
Soil assessment of south-eastern part (former market garden area)	<ul style="list-style-type: none"> <li>• Collection of soil samples at 20 unbiased locations (SP43 to SP62) across the area of the former market gardens in the south eastern part of the site in May 2015.</li> <li>• Samples were collected by push tube at depths of 0 - 0.15 m (nominal surface), 0.35 - 0.5 m and 1.35 - 1.5 m.</li> <li>• Visual assessment and logging of contamination was completed at each location based on observation of the soil and PID measurement.</li> <li>• Analysis of all samples for heavy metals<sup>14</sup>, sulfate, pH, hexavalent and trivalent chromium, cyanide, OCPs and PCBs, organophosphorus pesticides (OPPS), atrazine, pyrethroids, PAHs, TPHs and TRHs, BTEX and phenolics by ALS.</li> <li>• Field quality assurance/quality control sampling including collection of duplicates and rinsate, field and trip blanks and analysis by ALS.</li> <li>• Collection and analysis of triplicate samples by Eurofins.</li> <li>• Reporting.</li> </ul>
Soil assessment of northern and western margins of the site (beyond the quarry area)	<ul style="list-style-type: none"> <li>• Collection of soil samples at 10 equidistant unbiased locations (SP13 to SP22) along the northern and western margins of the site (beyond the quarry area) in May 2015</li> <li>• Samples were collected by push tube at depths of 0 - 0.15 m (nominal surface), 0.35 - 0.5 m and 1.35 - 1.5 m.</li> <li>• Visual assessment and logging of contamination was completed at each location based on observation of the soil and PID measurement.</li> <li>• Analysis of all samples for heavy metals<sup>14</sup>, sulfate, pH, hexavalent and trivalent chromium, cyanide, OCPs and PCBs, organophosphorus pesticides (OPPS), atrazine, pyrethroids, PAHs, TPHs and TRHs, BTEX and phenolics by ALS.</li> <li>• Field quality assurance/quality control sampling including collection of duplicates and rinsate, field and trip blanks and analysis by ALS.</li> <li>• Collection and analysis of triplicate samples by Eurofins.</li> <li>• Reporting.</li> </ul>

Sampling of soil samples for fluoride was only completed for the investigation of the natural material in the screening bunds for the April 2015 investigation by ESA. Fluoride analysis was completed for the imported fill as set out in Section 6 of this report and the screening bunds. The auditor noted that the screening bunds were formed from site-sourced overburden topsoil material before the commencement of quarrying operations.

The southeastern part of the site (former market garden area) is approximately 0.65 hectares in area. Soil sampling was completed at 20 grid-based locations, which exceeds the recommended sampling frequency in Australian Standard AS 4482.1.

**7.2.2 Field Data**

All material observed during the sampling of the screening bunds, the former market garden and the western and northern margins and the validation sampling of the quarry area was natural material with no evidence of waste or discoloration or odour. PID measurements were undertaken for all samples and were recorded as 0 ppm.

ESA completed sampling logs for all sampling locations and these are provided in the attached ESA reports. All soil, including the stockpiled material, was characterized as grey/light brown weathered siltstone (clayey silt) with some orange mottling. The auditor noted that the material in the screening bunds is natural material stripped from the site surface prior to the commencement of the quarrying operation in the

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1960s.

### 7.2.3 Analytical Data – Screening bunds

The screening bunds were formed when surface material was stripped from the proposed quarry area in the 1960s. This material was relocated on site around the perimeter of the quarry area in the 1960s.

The range of pH was typically from 4.1 to 5.5 and is naturally acidic. Sulfate concentrations ranged from less than 50 mg/kg to 260 mg/kg.

The concentrations of all organics were reported below the laboratory limits of reporting (LoRs). The concentration of fluoride ranged from 120 to 500 mg/kg in composite samples and from 70 to 760 mg/kg in individual samples, with concentration of arsenic ranging from less than 5 mg/kg to 12 mg/kg in composite samples and less than 5 mg/kg to 23 mg/kg in individual samples.

Vanadium was only analysed for composite samples and the concentrations ranged from for 36 to 115 mg/kg.

The concentrations of total cyanide, cadmium, hexavalent chromium, mercury, molybdenum selenium, silver and tin were all below the laboratory LoRs. A summary of the concentrations of heavy metals in 22 individual samples referred for analysis is presented in Table 10.

**Table 10: Summary on analytical data for fluoride and metals in screening bunds**

Analyte	Minimum concentration	Maximum concentration	No of results exceeding EIL for urban residential and open space use.	No of results exceeding HILs for urban residential use
Fluoride	70	760	Not stated	0
Arsenic	<5	17	0	0
Chromium	16	64	Not stated	0
Copper	<5	16	0	0
Lead	12	40	0	0
Nickel	2	16	0	0
Zinc	<5	43	0	0

The fluoride concentrations represent the natural mineralization of the weather siltstone at the site. Notably fluoride is typically high in the natural siltstone around Melbourne and may range up to a concentration of 1200 mg/kg.

The screening bunds were used as capping across the former quarry area. This was placed from November 2015 to February 2016.

### 7.2.4 Analytical data - Former quarry area

The former quarry area was filled in 2014/2015 to restore the historical surface levels with approximately 300,000 m<sup>3</sup> of imported siltstone sourced locally.

Sampling of the imported siltstone was progressively undertaken for each 300 mm compacted layer. Validation sampling was completed for this area at 20 grid-based locations to depths of 1.5 m in April 2015 to complement the data collected during the filling operations. A total of 67 individual samples were referred for analysis. The quarry area is approximately 5.0 ha.

The range of pH was typically from 4.8 to 8.3. Sulfate concentrations ranged from less than 50 mg/kg to 210 mg/kg.

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The concentrations of all organics and total cyanide, boron, cadmium, mercury and selenium were all below the laboratory LoRs. A summary of the concentrations of heavy metals in samples referred for analysis is presented in Table 11.

**Table 11: Summary on analytical data for metals in soils in former quarry area**

Analyte	Minimum concentration	Maximum concentration	No of results exceeding EIL for urban residential and open space use.	No of results exceeding HILs for urban residential use
Arsenic	<5	134	1	1
Barium	10	160	Not stated	Not stated
Beryllium	<1	1	Not stated	0
Hexavalent chromium	<0.5	1.0	Not stated	0
Chromium	5	108	0	Not Stated
Cobalt	<2	9	Not stated	0
Copper	<5	57	1	0
Lead	5	23	0	0
Nickel	<2	20	0	0
Manganese	<5	184	Not stated	0
Vanadium	<5	76	0	Not stated
Zinc	<5	54	0	0

Arsenic was reported at one location at a concentration of 134 mg/kg and exceeded the EIL and HIL of 100 mg/kg at a depth of 1.35–1.50 m. Arsenic is naturally occurring in imported siltstone and is not leachable based on ASLP testing undertaken for selected soils from the imported material used in to fill the quarry. Further discussion of the elevated arsenic concentrations in the fill is presented in Section 9 of this report.

The copper in the imported siltstone is naturally occurring with a background concentration of typically 10 to 15 mg/kg. Copper was reported at 1 location at concentrations at 57 mg/kg at a depth of 0.35-0.50 m, which marginally exceeded the EIL of 45 mg/kg. The EIL for copper is pH dependent. The mean concentration of copper in the fill was 13 mg/kg.

#### 7.2.5 Analytical data – South-eastern area (former market garden)

The south-eastern area of the site was historically used as market gardening in the 1950s before quarrying operations.

The former market garden and covers an area of approximately 0.65 ha. Samples were collected at 20 grid-based locations to depths of 1.5 m; this complies with the sampling frequency set out in AS 4482. A total of 53 individual samples were referred for analysis.

The range of pH was typically from 4.1 to 6.6. Sulfate concentrations ranged from less than 50 mg/kg to 270 mg/kg. Total cyanide concentrations were generally below the LoR; a concentration of 1 mg/kg was reported at four locations in the near surface soil samples.

The concentrations of all organics were reported below the laboratory limits of reporting (LoRs) with the exception of TPHs and naphthalene. TRHs were reported above the LoRs in the near-surface samples at 3 locations and naphthalene at 1 near-surface location. The maximum reported >C<sub>10</sub> - C<sub>16</sub> fraction TRHs was 240 mg/kg. Naphthalene was reported at concentration of 70 mg/kg at one location. A silica gel cleanup

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was conducted on these samples by ESA to assess the presence of petroleum hydrocarbons and all results reported concentration below the laboratory LoRs.

The concentrations of boron, cadmium, mercury and selenium were all below the laboratory LoRs. A summary of the concentrations of heavy metals in the surficial soil is presented in Table 12.

**Table 12: Summary on analytical data for metals in soils in southeastern area**

Analyte	Minimum concentration	Maximum concentration	No of results exceeding EIL for urban residential and open space use.	No of results exceeding HILs for urban residential use
Arsenic	<5	16	0	0
Barium	20	230	Not stated	Not stated
Beryllium	<1	1	Not stated	0
Hexavalent chromium	<0.5	1.4	Not stated	0
Chromium	8	59	0	Not Stated
Cobalt	<2	11	Not stated	0
Copper	<5	15	0	0
Lead	8	35	0	0
Nickel	<2	10	0	0
Manganese	<5	131	Not stated	0
Vanadium	29	63	0	Not stated
Zinc	<5	228	0	0

The median pH of the surficial soil across this area was 4.4 and the relevant EIL for copper was 25 mg/kg.

#### 7.2.6 Analytical data - northern and western margins

The northern and western margins at the site represent land along the quarry boundary that was retained as visual screening and has not been disturbed or subject to any works during the quarrying operations. This area is considered to represent the natural condition of the site.

Samples were collected from this part of the site at 10 representative locations to depths of 1.5 m. A total of 28 individual samples were referred for analysis.

The range of pH was typically from 4.1 to 7.3. Sulfate concentrations ranged from less than 50 mg/kg to 480 mg/kg. Total cyanide was below the LoR with one exception where a concentration of 1 mg was reported in the near-surface sample.

The concentrations of all organics were reported below the LoRs. The concentrations of boron, cadmium, hexavalent chromium, mercury and selenium were all below the laboratory LoRs. A summary of the concentrations of heavy metals in samples referred for analysis is presented in Table 13.

**Table 13: Summary on analytical data for soils in northern and western margins**

Analyte	Minimum concentration	Maximum concentration	No of results exceeding EIL for urban residential and open space use.	No of results exceeding HILs for urban residential use
Arsenic	<5	14	0	0
Barium	10	110	Not stated	Not stated

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Analyte	Minimum concentration	Maximum concentration	No of results exceeding EIL for urban residential and open space use.	No of results exceeding HILs for urban residential use
Beryllium	<1	1	Not stated	0
Chromium	8	83	0	Not stated
Cobalt	<2	7	Not stated	0
Copper	<5	24	0	0
Lead	8	47	0	0
Nickel	<2	28	0	0
Manganese	<5	414	Not stated	0
Zinc	<5	146	0	0

Vanadium was reported at concentration ranging up to 181 mg/kg. Vanadium is naturally occurring in the siltstone at the site; a mean concentration for all samples was 67 mg/kg. No NEPM 1999 (as amended in 2013) HIL or EIL is proposed for vanadium in soil.

### 7.3 Groundwater Investigation

#### 7.3.1 Summary of Investigations

Four (4) groundwater wells were installed at the site in 2010 at wells MW1 to MW4. Groundwater monitoring events were subsequently at the site, were undertaken ASA and ESA from May 2010 until May 2015. The location of all groundwater wells is shown in Figure 5. MW2 was damaged and was replaced in June 2012.

Groundwater monitoring events completed on the following dates

- 18 May 2010.
- 2 December 2011 and 26 June 2012.
- 20 December 2013.
- May 2015.

A summary of the scope of the ASA groundwater monitoring events completed in May 2010 and December 2011/June 2012 the ESA monitoring events completed in December 2013 and April 2015 is set out in Table 14. The 2010, 2011/2012 and 2013 monitoring events were completed before the filling of the quarry.

Sampling and quality plans for the groundwater monitoring events was provided to the environmental auditor for review. Groundwater sampling for the all groundwater monitoring events was undertaken in accordance with EPA Victoria Groundwater Sampling Guidelines – Publication 669 by micro-purging.

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**Table 14: Summary of Groundwater Investigations**

Consultant	Objective	Scope
ASA 2010	Installation and groundwater monitoring of wells to characterize conditions at the site prior to quarry rehabilitation.	<ul style="list-style-type: none"> <li>Installation, development and logging of 4 groundwater monitoring wells (MW1 to MW4) around the quarry and former market garden areas on 21/22 April 2010.</li> <li>Licensing of all wells.</li> <li>Survey of groundwater wells for location and top of casing and depths (to AHD) on 18 May 2010.</li> <li>Groundwater gauging, purging and sampling by micro-purging in May 2010 in accordance with relevant guidance.</li> <li>Analysis of all groundwater samples by Ecwise Environmental for heavy metals, manganese, iron, pH and total recoverable hydrocarbons (TRHs). The groundwater sample from MW2 was analysed for a full organics and inorganics screen.</li> <li>Reporting.</li> </ul> <p>A limited quality assurance/quality control program was completed.</p>
ASA 2011/2012	Further groundwater monitoring	<ul style="list-style-type: none"> <li>Groundwater gauging, purging and sampling of wells MW1, MW2 and MW4 on December 2011. Well MW3 was damaged and was replaced on 1 June (within 2 m of the original location).</li> <li>Groundwater gauging, purging and sampling of wells MW3 on 27 June 2012 and MW2 and MW3 on December 2011 (purge logs were not provided).</li> <li>Analysis of all groundwater samples by ALS with a duplicate sample from MW2 referred to mgt-Labmark for analysis.</li> <li>Analysis of samples for volatile organics, TRHs, polycyclic aromatic hydrocarbons (PAHs), organochlorine pesticides (OCPs) and PCBs, phenols, nitrate and heavy metals (filtered samples), manganese iron and pH. The groundwater sample from MW2 was analysed for a full organics and inorganics screen.</li> <li>Reporting.</li> </ul> <p>The quality assurance/quality control was not considered adequate to valid the data and this data from this groundwater monitoring event has not been considered for the purpose of the audit.</p>
ESA 2013	Further groundwater monitoring prior to quarry rehabilitation	<ul style="list-style-type: none"> <li>Resurvey of all wells for location and well top of casing and depth (to AHD).</li> <li>Groundwater gauging, purging and sampling of wells MW1, MW2 MW3 and MW4 on 20 December 2013.</li> <li>Recording and stabilization of field parameters during sampling</li> <li>Analysis of all groundwater samples by Eurofins with a duplicate sample from MW2 referred to ALS for analysis.</li> <li>Analysis of samples for volatile organics and volatile halogenated organics, TRHs, benzene, toluene, ethylbenzene and xylenes (BTEX), PAHs, OCPs and PCBs, phenols, nitrate and heavy metals including manganese (filtered samples), total dissolved solids (TDS), pH, sulfate and total cyanide.</li> <li>Analysis of spilt and inter laboratory duplicates, field rinsate and trip blanks.</li> <li>Reporting.</li> </ul> <p>The quality assurance/quality control and evaluation of data quality and completeness was generally consistent with NEPM 1999 (as amended in 2013) guidance.</p>
ESA 2015	Groundwater monitoring following quarry rehabilitation	<ul style="list-style-type: none"> <li>Groundwater gauging, purging and sampling of wells MW1, MW2 MW3 and MW4 on 26 May 2015.</li> <li>Recording and stabilization of field parameters during sampling.</li> <li>Analysis of all groundwater samples by ALS with a duplicate sample from MW4 referred to Eurofins for analysis.</li> <li>Analysis of samples for volatile organics and volatile halogenated organics, TRHs, BTEX, PAHs, OCPs and PCBs, phenols, nitrate and heavy metals including</li> </ul>

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Consultant	Objective	Scope
		<p>manganese (filtered samples), TDS, pH, sulfate and total cyanide.</p> <ul style="list-style-type: none"> <li>• Analysis of spilt and inter laboratory duplicates, field, rinsate and trip blanks.</li> <li>• Reporting.</li> </ul> <p>The quality assurance/quality control and evaluation of data quality and completeness was generally consistent with NEPM 1999 (as amended in 2013) guidance.</p>

Duplicate water samples (MW5 and MW6) were collected during the 2013 and 2015 groundwater monitoring events at sample location MW4 by ESA. MW5 blind duplicate sample was analysed by the primary laboratory (Eurofins for 2013 event and ALS for 2015 event). MW6 split duplicate sample was analysed by the secondary laboratory.

Groundwater monitoring well MW2 was damaged and was replaced with MW2A located with 2 m of the original well MW2 on 1 June 2012.

Groundwater monitoring was completed by Thiess Services for ASA in accordance with standardized sampling procedures for the December 2011/June 2012 groundwater monitoring event. No field logs were provided although field parameters are reported. ASA reporting is inferred to have assigned incorrect well numbers and in the absence of the logs the results of the 2011/2012 groundwater monitoring event have not been considered for the purpose of the audit. Gauging data has not been considered.

### 7.3.2 Groundwater gauging

The initial survey of groundwater depths completed by Thiess for ASA in the Groundwater Sampling Field Sheets, attached to the ASA August 2010 report, was considered to nominate the incorrect wells; the data was inconsistent with the field survey details. This was corrected by the environmental auditor. All wells were resurveyed by ESA in January 2014; this further survey data is also consistent with this amendment.

The well construction details are set out in Table 15.

**Table 15: Amended groundwater well details**

Well	Well depth (m)	Reference m AHD (ground)	Elevation Top of Casing (mAHD)	Screen settings below ground (mAHD) <sup>20</sup>
MW1	22.07	106.69	107.52	84.62 – 90.62
MW2	10.55	94.19	94.75	83.64 – 89.64
MW3	14.55	93.42	94.19	77.87 – 84.87
MW4	27.60	113.76	114.60	86.16 – 92.16

### 7.3.3 Field Data – 2010 groundwater monitoring

Field data from the 18 May 2010 groundwater monitoring event reported field measurement of electrical conductivity in the range from 6800 to 9450 mg/L. A TDS concentration ranging from 4100 to 5700 mg/L in all wells was inferred from this field data.

During purging and sampling groundwater was observed to be slightly turbid and yellowish brown in colour. No odours or LNPAL were observed during the groundwater monitoring events. Field pH data ranged from 6.2 to 7.3.

The inferred groundwater flow direction was to the northwest with a gradient of 0.014.

<sup>20</sup> AHD means Australian Height Datum

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### 7.3.4 Field data – 2013/2015 groundwater monitoring

Groundwater gauging/sampling of the four wells for the December 2013 event was undertaken by Eurofins MGT for ESA. ESA completed the gauging/sampling for the May 2015 event. All wells were sampled by micro-purging following stabilization of groundwater field parameters.

LANPL was not observed during groundwater gauging for either event. Groundwater was observed to be non-odorous with a brown discoloration and medium turbidity for both events

Groundwater levels were observed to rise in all wells from 2010 to 2013; the increase in groundwater levels ranged from 1.3 m (in MW4) to 3.7 m (in MW3).

Well gauging data for the December 2013 and May 2015 groundwater monitoring is set out in Table 16. Groundwater monitoring in May 2015 was undertaken following filling of quarry.

Table 16: May 2015 groundwater gauging

Well	Depth to groundwater May 2015 (m)	Groundwater RL May 2015 (mAHD)	Depth to groundwater December 2013 (m)	Groundwater RL December 2013 (mAHD)	Reported Change from 2013 (m)
MW1	17.69	89.84	17.54	89.11	+ 0.73
MW2	6.00	88.77	4.63	89.56	- 0.79
MW3	4.00	90.20	2.73	90.69f	- 0.49
MW4	21.44	93.16	20.77	93.00f	+ 0.16

Groundwater levels from the 2015 event infer the groundwater flow is to the west and towards Blind Creek.

A summary of the field measurement for the 2013 and 2015 monitoring events is set out in Table 17.

Table 17: Field data from December 2013 and May 2015 events

Well	Field pH	Dissolved oxygen (mg/L)	Electrical Conductivity (us/cm)	Temperature (° Centigrade)	Redox (mV)
MW4	7.7 /6.5	1.2/1.1	8050/7300	29/16	26/65
MW1	8.0/6.2	1.1/1.3	8750/8200	25/17	126/88
MW2	5.8/6.0	3.9/0.9	5400/5200	28/15	136/69
MW3	8.8/6.2	0.8/0.8	6900/5300	23/13	86/65

The changes in temperature and other groundwater parameters are inferred to be due to seasonal variations.

### 7.3.5 Groundwater segment

Based on the groundwater monitoring event data from the 2010 to 2015 field measurements the TDS of groundwater at the site ranged from 3200 to 6400 mg/L. Groundwater is classified as *Segment B* pursuant to *SEPP (Groundwaters of Victoria) 1997* and the beneficial uses to be protected for this groundwater segment are:

- Maintenance of Ecosystems
- Stock Watering
- Primary Contact Recreation



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- Agriculture Parks and Gardens
- Industrial Water Use, and
- Buildings and Structures.

The beneficial use of Maintenance of Ecosystems is relevant at the inferred point of discharge of groundwater to Blind creek approximately 500 to the west of the site.

### 7.3.6 Groundwater analytical data

All TRHs <LoRs, PAHs, BTEX, phenols, chlorinated hydrocarbons OCPs, PCBs, halogenated VOCs, VOCs were reported below <LoRs (1 µg/L) for the May 2010, December 2013 and May 2015 groundwater monitoring event.

The May 2010 groundwater monitoring event reported concentration of iron ranging from 580 µg/L to 9.2 mg/L, lead from 11 to 200 µg/L and manganese from 1120 to 840 µg/L, which precluded the use of groundwater for Primary Contact Recreation, Stock Watering and Industrial Use. The concentrations of iron, manganese and lead were higher in the up-gradient wells MW3 and MW4. The low pH was also below the objectives set out in ANZECC 2000 for Primary Contact Recreation.

The concentrations of cadmium, copper, nickel selenium and zinc at the site also exceeded the Maintenance of Ecosystems objective (at the point of discharge) for Blind Creek in all wells.

The May 2015 groundwater monitoring event reported concentration of iron ranging from less than 50 µg/L to 540 µg/L and manganese concentrations from 17 to 1800 µg/L. Lead concentrations in groundwater ranged from 2 to 9 µg/L and exceeded the Maintenance of Ecosystems objective at the inferred point of discharged to Blind Creek. The concentrations of cadmium, copper, nickel, selenium and zinc at the site also exceeded the Maintenance of Ecosystems objective (at the point of discharge) for Blind Creek in all wells.

The elevated groundwater concentrations of all heavy metals were consistent with the condition of groundwater in up-gradient wells, and were considered to be an artefact of the regional geology in the upper aquifer. The contamination of groundwater was not considered to be site sourced which is consistent with the site history. Furthermore the up-gradient land use is residential and the elevated concentration of metal in groundwater is not considered to be associated with ambient conditions.



Table 18: Summary of groundwater analytical data for May 2015

Analyte	MW4	MW3	MW2	MW1	Maintenance of Ecosystems	Stock Watering	Agriculture Parks and Gardens (1)	Primary Contact Recreation (2)
pH	6.8	6.4	6.2	6.4	6.0-8.5			6.5-8.5
TDS	5800	4950	3400	6530				
Arsenic	<1	<1	2	<1	13	500	100	100
Cadmium	<0.1	0.2	0.1	<0.1	0.2	10	10	20
Cobalt	2	8	8	1	NS	1000	50	NS
Chromium	<1	<1	<1	<1	NS	1000	100	NS
Hex Chromium	<1	<1	<1	<1	1	NS	NS	500
Copper	<1	10	6	9	1.4	400 (3)	200	1000
Iron	470	140	540	<50	NS	NS	200	300
Lead	3	<1	9	2	3.4	100	2000	100
Manganese	1800	126	86	17	1900	NS	200	100
Mercury	<0.1	<0.1	<0.1	<0.1	0.6	2	2	10
Nickel	17	28	64	26	11	1000	200	200
Selenium	<10	<10	<10	<10	11	20	20	100
Zinc	19	20	22	19	8	20 mg/L	2000	3000

Note:  
 Highlighting notes exceedances.

## 8. Conceptual Site Model

### 8.1 Site Setting

The site falls from the northwest with the highest ground elevation of around RL 115 m AHD in the south eastern corner.

The site is underlain by Humevale Formation siltstone to the full depth of investigation, this being approximately 30 m. Based on geological survey information the depth of this formation may be of the order of 100 m or more. The depth to groundwater varied across the site with depths of around 20 m below ground level in the southeast and 3 m in northwest; the surface aquifer is unconfined and found within the siltstone.

The nearest surface water body is Blind Creek with runs to the north and west of the site. This creek is a tributary of Dandenong Creek. A hydrogeological cross section of the site is set out in Figure 6. This cross section includes the up-gradient well MW4 and follows the inferred groundwater flow direction inferred from the May 2015 gauging.

### 8.2 Groundwater Flow

Groundwater flow inferred from gauging undertaken during the December 2013 and May 2015 groundwater monitoring events is to the northwest to west and towards Blind Creek (approximately 500 m to the west of the site). It is relevant to note that the quarry did not intersect the historical groundwater levels and the groundwater depths following filling are consistent with the historical levels.

The groundwater gradient is typically 1/100 based on the May 2015 groundwater monitoring event gauging.

The hydraulic conductivity of siltstone will depend on fractures but is likely to be in the order of less than 1 m/year. The groundwater flow rate is therefore of the order of 1 m/year for an effective porosity of 0.1.

Based on the expected groundwater flow rate groundwater discharge from the site to the Blind Creek is not likely to occur for over 500 years.

### 8.3 Existing Uses of Groundwater

There are a total of 34 registered groundwater bores identified within a 2 km radius of the site. The nearest bore registered for domestic/stock use (Bore WK974723) is located approximately 1.1 km to the north and up-gradient of the site. A further bore registered for miscellaneous use (Bore B90606) located is 1.2 km to the east and up-gradient of the site. No bores are located to the west or north of the site and Blind Creek.

The auditor is of the opinion that there is no existing or potential use of groundwater from the shallow aquifer at the site based on the low aquifer yield.

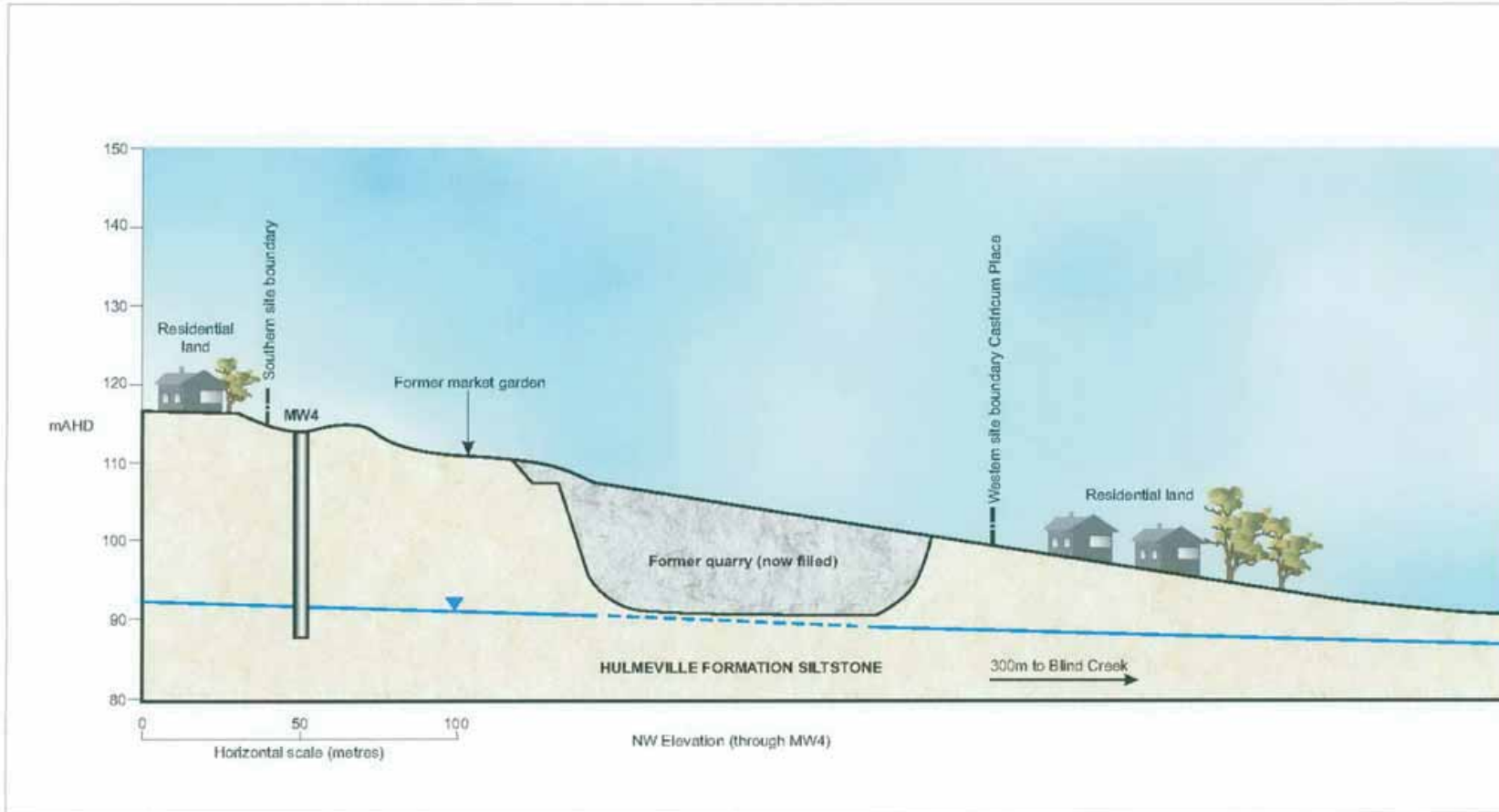


Figure 7: Norvel Road quarry cross section



## 9. Auditor Evaluation of Data Quality and Completeness

### 9.1 Data Quality Objectives

A review of data quality and completeness for the detailed investigations ESA has been undertaken by the auditor based on the NEPM 1999 (as amended in 2013) and AS4482 objectives for the purpose of the audit. The NEPM data quality indicators (DQIs) provide a systematic basis for the evaluation of both field and analytical procedures with reference to the data quality objectives of completeness, comparability, representativeness, precision and accuracy.

As noted a EMP setting out procedures for the testing of imported fill comprising natural material sourced from local sites at the audit site was agreed for the purpose of the audit prior to commencement of the fill importation. These procedures were generally followed for the progressive testing of all imported fill material as set out in Section 6.

A review of the data quality assurance and quality control has been completed for the following:

- Validation sampling of the top 3 m of imported material placed across the former quarry area (Sampling locations SP23 to SP42).
- Soil testing of the former market garden area in the southeast part of site and the site margins beyond the former quarry area (Sampling locations SP43 to SP62).
- The site margins (SP13 to SP22).
- The overburden material in bunds around the quarry; this material was subsequently screened and placed across the quarry area.
- The groundwater monitoring events, and notably the groundwater monitoring completed by ESA in December 2013 prior to filling of the quarry and May 2015 following placement of the fill within the quarry area.

The sampling of locations SP 13 to SP62 was completed as a final validation of the soil including imported filling across the site. In this regard it is noted that the imported fill from the Mitcham, Knox Hospital and Eastland sites was considered to be clean fill based on the site history review, the preliminary investigation at the source sites and the exclusion of fill material. The testing of imported material was based on the progressive sampling of analysis of fill material following placement at for each 250 m<sup>3</sup>.

The evaluation of data quality and completeness has considered inter alia the following elements:

- Review of sampling and analytical plans (SAPs).
- Review of site operating procedures (SOPs), including the review of these procedures during the field sampling.
- Review of data quality based on the verification of field QA/QC procedures, evidence of the proper transference of samples (chain-of-custody documentation) and sample analysis (and extraction) within the recommended holding times.
- Review of the findings of sample analyses against field observations and measurement;
- Review of well installation and bore logs;
- Analysis of 10% (blind and split) duplicate samples by an independent laboratory and compliance with data quality indicators (DQIs);
- Analysis of field, trip and/or field equipment rinsate samples and compliance with DQIs;
- Use of NATA-approved analytical procedures; and
- Review of internal laboratory QA/QC analyses including analysis of blanks, spike recoveries and duplicates against laboratory DQIs.

The findings of this review are set out in Table 19 with reference to the NEPM data quality indicators.

Although there were some minor non-conformities, the auditor considers that the soil and groundwater data complete and of an acceptable standard.



Table 19: Auditor evaluation of data quality and completeness

Data Quality Objective	Data Quality Indicator	Requirement satisfied (yes/no)	Auditor Comments
Completeness	All critical locations sampled	Yes	Given the nature of the material on site grid-based sampling was considered to be appropriate. The former market garden area in the southeast part of the site has been idle since the quarry operations commenced in 1950s. Testing of the former market garden area was completed generally in accordance with AS4482 requirements. A sampling and analytical quality plan (SAQP) for the soil sampling and testing of all areas and the bunds was provided to the auditor for review. A registered survey of the wells and sampling locations was completed and provided in the consultant reports.
	Soil samples collected (from grid and at depth)	Yes	Soil sampling collected from grid-based locations and appropriate depths across the site following the filling of the former quarry area was considered to be sufficient to characterize the soil conditions and to describe background conditions. Grid-based sampling undertaken for collection of soil samples of the former market garden area was in accordance with AS 4482.1 requirements. The validation sampling across the former quarry area was completed at 20 locations to depths of 1.5m; the investigation was further and complementary to the progressive sampling and analysis of fill following placement and compaction during the filling operation. Over 100 soil samples were collected and referred for analysis across the former quarry area for the top 3 m of soil. Soil samples from the site margins were sampled at 10 representative locations; this was considered to be adequate for the purpose of the audit given no use was made of these areas and they have remained as bush land.
	Sufficient groundwater samples were collected to characterize the spatial and temporal conditions.	Yes, with qualifications	Based on the review of the site history and quarry operations the site is not considered to be a source site for groundwater contamination. Groundwater samples were collected from four wells located around the site from 2010. Groundwater monitoring events were completed for all wells in April 2010, December 2012, December 2013 and May 2015. As noted the ASA groundwater monitoring event completed in December 2011 (and June 2012) was not supported by adequate data quality assurance/quality control and has not been considered for the purpose of the audit. The groundwater monitoring program was considered sufficient to characterize the spatial and temporal groundwater conditions across the site. Note that the May 2015 groundwater monitoring event was completed following the filling of the quarry. Groundwater analyses were completed for a broad range of volatile and non-volatile chemicals as note in section 7.3.
	Standard Field Operating Procedures (SOPs) approved and complied with by investigations	Yes	The soil and groundwater sampling completed by ASA and ESA were completed generally in accordance with approved SOPs. In this regards the procedures were consistent with AS4482 and NEPM 1999 (as amended in 2013) requirements. The groundwater sampling methodology was conducted using micro-purge technique and was generally in accordance with EPA Victoria Publication 669. Soil sampling by ESA were collected by push tubes, which are considered to be appropriate for quantification of VOCs. The environmental auditor's support staff observed groundwater and soil sampling and the ESA field staff were suitably experienced in the sampling methods and SOPs were followed.
	Experienced sampler	Yes	ESA stated that an experienced field scientist completed the soil sampling and groundwater well installation and sampling.
	Documentation correct	Yes	Field logs were completed for the all soil and groundwater sampling locations in accordance with relevant guidance. Field logs, bore development logs and purge logs for groundwater sampling were completed as set out in EPA Victoria publication 669. Chain of custody documentation was completed for all sample transfers including quality assurance/quality control samples. Calibration certificates were provided for field instruments and were complete. All documentation was attached to the investigation reports (with the exception of the ASA Groundwater investigation report (July 2012), as noted above).
	All critical samples analysed according to SAP	Yes	All critical samples were analysed according to the SAQP. See above comment.
	All analytes analysed according to SAP	Yes	All analytes for the further soil and groundwater investigation were analysed according to the SAQPs.
	Appropriate methods and PQLs (or Limits of reporting)	Yes	ESA referred all primary soil and groundwater samples to ALS and Eurofins (formerly to mg/Labmark) for secondary analysis. Both laboratories are NATA certified for the analysis methods undertaken. The LoRs were appropriate for the audit criteria for the beneficial use objectives for soil. A number of LoRs were not appropriate for groundwater, however this was not considered to affect the integrity of the investigation.
	Sample documentation complete	Yes	As noted above.
Comparability	Sample holding times complied with	Yes, with qualifications	All soil analysis was conducted within the appropriate holding times. Non-compliances with holding times for pH were noted for all groundwater monitoring events; the audit considered that the field data is however relevant and this did not affect the integrity of the data. Holding times for groundwater samples for nitrate and hexavalent chromium were exceeded for during the November 2013 groundwater monitoring event. The analysis results were consistent with data from the other groundwater monitoring events and this non-compliance was not considered to affect the integrity of the data set.
	Same SOPs used on each occasion	Yes	As noted above
	Experienced sampler	Yes	See above.
	Climatic conditions (e.g. temperature, rainfall, wind)	n/a	All sampling was undertaken during no rainfall days.
	Same types of samples collected (e.g. filtered, size, fractions)	Yes	The sample type for soil and groundwater was consistent throughout the investigations.
Sample analytical methods	Yes	NATA (and equivalent) approved methods were used and were consistent as noted above.	



Data Quality Objective	Data Quality Indicator	Requirement satisfied (yes/no)	Auditor Comments
	used (including clean-up)		
	Sample LoRs	Yes.	See above.
	Same laboratories used	Yes.	See above.
	Same units used	Yes	The laboratories and consultants used the same units. The data has also been correctly translated from the NATA reports to the consultant's report.
Representativeness	Appropriate media sampled according to SAQP	Yes	The appropriate media was sampled according to the SAQP; this includes soil and groundwater.
	All media identified in SAP sampled	Yes	All media identified in the SAQPs was sampled (soil and groundwater).
	All samples analysed according to SAP	Yes.	All samples were analysed according to the SAQP.
Precision	SOPs approved and followed	Yes, with qualifications	SOPs were approved and have been generally complied with during all investigations. The SAQP for the soil sampling of bunds margins and former market garden was provided to the audit following completion of the bund sampling. Further sampling was undertaken at the requested of the auditor to validate the results. This sampling was observed by the auditor's assistant.
	Equipment decontaminated between samples	Yes	SOPs provided for appropriate decontamination of sampling equipment.
	Analysis of field duplicates and triplicates	Yes, with qualifications	A number of soil and groundwater duplicate/triplicate pair RPDs exceeded the 50% limit as set in AS4482.1. 4 RPD pairs for split samples (SP13 to SP62) exceeded the 50% limit for chloride and sulfate.  Blind replicate (duplicate) pairs reported a RPD above the 50% limit for 6 analytes; all exceedances were for samples with reported concentrations less than 10 times the LoR and are considered to be acceptable; with the exception of sulfate reported as 310 mg/kg by ALS and <50 mg/kg by Eurofins (SP20/0.35-0.50 and pair). This is considered to be due to sample heterogeneity and is not considered to affect the overall data integrity  RPDs for split replicate pairs were reported above the 50% limit for 9 analytes; the reported concentrations for all exceedances were within 10 times the LoR and acceptable; with the 5 exceptions where RPDs were greater than 100 were reported. RPDs pairs were above 100% for SP23/0-0.15 with zinc at 9 and 65 mg/kg, manganese at 6 and 43 mg/kg and nickel at 4 and 10 mg/kg and for SP20/0.35 -0.5 with manganese at 37 and 398 mg/kg and zinc at 42 and 146 mg/kg. Again given the nature of material this is considered to be due to sample heterogeneity. All values were reported below the relevant screening levels.  All RPDs for groundwater duplicate and triplicate pairs for was reported below 50% with the exception of aluminium.
	Analysis of laboratory duplicates	Yes	The frequency of laboratory duplicates analysed was sufficient to meet requirements of the laboratory standards; minor non-compliances with the laboratory standard were noted.
	Laboratory prepared volatile trip spikes	Yes	Trip spikes were not including in the quality assurance/quality control used as part of the investigation. This is not considered to detract from the integrity of the investigation.
Accuracy	SOPs approved and complied with of field investigation.	Yes.	See above.
	Analysis of trip blanks	Yes	Trip blanks were analysed each sample batch (container) for the soil and groundwater sampling and reported concentrations of THMs and BTEX below LoRs
	Analysis of field blanks	Yes.	Field blanks were collected for each day of sampling for the soil and groundwater sampling and reported concentrations below the LoRs.
	Analysis of rinsate blanks	Yes	Rinsate blanks were collected for each day of sampling for the soil and groundwater sampling and reported concentrations below the LoRs.
	Analysis of method blanks	Yes	ALS and mgt/Eurofins reported that all method blanks were below the LoRs.
	Analysis of matrix spikes (Addition of the analyte to the sample and reported as percentage recovery).	Yes, with qualifications	ALS and mgt/Eurofins recoveries were within the 70 to 130% limits set out in their standards for soil analyses; with the exception of one outlier (for hexavalent chromium) reported by ALS. Eurofins reported all matrix spikes within the standard limits.  All spike samples for groundwater analyses were reported within the acceptable limits.
	Analysis of surrogate spikes	Yes.	ALS and Eurofins reported all surrogate spikes were within the nominated limits.
	Analysis of laboratory control samples.	Yes, with qualifications	ALS and mgt/Eurofins recoveries were within the limits set out in their standards for soil analyses; with the exception of one outlier (for benzo(a)pyrene) reported by ALS. Eurofins reported all matrix spikes within the standard limits. This was not considered to affect to overall integrity of the data set.  All control samples for groundwater analyses were reported below the acceptable limits.



## 10. Nature and Extent of Site Contamination

### 10.1 Condition of the Soil

The site is vacant and has been restored to the historical land from following filling of a former clay quarry in the central part of the site.

The former quarry was filled from 2013 to 2015 with locally source siltstone to restore the historical landform. Approximately 300,000 m<sup>3</sup> of siltstone was imported from developments in Mitcham, Eastland at Ringwood and Knox Hospital to site and compacted to progressively fill the quarry.

Visual inspection and testing of all imported siltstones by ESA were completed for each 300 mm layer following compaction. The auditor and the auditor's assistant also made several site inspections during this period and visually observed the process and material.

Further soil investigations were completed for the following site areas following completion of the filling of the quarry area:

- Overburden material relocated from the quarry area the form screening bunds around the perimeter of the former quarry in the 1960s.
- Validation of the former quarry area.
- The south-eastern part of the site (former market garden area).
- The northern and western margins of the site (these areas were undisturbed during the quarrying).

All material observed during the sampling of the screening bunds, the former market garden, the western and northern margins and the validation sampling of the quarry area was that of natural material with no evidence of waste or discoloration or odour. All soil, including the bund material, was characterised as grey/light brown weathered siltstone (clayey silt) with some orange mottling. PID measurements were undertaken for all samples and were recorded as 0 ppm.

The range of pH of the natural clays at the site (former market garden area and northern and eastern margins) was typically from 4.1 to 7.3. The pH of the imported siltstone was typically around 7.

The progressive sampling of the fill reported arsenic above the EIL and HIL of 100 mg/kg in a number of composite and discrete samples in the top 3m of the fill. The validation sampling completed following the completion of the filling also reported arsenic above the EIL and HIL; with a concentration of 134 mg/kg reported at one location at a depth of 1.35–1.50 m in the imported fill. Arsenic is naturally occurring in siltstone and is not leachable based on ASLP testing undertaken for selected soils from the imported material used in to fill the quarry.

Copper was reported at 1 location in the fill at concentration of 50 mg/kg at a depth of 0.35–0.50 m, which marginally exceeded the EIL for a soil of 45 mg/kg. The EIL for copper is pH dependent. The copper in the siltstone is naturally occurring with background concentrations of typically 10 to 15 mg/kg. The copper concentration was significantly below the HIL of 6000 mg/kg for residential use.

Fluoride concentration in the imported and site siltstone have ranged up to 700 mg/kg with mean concentrations of around 465 mg/kg. NEPM 1999 (as amended in 2013) does not nominate an EIL or HIL for fluoride however all concentration are below the USEPA residential screening level of 3100 mg/kg.

All other analytes were reported at concentrations below screening levels.

#### Arsenic in soils to 3 m

NEPM 1999 (as amended in 2013) guidance recommends that the condition of the top 3 m of soil is relevant to human health and similarly the top 2 m is relevant for ecosystem protection for any normal land use.





The levels of arsenic in shallow soils to a depth of 3.0m were elevated in the former quarry area as a result of the high naturally occurring concentration of arsenic in soils imported from the Eastland Shopping Centre and Knox Hospital sites.

The audit has considered 2 soil data sets in assessing the concentration of arsenic in shallow soils across the former quarry area, one for the fill as imported<sup>21</sup> and a second for the final soil validation completed to validate the top 3.0m depth of soil following placement and compaction and prior to placement of the topsoil from the bunds<sup>22</sup>. A total of 111 discrete fill samples from the top 3.0 m of imported fill placed across the former quarry area were analysed.

The fill to a 3.0m depth in the former quarry area was sourced from Eastland Shopping Centre in Ringwood and Knox Hospital in Wantirna where the natural siltstone has naturally occurring high arsenic concentrations. The highest arsenic concentration in top 3.0 m was reported at 180 mg/kg at a 1.3m depth below the final site surface level from the fill reporting. Four (4) samples reported arsenic concentration in fill above 100 mg/kg. A summary of the arsenic concentration data for the analyses of fill and from the final quarry area validation is set out in Table 20.

**Table 20: Arsenic in imported siltstone in top 3.0 m**

Data Set	Number of samples	Range of arsenic concentrations (mg/kg)	Number of samples exceeding HIL	Mean concentration (mg/kg)	95 UCL of the mean (mg/kg) <sup>1</sup>
Fill Importation report	51	10 – 146	3	42	50
Quarry area validation	60	7 – 134	1	21	33

Notes

1. 95UCL of mean by Chebyshev method

The arsenic concentrations above 100 mg/kg were all reported at depths of 1.5 to 2.5 m below the final site surface level. ASLP testing for selected fill samples from the top 3.0 m of imported fill reported all arsenic concentrations below laboratory LoRs for arsenic.

Dr Ismail Gulec (a member of the auditor's expert support team (risk assessment and toxicology)) undertook a review of the bioavailability of arsenic in the natural siltstone and the associated human exposure risk at the request of the environmental auditor. This assessment concluded that the bioavailability of arsenic in the natural siltstone was low. The advice noted to the following:

- Arsenic is a non-volatile substance. Therefore, no vapour exists for inhalation by the receptors.
- Soil samples with arsenic concentrations above the human health investigation levels were collected from depths greater than of 1.5 to 2.5 m and there is no complete direct contact (ingestion of soil and dermal contact) exposure pathway of residents and maintenance workers unless the soil is disturbed by deeper excavations, such as services trenches.
- Where deeper excavation occurs and due to the mobility of receptors a 95 UCL is representative of potential long term exposure to arsenic in soil where and the calculated 95 UCL (for both data sets) are well below the HIL for standard residential use of 100 mg/kg.

Therefore, the review by Dr Gulec concluded there is no risk identified for the future users of the site. However, if deep excavations are conducted in these high arsenic locations, and if soil is left on the surface after the work, exposure pathways of direct contact will be complete for the future users of the Site. This is a highly unlikely scenario, but if it occurs, the potential risk for this scenario would still be acceptable for the future users due to the following:

- The NEPM 1999 (as amended in 2013) criterion for arsenic was derived with a risk assessment assuming that the arsenic in the soil is 100% bioavailable for human consumption; this is a highly

<sup>21</sup> For discrete sample analyses from the ESA Fill Importation Report Eastland Shopping Centre and Knox Hospital Revision 3 dated 12 October 2015

<sup>22</sup> From the ESA Stockpile Soil Validation Report – Norvel Road, Ferntree Revision 1 dated 4 June 2015



conservative assumption. Considering the leachability tests reported non-detect for the arsenic soil, 100% bioavailability would be not applicable for this Site.

- A literature review that the arsenic bioavailability would potentially be 25% for human consumption. If 25% bioavailability is used for the arsenic on surface soil, the risk will be in an acceptable range.

Based on the soil analysis data for arsenic, including the leachability data, and the expert advice the auditor considers that the arsenic in the importer siltstone fill does not preclude a residential use of the site.

#### **Arsenic in groundwater**

The auditor also reviewed groundwater data from pre and post-filling were maximum arsenic in groundwater was 4 µg/L. All concentrations were below the beneficial use objective for Maintenance of Ecosystems criteria for down-gradient surface water receptor. Concentrations of arsenic in groundwater post-filling were less than the concentration reported prior to filling.

### **10.2 Aesthetics**

No waste was identified in the natural or imported siltstone across the site.

### **10.3 Asbestos**

Asbestos was not identified during the site investigation. A survey was completed by Azcor for ESA of all stockpiled material located in bunds surrounding the quarry area. No asbestos containing material (ACM) was identified.

### **10.4 Groundwater**

#### **10.4.1 General**

The surface aquifer is located in the Humevale Formation siltstones, which occur regionally.

Groundwater at the site was intersected at depths ranging from approximately 3 to 20m across the site for the 2010 to 2015 groundwater monitoring events.

No non-aqueous phase liquid or groundwater odour was identified during the groundwater monitoring events.

Based on the groundwater monitoring event data from the 2010 to 2015 field measurements the TDS of groundwater at the site ranged from 3200 to 6400 mg/L. Then groundwater is classified as *Segment B* under SEPP Groundwater and the beneficial uses of groundwater to be protected are:

- Maintenance of Ecosystems.
- Primary Contact Recreation.
- Stock Watering.
- Agriculture Parks and Gardens.
- Buildings and Structures.
- Industrial use.

#### **10.4.2 CUTEP Determination**

Section 13.7 of EPA Victoria Publication 759 – *Environmental Auditor (Contaminated Land): Guidelines for Issue of Certificates and Statements of Environmental Audit* provides the criteria for CUTEP determinations where groundwater beneficial use are precluded by contamination and groundwater is deemed to be polluted.



An auditor may assess and determine CUTEP for audits that are non-source sites where pollution of groundwater is identified and the following conditions are satisfied:

- The site is not the source (or likely source) of pollution;
- Beneficial uses of groundwater are not relevant; and
- Access to the site is not required to effect the only practicable clean-up options to protect surface water from the effects of groundwater pollution.

The auditor notified EPA Victoria that a CUTEP determination was required on 15 September 2015 and that the auditor intended to determine CUTEP.

Based a review of the site history and the groundwater analytical data for the May 2015 monitoring event naturally occurring concentrations of only iron and manganese exceeded the relevant beneficial use objectives for the aquifer set out in Table 3 of *SEPP (Groundwaters of Victoria) 1997*. The elevated concentrations of these heavy metals is however considered to be naturally occurring and associated with the regional geology of the upper aquifer and is not considered to be pollution of groundwater. In accordance with section 10 of the SEPP the background level of a water quality indicator sets the objective.

CUTEP is not relevant where pollution of groundwater has not occurred and a determination was not relevant.

#### 10.4.3 Maintenance of Ecosystems

The concentrations of a number of naturally occurring heavy metals, namely, cadmium, copper, lead, nickel and zinc in groundwater at the site exceeded the MoE objectives as set out in *SEPP (Waters of Victoria) 2003* for the water of the Dandenong Valley (and Blind Creek) with reference to ANZECC 2000 guidelines. The concentration of all heavy metal are naturally occurring in groundwater at the site based on the May 2015 groundwater monitoring data and set the beneficial use objectives for Maintenance of Ecosystems for the Blind Creek, which lies approximately 500 m to the north and down-gradient of the site. According the beneficial use objectives for Blind Creek are not potentially impacted the groundwater conditions at the site.

Groundwater discharge from the site to Blind Creek is not likely to occur for over 500 years.

#### 10.4.4 Auditor Comment

Groundwater at the site is classified as *Segment B* and pursuant to *SEPP (Groundwaters of Victoria) 1997* the following beneficial uses are to be protected:

- Maintenance of Ecosystems
- Agriculture Parks and Gardens
- Stock Watering
- Primary Contact Recreation
- Industrial use

There are no surface waters at the site and the beneficial use of Maintenance of Ecosystems (MoE) is relevant at the inferred point of groundwater discharge at Blind Creek approximately 500m to the west of the site.

Data groundwater data from the May 2015 monitoring event reported naturally occurring concentrations of manganese and iron above a number of beneficial use objectives for groundwater at the site a set out in Table 3 of *SEPP (Groundwaters of Victoria) 1997*. These elevated heavy metal concentrations are considered to be naturally occurring and an artefact of the regional geology. In accordance with section 10 of SEPP the background water quality represents the beneficial use objective for groundwater use at the site.

The use of the groundwater extracted at the site for any purpose should be subject to testing in accordance relevant guidance to assess suitability.

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Any use of groundwater at the site is unlikely to be realized given the low aquifer yield and the location of the site within an urban residential area with a reticulated water supply area. In this regard the auditor noted that there is no existing or likely future use of groundwater within 1 km of the site and down-gradient of the site.

## 11. Evaluation of Environmental Quality of the Site

### 11.1 Soil

#### 11.1.1 Maintenance of Ecosystems

The NEPM 1999 (as amended in 2013) recommends use of the interim urban EILs where no land use or site-specific risk assessment has been completed. Concentrations of arsenic and copper marginally exceeded the NEPM 1999 (as amended in 2013) EILs within the top 2 m of the imported fill. Both the elevated arsenic and copper concentrations are naturally occurring in siltstones regionally. Testing of soils identified that the arsenic was not leachable by ASLP testing.

Vanadium and fluoride concentrations were naturally elevated and are all naturally occurring in the imported siltstone.

The naturally high concentrations of arsenic, copper, fluoride is not considered to impact the ecosystems at the site for an urban residential use as all these elements are naturally occurring regionally.

#### 11.1.2 Human Health

The concentration of arsenic exceeded the NEPM 1999 (as amended in 2013) HIL of 100 mg/kg at a minor number of locations in the former quarry area.

This concentration of arsenic is not considered to preclude the urban residential use of the site.

#### 11.1.3 Buildings and Structures

The Land SEPP requires that contamination must not cause the land to be corrosive, or to adversely impact the integrity of structures or building materials.

The NEPM 1999 sets a guideline for sulfate concentration in soil of 2000 mg/kg for urban ecological settings.

Australian Standard AS3600 – *Concrete Structures* – states that permeable soils with a pH of less than 4 or groundwater containing sulfate concentrations higher than 1000 mg/L is considered aggressive and detrimental to concrete structures.

The condition of the fill and the underlying natural material is not considered to preclude the beneficial use of Buildings and Structures.

#### 11.1.4 Aesthetics

Contamination must not cause the land to be offensive to the senses of human beings under the SEPP provisions. No waste or discoloured/odours soil was identified and this use is not precluded.

#### 11.1.5 Production of Food, Flora and Fauna

The site is zoned for residential use and this beneficial use is not considered to be relevant at the site.

Furthermore the naturally low pH of the soil is potentially detrimental to the production of food, flora and fibre is a regional artefact. The occurrence of concentrations of arsenic, copper in soils above EILS is very limited in the top 2 m of soil across the site as not is considered to preclude the beneficial use of Production of Food, Flora and Fibre.

#### 11.1.6 Summary

The condition of the soil at the site is not considered to preclude any relevant beneficial use for the land set out in Land SEPP as set out in Table 21.



**Table 21: Summary of impact on potential Beneficial Uses of the site**

Beneficial Use	Objective Status
Maintenance of Ecosystems	Not precluded
Protection of Human Health	Protected
Buildings and Structures	Protected
Aesthetics	Protected
Production of Food, Flora and Fibre	No precluded

### 11.2 Groundwater

Elevated concentrations of iron, manganese and a number of other heavy metals have been reported in groundwater based on the May 2015 groundwater monitoring data. These elevated heavy metal concentration are considered to be naturally occurring and an artefact of the regional geology. In accordance with section 10 of *SEPP (Groundwaters of Victoria) 1997* the background water quality represents the beneficial use objective for groundwater use at the site. The condition of groundwater at the site is not considered to preclude and beneficial use of groundwater.

### 11.3 Off-site Soil Contamination

The site is not considered to be a source of the groundwater pollution.

### 11.4 Nature and Extent of Continuing Risk

It is the opinion of the auditor that there is no continuing risk relating to soil or groundwater contamination at the site.

It is however noted that the concentrations of a number of naturally occurring heavy metals in groundwater at the site are elevated, based on monitoring the May 2015 groundwater monitoring data and any use of groundwater at the site should be subject to testing in accordance with relevant guidance to assess suitability.

The auditor notes in this regard that there is no existing or likely future use of groundwater in the vicinity of the site and the site is within the Melbourne urban area and has a reticulated water supply. The future extraction of groundwater at the site for any use is considered unlikely.



## 12. Audit Outcome

The site was operated as a clay quarry from the 1960s and approximately 400,000 m<sup>3</sup> of material was removed from the central part of the site until the mid-2000s.

Fill comprising natural siltstone was imported from a number of local construction projects in 2013/2015 to restore the original ground levels across the former quarry area of the site. The maximum concentrations of arsenic and copper exceed the NEPM 1999 Ecological Investigation Levels (EILs) the shallow natural soil (within the top 2 m of soil) across the site.

The concentrations of arsenic in the imported fill a number of locations exceeded the NEPM 1999 (as amended in 2013) HIL of a 100 mg/k. Both the mean and 95 UCL concentrations are however significantly below the EILs. The arsenic in the fill was not leachable and the bioavailability is low and is not considered to preclude the residential use of the land.

Fluoride and vanadium concentrations in the fill and natural soil at the site were also elevated but are naturally occurring in the local siltstone and concentration of copper in imported fill and are not considered to preclude the residential use of the site.

The Groundwater at the site is classified as Segment B pursuant *SEPP (Groundwaters of Victoria) 1997*. Groundwater data from the May 2015 monitoring event reported naturally occurring concentrations of manganese and iron above a number of beneficial use objectives for groundwater at the site a set out in Table 3 of *SEPP (Groundwaters of Victoria) 1997*. These elevated heavy metal concentrations are considered to be naturally occurring and an artefact of the regional geology. In accordance with section 10 of *SEPP* the background water quality represents the beneficial use objective for groundwater use at the site.

The use of the groundwater extracted at the site for any purpose should be subject to testing in accordance relevant guidance to assess suitability.

Any use of groundwater at the site is unlikely to be realized given the low aquifer yield and the location of the site within an urban residential area with a reticulated water supply area. In this regard the auditor noted that there is no existing or likely future use of groundwater within 1 km of the site and down-gradient of the site.

The concentration of a number of heavy metal that are naturally occurring in groundwater at the site set the beneficial use objectives for Maintenance of Ecosystems for the Blind Creek, which lies approximately 500 m to the north and down-gradient of the site.

The condition of the site is neither detrimental nor potentially detrimental to any beneficial use of the site.

A Certificate of Environmental Audit was issued for the site on 20 April 2015. The soil and groundwater conditions at the site are not considered to preclude any use of the site.



### 13. Limitations

This audit report and the accompanying Certificate of Environmental Audit relate to the site described as herein have been prepared in accordance with Part IXD of the *Environment Protection Act 1970* (Vic.), relevant EPA Victoria guidelines and other standards, policies and guidelines.

The audit report and Certificate have been prepared for Robertson Industries for the purposes described in the audit report, including informing the future owners and occupiers of the site. It is acknowledged that EPA Victoria and the City of Knox in reaching their conclusions about environmental conditions at the site may also use the audit report and Certificate of Environmental audit. The scope of work performed in connection with the audit may not be appropriate to satisfy the needs of any other person. Any other person's use of, or reliance on, the audit report and Statement, or the findings, conclusions, recommendations or any other material presented in them, is at that person's sole risk.

The conclusions of this environmental audit report and the issue of the Certificate of Environmental Audit are based on a review of information which was available to the auditor at the time of the audit and relating to the environmental quality conditions of the audit site and adjacent land. The audit is relevant at the date of issue of the report and the Certificate, and the audit may not apply if the condition of the land or land use is amended subsequent to the date of issue. AEA and the environmental auditor are satisfied that the information and data available were adequate for this purpose. In the event that site conditions have since changed or are likely to change in the future, the environmental auditor recommends that the an environmental consultant confirms that the site conditions remain suitable for its proposed use.

AEA and the environmental auditor have taken due care to consider all reasonably available information in undertaking this audit and have taken this information to represent a fair and reasonable characterisation of the environmental status of the site, but recognise that any site assessment program is necessarily limited in scope and true site conditions may differ from those inferred from the available data.

Although all reasonable care has been taken, to the extent practical under normal auditing procedures, to assure the reliability of the information, the environmental auditor and AEA cannot warrant that this is the case. If the information is subsequently determined to be false, inaccurate, misleading or incomplete, it is possible that the environmental auditor's conclusions as expressed in the audit report may change. AEA and the environmental auditor disclaim any responsibility for inconsistencies between the findings of this audit report (and the issue of a Certificate of Environmental Audit) and information or data that may become available after the date of completion of this audit.

AEA or the environmental auditor did not conduct verification testing by sampling and analysis of site soils or groundwater, but relied on the data produced from the site assessment, remediation and validation program undertaken by others. The auditor provided comment on, and approval of, the site assessment completed by those consultants after the date of auditor engagement, and conducted site inspections and discussions to be satisfied that the program and its outcomes were appropriate for the purposes of the audit. The auditor is satisfied that the data are reliable for the purpose for which they have been used, and that independent sampling and analysis was not justified in this case.

It is not possible in an environmental audit report to present all data that could be of interest to all readers of this report. Readers are therefore referred to the referenced documentation for further information and data.





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- Victorian Water Register (2015), Licence to Decommission Works, dated 4 December 2015

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Norvel Road Quarry, Ferntree Gully, Victoria



## Appendices

(Refer to digital file: Report Appendices 66238-1\_b)

### Appendix A

Certificates of Title

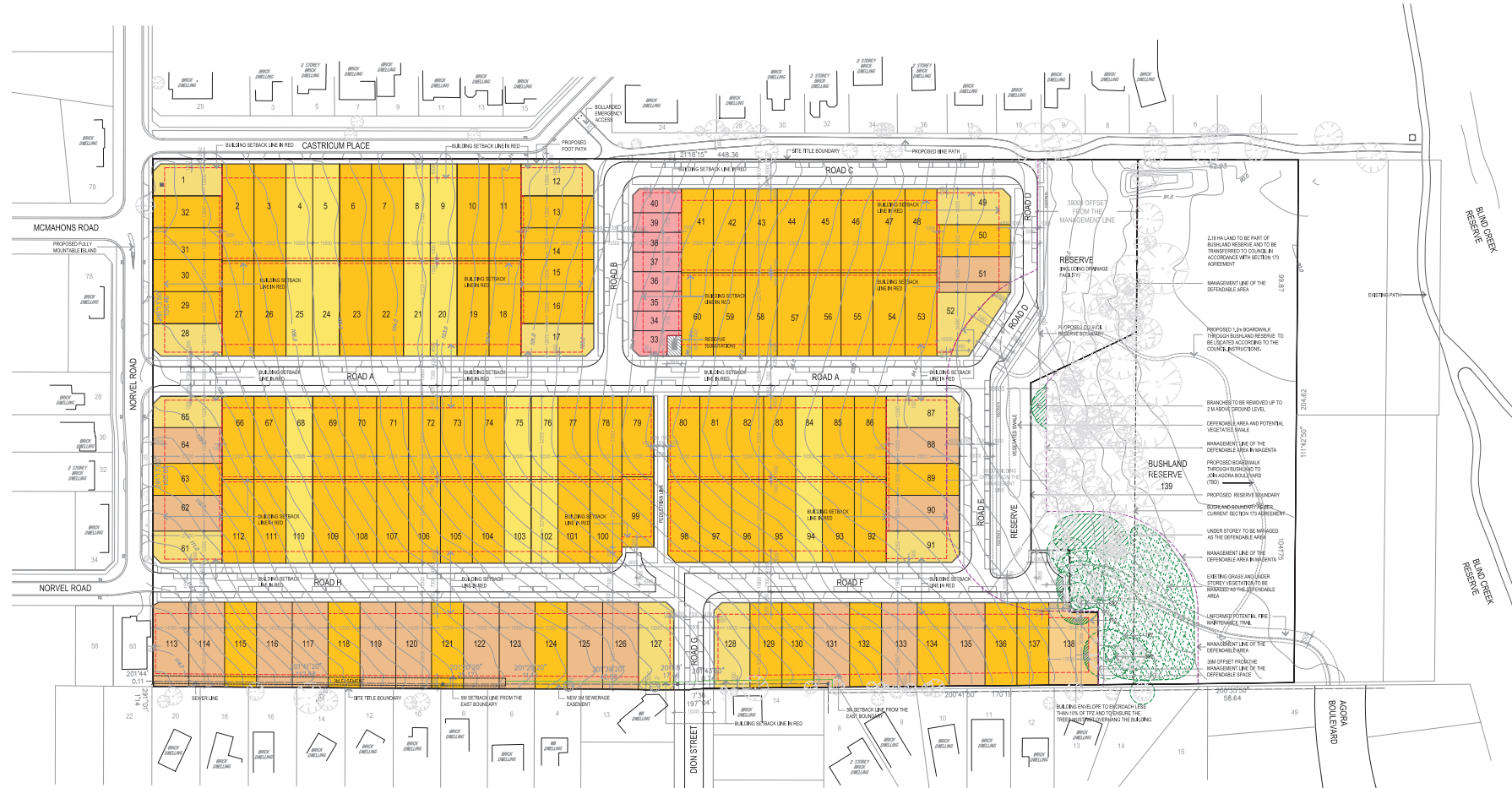
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AREA ANALYSIS	LOT NUMBER	LOT AREA(m²)	LOT NUMBER	LOT AREA(m²)	LOT NUMBER	LOT AREA(m²)	LOT NUMBER	LOT AREA(m²)	LOT NUMBER	LOT AREA(m²)	LOT NUMBER	LOT AREA(m²)	LOT NUMBER	LOT AREA(m²)	LOT NUMBER	LOT AREA(m²)	LOT NUMBER	LOT AREA(m²)	LOT NUMBER	LOT AREA(m²)	LOT NUMBER	LOT AREA(m²)	LOT NUMBER	LOT AREA(m²)	LOT NUMBER	LOT AREA(m²)	LOT NUMBER	LOT AREA(m²)	LOT NUMBER	LOT AREA(m²)	LOT NUMBER	LOT AREA(m²)	LOT NUMBER	LOT AREA(m²)	LOT NUMBER	LOT AREA(m²)																																																																																																																																																																																																																										
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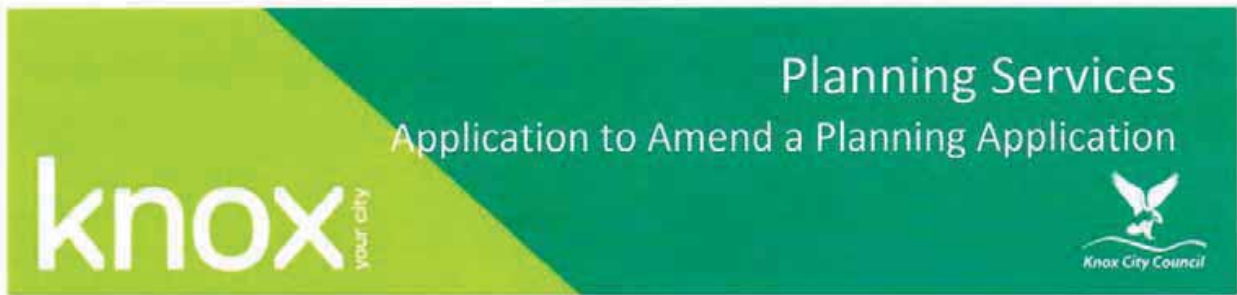
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<span style="background-color: #f0e68c; border: 1px solid black; display: inline-block; width: 10px; height: 10px;"></span>	TOWNHOUSE LOTS	8	TOWNHOUSE LOTS
<span style="background-color: #e6e6e6; border: 1px solid black; display: inline-block; width: 10px; height: 10px;"></span>	BUSHLAND RESERVE	1	BUSHLAND RESERVE



RESIDENTIAL SUBDIVISION OF 290, 410 NORVELL ROAD AND 180 DION STREET FERNTREE GULLY  
36-0125

LAND SUBDIVISION MASTER PLAN  
11 FEB 2021 | REV H | 1:750 @ A1 | 1:1500 @ A3





**Is this the right form for me?**

This form is for making amendments to an application for planning permit that has already been lodged with Council, **but which has not yet been decided**. This form can be used both for amendments made before the advertising of the application (Section 50 of the Planning & Environment Act) or afterwards (Section 57A of the Act). If you wish to modify a previously issued permit, or make a new application for planning permit, you will need a different form.

The prescribed fee in accordance with the Planning Fee Guidelines is required to be paid at the time of this application being submitted to Council.

It is strongly recommended that before lodging this form, you discuss the proposed amendment of your application with the Council Officer processing the application.

**Details of the Planning Application you wish to Amend:**

Application Number:  
C184knox

Address of subject land:  
29Q & 41Q Norvel Road and 18Q Dion Street, Ferntree Gully 3156

The Proposal: what changes are to be made to the application?  
If the description of the use or development is to change, include the full amended description of the proposed use or development, and make clear what changes are to be made. If you need more space, attach correspondence that clearly sets out the changes.

Please refer to the Cover Letter prepared by Urbis that accompanies this application

Has advertising been undertaken for this application?  Yes  No

**Encumbrances on Title**

Does the amended proposal breach, in any way, a registered covenant, Section 173 Agreement or restriction on title?

Yes  No  Not Applicable (no such covenant, Section 173 Agreement or restriction applies)

If yes, you should contact Council for advice on how to proceed with the application.

**The Cost of the Development**

Changes to the type of proposal or the estimated cost of works may alter the fee payable for the application. If this is the case, then you will need to pay the difference between the fee originally paid and the fee payable for the amended proposal.

State the estimated cost of the proposed development. This is the total cost of the proposal, including the amendments.

Unchanged from the initial Application OR:

**Your Details:**

Name (& Company, if applicable): Norvel Estate Pty Ltd C/o Grace Brown - Urbis Pty Ltd

---

Postal Address: Level 10, 477 Collins Street, Melbourne Postcode: 3000

---

Phone No: [REDACTED] Mobile No: \_\_\_\_\_

---

Email Address: [REDACTED]

---

**Declaration to be Completed:**

This form must be signed. Please complete Section A, B or C

<b>A</b>	I declare that I am the Applicant and the Owner of the land and that all information given is true and correct.	Owner/Applicant Signature: <u>[REDACTED]</u>
		Date: <u>17/02/2021</u>
<b>B</b>	I am the Owner of the land. I have seen this application.	Owner Signature: _____
		Date: _____
	I/We the Applicant declare that all information given is true and correct.	Applicant Signature _____
<b>C</b>	I/We the Applicant declare that I/We have notified the owner about this application and that all information given is true and correct.	Date: _____
		Applicant Signature: _____
		Date: _____

**How to Submit an Amendment to a Planning Application**

Amendments can be lodged by emailing the officer assessing your application. They will arrange an invoice for any additional fees. The fees can then be paid online or over the phone. Your application will not be processed if the fees have not been paid.

**Privacy Statement**

The personal information requested on this form is being collected by Knox City Council (Council) for the purpose of assessing your application under the Planning and Environment Act 1987. Any material submitted with this application, including plans and personal information, will be made available for public viewing, including electronically, and copies may be made for interested parties for the purpose of enabling consideration and review as part of a planning process under the Planning and Environment Act 1987. The personal information will be used by Council for that primary purpose or directly related secondary purposes. The information may also be used to update Council databases to assist Council in discharging its functions or providing services. If the information is not collected, your application can not be processed. Requests for access to and/or amendment of personal information should be made to Council's Chief Privacy Officer.



The logo for URBIS, consisting of the word "URBIS" in a bold, white, sans-serif font, enclosed within a white square border.A photograph of a residential street lined with mature trees in full pink cherry blossom. The street is paved and leads towards a row of houses under a bright blue sky with scattered white clouds. The scene is captured from a low angle, looking down the street.

# NORVEL ESTATE, FERNTREE GULLY

URBAN CONTEXT REPORT AND DESIGN RESPONSE

PREPARED FOR  
NORVEL ESTATE PTY LTD / YONG NING PTY LTD  
REV D  
09/02/21

URBIS STAFF RESPONSIBLE FOR THIS REPORT:

Director - Peter Haack  
*B.LandArch, Dip.AppSc(Hort), RLA, FAILA*

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*B.DesSt, M.LandArch, M.Plan(UrbDes)*

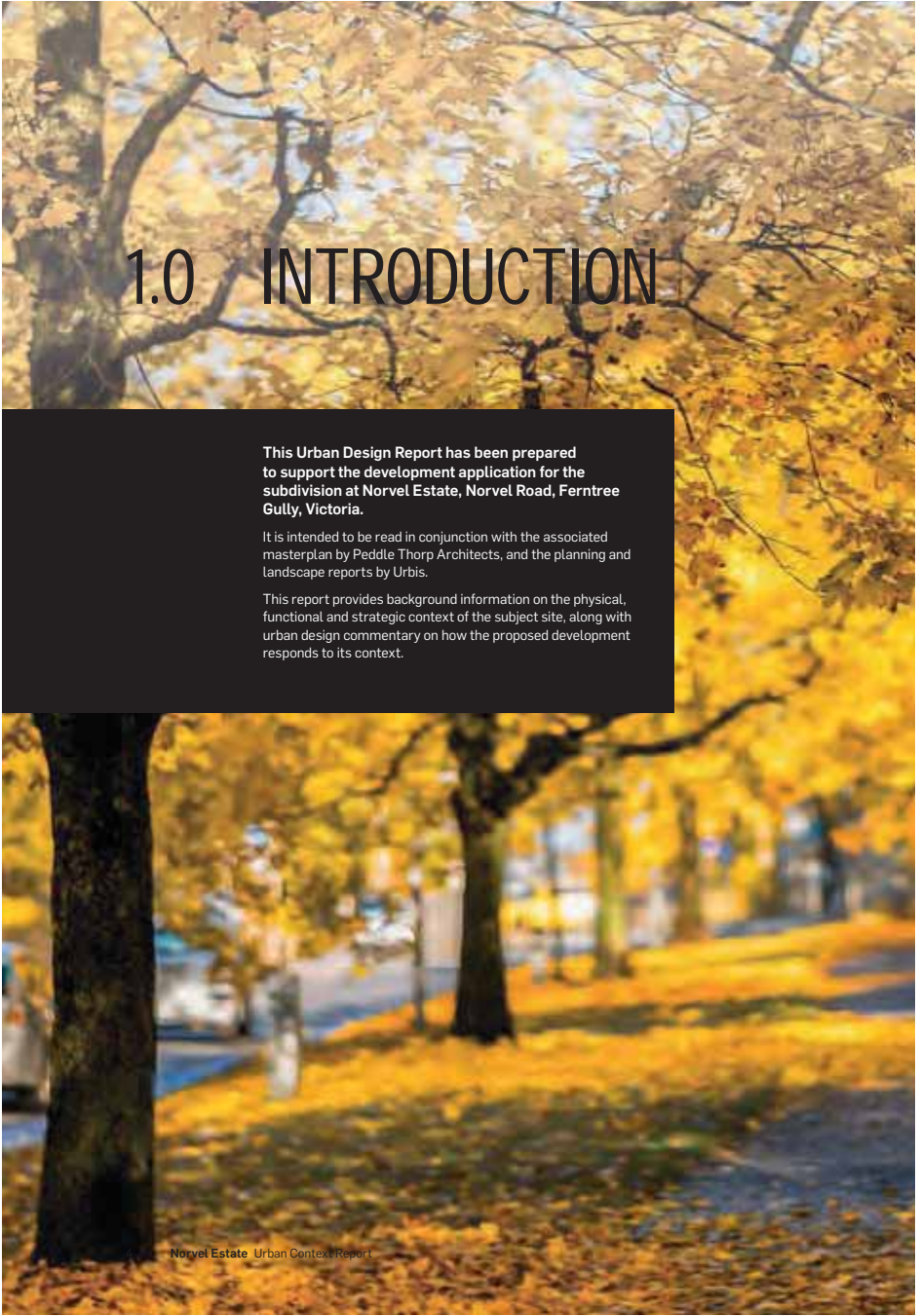
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# 1.0 INTRODUCTION

**This Urban Design Report has been prepared to support the development application for the subdivision at Norvel Estate, Norvel Road, Ferntree Gully, Victoria.**

It is intended to be read in conjunction with the associated masterplan by Peddle Thorp Architects, and the planning and landscape reports by Urbis.

This report provides background information on the physical, functional and strategic context of the subject site, along with urban design commentary on how the proposed development responds to its context.

# 2.0 STRATEGIC CONTEXT

**Norvel Estate [the Site] is situated in an area which is not subject to a Structure Plan. Therefore development is largely controlled by the local Planning Scheme. Additional guidance, particularly for the public realm, is provided in various policy plans and frameworks by Knox City Council.**

## 2.1 ZONING

The Site is currently zoned Special Use. Apart from Urban Floodway and Public Park & Recreation zones on the northern boundary (along Blind Creek), the Site is fully surrounded by Residential Zones (refer to Figure 1).

## 2.2 OVERLAYS

The Site is subject to an Environmental Significance Overlay - Schedule 2 (ES02) on the northern end, covering the area of indigenous remnant vegetation (refer to Figure 2).

This overlay aims to protect sites and vegetation of biological significance within the Knox City Council municipality from extinction, and to maintain and improve habitat corridors and connectivity.

There was previously a Vegetation Protection Overlay 1 (VPO1) over part of the site but it has since been removed since that area has now been cleared of vegetation.

There are no heritage overlays in close proximity and the portion of Blind Creek immediately adjacent to the Site does not have a Land Subject to Inundation Overlay.

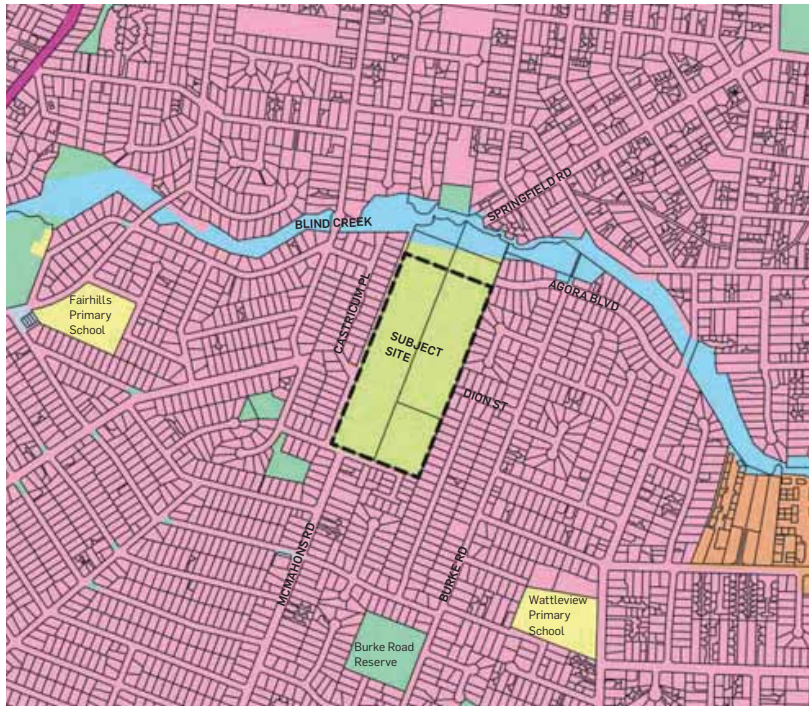


Figure 1 Planning Zones








Figure 2 Overlays



**LEGEND**

	Subject site		Public Park & Recreation
	Special Use		Public Use
	Residential		Industrial 1
	Urban Floodway		Road

**LEGEND**

	Subject site
	Environmental Significance Overlay
	Vegetation Protection Overlay
	Land Subject to Inundation Overlay
	Heritage Overlay

## 2.3 KNOX URBAN DESIGN FRAMEWORK

### Garden Suburb

The Knox Urban Design Framework divides the council area into different Residential Environments with specific guidance provided for each. Norvel Estate is situated within a "Garden Suburb" character area. The key objective for Garden Suburbs is stated as:

“  
ENCOURAGING LOW SCALE DWELLINGS SET WITHIN AN OPEN LANDSCAPE WITH FREQUENT STANDS OF LARGE NATIVE AND EXOTIC TREES.

Notable guidelines include:

- Adjacent to creek corridor open space, encourage
  - medium density
  - public access to creek corridor path.
- Improve the amenity of roads with:
  - avenue tree planting
  - traffic calming where appropriate
  - retain the traditional arrangement of sealed footpaths on both sides of the street.
- Use a single dominant tree species for the whole street.
- Retain existing indigenous trees.
- Increase connectivity between Garden Suburbs and activity centres.

### Creek Corridors

The subject site is also immediately adjacent to a Creek Corridor. Notable strategic directions and actions include:

Creeks as Paths:

- Provide frequent connections to adjoining streets that provide a reasonable range of choice between paths.
- Extending local streets to and along the edges of the creek corridors where space permits.
- Better integrate creek corridors with transport routes.

Creeks as nature:

- Manage the creeks to allow water to be seen as a feature rather than treating them as engineered and sanitised drains.
- Utilise detention and retarding basins as a positive feature of the landscape.
- Prioritise indigenous vegetation.
- Protect & retain remnant vegetation.
- "Encouraging functional, contemporary landscape designs to provide attractive and useful park spaces".

## 2.4 KNOX GREEN STREETS POLICY

The Green Streets Policy is also based on the character areas described in the Knox Urban Design Framework. Guidelines relating to streetscapes in "Garden Suburban" areas (p.23), include:

- Gardens are frequently low level with small shrubs and occasional tall trees, usually native varieties.
- Street trees are generally medium height and may be formally or informally arranged.
- Retention of native and indigenous canopy trees is encouraged.
- Retain existing high canopy trees wherever possible. If removal is necessary, replace with a tree of an equivalent height.

### Nature Strips

As a general rule, landscaping to nature strips (i.e. a treatment other than grass) is only permitted in special circumstances (e.g. erosion prevention, public safety, resident incapable of maintaining grass, service requirements etc.).

### DESIGN RESPONSE TO 2.3 & 2.4

- Remnant vegetation subject to the ESO2 overlay is protected and retained.
- The design of the public realm offers a particularly strong response to the Garden Suburbs and Creek Corridors guidelines and desired characters. Refer to the Norvel Estate Landscape Report for details.
- The key objective of Garden Suburbs is met with:
  - large expanses of green space and existing trees being preserved, and
  - high densities of new trees proposed in the public realm.

## 2.5 LEISURE PLAN

A key area of focus in the Leisure Plan is "Active leisure", and opportunities for residents to become more active as part of their daily routine" (p.7). Active leisure is defined here as "Leisure activities that involve physical activity".

Some key observations and actions from the leisure plan include:

- "It is important to provide facilities (e.g. bike storage facilities, safe road crossings, seats, trails/footpaths) that encourage residents to incorporate physical activity into daily work, school, and family routines" (p.19)
- "There is also a need to acquire additional open space for sport and leisure activities previously unplanned for, such as dog off leash activities" (p.48)
- "Explore opportunities for the establishment of outdoor gyms" (p.39).

### DESIGN RESPONSE TO 2.5

- Providing a formalised SUP along the western boundary and access paths through the bushland reserve will support active leisure and active transport (walking & cycling to local destinations)

## 2.6 PLAY SPACE PLAN

Knox City Council has approximately one playground per 740 people, the highest in the region with exception of the City of Manningham.

According to the Knox Play Space Plan "All residents should ideally have access to a park (of any category) within an approximate 10 minute walk or up to approximately 500m". By these standards, Norvel Estate has excellent access to existing playgrounds and public open space (refer to Figure3).

### DESIGN RESPONSE TO 2.6

- Recognising that the area is already well serviced by playgrounds with proprietary equipment, the public realm offering draws upon other opportunities identified in the Leisure Plan - through the following actions:
  - the development of passive, local open space,
  - the provision of safe road crossings, seats and footpaths.

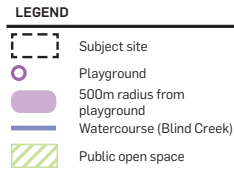


Figure 3 Playground & public open space provision

# 3.0 BROAD CONTEXT

## 3.1 LAND USES

Norvel Estate is located within an established low scale residential area, bounded to the north by Blind Creek. It is located approximately 30 kms east of Melbourne CBD.

It is well serviced by primary schools and open green spaces, with three schools and three parks located within a walkable 800m radius.

Just beyond this radius, the site has access to a variety of retail outlets in two Major Activity Centres - Boronia and Mountain Gate. These activity centres contain supermarkets, a Kmart, major pharmacies and retail strips including many food and beverage outlets.

## 3.2 TRANSPORT

The site has access to several public transport routes. The main connection is provided by the 753 bus route, a 5-10 minute walk from the site, with a short connection to Boronia Station. Boronia Station is on the Belgrave line with an approximate 50 minute commute to the CBD or 10 minutes to Ringwood. In addition, six bus routes connect with the train station, as depicted in Figure 4.

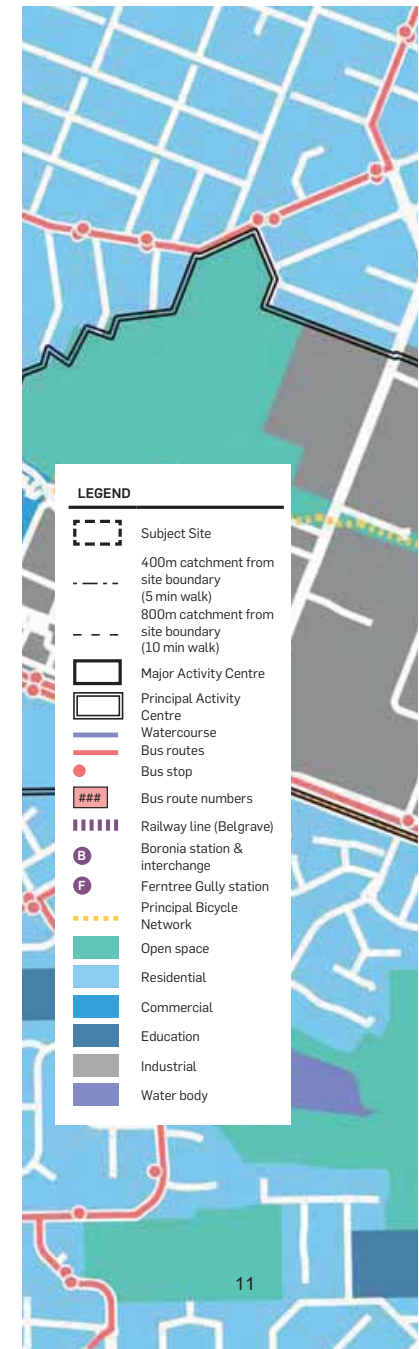
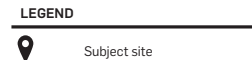
The site has almost direct access to the Principal Bicycle Network via the Blind Creek Trail which meets the Dandenong Creek Trail to the west and the Belgrave Rail Trail to the east.

### DESIGN RESPONSE TO 3.1 & 3.2

- Recognising that conveniences and transport connections are generally not within a very walkable distance, there is an appropriate provision of on-street parking.



Figure 4 Public transport route map (Source: PTV)





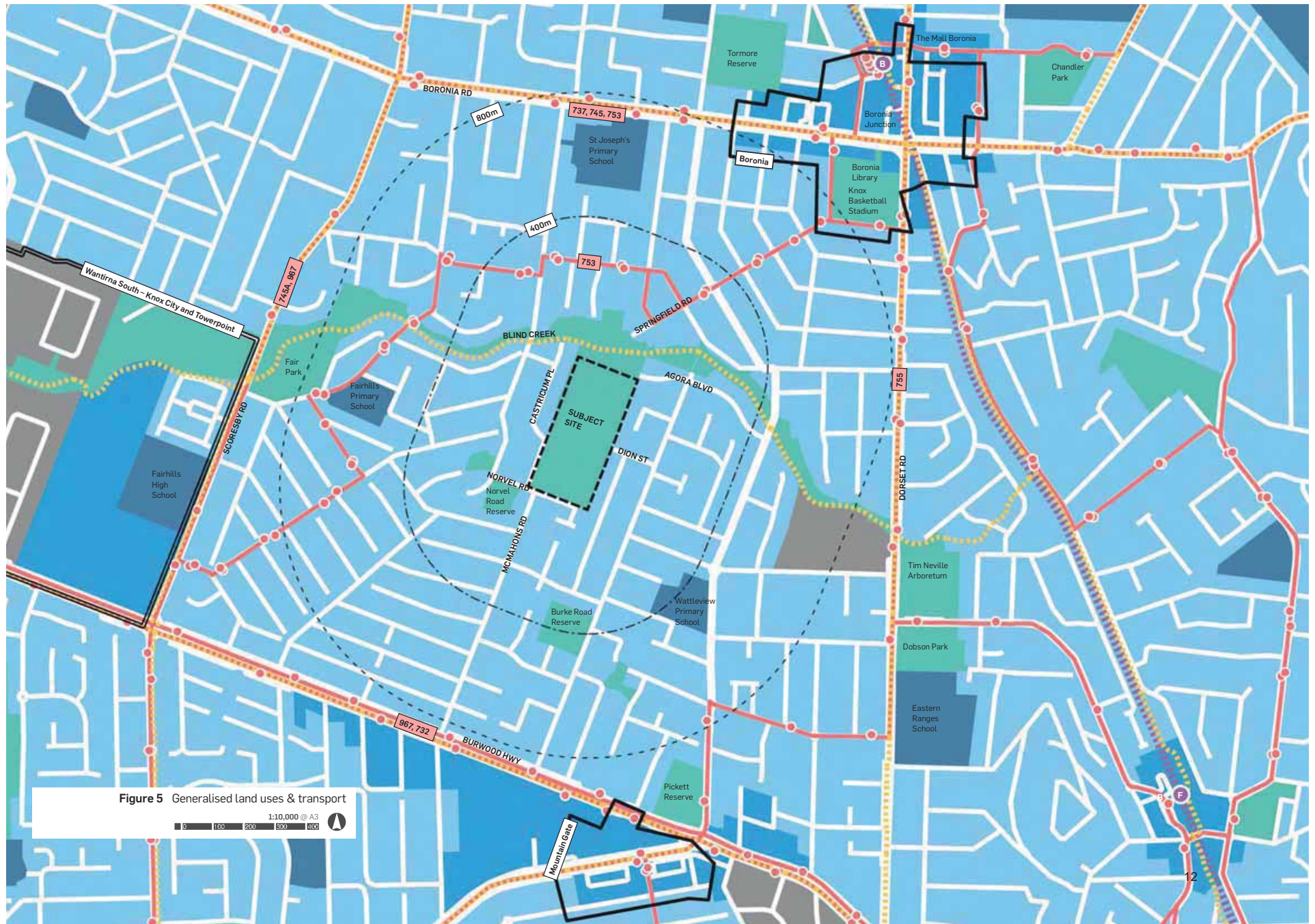


Figure 5 Generalised land uses & transport

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### 3.3 TOPOGRAPHY















The local area has gently undulating topography, sloping down from local high points to Blind Creek.

Although the Site previously had some steep slopes due to past clay extraction activities, it has since been filled in and now has a consistent slope of approximately 1 in 20, falling in elevation from south to north.

#### DESIGN RESPONSE TO 3.3

- Most streets are proposed to run north-south. This ensures level changes between properties are kept to a minimum and reduces the amount of cut and fill required.
- Streets running east-west will enjoy views to the Dandenong Ranges.
- The cluster of dense and moderate tree canopy in the north of the site will be protected and retained.

#### LEGEND

-  Subject site
-  Watercourse (Blind Creek)
-  +1m contours (AHD)
-  Local high points
-  Long-range views to Dandenong Ranges
-  Prevailing wind directions - Summer
-  Prevailing wind directions - Winter
- Geology**
-  Clay pit filled in (indicative)
-  Humevale Siltstone
-  Alluvium
-  Incised colluvium
- Tree canopy**
-  Dense canopy
-  Moderate canopy
-  Scattered canopy

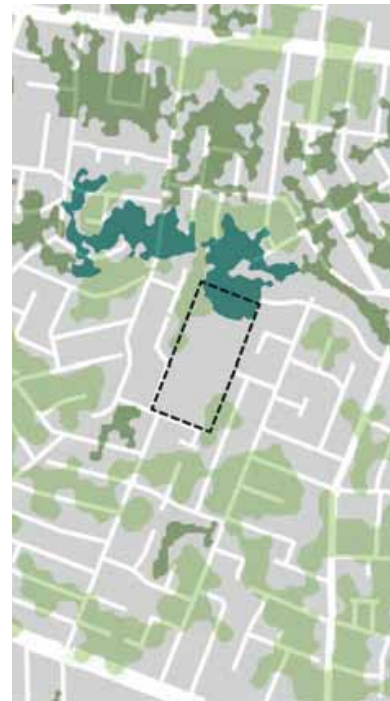


Figure 6 Tree canopy cover

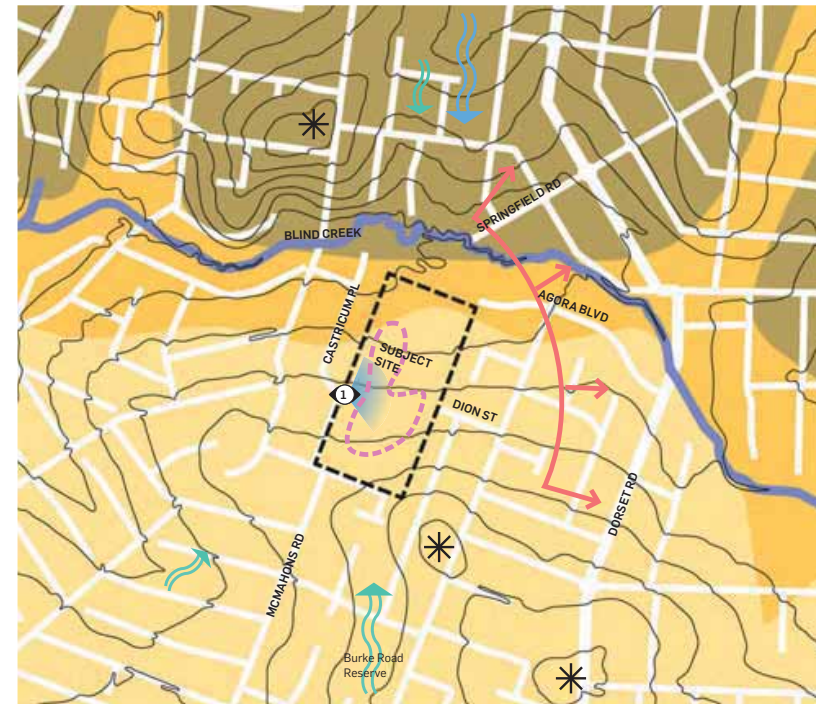


Figure 7 Environmental attributes



Figure 8 Views to the Dandenong Ranges from the Site

### 3.4 URBAN FORM & CHARACTER

In the area surrounding Norvel Estate, the residential streets are laid out in a generally rectilinear arrangement with frequent culs-de-sac / dead end roads and few local connector roads. The nearest main roads are about a kilometre from the subject Site.

Residential lots in the surrounding area are most commonly around 750m<sup>2</sup> in area and contain single detached dwellings of 1-2 storeys in height. However, there is a trend towards further subdividing older lots to accommodate multiple dwellings on sites that would have originally contained a single detached dwelling. This is reflective of changing home buyer expectations and housing affordability pressures, relative to the time many decades ago when the land was first developed.

The front setback depths and articulation of houses often vary noticeably within a street. Occasionally houses are even rotated at different angles to their lots which further breaks up the built edge of the street. This is explored in more detail in Section 5.0 Interfaces and Section 6.0 Local Case Studies.

Apart from residential, this area also has a few 'pavilions in a park' - i.e. mostly larger institutional or community-use buildings which are surrounded by a generous amount of open space and can easily be viewed in the round. There are also some industrial buildings further to the south east of generally low architectural quality, surrounded by paved areas but also a generous number of trees.

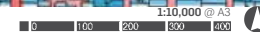
As is regularly noted in Knox City Council strategies and guidelines, this council area is known for having a leafy character. Tree canopy cover is especially dense immediately north of the subject site.

#### DESIGN RESPONSE TO 3.4








- The proposed streets are oriented in the same directions as the existing surrounding streets to provide continuity and aid navigation.
- The design has a finer grain of subdivision than the surrounding areas, responding to changing expectations of the market. Offering this scale of subdivision from the outset avoids the less desirable outcome of larger lots being later subdivided with private lanes to service dwellings at the rear.



Figure 9 Urban form surrounding the subject site



#### LEGEND

	Subject site		Pavilions in a park
	Green space		Industrial
	Typical residential lots (mostly with single low scale detached dwelling)		Local road
	Finer-grain subdivided residential lots		Minor road
			Dead-end minor road

# 4.0 SITE & IMMEDIATE CONTEXT

## 4.1 HISTORY

Norvel Estate was previously known as the Norvel Road Quarry. It was owned by Robertson Industries and was used for clay extraction to manufacture bricks under the Daniel Robertson brand.

Within the past decade, the clay pit has been filled so the site has a relatively consistent, gentle slope and the vegetation south of the most densely vegetated remnant woodland area has been cleared.

## 4.2 BIODIVERSITY

The northern end of the Site contains four regionally Endangered vegetation types - Wetland, Swampy Riparian Woodland, Swampy Woodland and Valley Heathy Forest. It is one of the most densely vegetated areas in its local context.

The Biodiversity Assessment conducted by Ecolink Consulting (Dec 2020) observes the following:

**"Two remnant patches of native vegetation were identified within the study area. Habitat Scores indicate that the vegetation is of high quality in the north of the study area, with Habitat Scores ranging from 26 to 55 (out of 100). Other native vegetation, that is not classified as remnant, was recorded in the south of the study area."**

.... Although 18 threatened flora and fauna species have been previously recorded within three kilometres of the study area within the last thirty years, only one was recorded during the current assessment. [Green Scentbark - *Eucalyptus fulgens*]

- Biodiversity Assessment, Norvel Road, Ferntree Gully, Ecolink, Dec 2020, p. 4



**Figure 10** Site in Feb 2007  
(Source: Sites of Biological Significance In Knox Vol.2, p.180)



**Figure 11** Site in Sept 2013



**Figure 12** Site in Feb 2017 (conclusion of major changes)

LEGEND	
	Subject site
	Vegetation cleared
	Clay pit filled in (indicative)



Figure 13 Biodiversity assessment of the Site (Source: Biodiversity Assessment, Norvel Road, Ferntree Gully, by Ecolink, Dec 2020)

NTS

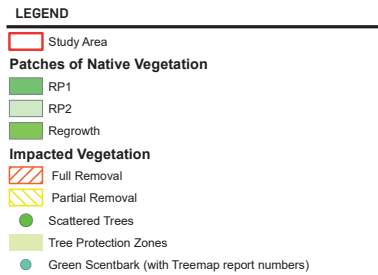


Figure 14 Rare species identified on site - Eucalyptus fulgens

**DESIGN RESPONSE TO 4.1 & 4.2**

- The history of the site is referenced with the use of Daniel Robertson bricks in the hardscape palette (refer to Norvel Estate Landscape Report).
- High quality remnant indigenous vegetation will be preserved within a Council reserve, and other native trees (including the rare *E. fulgens* specimens) will be preserved wherever possible.
- Water run-off from the proposed development will be treated in a constructed wetland before it is discharged into the reserve to help protect the health and biodiversity of the area. Refer to Norvel Estate Stormwater Management Plan prepared by Cardno for further detail.
- The majority of proposed plants are native or indigenous to minimise the risk of weeds invading the reserve. Refer to Norvel Estate Landscape Report for details.

### 4.3 SITE DIMENSIONS

Norvel Estate consists of three rectangular lots, totalling 9.24ha in area. The collective site has an average width of 206m, and average depth of 447m. A 10m wide reserve runs along half of the western boundary. Refer to Figure 15 - Site Survey.



Figure 15 Site survey (Source: H.J. Macey) over aerial view

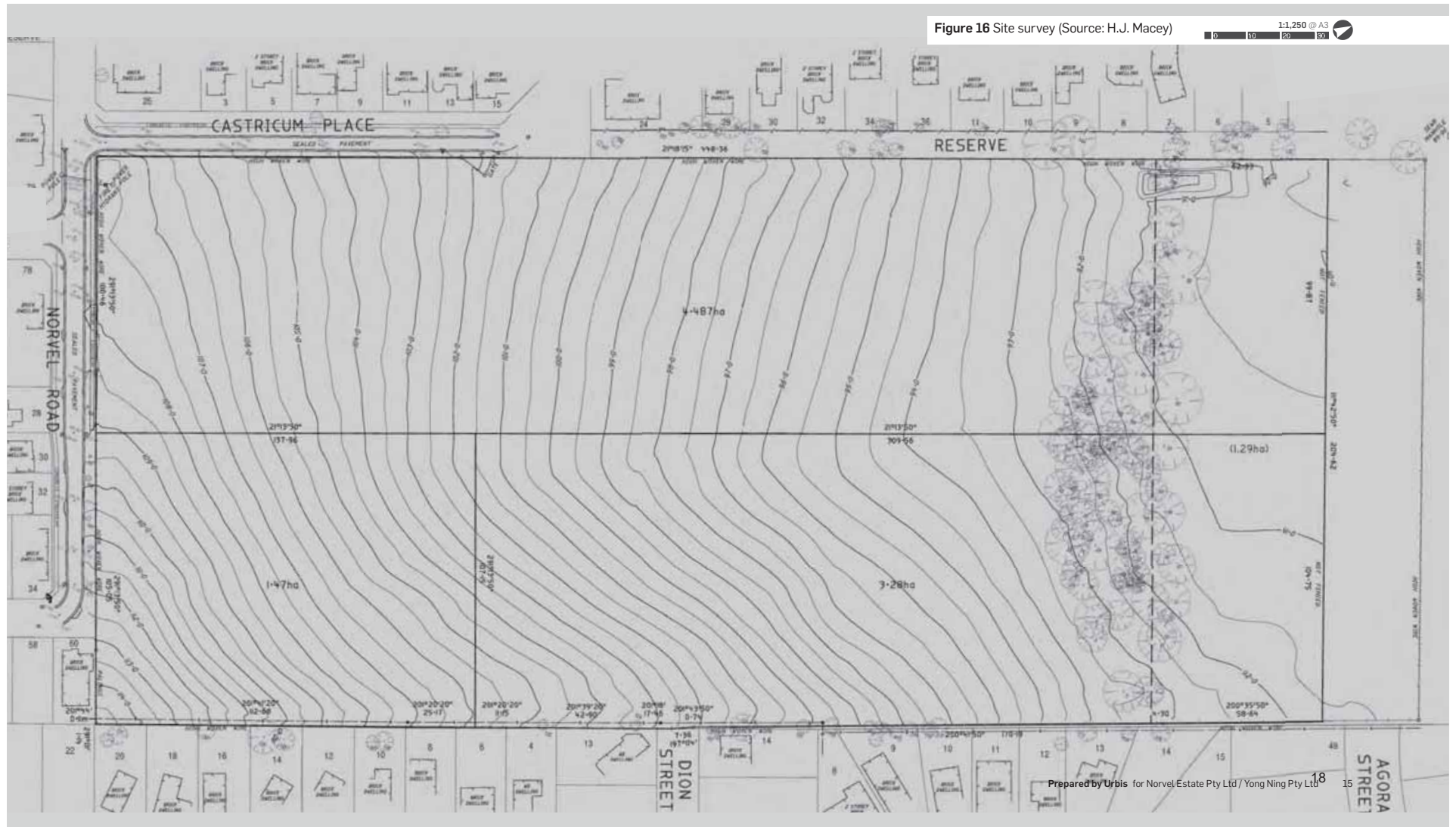


Figure 16 Site survey (Source: H.J. Macey)

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## 4.4 MOVEMENT & ACCESS

The area around Norvel Estate would not generally attract high levels of foot traffic since it is a largely residential area, however the Blind Creek trail attracts recreational walkers and cyclists. The local feeder paths to access the trail are via Springfield Rd and Castricum Place and the linear reserve to the west. These desire lines to and from the Site will be reinforced. While the Blind Creek trail can also be accessed via Castricum Place and Jacobus Walk, this route has an interruption in the middle and inconsistent footpath provision so it is not as clear and direct as the linear reserve, particularly for cyclists.

The surrounding street network is formed by a number of connector streets (e.g. Norvel, Rankin, McMahoons, Edina and Burke Roads) stitched together by secondary streets with perpendicular culs-de-sac.

Vehicles are currently able to access Norvel Estate via three entry points off Norvel Road, Castricum Place, and Agora Boulevard (refer to plans in Section 5.0 Interfaces). Potential entries at Dion Street and Norvel Road provide an opportunity for the site to be more legibly embedded within the surrounding street network.

### DESIGN RESPONSE TO 4.4

- Providing a welcoming entry point at the junction of Castricum Place and the linear reserve, including a rest spot and way-finding.
- New shared use path (SUP) along the linear reserve provides more legible and direct access for pedestrians and cyclists to the Blind Creek trail, and onwards to Boronia Activity Centre.
- Creating logical site entry points and an internal road network that is legible and responsive with the surrounding urban context.

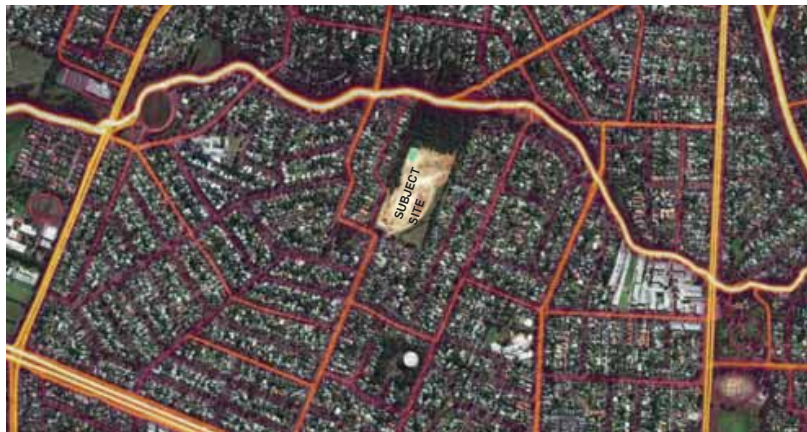


Figure 18 Heat mapping of pedestrian/cyclist movement surrounding site (Source: Strava Labs)

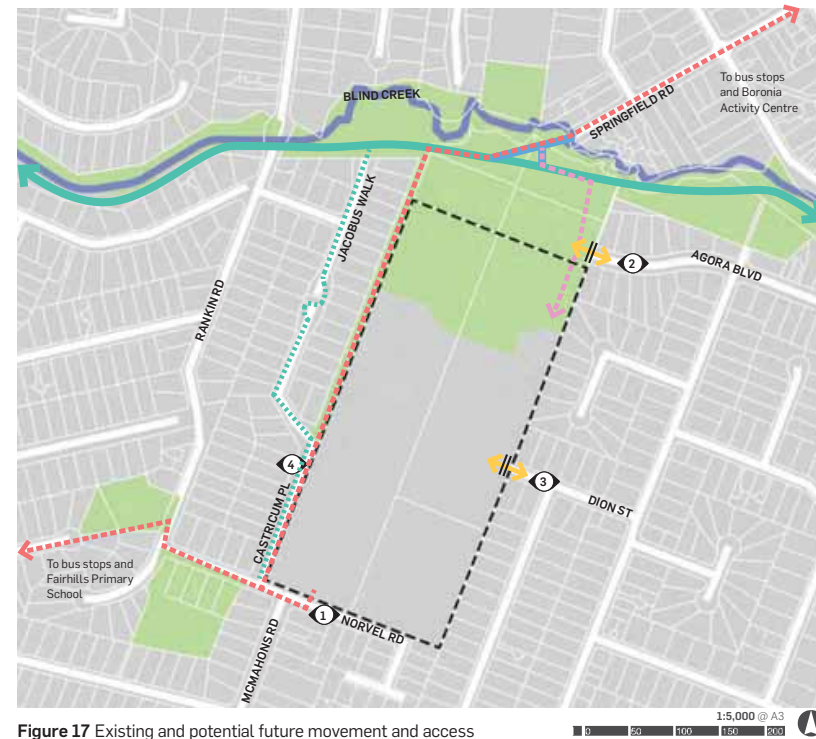
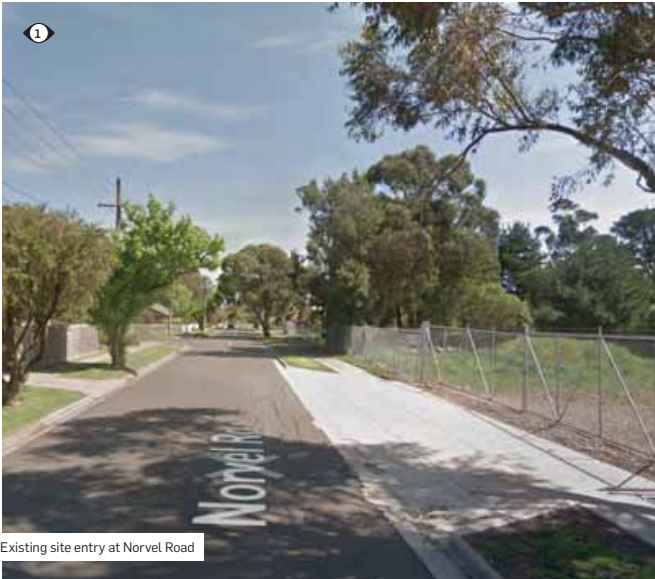


Figure 17 Existing and potential future movement and access

### LEGEND

- |   |                                     |  |
|---|-------------------------------------|--|
| Subject site                              | Blind Creek trail                   | Desire lines to-from the subject site once developed |
| Open green space                          | Indirect feeder path via Jacobus St | Potential new pedestrian connections (schematic)     |
| Blind Creek                               | Dead ends                           | Potential new connections with existing roads        |
| Photo locations (refer to following page) |                                     |  |





# 5.0 INTERFACES

The following sections describe the immediately surrounding conditions of the site, as defined in Figure 19 Interfaces Key Plan.

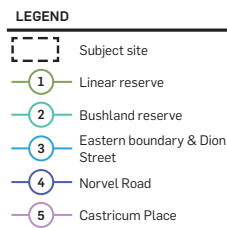


Figure 19 Interfaces key plan

## 5.1 LINEAR RESERVE

As described in Section 4.4 Movement and Access, the linear reserve along the western boundary of the site can be used to access the Blind Creek trail. The linear reserve is currently confined by full height rear fencing of the abutting properties along Castricum Place, and wire fencing on the western perimeter of the Site. At present it is a grassed area with no established track.

There are currently fifteen trees of varying species and conditions scattered along the length of the reserve, including three *E. fulgens*. The sparseness of the trees along the linear reserve creates a clear visual link between Castricum Place and the Blind Creek corridor.

### DESIGN RESPONSE TO 5.1

- Extends the green character, with additional tree and under-storey plantings along the SUP and entry point. Also softens the inactive edge of the back fences.
- Alignment of the SUP minimises the need for tree removal as much as possible (including preservation of the *E. fulgens* specimens).
- Road is aligned immediately adjacent to the linear reserve and houses face towards it. This ensures the space does not feel too enclosed and provides a more pleasant frontage with passive surveillance along one side.



Figure 20 Linear reserve interface

## 5.2 BUSHLAND RESERVE

- The northern perimeter of the site is bordered by the bushland reserve and the Blind Creek corridor containing the Blind Creek Trail shared use path.
- The bushland reserve contains some swampy vegetation toward the creek and some Valley Heathy Forest within the subject site. Generally throughout the reserve there is a groundcover of dense grasses and sedges.
- Side and rear fences of properties belonging to Vandeven Court and Agora Boulevard about the north-eastern perimeter of the site, some with full height timber fences and others with wire fencing offering views into the bushland reserve.
- The linear reserve provides a buffer between the rear fencing of allotments belonging to Jacobs Walk and the bushland reserve to the west.
- The reserve between the subject site and the Blind Creek trail is generally densely vegetated. The asphalt shared path is flanked by wire fencing restricting access to the bushland reserve.
- The bushland reserve presents some risk of bushfire. Any development adjacent must be designed and maintained in accordance with relevant bushfire safety guidelines to minimise any potential harm to life and property in the event of a bushfire.

### DESIGN RESPONSE TO 5.2

- All but one of the adjacent lots front on to the reserve, providing passive surveillance and visual access toward the reserve and Blind Creek Trail.
- A road is proposed to separate residential development from the reserve, providing a fire break.
- Pedestrian access through the reserve, connecting to Agora Boulevard, is provided via paths that are positioned and designed to minimise disruption to remnant vegetation
- Setbacks proposed for Lot 140 at the southeast corner of the bushland are intended to minimise impacts on existing tree protection zones (TPZs) and minimise bushfire risks from overhanging tree canopies
- The landscape concept for the wetland reserve and swale (south of the bushland) have been designed as 'shrubland' so that they do not require any additional building setback for bushfire safety purposes beyond that which is already required for the bushland reserve.
- The street trees and nature strips along the road have been designed in accordance with the CFA guidelines "Landscaping for Bushfire - Garden Design and Plant Selection" or based on CFA advice.

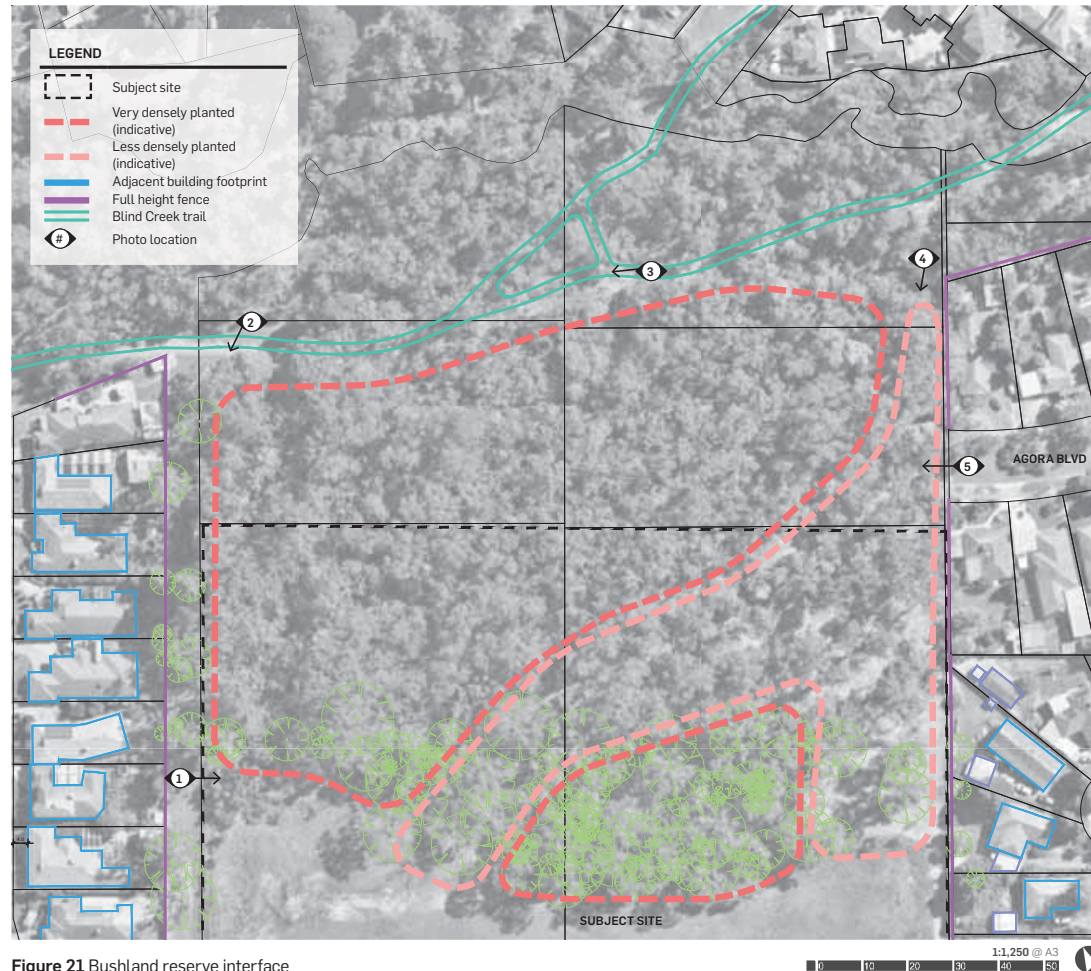


Figure 21 Bushland reserve interface



### 5.3 EASTERN BOUNDARY

Apart from the intersection with Dion Street, the entire eastern boundary of the subject site consists of the side or rear fences (usually wire mesh) of the adjacent houses. These neighbouring houses are almost entirely one storey.

Rear setbacks from this boundary to the main dwelling are generous, ranging from approx. 9m and 22m. However the majority of these lots also contain outbuildings and garages at the rear which have much smaller setbacks. Therefore, an open rear yard character is currently not maintained among these existing dwellings.

### 5.4 DION STREET

#### STREETScape

- Street width is approx 15.2m.
- Street trees are few, sparsely scattered and usually Callistemons. They do not form a strong, consistent streetscape.
- Grass nature strips and concrete footpaths.

#### BUILT FORM & SETBACKS

- The building setbacks vary significantly, ranging from a carport and a house, which are both set back 2.5m at their closest, up to a house which is set back at least 13.5m.
- The houses at the eastern end have side fences facing onto Dion Street.

#### DESIGN RESPONSE TO 5.3 AND 5.4

- New allotments will sit back-to-back with the existing lots, separated by new solid fencing to replace the existing wire fencing.
- Dwellings bordering the east property boundary will have minimum 5m setbacks to allow for at least one canopy tree and flexibility of built form at the rear. This allows for a variety of highly articulated forms, including some larger setbacks.
- The proposed lot widths and rear building setbacks also maintain a similar pattern to the existing lots to the south of the site, at 54, 56, 58 and 60 Norvel Road.
- Deciduous street trees are proposed for the extension to Dion Street to mark the entry to the development and maximise winter sun ingress for the adjacent properties.





Figure 22 Eastern boundary and Dion Street

- LEGEND**
- Subject site
  - Adjacent building footprint
  - Adjacent ancillary building footprint
  - Full height fence
  - ↔ Driveways
  - Blind Creek trail
  - # Photo location

## 5.5 NORVEL ROAD

Norvel Road borders the subject site to the south, before terminating in a double-ended court.

### STREETSCAPE

- Street width is approx 15.2m to 16m.
- Both sides of the street have a median strip with a mix of mature and young street trees. The planting scheme is most consistent at the eastern end of the street where there is a series of *Acer platanoides* 'Norwegian Sunset'.
- Few of the abutting houses have front fences, creating an open setting with private vegetation contributing to the streetscape amenity.

### BUILT FORM & SETBACKS

- Houses with frontages to Norvel Road have a broad range of front setbacks. The largest front setback, belonging to one of the older homes, is 10.7m. The smallest front setback is 3.8m. Many of the newest homes on the street have front setbacks of around 4.2-4.8m.
- Buildings with a side frontage to Norvel Road have short setbacks of 3.3m and 2.1m.

### DESIGN RESPONSE TO 5.5

- New allotments within the estate along Norvel Road will front onto the existing street. They will have a minimum 4.5m front setback which is consistent with the range of setbacks currently existing along Norvel Road.
- As is the case for most properties on Norvel Road, new allotments will not have front fences, maintaining the openness of the street.
- The existing street tree palette will be reinforced with more *A. platanoides* 'Norwegian Sunset' proposed along Norvel Road.

**LEGEND**

- Subject site
- Adjacent building footprint
- Full height fence
- Driveways
- Photo location



Figure 23 Norvel Road interface





## 5.6 CASTRICUM PLACE

Castricum Place borders the Site's western perimeter, south of the linear reserve. Aside from the property at the Norvel Road corner, houses have a frontage to Castricum Place facing west towards the subject site.

### STREETScape

- Street width is approx 16.5m.
- There is a relatively consistent lining of street trees on the western side of the street, with 1-2 trees between on the nature strip between vehicle crossovers.
- Few of the abutting houses have front fences creating an open setting with private vegetation contributing to the streetscape amenity.
- A dense lining of vegetation visible on the eastern side of the street within the subject site has been cleared since the image was taken.

### BUILT FORM & SETBACKS

- There is a range of building setbacks from the street, with the shortest being 4.4m and the furthest being 8.9m.
- There is one double storey residence amidst the row of detached single storey brick homes.

#### DESIGN RESPONSE TO 5.6

- New allotments along the western perimeter of the site will have frontage and vehicle access to Castricum Place, consistent with the existing street typology.
- Street trees to be maintained where possible or planted between the proposed crossovers.
- Buildings are proposed to have minimum 5.5m front setbacks which is consistent with the range of setbacks currently existing along Castricum Place.

#### LEGEND

- ▭ Subject site
- ▭ Adjacent building footprint
- ▭ Full height fence
- ↔ Driveways
- ↔ Pedestrian crossing
- 📍 Photo location

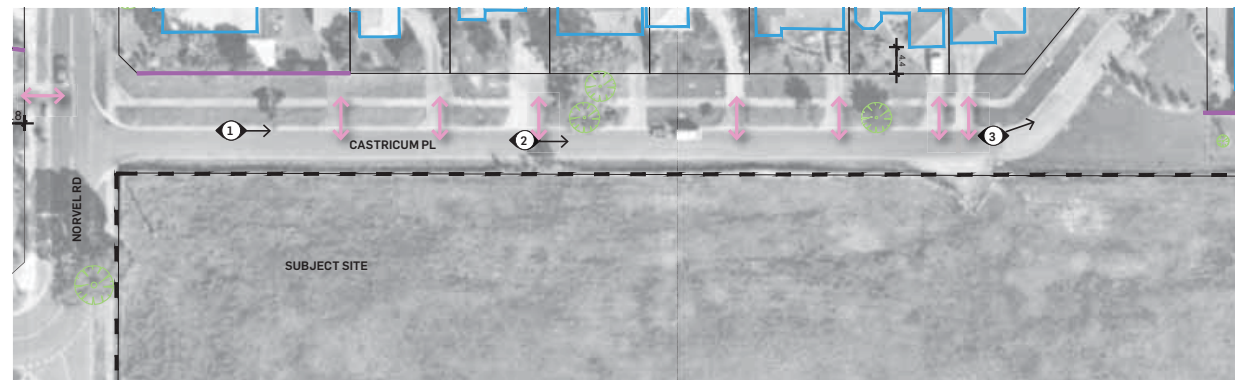


Figure 24 Castricum Place interface

# 6.0 LOCAL CASE STUDIES



Figure 25 Case studies key plan

The variations in front setbacks are not restricted to just the streets immediately adjacent to Norvel Estate. Within the local area there are numerous examples of homes which have relatively small setbacks and some which incorporate generously sized trees and shrubs.

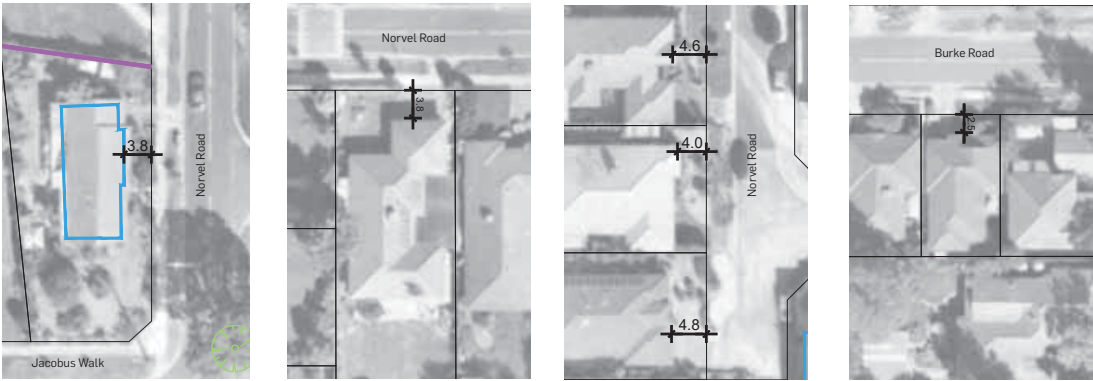


Figure 26 Jacobus Walk



Figure 27 Moira Avenue



Figure 28 Norvel Road



Figure 29 Mellowood Court



Figure 30 Litchfield Avenue



# 7.0 DESIGN RESPONSE SUMMARY

## 7.1 CONTEXT

Norvel Estate is located within an established low scale residential area of Ferntree Gully, bounded to the north by Blind Creek. It is located approximately 30kms east of Melbourne CBD. The site is most directly accessible via Rankin Road and McMahon's Road which respectively intersect with Boronia Road and Burwood Highway.

Originally used as a quarry, the site is now vacant. Its former use has resulted in much of its vegetation being cleared, particularly in its southern half. Dense bushland toward its northern interface serves as a buffer between the site and the bushland reserve abutting the creek trail. The site has a gentle slope running north towards the creek.

At present the surrounding area is largely made up of low density detached dwellings, typically of single or double storeys often with generously sized yards.

However much has changed since the area was first developed as detached dwellings on single allotments. The Knox Municipal Strategic Statement outlines a demand for different types of housing as well as an undersupply of affordable housing. Housing composition in the surrounding area is changing and becoming more diverse, with many existing blocks that once contained a single home now being subdivided into two or more smaller allotments.

## 7.2 PROPOSED DESIGN

### STREETS

The street network proposed for Norvel Estate has been designed to integrate well with the surrounding grid in terms of its form and connectivity.

The proposed new streets are laid out parallel to surrounding streets and use similar widths. The narrowest roads run alongside open green spaces, so they will not appear disproportionate.

Most streets are proposed to run north-south. This ensures level changes between properties are kept to a minimum and reduces the amount of cut and fill required. The road layout allows for long sightlines and is simple to navigate. Road H has been designed as a no-through-road in response to Council concern that allowing a direct connection from Norvel Road to Dion Street (via Road G) would result in its use as a busy shortcut for the wider community wanting to travel between the two points.

The road reserves provide ample opportunities for the establishment of canopy trees which is consistent with the character of the surrounding area and the broader municipality.

An appropriate number of on-street car parks have been provided to service the proposed number of residences.

### RESIDENTIAL LOTS

Compared to the older subdivisions in surrounding areas, this design offers a higher density of residential lots to cater to present-day challenges and buyer expectations, while maintaining the green character that is so valued in Knox. It includes a mix of different lot depths and sizes, including some that are appropriate for affordable housing. This caters to the needs of a variety of potential buyers and allows for a variety of different building types and enough space for leafy front yards.

### BUILT FORM & SETBACKS

While the current proposal for Norvel Estate does not include designs for individual dwellings, high-level design guidance including minimum setbacks is provided in the masterplan and Urban Design Guidelines. These have been developed in close consultation with Council and the CFA (Country Fire Association) to mitigate potential bushfire risks, provide enough space for landscaping, and to help ensure the built form character is appropriate for its setting.

The proposed minimum front setbacks of outward facing lots are appropriate for the surrounding neighbourhood character. They will allow for yards that are of a comparable depth to others along Norvel Road and Castricum Place, and throughout the local neighbourhood (see "5.5 Norvel Road", "5.6 Castricum Place" and "6.0 Local Case Studies"). Inward facing lots will also feature front setbacks with similar depths.

Garages are to be set back further than other portions of the frontage so they are not given visual prominence and to provide articulation in the frontage.

Dwellings bordering the east property boundary will have generous rear setbacks to respect the open rear yard character of the development along this interface.

### PEDESTRIAN AND BICYCLE MOVEMENT

New pedestrian and shared use paths will provide improved connectivity for the residents and neighbours of Norvel Estate through the green spaces.

A formalised shared use path (SUP) in the easement on the western edge of the site will allow pedestrians and cyclists to easily access the bicycle trail along Blind Creek and also Boronia town centre via Springfield Road. It is designed to have minimal disturbance to existing trees and the green character will be reinforced with additional planting.

Proposed paths through the bushland reserve will connect Norvel Estate with Agora Boulevard. These paths will be designed to have a naturalistic character and make use of already disturbed areas within the bushland reserve. They will allow the community to experience the remnant forest environment while reducing the risk of additional disturbance to the site.

### BUSHLAND RESERVE

In the north of the site, 2.18 hectares of land that is densely planted with remnant indigenous vegetation will be preserved and handed over to Council in accordance with the Section 173 Agreement.

The proposed design will allow the community to safely enjoy this green space while minimising any degradation. Nearly all the adjacent lots front on to the reserve, providing a green outlook to residents and some passive surveillance. No trees are proposed to be removed in the bushland reserve, and the proposed paths will generally be positioned in already disturbed areas and adopt materials and construction techniques to minimise visual and physical disturbance. Stormwater from the estate will be collected and treated using gross pollutant traps, a swale and an ephemeral wetland prior to being discharged into to Bushland Reserve and Blind Creek.

While establishing this bushland reserve will be very positive ecologically, it does present some bushfire risk. The proposed design takes this into account and seeks to minimise dangers to life and property through the positioning of a road as a buffer, providing appropriate building setbacks, and by selecting appropriate plant species and positioning of plants.

### LANDSCAPE

The proposed landscape design for Norvel Estate seeks to preserve and enhance the leafy character of the area while referencing the history of the site and providing a well considered response to potential bushfire threats.

A feature landscape with seating is provided at the junction of the SUP and Castricum Place to enhance local amenity and provide a welcoming entry for pedestrians and cyclists. Areas of feature paving are proposed at this junction and in a number of other locations throughout the site. The feature paving will include Daniel Robertson bricks to reference the history of the site as a clay quarry for this company.

The design has been developed to preserve as many existing trees as possible. Two will need to be removed in the linear reserve to accommodate the SUP in the linear reserve and four exotic trees along Norvel Road to accommodate the driveways and the road reserve. In addition to those preserved, a generous number of new canopy trees are provided along all roads and the shared use path. Species that have been specifically recommended for this site by Council are proposed.

The design also seeks to mitigate bushfire risks by proposing low-flammability trees & grass, loosely positioned to avoid a continuous canopy along the southern side of Roads D and E. Within the wetland reserve and swale situated along the northern side of Roads D and E, plants have been selected that are appropriate for treating stormwater and are also below 1m height. This allows the wetland & swale area to be considered a 'Shrubland', which requires building setbacks that are well below what is already necessary for the Bushland Reserve ('Forest').

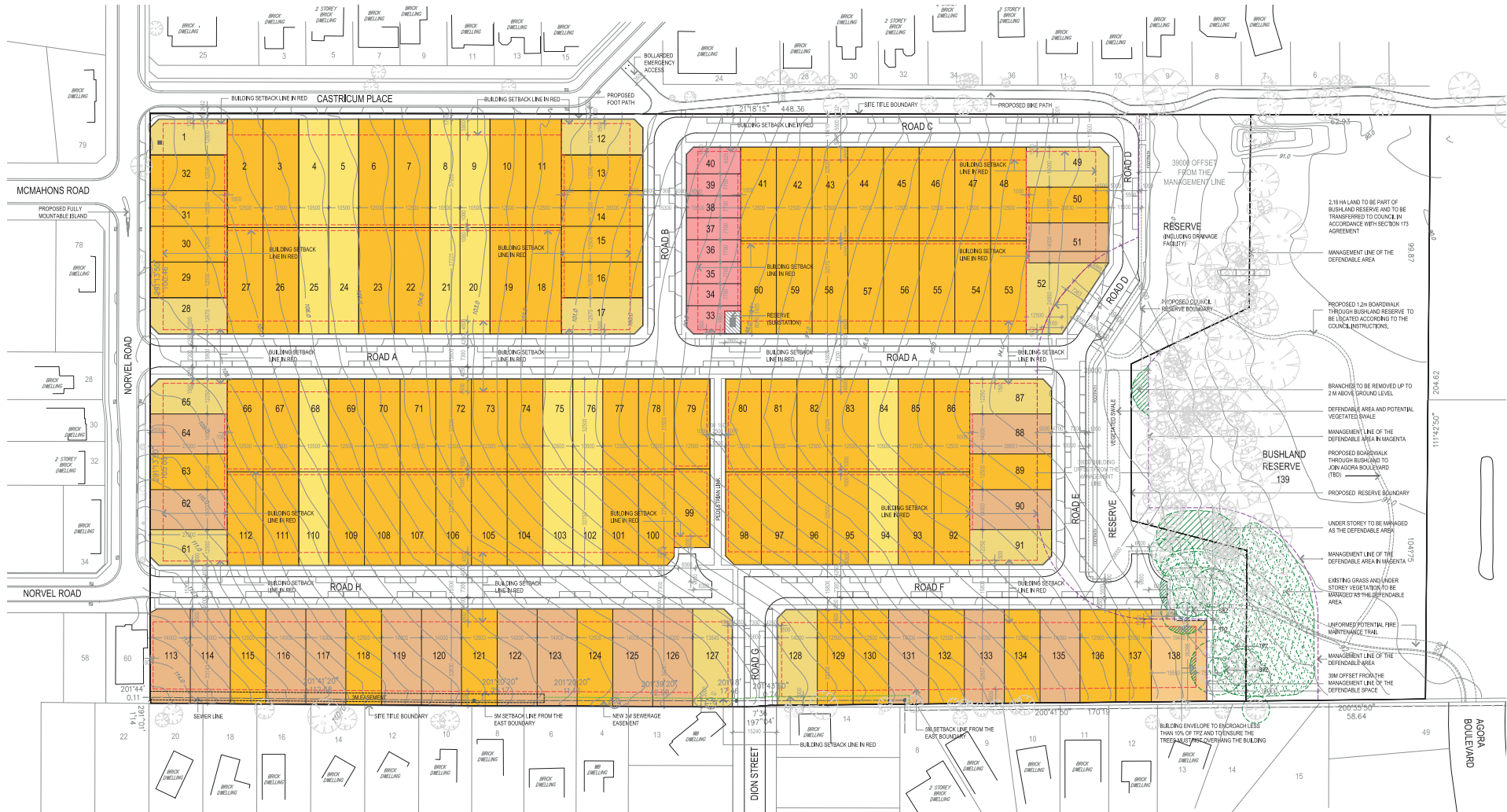


Figure 31 Proposed masterplan - including roads, subdivision, and bushfire management (excludes landscape & wetlands)



## 7.3 SUMMARY OF RESPONSES TO UCR TOPICS

### "2.1 Zoning"

- Refer to Planning report for matters regarding zoning.

### "Design Response to 2.3 & 2.4" on page 6

#### "2.2 Overlays", "2.3 Knox Urban Design Framework" & "2.4 Knox Green Streets Policy"

- Remnant vegetation subject to the ES02 overlay is protected and retained.
- The design of the public realm offers a particularly strong response to the Garden Suburbs and Creek Corridors guidelines and desired characters. Refer to the Norvel Estate Landscape Report for details.
- The key objective of Garden Suburbs is met with:
  - large expanses of green space and existing trees being preserved, and
  - high densities of new trees proposed in the public realm.

### "Design Response to 2.5" on page 6

#### "2.5 Leisure Plan"

- Providing a formalised SUP along the western boundary and access paths through the bushland reserve will support active leisure and active transport (walking & cycling to local destinations)

### "Design Response to 2.6" on page 7

#### "2.6 Play Space Plan"

- Recognising that the area is already well serviced by playgrounds with proprietary equipment, the public realm offering draws upon other opportunities identified in the Leisure Plan - through the following actions:
  - the development of passive, local open space,
  - the provision of safe road crossings, seats and footpaths.

### "Design Response to 3.1 & 3.2" on page 8

#### "3.1 Land Uses" & "3.2 Transport"

- Recognising that conveniences and transport connections are generally not within a very walkable distance, there is an appropriate provision of on-street parking.

### "Design Response to 3.3" on page 10

#### "3.3 Topography"

- Most streets are proposed to run north-south. This ensures level changes between properties are kept to a minimum and reduces the amount of cut and fill required.
- Streets running east-west will enjoy views to the Dandenong Ranges.
- The cluster of dense and moderate tree canopy in the north of the site will be protected and retained

### "Design Response to 3.4" on page 11

#### "3.4 Urban Form & Character"

- The proposed streets are oriented in the same directions as the existing surrounding streets to provide continuity and aid navigation.
- The design has a finer grain of subdivision than the surrounding areas, responding to changing expectations of the market. Offering this scale of subdivision from the outset avoids the less desirable outcome of larger lots being later subdivided with private lanes to service dwellings at the rear.

### "Design Response to 4.1 & 4.2" on page 13

#### "4.1 History" & "4.2 Biodiversity"

- The history of the site is referenced with the use of Daniel Robertson bricks in the hardscape palette (refer to Norvel Estate Landscape Report).
- High quality remnant indigenous vegetation will be preserved within a Council reserve, and other native trees (including the *E. fulgens* specimens) will be preserved wherever possible.
- Water run-off from the proposed development will be treated in a constructed wetland before it is discharged into the reserve to help protect the health and biodiversity of the area. Refer to Norvel Estate Stormwater Management Plan prepared by Cardno for further detail.
- The majority of proposed plants are native or indigenous to minimise the risk of weeds invading the reserve. Refer to Norvel Estate Landscape Report for details.

#### "4.3 Site Dimensions",

- Provided as background information

### "Design Response to 4.4" on page 16

#### "4.4 Movement & Access"

- Providing a welcoming entry point at the junction of Castricum Place and the linear reserve, including a rest spot and way-finding.
- New shared use path (SUP) along the linear reserve provides more legible and direct access for pedestrians and cyclists to the Blind Creek trail, and onwards to Boronia Activity Centre.
- Creating logical site entry points and an internal road network that is legible and responsive with the surrounding urban context.

### "Design Response to 5.1" on page 18

#### "5.1 Linear Reserve"

- Extends the green character, with additional tree and under-storey plantings along the SUP and entry point. Also softens the inactive edge of the back fences.
- Alignment of the SUP minimises the need for tree removal as much as possible (including preservation of the *E. fulgens* specimens).
- Road is aligned immediately adjacent to the linear reserve and houses face towards it. This ensures the space does not feel too enclosed and provides a more pleasant frontage with passive surveillance along one side

### "Design Response to 5.2" on page 20

#### "5.2 Bushland Reserve"

- All but one of the adjacent lots front on to the reserve, providing passive surveillance and visual access toward the reserve and Blind Creek Trail.
- A road is proposed to separate residential development from the reserve, providing a fire break.
- Pedestrian access through the reserve, connecting to Agora Boulevard, is provided via paths that are positioned and designed to minimise disruption to remnant vegetation
- Setbacks proposed for Lot 140 at the southeast corner of the bushland are intended to minimise impacts on existing tree protection zones (TPZs) and minimise bushfire risks from overhanging tree canopies
- The landscape concept for the wetland reserve and swale (south of the bushland) have been designed as 'shrubland' so that they do not require any additional building setback for bushfire safety purposes beyond that which is already required for the bushland reserve.
- The street trees and nature strips along the road have been designed in accordance with the CFA guidelines "Landscaping for Bushfire - Garden Design and Plant Selection" or based on CFA advice.



**"Design Response to 5.3 and 5.4" on page 22****"5.3 Eastern Boundary" & "5.4 Dion Street"**

- New allotments will sit back-to-back with the existing lots, separated by new solid fencing to replace the existing wire fencing.
- Dwellings bordering the east property boundary will have minimum 5m setbacks to allow for at least one canopy tree and flexibility of built form at the rear. This allows for a variety of highly articulated forms, including some larger setbacks.
- The proposed lot widths and rear building setbacks also maintain a similar pattern to the existing lots to the south of the site, at 54, 56, 58 and 60 Norvel Road.
- Deciduous street trees are proposed for the extension to Dion Street to mark the entry to the development and maximise winter sun ingress for the adjacent properties.

**"Design Response to 5.5" on page 24****"5.5 Norvel Road"**

- New allotments within the estate along Norvel Road will front onto the existing street. They will have a minimum 4.5m front setback which is consistent with the range of setbacks currently existing along Norvel Road.
- As is the case for most properties on Norvel Road, new allotments will not have front fences, maintaining the openness of the street.
- The existing street tree palette will be reinforced with more *A. platanoides* 'Norwegian Sunset' proposed along Norvel Road.

**"Design Response to 5.6" on page 26****"5.6 Castricum Place"**

- New allotments along the western perimeter of the site will have frontage and vehicle access to Castricum Place, consistent with the existing street typology.
- Street trees to be maintained where possible or planted between the proposed crossovers.
- Buildings are proposed to have minimum 5.5m front setbacks which is consistent with the range of setbacks currently existing along Castricum Place.





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# NORVEL ESTATE, NORVEL ROAD, FERNTREE GULLY TOWN PLANNING REPORT

**URBIS**

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## EXECUTIVE SUMMARY

This planning report has been prepared by Urbis Pty Ltd on behalf of Norvel Estate Pty Ltd in support of an application pursuant to Section 96A of the *Planning and Environment Act 1987* for a combined planning scheme amendment, subdivision and vegetation removal application associated with Lot 1 TP297137 (29Q Norvel Road), Lot 1 TP963860 (41Q Norvel Road) and Lot 2 TP963860 (18Q Dion Street).

Specifically, the proposal includes:

- Rezoning of the site from the Special Use Zone Schedule 2 (SUZ2) to the:
  - Neighbourhood Residential Zone (Schedule 7)
  - Public Conservation and Resource Zone
  - Public Park and Recreation Zone
- Subdivision of the land into 140 lots comprising:
  - 138 residential lots
    - Inclusive of 8 residential lots (5.8%) provided for social housing
  - a bushland lot and
  - a public park reserve.
- Removal of four (4) trees, all of which require a planning permit for removal (Trees 141, 164, 167 and 169)

The site is subject to a Section 173 Agreement which amongst other things, specifies urban design guidelines that apply to the future redevelopment of the site. These guidelines were originally prepared in 2004 and are proposed to be updated as part of this application.

The proposal triggers planning approval under the following provisions of the Planning Scheme:

- **Clause 37.01-3** – A planning permit is required to subdivide land.
- **Clause 42.01-2** – A planning permit is required subdivide land and remove, destroy, or lop vegetation including dead vegetation.
- **Clause 52.17** – A planning permit is required to remove, destroy or lop native vegetation, including dead native vegetation.

This report provides an overview of the site's context and the relevant planning controls and policies of the Knox Planning Scheme and provides an assessment of the proposal against these considerations. In summary, the report concludes that:

- The proposal complies with the Planning Policy Framework and Local Planning Policy Frameworks, and particularly the proposed Neighbourhood Residential Zone.
- The proposal will positively contribute to Knox's housing stock by providing for a diversity of lot sizes including 8 lots provided for social housing.
- The proposal responds to the Environmental Significance Overlay Schedule 2 (ESO) applying to the northern portion of the land by minimising and avoiding vegetation removal where possible and ensuring the protection of the Blind Creek Corridor and associated bushland reserve.
- The proposed stormwater management approach has demonstrated that the proposed mitigation controls can achieve alleviation of flood waters to the surrounding properties.
- The proposal will improve existing connections, and provide new connections, to the Blind Creek Corridor.
- The proposed landscaping design response will make a significant contribution to the site and surrounding area and positively contributes to the garden character of Knox's residential areas.



- The proposal will not result in any unreasonable amenity impacts to existing dwellings.
- The proposal will ensure appropriate measures are undertaken to mitigate bushfire risk.

# 1. SITE AND SURROUNDING CONTEXT

## 1.1. THE SITE

The subject site comprises a vacant, rehabilitated quarry generally bound by Blind Creek to the north, Norvel Road to the south, Castricum Place to the west and a row of residential properties to the east. The site formally comprises three separate land parcels being:

- Lot 1 TP297137 (29Q Norvel Road)
- Lot 1 TP963860 (41Q Norvel Road)
- Lot 2 TP963860 (18Q Dion Street)

A copy of the Certificates of Title are provided at **Appendix A**.

The site has an area of approximately 9.2 hectares and features a fall of 1:20 from south to north. The northern portion of the site comprises dense vegetation which is associated with the Blind Creek Corridor.

## 1.2. HISTORY

The site was previously known as the Norvel Road Quarry (owned by Robertson Industries) and was used for clay extraction to manufacture bricks under the Daniel Robertson brand from 1996 until circa 2009. During this time, a Section 173 Agreement (the "Original Agreement") was applied to the site and sought to (amongst other things) facilitate its rehabilitation along with a land swap between Robertson Industries and Council.

Since the termination of the use of the site as a quarry, the site has undergone extensive rehabilitation through a filling and levelling process that has involved the deposit of clean-fill and the clearing of vegetation on the site. A retarding basin associated with the quarry was located in the north-west corner of the site. This was also filled as part of the site's rehabilitation.

The ultimate residential redevelopment of the site has been contemplated for several of years (although no approvals have been secured) and is evident with the rehabilitation of the quarry and the preparation of urban design guidelines in 2006 to facilitate this form development.

In 2006, Council resolved to prepare a planning scheme amendment to facilitate the residential development of the site subject to a Section 173 Agreement (the "S173 Agreement") being introduced to provide for a land exchange between Council and Robertson Industries.

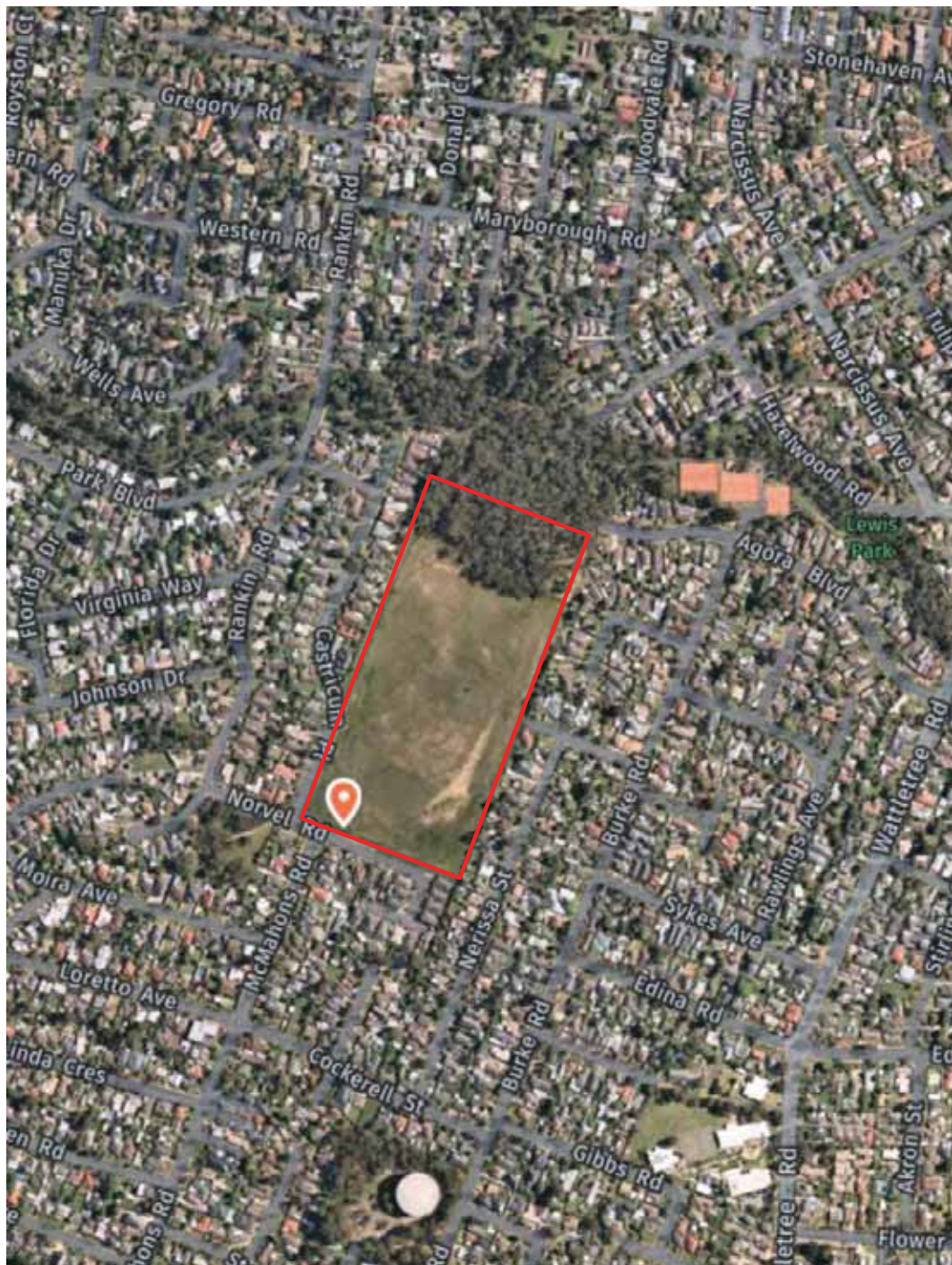
The S173 Agreement was introduced to the site 2009 and includes but is not limited to:

- The Northern Parcel of the site being transferred to Council as the Public Open Space contribution that would otherwise be required under Clause 52.01 of the Planning Scheme for the subdivision of the balance of the site.
- The Schedule to the Development Plan Overlay that would be applied to the development of the site *'should generally reflect the principles of the Urban Design Guidelines to the extent possible having regard to the form of development and use of the Robertson Land proposed by the Owner at the time of preparation of the Amendment.'*
- The Urban Design Guidelines referenced in the Agreement relate to the *Norvel Road Quarry, Ferntree Gully Urban Design Guidelines, prepared for the Knox City Council by Jones & Whitehead Pty Ltd (amended by Council, Draft May 2006)*. It is proposed to replace these guidelines with updated Urban Design Guidelines prepared by Urbis. This is discussed in more detail in Section 5.3 of this report.

A copy of the Agreement and 2006 Urban Design Guidelines are provided at **Appendix B**.

- A future Planning Scheme Amendment will require land to be rezoned to the Residential 1 Zone (now known as General Residential Zone) and be included within an Environmental Audit Overlay if deemed necessary.

Figure 1 – Aerial Map of Subject Site



Source: [Nearmap]

 = Subject Site

### 1.3. SURROUNDING CONTEXT

The site is located approximately 890 metres south of the Boronia Activity Centre and 1 kilometre north of Mountain Gate Shopping Centre. These centres provide key “hubs” for the outer Melbourne region and comprise a broad range of retail, commercial and community uses.

The surrounding area is predominantly located in the General Residential Zone (except for Blind Creek which is located within the Special Use and Urban Floodway Zone) and comprises single and double storey dwellings.

The site has good access to several key public transport links including:

- Boronia Train Station (1.33km north east)
- Bus route 755 (860m east)
- Bus route 732 (836m south west)
- Bus route 737 and 753 (940 metres north)

The site’s specific interfaces are described as follows:

#### 1.3.1. North

To the north is the Blind Creek Corridor and associated bushland reserve beyond which are predominantly single and double storey dwellings and the Mountain Gate Tennis Club. Land in this vicinity is located within the Public Park & Recreation Zone, Urban Floodway Zone or General Residential Zone.



Picture 1 – Northern Interface

#### 1.3.2. East

To the east the subject site abuts single and double storey dwellings located within the General Residential Zone. These dwellings predominantly comprise a mix of weatherboard and brick buildings with various material, finishes and roof forms.



Picture 2 – Eastern Interface

### 1.3.3. South

To the south the site abuts Norvel Road which is a local street providing a two-way carriageway and on-street car parking. Over Norvel Road land comprises single and double storey dwellings located within the General Residential Zone, as well as Norvel Reserve. Further south are some commercial tenancies and Burke Road Reserve.



Picture 3 – Southern Interface

### 1.3.4. West

To the west the subject site partly abuts Castricum Place which is a local street providing a two-way carriageway and on-street car parking. A footpath is only provided along the western side of this road reserve. Over Castricum Place are single and double storey dwellings.



Picture 4 – Western Interface

## 2. EXISTING PLANNING CONTROLS

### 2.1. ZONE

The subject site is located within the Special Use Zone Schedule 2 (“SUZ2”) pursuant to Clause 37 of the Planning Scheme. The SUZ2 specifically relates to the ‘Earth and Energy Resources Industry’ and seeks:

- *To recognise or provide for the use and development of land for earth and energy resources industry.*
- *To encourage interim use of the land compatible with the use and development of nearby land.*
- *To encourage land management practice and rehabilitation that minimises adverse impact on the use and development of nearby land.*

Pursuant to this Clause use of land for “accommodation” is prohibited.

It is considered that the SUZ2 is no longer appropriate for the site as:

- The use of the site as a quarry has ceased and the site has since been rehabilitated.
- The surrounding zoning largely constitutes the General Residential Zone and adopts conventional lot sizes.
- The site has the capacity to accommodate a larger number of dwellings and make a positive contribution to Knox’s housing stock.

### 2.2. EXISTING OVERLAYS

The northern portion of the site (relating to the Bushland Reserve Blind Creek Corridor) is affected by Schedule 2 to the Environmental Significance Overlay (“ESO2”) pursuant to Clause 42.01.

This Clause specifically relates to ‘Sites of Biological Significance’ and seeks to (amongst other things) *‘ensure buildings, works or subdivisions are compatible with the long-term protection and enhancement of biological significance.’*

The Statement of Environmental Significance identifies that *‘the area covered by this schedule includes a range of sites of biological significance identified in ‘Sites of Biological Significance in Knox – 2nd Edition,’ 2010. Their protection and appropriate management is of particular importance for the maintenance of both Knox’s and Victoria’s biodiversity, as well as for liveability and the health and wellbeing of the community. The area covered by this overlay is 26.42 square kilometres or 23.12% of the Knox municipality.’*

Pursuant to this Clause, a permit is required to:

- Construct a building or construct or carry out works.
- Construct bicycle pathways and trails.
- Subdivide land.
- Remove, destroy or lop any vegetation, including dead vegetation (with certain exceptions).

This Clause contains a range of decision guidelines to be considered in the assessment of this proposal.

It is proposed to retain this Overlay as it applies to the northern portion of the site.

Figure 2 – Zoning Map of Subject Site



**NORVEL ESTATE, FERNTREE GULLY  
PLANNING ZONES**





## 3. PROPOSAL

### 3.1. PLANNING SCHEME AMENDMENT

The proposed planning scheme amendment involves the following changes to the Knox Planning Scheme:

- Rezone the balance of the subject site from the SUZ2 to the Neighbourhood Residential Zone Schedule (“NRZ7”).
- Rezone the existing bushland at the northern portion of the site to the Public Conservation and Resource Zone (PCRZ)
- Rezone the proposed new parkland area to the Public Park and Recreation Zone (PPRZ)

A copy of the proposed Schedule 7 to the NRZ is provided at **Appendix C**.

These controls accord with the S173 Agreement applying to the site, accord with the relevant practice notes and are considered appropriate in the context of the subject site (see Section 5.3 of this report for further details).

### 3.2. URBAN DESIGN GUIDELINES

The S173 Agreement applying to the site includes reference to urban design guidelines which are specifically defined as the *Norvel Road Quarry, Ferntree Gully Urban Design Guidelines, prepared for the Knox City Council by Jones & Whitehead Pty Ltd (amended by Council, Draft May 2006) or as amended from time to time with the consent of the Responsible Authority and the Owner.*

The wording of the S173 Agreement allows the urban design guidelines to be amended without the need to amend the Agreement itself.

It is therefore proposed to amend the urban design guidelines to make them more relevant to the current context, noting that the guidelines were originally prepared over 14 years ago and are somewhat outdated.

The appropriateness of the proposed guidelines is discussed in further detail in Section 5.3 of this report.

### 3.3. SUBDIVISION

The proposal involves the subdivision of the 9.2-hectare site into 138 residential lots including:

- 8 residential lots provided for social housing
- Lot sizes ranging in size from 116 square metres to 581 square metres.
- Vehicle access via three connections to the external road network comprising:
  - A new connection to Norvel Road at the south of the site (located approximately in the same location as an existing crossover).
  - The extension of Norvel Road running north to south into the site at the southern boundary.
  - The extension of Dion Street into the site at the eastern site boundary.

Vehicle access is not proposed to Castricum Place.

- Creation of local roads to service the new dwellings. The hierarchy of roads proposed include:
  - Access Street – 7.3m carriageway
  - Access Place – 5.5m carriageway
- Pedestrian footpaths along all streets with a residential frontage.

### 3.4. AFFORDABLE HOUSING

An Affordable Housing Strategy has been prepared by Affordable Development Outcomes and is enclosed with this submission. The Strategy responds to Knox City Council's 'Affordable Housing Action Plan 2015-2020' which sets a policy objective for a voluntary contribution to social housing of approximately 5%. This subdivision application proposes to gift 8 titled and serviced lots to a Registered Housing Agency for development and management as affordable housing.

The design of the affordable housing lots will be in accordance with the relevant Rescode requirements and Design guidelines.

The provision of 8 lots comprises 5.8% of the total 138 residential lots proposed and will accommodate the development of 8 high quality two to three-bedroom dwellings to cater for a diversity of households. This number exceeds the 5% objective in Council's *Affordable Housing Action Plan* and will allow for quality affordable housing other than apartment typologies to be delivered within the municipality.

The Affordable Housing Strategy has been prepared following significant negotiation with Council and it is understood that Council is in agreement with the proposed gifting of lots on the condition that the landowner must procure the Housing Association that will deliver the built form on the 8 lots.

A Section 173 agreement will be prepared with continued negotiation with Council on the particulars of the agreement.

For further information on the affordable housing agreement, please refer to the Affordable Housing Strategy prepared by Affordable Development Outcomes, dated February 2021.

### 3.5. INFRASTRUCTURE

The proposal includes the construction of a wetland and heavily vegetated swale in the northern portion of the site for stormwater purposes. Further, several flood mitigation systems are proposed within this section of the site as well.

In addition to this, underground reticulated utility services, typically in shared trenches are proposed along with sewerage and gas connections.

### 3.6. VEGETATION AND LANDSCAPING

It is proposed to remove 4 trees as part of the proposal, all of which require a planning permit for removal.

Three (3) trees are street trees and one (1) is a reserve tree. The location and type of trees proposed for removal are specified in the accompanying arborist report prepared by Treemap.

As part of the proposal 107 existing trees will be retained and 173 new street trees are proposed. Of the proposed street trees, streets running east to west are proposed to have deciduous trees and streets running north to south will have evergreen trees. This will complement each other by providing a balance between a high proportion of native trees and maximising opportunities for winter sun into properties.

In addition, there are a range of hardscape and softscape materials proposed throughout the site that includes feature paving with custom graphics (alluding to the history of the site as a quarry), grassed nature strips and a range of design guidelines that seek to both persevere and enhance the vegetated character of the surrounding area.

### 3.7. OPEN SPACE

The public open space contribution required by Clause 52.01 is satisfied by the land swap with Council. This land is made up of the Bushland Reserve (Lot 139) and the Reserve (Lot 140) shown and the plan of subdivision and comprises 2.07 hectares of land.

In addition to this, additional improvements are proposed as follows:

- Improvement of the existing informal shared path abutting the western site boundary, connecting Castricum Place and the Blind Creek Trail.

- Provision of a new informal path and boardwalk providing a connection between the site, Blind Creek Trail and Agora Boulevard to the east.

### **3.8. STAGING**

It is proposed to undertake the subdivision in a single stage.

## 4. PLANNING POLICY CONTEXT

The planning policy context for assessment of the proposal is summarised below.

### 4.1. PLAN MELBOURNE 2017-2050

Plan Melbourne 2017-2050 (“Plan Melbourne”) seeks to guide the future growth and development of Metropolitan Melbourne over the next 35 years. Plan Melbourne estimates that Melbourne’s population growth is projected to grow by 3.4 million by 2051. In turn, this will *‘require another 1.6 million dwellings and 1.5 million jobs.’*

An ongoing challenge faced by Melbourne, and consequently the City of Knox, is where to accommodate the continual population growth.

The overarching objectives in Plan Melbourne seek to deal with this challenge and include directions to:

- *Manage the supply of new housing in the right locations to meet population growth and create a sustainable city* (Direction 2.1)
- *Deliver more housing closer to jobs and public transport* (Direction 2.2)
- *Increase the supply of social and affordable housing* (Directions 2.3)
- *Facilitate decision-making processes for housing in the right locations* (Direction 2.4)
- *Provide greater choice and diversity of housing* (Direction 2.5)

Plan Melbourne also recognises that that *‘middle-ring suburbs are well serviced with hubs and services and can provide greater housing choices in these locations’* however, development will need to be carefully planned and managed to ensure the city’s liveability.

The City of Knox is located within the “eastern region” and has an “aspirational” housing distribution of 190,000 dwellings to be wholly provided within established areas.

### 4.2. PLANNING POLICY FRAMEWORK

The following Clauses of the Planning Policy Framework (“PPF”) are considered relevant to the proposal.

**Clause 11 (settlement)** recognises that planning is to anticipate and respond to the needs of existing and future communities through provision of zoned and serviced land for (amongst other things) housing. Further, this Clause specifies that planning should recognise the need for, and as far as practicable contribute towards diversity of choice, a high standard or urban design and amenity and protection of environmentally sensitive areas and natural resources.

**Clause 11.02-1S (supply of urban land)** seeks to *‘ensure a sufficient supply of land is available for residential, commercial, retail, industrial, recreational, institutional and other community uses’*. Further, this Clause recognises that planning for urban growth should consider *‘opportunities for the consolidation, redevelopment and intensification of existing urban areas.’*

**Clause 12 (environment and landscape values)** seeks to protect sites and features of nature conservation, biodiversity, geological or landscape value. Specifically, **Clause 12.01 (biodiversity)** seeks to assist the protection and conservation of Victoria’s biodiversity through existing information and relevant planning tools. The Clause further states that planning should assist in the establishment, protection and re-establishment of links between important areas of biodiversity.

**Clause 12.01-2S (native vegetation management)** seeks to ensure that there is no net loss to biodiversity as a result of the removal, destruction or lopping of native vegetation.

**Clause 13 (environmental risks and amenity)** seeks to (amongst other things) minimise environmental degradation and recognises that planning should function in a manner that adheres to best practise environmental management, including risk management.

**Clause 13.02-1S (Bushfire Planning)** seeks to ensure that bushfire hazards and risks are mitigated within communities and settlements and to strengthen resilience to bushfires in at risk areas to protect human life.

**Clause 14 (natural resource management)** seeks to assist in the conservation of a broad spectrum of natural resources. Specifically, **Clause 14.02** relates to water and seeks to assist the protection and or restoration of existing catchments and waterways.

**Clause 15 (built environment and heritage)** states that planning should ensure all new land uses respond appropriately to its contextual conditions. Further, this Clause recognises that urban design and architecture should contribute positively to the local character and sense of place, whilst minimising detrimental impacts on neighbouring properties.

**Clause 15.01-3S (subdivision design)** seeks *'to ensure the design of subdivisions achieve attractive, liveable, walkable, cyclable, diverse and sustainable neighbourhoods'*.

**Clause 16.01 (residential development)** seeks to provide a *'housing market that meets community needs'* and to *'increase the supply of housing in existing urban areas by facilitating increased housing yield in appropriate locations, including under-utilised urban land.'*

**Clause 18.02-3S (road system)** seeks to *"manage the road system to achieve integration, choice and balance by developing an efficient and safe network and making the most of existing infrastructure"*.

**Clause 19.03-3S (integrated water management)** seeks to *'sustainably manage water supply, water resources, wastewater, drainage and stormwater through an integrated water management approach'*.

## 4.3. LOCAL PLANNING POLICY FRAMEWORK

### 4.3.1. Municipal Strategic Statement (MSS)

**Clause 21.01 (municipal profile)** recognises that Knox's population is expected to grow by 24,156 persons by 2036 and forecasts that an additional 12,658 dwellings will be required to accommodate this increase.

Further, this Clause recognises the following key issues and influences affecting the municipality include (selected):

#### Environment and landscape values

- *Protecting the Dandenong Foothills, Sites of Biological Significance and other areas of significant biological and landscape value from inappropriate development.*
- *Loss of vegetation, tree canopy and habitat eroding Knox's 'green and leafy' image.*

#### Built environment and heritage

- *Facilitating a strong City character, identity, sense of place and culture.*
- *Incorporating safer design principles.*
- *Achieving environmentally sustainable development.*

#### Housing

- *A growing population requires increased housing supply in Activity Areas, Local Living areas and some Strategic Investigation Sites outside of the Dandenong Foothills.*
- *Knox's community is ageing and diversifying, requiring more diverse and accessible housing options.*
- *Knox's supply of social housing is below the Melbourne Metropolitan average.*

#### Transport and Infrastructure

- *Linking and providing quality infrastructure for walking and cycling.*
- *Improving efficiency,*

**Clause 21.02** sets out the "Vision" for the municipality and includes a Strategic Framework Plan that identifies the subject site as a "residential strategic investigation site".

**Clause 21.03 (Environmental and landscape values)** relates to environment and landscape values and includes objectives and strategies relating to a treed city, biodiversity and native vegetation, natural corridors and significant landscapes.

**Clause 21.04-1 (Bushfire)** seeks to identify areas prone to bushfire and ensure that ‘*new development responds to bushfire risk to life and property.*’

**Clause 21.05 (Built environment and heritage)** includes objectives and strategies relating to local character, identity and sense of place, urban design, design for safety and environmentally sustainable development. Relevant objectives include (selected):

- *To create vibrant local areas with a strong character, identity and sense of place.*
- *To create high quality, well-designed places that respect and strengthen the local context and landscape qualities of Knox.*
- *To create places that increase personal safety and perceptions of safety and reduce opportunities for crime and antisocial behaviours.*

**Clause 21.06 (Housing)** recognises that the City of Knox has adopted a “*scaled approach to residential development*” and that some areas of the City will need to accommodate greater change than others. This Clause identifies the subject site as a “strategic investigation area” surrounded by a “Knox Neighbourhood” residential area.

Guidance for such strategic development sites is provided in the *Knox Housing Strategy 2015* and the *Knox Affordable Housing Action Plan 2015-2020*, discussed further below.

**Clause 21.09 (Transport and infrastructure)** recognises the importance of providing and maintaining infrastructure and water management.

## 4.4. REFERENCE DOCUMENTS

There are several reference documents of which, are relevant to the subdivision proposal. Noted in the following section are all documents with said relevance, with several being extrapolated upon due to their high level of relevancy.

- *Knox City Plan (incorporating the Council Plan) 2013-17, Knox City Council, 2013 (or as amended).*
- *Knox Urban Design Framework 2020, Planisphere, 2003*
- *Knox Affordable Housing Action Plan 2015-2020, Knox City Council, 2015*
- *Knox Housing Strategy 2015, Knox City Council, 2015*
- *Sites of Biological Significance in Knox - 2nd Edition, G.S. Lorimer, 2010*

### 4.4.1. Knox Community and Council Plan (2017-2021)

Goal 2 within this plan seeks to provide housing that meets the changing needs of the community. A Council target is to increase the number of new housing developments in well located areas. Cognisant with strategy within the municipality the document seeks to facilitate the development of sustainable dwellings and environments that work in with the existing and emerging built form.

### 4.4.2. Knox Urban Design Framework 2020, Planisphere, 2003

The vision specified within the plan seeks to further bolster the existing natural significance of the municipality. This seeks to support creek corridors, natural landscapes and native habitats. It is a pursuit of the document to facilitate safe and attractive neighbourhoods that have resolved and distinctive identities and character. The development of paths along creek corridors with good linkages to streets is sought by the document.

### 4.4.3. Knox Affordable Housing Action Plan 2015-2020, Knox City Council, 2015

The plan seeks to capitalise on existing underutilised land that is suitable for residential development and estimates that ‘*an additional 860 social housing dwellings will be needed in Knox by 2036 to meet minimum requirements*’. The strategy highlights the location of the site within a ‘Strategic Investigation Site’. Such sites are identified as potential opportunities for social housing dwellings.

#### 4.4.4. Knox Housing Strategy 2015, Knox City Council, 2015

The *Knox Housing Strategy 2015* sets out Council's plan for managing residential development to respond to the current and future needs of the Knox community. The document seeks to act upon the changing demographic and needs of the community through directing new housing (and its typology) accordingly. The subject site borders 'Knox Neighbourhood' and 'Bush Suburban' residential area types. These types include: detached dwellings, dual occupancy and villa units.

The subject site is identified as a strategic redevelopment site that is '*suitable for residential use only, with development at a range of densities.*' The redevelopment of the site must have regard to the following:

- *Protect the most significant vegetation at the northern end of the site.*
- *Incorporates a central park linked to the creek corridor*
- *Keep housing densities consistent with the surrounding area on the interfaces, with increased densities located internally, toward the centre of the site (facing public open space)*
- *Housing facing the creek or any creek corridor frontage road, creating opportunities for passive surveillance of public areas.*

This strategy indicates that likely future housing types on the site include '*detached dwellings, dual occupancies, villa units, townhouses.*' Moreover, this strategy has estimated a capacity of 100 dwellings on the site however, notes that this estimation is '*preliminary and indicative only.*'

#### 4.4.5 Sites of Biological Significance in Knox - 2nd Edition, G.S. Lorimer, 2010

The Norvel Road Reserves, which are located in the northern portion of the site and along the Blind Creek Corridor are identified as State sites of biological significance in Knox (Site 35).



## 5. PLANNING CONSIDERATIONS

### 5.1. PLANNING SCHEME AMENDMENT

The proposed planning scheme amendment has been considered having regard to the Strategic Assessment Guidelines established by the Department of Environment, Land, Water and Planning (“DELWP”). We have also considered the relevant Clauses of the PPF and LPPF.

In summary, there is strong strategic justification for the proposed planning scheme amendment.

#### 5.1.1. Strategic Assessment Guidelines

##### Why is the amendment required?

The amendment is required to facilitate the redevelopment of the site with 138 residential lots, a bushland reserve and a parkland reserve within an already established residential environment. Clause 21.02 of the Knox Planning Scheme outlines the subject site as a ‘strategic investigation site’ for residential uses. The proposal will assist with providing residential housing lots for the growing population within the municipality.

Currently, dwellings are prohibited under the SUZ2 applying to the site. It is proposed to rezone the site to the NRZ and to subdivide the site in accordance with updated urban design guidelines as required by the S173 Agreement applying to the land.

The existing ESO is proposed to be retained as it applies to the Blind Creek Corridor and associated bushland to ensure this area of environmental significance is protected.

##### How does the amendment implement the objectives of planning in Victoria?

The proposal responds to the objectives of planning in Victoria by providing for the orderly development of the underutilised land parcel whilst ensuring the protection of the Blind Creek Corridor. This is achieved by rezoning the site to the NRZ which will allow for suitable infill of dwellings within an established residential area in the future. Further, the proposal provides for an extended bushland reserve and buffer zone to ensure that the protection of the bushlands associated with the Blind Creek Corridor. This responds to objectives seeking the fair, orderly, economic and sustainable use and development of the land.

##### How does the amendment address any environmental, social and economic effects?

It is considered that the proposed amendment will have a positive environmental and net community benefit for the following reasons:

- Extending and protecting the bushland reserve.
- Improving the quality of water entering Blind Creek as well as the hydrology of the existing billabong through the proposed stormwater approach and vegetated swale in the northern portion of the site and the adoption of several flooding mitigation measures.
- Ensuring that no threatened flora or fauna species are impacted by the proposal.
- Requiring high quality landscape treatments throughout the development.
- Providing the retention of 107 existing trees
- Providing vegetation offset in accordance with Clause 52.17 and the relevant requirements.

The proposal will also have positive economic impacts by providing 138 residential lots to support the housing industry and will facilitate a further land swap with Council.

In terms of social effects, the proposal will enable the development of 138 residential lots of varying sizes (including 8 residential lots to be provided as social housing) in a location that is serviced by retail, community and commercial services. Further, it ensures that adequate areas of private open space to each dwelling can be accommodated in the future facilitates the provision of additional pedestrian and bicycle links through the bushland reserve and to the Blind Creek Trail.

**Does the amendment address relevant bushfire risk?**

The subject site is not located within the Bushfire Management Overlay, however, is located within a designated bushfire prone area. With appropriate mitigation measures, the proposal will not unduly increase the risk to life, property, infrastructure, or the natural environment from bushfire.

Extensive consultation with the CFA and Council has been undertaken to ensure there will be no unreasonable increased risk from bushfire as a result of the proposal.

**Does the amendment comply with all relevant Minister's Directions?**

The proposal is consistent with the relevant Ministerial Directions being Directions 1, 9 and 11 as follows:

- Ministerial Direction 1 – Potentially Contaminated Land
  - We have assumed that the rehabilitation of the site utilised clean fill and therefore has been successfully rehabilitated with respect to contamination. Please refer to the geotechnical reports prepared by Civil Test Pty Ltd for further details.
- Ministerial Direction 9 – Metropolitan Planning Strategy
  - The proposal is consistent with the current Metropolitan Planning Strategy as it provides for 138 diverse lots to cater for forecasted population growth within an established residential area proximate to jobs, services and transportation routes.
- Ministerial Direction 11 – Strategic Assessment of Amendments
  - This assessment has been prepared in accordance with these assessment requirements

**How does the amendment support or implement the Planning Policy Framework and any adopted State policy?**

In relation to the State PPF, the proposal responds as follows:

- The amendment is in accordance with Clause 11 (settlement) as it will facilitate the rezoning of the site to a residential zone. In turn, this will allow for the redevelopment of the site in the future and the protection and retention of the Blind Creek Corridor and associated bushland reserve.
- This amendment also responds to the objectives of Clause 11 by providing for the consolidation, redevelopment and low scale intensification of existing urban areas and by providing new walking and cycling trails and links to the Blind Creek Corridor (Clause 11.02-1S – supply of urban land).
- The proposal responds to the objectives of Clause 12 (environmental and landscape values) by extending the bushland reserve and minimising vegetation removal. Further, vegetation and biodiversity offsets have been calculated which considers the subdivision of the site and vegetation management (Clause 12.01-2S – native vegetation management).
- The proposal responds to Clause 13 (environmental risks and amenity) by preventing inappropriate future development within the bushland reserve and extending the bushland reserve and buffer zone.
- The proposal responds to Clause 14.02 (water) by incorporating a sophisticated stormwater system and flood mitigation methods.
- The amendment is in accordance with Clause 15 (built environment and heritage) as it provides guidelines for an attractive design outcome that responds to its contextual context including, landscape and built form context. Further, the proposed rezoning to the NRZ is consistent with the residential nature of the surrounding area and its environmental characteristics and will not result in any unreasonable amenity impacts on the surrounding area.
- The proposal is consistent with Clause 16 (housing) as it provides 138 new residential lots within a strategically advantageous location proximate to identified activity centres, providing access to jobs and services. The proposal will provide for an increase the supply of housing in an existing urban area on an underutilised piece of land. Further, the proposal includes several lot sizes, positively contributing to residential diversity.

- The proposal accords with the objectives of Clause 18 (transport) and includes the creation of a new road network to accommodate the new residential lots and provides appropriate linkages to the wider road network.
- The proposal is consistent with the objectives of Clause 19 (infrastructure) as it provides adequate infrastructure and utility provision for the site.

**How does the amendment support or implement the Local Planning Policy Framework, and specifically the Municipal Strategic Statement?**

The proposal is consistent with the following Clauses of the LPPF, including the MSS:

- Clause 21.01 (Municipal profile)
- Clause 21.02 (Vision)
- Clause 21.03 (Environmental and landscape values)
- Clause 21.05 (Built environment and heritage)
- Clause 21.04 (Environmental risks)
- Clause 21.09 (Transport and Infrastructure)

The proposal responds to these Clauses by responding to estimated population forecasts and providing 138 new residential lots within an established residential area with good access to jobs and services. Moreover, the proposal minimises vegetation removal and improves the interface with the Blind Creek Corridor and bushland by extending the buffer zone and activating the interface through proposed subdivision pattern. The proposal also includes a new trail through the corridor to facilitate interaction whilst protecting the corridor from intrusive development. A flora and fauna assessment has also been prepared and has established the appropriate native vegetation offsets associated with the proposal.

The proposal will facilitate the vibrant redevelopment of the site to positively contribute to the residential and landscape character.

For these reasons, it is considered that the proposed rezoning supports the relevant clauses of the LPPF.

**Does the amendment make proper use of the Victorian Planning Provisions?**

The proposed rezoning of the land to the NRZ, PCRZ and PPRZ and retention of the ESO as it applies to the northern part of the site, is an appropriate use of the Victorian Planning Provisions given the surrounding zoning pattern and land use context.

**How does the amendment address the views of relevant agencies?**

The proposal has stemmed from multiple discussions and consultations with Council and the CFA and is not anticipated to affect any other relevant agencies.

**Does the amendment address the requirements of the Transport Integration Act 2010?**

The proposal is considered to have minimal impact on the existing transport infrastructure and network, and therefore satisfactorily addresses the *Transport Integration Act 2010*.

**What impact will the new planning provisions have on the administrative cost of the responsible authority?**

The amendment is not expected to result in any unreasonable resource or administrative costs for the responsible authority.

## 5.2. SUBDIVISION

The proposed subdivision has been considered against the relevant provisions of the Knox Planning Scheme including Clause 56.

A full assessment against Clause 56 is contained at **Appendix D**. In summary, the proposal provides a high level of compliance with the objectives and standards of this Clause as the proposal:

- Provides for a range of lot sizes to meet community needs for housing, whilst responding to the existing subdivision pattern of the surrounding area.
- Provides for the orderly development of the area.
- Ensures that appropriate infrastructure and services are provided, including a reserve at the north-west corner of the site.
- Is well connected to a range of services and facilities given its proximity to Boronia Activity Centre (approximately 850 metres away) and Mountain Gate Shopping Centre (approximately 1.2 km away).
- Provides for a walkable and well-proportioned neighbourhood through pedestrian pathways on streets with residential interfaces and appropriately sized road carriageways in accordance with Clause 52.06 of the Knox Planning Scheme. Moreover, the proposal provides for the improvement of the existing shared path along the western site boundary and new boardwalks and connection to the bushland reserve to the surrounding residential area.
- Will facilitate increased residential densities and development of the site in the future, consistent with the character and identity of the surrounding residential area.
- Provide for lots that will allow future dwellings to be oriented to the proposed street or bushland reserve. This will ultimately provide for the public surveillance of the area.
- Provides appropriate connections to the external road network and for an internal road layout in accordance with Clause 52.06 of the Knox Planning Scheme.

### 5.3. URBAN DESIGN GUIDELINES

Since the preparation of the original urban design guidelines in 2006, the subject site and the surrounding area has undergone significant change. Specifically, the use of the site as a quarry for clay extraction has ceased and the site has been filled. In addition, vegetation on the site has been cleared outside of the bushland reserve (refer Figures 5 and 6 below).

Figure 4 – 2007 Subject Site



Figure 5 – 2017 Subject Site (current)



There is also an emerging trend towards further subdividing older lots (of approximately 750 square metre) to accommodate multiple dwellings on sites that originally contained singles, detached dwellings. This coupled with a change in policy direction seeks to deliver increased housing opportunities on underutilised land in established residential areas.

For these reasons, it is considered that the 2006 urban design guidelines should be updated.

The table below (which has been extracted from the accompanying Urban Design Guidelines prepared by Urbis) provides an outline of the 2006 objectives and their current status.

Table 1 – Review of General Objectives from 2004 Urban Design Guidelines

OBJECTIVE	CURRENT STATUS
Ensure that development is complementary to surrounding residential neighbourhoods.	<ul style="list-style-type: none"> <li>At a high level the objective is still valid, but requires some refinement</li> </ul>
Allow for development on quarried areas of the site at a higher density and with varied building types relative to surrounding areas	<ul style="list-style-type: none"> <li>'Quarried' areas have been filled in, but still valid in principle.</li> </ul>
Protect and restore significant indigenous vegetation communities including canopy trees, understorey and herbaceous elements.	<ul style="list-style-type: none"> <li>Still valid in principle, however the specifics of public access have changed</li> </ul>
Create an interface between development and the flora and fauna reserve that helps to protect the ecological values of the reserve while allowing benefits to residents and the broader community.	<ul style="list-style-type: none"> <li>The high level objective is valid, however many of the guidelines are no longer supported.</li> <li>Based on previous advice from Council, the guideline to "support fenced outdoor spaces with minimal plantings next to the reserve" is no longer correct.</li> </ul>
Create links with parkland along Blind Creek.	<ul style="list-style-type: none"> <li>Still valid</li> </ul>
Minimise the impacts of construction during, and as a result of, development of the site.	<ul style="list-style-type: none"> <li>Still valid</li> </ul>
Follow best practice in design, construction and operation of drainage systems.	<ul style="list-style-type: none"> <li>Still valid</li> </ul>
Support energy-efficient buildings and landscapes.	<ul style="list-style-type: none"> <li>Still valid</li> </ul>
Plan streets within the site as an integral part of the local street network.	<ul style="list-style-type: none"> <li>Most points still valid</li> <li>Guideline to "Design streets with a character similar to streets in adjoining areas (width, pavement materials)" is limited in some respects by the need to provide a finer grain of subdivision in order to be commercially viable.</li> </ul>
Create an attractive public interface between the new housing and other public open spaces.	<ul style="list-style-type: none"> <li>At a high level the objective is still valid</li> <li>Some of the specific guidelines for achieving the objective are questionable and may not be in line with the most recent Urban Design Framework for Knox.</li> </ul>

The proposed Urban Design Guidelines ("UDGs") have been prepared in response to the above review and will provide a contemporary design response which will be sympathetic to and add value to the character of the surrounding neighbourhood when the site is redeveloped in accordance with the proposed subdivision layout in the future.

### 5.3.1. Design Requirements

Based on the urban design guidelines and ongoing negotiations with Council, design requirements for future residential development have been prepared. The design requirements ensure that built form will be consistent with Council's Neighbourhood Character Policy, the proposed UDGs to be agreed to in the Section 173 Agreement and other site-specific controls that have come about over the development of the subdivision design.

For the most part, it is considered that ResCode and the relevant building code requirements are sufficient mechanisms to ensure appropriate built form outcomes at the Norvel Estate. It is sought to keep design intervention to a minimum and additional controls have only been incorporated where necessary.

With regard to the mechanism to implement these controls, a Section 173 agreement with a 10-year sunset clause is proposed. The Section 173 can be required via a condition on permit and the agreement can subsequently be prepared at this stage.

#### 5.3.1.1. Proposed Design Requirements

The following design requirements are proposed to be included on the Section 173 agreement:

1. The rear setback of all lots bordering the east property boundary to be:
  - a. At least 5 metres from the east property boundary if not on a corner lot
  - b. At least 3 metres from the east property boundary if on a corner lot

Any encroachment into the setback must be limited to structures such as porches, pergolas, verandahs, balconies, landings, stairways, ramps, pergolas, shade sails and decks that are less than 3.6 metres in height, and Eaves, window hoodings, sunblinds, awnings, eaves, fascias, gutters, masonry chimneys, flues, pipes, domestic fuel or water tanks, and heating or cooling equipment or other services, which may encroach into this setback.

2. The front setback to be a minimum of:
  - a. 5.5 metres for lots facing Castricum Place
  - b. 4.0 metres for lots on the northern side of Road B (Lots 33 – 40(townhouse lots))
  - c. 4.5 metres for all other lots

Any encroachment into the front setback must be limited to structures such as porches, pergolas, verandahs, balconies, decks, terraces, landings, stairways, ramps and pergolas that are less than 3.6 metres in height, and Eaves, window hoodings, sunblinds, awnings, eaves, fascias, gutters, masonry chimneys, flues, pipes, domestic fuel or water tanks, and heating or cooling equipment or other services, which may encroach not more than 2.0 metres into the front setback.

3. A new building not on or within 200mm of a boundary must be set back from side or rear boundaries, 1 metre, plus 0.3 metres for every metre of height over 3.6 metres up to 6.9 metres, plus 1 metre for every metre of height over 6.9 metres from the finished natural ground levels. Sunblinds, verandahs, porches, eaves, fascias, gutters, masonry chimneys, flues, pipes, domestic fuel or water tanks, and heating or cooling equipment or other services may encroach not more than 0.5 metres into these setbacks. Landings having an area of not more than 2 square metres and less than 1 metre high, stairways, ramps, pergolas, shade sails and carports may encroach into these setbacks.
4. Garage doors must be set back a minimum of 5.4 metres from the front boundary and at least 0.5 metres behind the building line. This requirement does not apply to the lots on the northern side of Road B (Lots 33-40 (townhouse lots)).
5. Each lot must have a maximum of one (1) crossover.
6. Provision for at least one (1) small canopy tree with a mature height of 5-8 metres must be provided within the front setback of each lot. Any encroachments into the minimum front setback e.g. eaves, verandah etc, must not inhibit on the survival of the tree. This requirement does not apply to the lots on the northern side of Road B (Lots 33-40 (townhouse lots)).
7. The Lot 138 building envelope must be set back by at least:
  - a. 2.0 metres from the west property boundary
  - b. 3.8 metres from the north property boundary
8. The building on Lot 138 should be single storey. If a double storey building is proposed, the upper level must be set back by at least 3 metres behind the ground floor north and west façade to ensure a recessive second storey element.
9. Where a dwelling faces a nature strip with a width of less than 2.4 metres and a boundary offset of 0.2 metres (properties facing Road A, Road F and Road G), no front fence may be constructed.

#### 5.3.1.2. Variations to Rescode via Schedule 7 to the NRZ

In addition to the design requirements, a variation to ResCode Standard A10 and B17 (Side and Rear Setbacks) is proposed. This variation relates to side setbacks on corner lots as the minimum 2 metre standard requirement cannot be achieved with the proposed subdivision layout.

It is proposed that Standard A13 and B20 (North Facing Windows) is not applicable to future development due to the impact that it will have on the developable width of lots. As this is a new development, removing this requirement will not create any unexpected amenity impact to neighbouring properties.

The Walls on Boundaries Standard (A11 and B18) is proposed to be updated to allow an average wall height of 3.6 metres and maximum height of 4.0 metres. The height is proposed to be increased from the general ResCode requirement for the following reasons:

- Given the slope of the land, there will be insufficient height at 3.2 metres to allow for a garage wall on boundary. If the Standard is not varied, it is likely that the future owners will require a dispensation to achieve the required garage dimensions. A garage height of greater than 3.2 metres was previously accepted by Council in the now amended development and subdivision application.
- As the lots have been designed for a volume builder, the additional height will allow for the standard garage with minimal modifications or dispensations, to be provided.
- The walls on boundary will be within a new development and will therefore create no unreasonable or unexpected detriment to neighbouring properties.

Schedule 7 to the NRZ is proposed include variations to the following:

- Standard A10 and B17 (Side and Rear Setbacks):
  - *Side walls of new development on a corner site should be set back the same distance as the setback of the front wall of any existing building on the abutting allotment facing the side street or 1.5 metres, whichever is the lesser.*
- Standard A11 and B18 (Walls on Boundaries):
  - The height of a new wall constructed on or within 200mm of a side or rear boundary or a carport constructed on or within 1 metre of a side or rear boundary should not exceed an average of 3.6 metres with no part higher than 4.0 metres unless abutting a higher existing or simultaneously constructed wall.
- Standard A13 and B20 (North Facing Windows):
  - *Standard does not apply.*

## 5.4. PLANNING CONSIDERATIONS

### 5.4.1. Does the proposal comply with applicable planning controls and policies?

The proposed built form responds to the objectives, provisions and decisions guidelines of the General Residential Zone and the SPPF and LPPF for the following reasons:

- The proposal provides for a range of lot sizes that can facilitate a range of different housing options to contribute to dwelling diversity and includes the provision of 8 residential lots allocated to social housing.
- The subject site has been established as a prime opportunity for housing growth and more intensive, low scale development. The proposed lot sizes can accommodate single and double storey dwellings (including villa units, attached dwellings and townhouses where appropriate) and contribute to this preferred character of the area.

Compliance with the Environmental Significance Overlay and its decision guidelines is detailed in Section 5.5 of this report. Suffice to say, the proposal complies with the objectives and decision guidelines of this Overlay.

### 5.4.2. Will the proposal result in any unreasonable amenity impacts?

The proposal has two external road abutments to the south and west with the Blind Creek Corridor abutting the site to the north.

The lot sizes have been carefully considered so that any proposed development along the eastern interface will have no unreasonable amenity impacts occur to existing dwellings.

To the east, the lot abuts the rear yards of dwellings facing Nerrissa Street and Vandeven Court. To ensure that the open character of these rear yards is retained, additional setback requirements stipulated in Section 5.3.1.1 above will ensure that new dwellings are appropriately set back from their rear boundary, allowing for landscaping and back garden space within this setback.

To the west, the site will abut the proposed Road C, reserve and Castricum Place. As the dwellings to the west are separated by a road and reserve, new development will not place any unreasonable amenity impact on these properties.

Traffic impacts are discussed in Section 5.6 of this report.

## **5.5. VEGETATION, LANDSCAPING AND OPEN SPACE**

### **5.5.1. Arboricultural Assessment**

An Arborist Assessment has been undertaken by Treemap Arboriculture with regard to the subject site and immediately adjacent areas. The assessment confirms that a very small number of trees are influenced by the proposal with 4 trees proposed to be removed, all of which require planning permission.

This includes three (3) street trees (tree 164, 167 and 169) to allow the installation of crossovers and the removal of Tree 141 which is a low value tree to allow for the pedestrian/bike path to be installed.

The report notes that the trees proposed to be removed are of poor to fair health and of low retention value. No other trees are expected to be impacted by the proposal with any TPZ encroachments limited in accordance with the relevant Australian Standards to ensure their retention.

Given this and given the proposed landscaping approach (as discussed further below), the proposed tree removal is considered acceptable and will be appropriate off-set.

### **5.5.2. Biodiversity Assessment**

A Biodiversity Assessment has been prepared by Ecolink Consulting in support of the proposal. The assessment assesses and maps the ecological values and constraints within the subject site.

The assessment confirms that the proposal has avoided the removal of native vegetation wherever practicable and will minimise impacts to biodiversity.

Specifically, two remnant patches of vegetation occur within the northern portion of the site and are of high quality. Other native vegetation, that is not classified as remnant, was recorded in the southern portion of the site however, as this vegetation comprises regrowth less than 10 years old (associated with the rehabilitation of the quarry) it is not required to be offset. In addition, "green scentbark" (which is a threatened flora species) was found within the site and three scattered indigenous trees were found adjacent to the western site boundary, along an existing shared pathway (see Figure 6 below).



Figure 6 – Extract from Biodiversity Assessment



To assess the vegetation removal currently proposed, the proposal has been assessed under the low risk-based pathway in accordance with the *Guidelines for the removal, destruction or lopping of native vegetation* and the requirements of Clause 52.17.

In accordance with Clause 52.17, the proposal has been designed to avoid and minimise impacts to native vegetation. Specifically, this has been achieved by:

- Ensuring the identified areas of remnant vegetation as well as other high quality vegetation are protected.
- Ensuring the identified threatened flora species is protected by siting the proposed development on the previously disturbed areas of the site.
- Ensuring the proposed improvements to the existing shared path along the western site boundary will not adversely impact the three scattered indigenous trees in this location.
- The future preparation of a land management plan and construction management plan that will minimise construction related impacts and ongoing management of ecological values.

Overall, 1.129 hectares of native vegetation will be impacted by the proposed development. However, 0.738 hectares of this vegetation comprises regrowth and is therefore exempt from requiring offsets under Clause 52.17. Offsets will be required for the remaining 0.391 hectares of native vegetation to be removed.

To ensure no net loss to Victoria's biodiversity as a result of the proposal, specific offsets have been identified. A biodiversity offset of 0.126 General Habitat Units with a minimum Strategic Biodiversity Score of 0.202 will be provided as required by the Biodiversity Impact and Offset Requirements Tool (Refer to appendix 3 of the Biodiversity report). This will be located within the Port Phillip and Westernport Catchment Management Authority area, or Knox City Council.

This demonstrates that the proposal has avoided and minimised native vegetation removal and the removal required will be appropriate offset in accordance with the requirements of Clause 52.17 to ensure net gain to Victoria's biodiversity.

### 5.5.3. Response to Environmental Significance Overlay Schedule 2

ESO2 relates to Sites of Biological Significance and seeks to protect and appropriately manage their importance for the maintenance of Knox's and Victoria's biodiversity, as well as for the liveability and the health and wellbeing of the community.

The proposal responds to the objectives of ESO as the proposal:

- Minimises the amount of vegetation required to be removed to facilitate the development.
- Ensures that the identified indigenous scattered trees are not adversely impacted by the proposed improvements to the existing shared path along the western site boundaries.
- Does not adversely impact on identified threatened flora or fauna species.
- Improves the quality of water entering Blind Creek as well as the hydrology of the existing billabong.
- Provided a new, designated boardwalk through the bushland reserve to protect the area from heavy foot traffic.

Overall, the proposal will provide for the long-term protection of the bushland reserve and will result in a net community benefit.

### 5.5.4. Landscaping and Open Space

The accompanying landscape report outlines the design rationale for the proposed street trees, the linear reserve and bushland and wetland reserve.

The design rationale has stemmed from the residential and landscape character of the surrounding area and creates a strong canopy tree framework that will provide a link to the adjoining bushland reserve. Key themes include (selected):

- Providing a mix of deciduous and evergreen trees to ensure there is little or no risk that they will overshadow nearby windows during the winter months.
- Avoiding the overlapping of trees to ensure that there is adequate space for the roots of each tree to develop.
- Retaining existing street trees where possible.
- Planting of deciduous trees along east-west streets and evergreen natives on north-south streets to balance the desire for native trees whilst maximising opportunities for winter sun.
- Utilising a mix of concrete and brick feature paving for wayfinding.

A total of 173 street trees are proposed as part of the subdivision. Additional canopy trees will also be required within the front gardens of each lot. Only 4 trees are proposed to be removed. Overall, the proposed landscaping design response will make a significant contribution to the site and surrounding area and positively contributes to the garden character of Knox's residential areas.

In addition to the above it is proposed to:

- Upgrade the existing informal shared pathway along the western boundary of the site, which provides a link between Castricum Place and the blind creek trail. The proposed improvements will incorporate a 3m wide formalised shared use path ("SUP") as well as new indigenous canopy trees and low level native vegetation to be planted along its length.
- Provide an informal trail through an already disturbed portion of the bushland reserve to improve local connectivity with the bushland reserve. This trail will connect the site, blind creek trail and also provide a connection to Agora Boulevard which is currently a dead end. The trail will comprise granitic sand for the majority of the path to maintain a naturalistic appearance with an at-grade or elevated boardwalk where there is a risk of disturbing native vegetation.

- Extending the Bushland Reserve further to the south and incorporating new reserves at the north-east and north-west corners of the site which will also function as an integrated element within a passive recreation space.

These improvement works will provide positive connections between the subject site, surrounding area and the Blind Creek Corridor and associated bushland, and will result in net community benefit.

## 5.6. PARKING, TRAFFIC AND MOVEMENT

A traffic assessment of the site was undertaken by Cardno and accompanies this report.

### 5.6.1. Parking

In relation to car parking, a total of up to 122 on-street car parking spaces is achievable.

This provides ample space for on street parking for residents, visitors and external visitors to the bushland and parkland area. Furthermore, complies with the design guidelines of Clause 56.06 of the Knox Planning Scheme with regard to provision of kerbside parking and carriageway widths.

### 5.6.2. Traffic and Movement

The proposal provides for an internal road network based on estimated daily traffic volumes and predominantly provides for 15.8m, 15.3m and 13.0m road reserves with a 7.3m carriageway. These streets provide car parking on both sides of the street.

Other street types include access lanes and places to provide access to certain lots with parking on one side of the street.

Based on the above, the proposal provides for street types that are greater than those required by the Planning Scheme and is a positive outcome.

The traffic assessments undertaken took a conservative estimate with respect to traffic generation and estimates that the proposal will generate 9 vehicle movements per dwelling a day (1,260 vehicle movements per day for the site). Traffic generation at AM and PM peak hours is expected to be 10% of the daily traffic volume of 126 vehicle movements.

Of the 138 residential lots proposed, 119 of these are proposed to be accessed via the internal road network and 21 will have direct access to Norvel Road or Castricum Place. Based on this, the internal traffic generation will be approximately 1,071 vehicle movements per day. This will be split between the three (3) streets within the subdivision and therefore no street will carry a daily traffic volume greater than 1,000 vehicle movements per day.

The anticipated daily traffic volumes are within the capacities of the proposed carriageway widths and are therefore an acceptable outcome for the site. Moreover, whilst there will be an increase in vehicle movements at arterial intersection during the AM and PM peak periods, the increase is considered low from a traffic engineering context.

Overall, the proposal will result in appropriate parking and traffic outcomes for the site and often exceeds the minimum requirements of Clause 52.06 of the Knox Planning Scheme.

## 5.7. UTILITIES

### 5.7.1. Stormwater Management

The proposed stormwater management approach relies on the existing billabong to the north-west of the site for detention and water quality mitigation and the construction of a wetland which will disperse overflow into adjoining bushland reserve.

Specifically, the proposed strategy proposes:

- *A raised bike path*
- *A swale along the property boundary*
- *A culvert under the existing foot path*
- *A bund between the proposed site road and localised high point*

Overall, the proposed stormwater management will improve the quality of water entering Blind Creek as well as the hydrology of the wetland. Further details are outlined within the Stormwater Management Plan prepared by Cardno.

### 5.7.2. Other Utilities

The proposal utilises underground reticulated utility services, typically in shared trenches in accordance with standard industry practice.

Specifically:

- An existing sewer along the site's western boundary and a new sewer along the Council reserve will be utilised to service the proposal and will ensure that existing infrastructure is not overloaded.
- Water supply will occur via an existing 150mm dia water main in Norvel Road. Further, an existing 100mm dia water main will be updated to 150mm dia so that it can extend into the development as the primary source of water supply.
- Connections to existing mains in Castricum Place and Dion Street will also be required to service the proposal.
- The proposal will incorporate the construction of a high voltage cable from the existing high voltage line in McMahons Road to the south to a new kiosk station within the site.
- There is sufficient capacity in the existing gas reticulation network in the vicinity of the site to provide gas supply to the proposal.
- The proposal will require the installation of a telecommunications pit and infrastructure, with the installation of fibre optic cable to be carried out by NBN Co.

Please refer to the Utility Services Infrastructure Report prepared by Cardno for further details.

## 5.8. BUSHFIRE ASSESSMENT

A bushfire development report has been prepared by Terramatrix. This report was prepared after extensive consultation with Council and the CFA. The report assesses the bushfire risk and demonstrates how the development can respond to the relevant policy. A summary of the report is as follows:

- The subject site is partially within a Bushfire Prone Area (BPA) (however is not within a Bushfire Management Overlay).

Figure 7 Extract from Bushfire Development Report indicating brown areas as Bushfire Prone Areas



- Part of the western boundary of the site is eligible to be removed from the BPA due to the recent removal of trees along this boundary.
- Appropriate setbacks from vegetation is provided to all lots to ensure a Bushfire Attack Level (BAL) 12.5 construction standard is achieved.
- Knox City Council has agreed to undertake part of the management of the reserve which includes monthly visits during the declared fire danger period.
- A range of objectives have been agreed upon for fire management regime.
- Lot 138 will be the closest to the bushland reserve and additional requirements will be in place to support the BAL-12.5 construction standard.
- The proposed landscaping within the drainage reserve will be largely outside the BPA and is therefore not discussed within the report. Additionally, the proposed vegetation / street trees are as recommended by Knox City Council.
- The report concludes that bushfire risk can be mitigated to an acceptable level and the development can appropriately prioritise the protection of human life.
- The existing and proposed road network provides good access and egress for emergency management vehicles and residents in the event of a bushfire.

It is expected that this report will be referred to the CFA and any requirements will be enforced via condition on the permit.

## 6. CONCLUSION

The proposed subdivision of the site with 138 residential lots, a bushland reserve and a parkland reserve, appropriately responds to overarching state and local planning policies which seeks to provide for increased housing densities on under-utilised urban land and protect and enhance significant environments. The proposal takes advantage of the site's designation as a large strategic investigation site and provides for a low scale intensive development that will positively contribute to dwelling diversity and housing stock within the City of Knox.

The proposed Urban Design Guidelines provide for the future development of the site whilst ensuring that the high level of amenity of the surrounding residential area is maintained. Further, the proposal provides substantial landscaping opportunities which will positively contribute to the garden character of the area and the adjoining Blind Creek Corridor and associated bushland reserve.

Overall, the proposal has had appropriate regard to the characteristics of the site, the broader context and adjoining properties to minimise the potential for off-site amenity impacts and should be supported.

## DISCLAIMER

This report is dated 12 February 2021 and incorporates information and events up to that date only and excludes any information arising, or event occurring, after that date which may affect the validity of Urbis Pty Ltd's (**Urbis**) opinion in this report. Urbis prepared this report on the instructions, and for the benefit only, of Norvel Estate Pty Ltd (**Instructing Party**) for the purpose of Town Planning Report (**Purpose**) and not for any other purpose or use. To the extent permitted by applicable law, Urbis expressly disclaims all liability, whether direct or indirect, to the Instructing Party which relies or purports to rely on this report for any purpose other than the Purpose, and to any other person which relies or purports to rely on this report for any purpose whatsoever (including the Purpose).

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This report has been prepared with due care and diligence by Urbis and the statements and opinions given by Urbis in this report are given in good faith and in the reasonable belief that they are correct and not misleading, subject to the limitations above.

# APPENDIX A      CERTIFICATES OF TITLE



**APPENDIX B**      **EXISTING SECTION 173 AGREEMENT AND  
URBAN DESIGN GUIDELINES**

**APPENDIX C**      **PROPOSED NEIGHBOURHOOD  
RESIDENTIAL ZONE SCHEDULE 7**

# APPENDIX D      CLAUSE 56 ASSESSMENT





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**Register Search Statement - Volume 9381 Folio 087**

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REGISTER SEARCH STATEMENT (Title Search) Transfer of Land Act 1958

VOLUME 09381 FOLIO 087

Security no : 124088097201C  
Produced 12/02/2021 04:06 PM

LAND DESCRIPTION

Lot 1 on Title Plan 297137X.  
PARENT TITLE Volume 08240 Folio 224  
Created by instrument H868559 14/02/1980

REGISTERED PROPRIETOR

Estate Fee Simple  
Sole Proprietor  
NORVEL ESTATE PTY LTD  
AQ306807L 03/10/2017

ENCUMBRANCES, CAVEATS AND NOTICES

Any encumbrances created by Section 98 Transfer of Land Act 1958 or Section 24 Subdivision Act 1988 and any other encumbrances shown or entered on the plan set out under DIAGRAM LOCATION below.

AGREEMENT Section 173 Planning and Environment Act 1987  
AG370823M 25/02/2009

DIAGRAM LOCATION

SEE TP297137X FOR FURTHER DETAILS AND BOUNDARIES

ACTIVITY IN THE LAST 125 DAYS

NUMBER		STATUS	DATE
AT904728V	CONVERT A PCT TO AN ECT	Completed	23/12/2020

-----END OF REGISTER SEARCH STATEMENT-----

Additional information: (not part of the Register Search Statement)

Street Address: 29Q NORVEL ROAD FERNTREE GULLY VIC 3156

ADMINISTRATIVE NOTICES

NIL

eCT Control 14973C D Y & CO LAWYERS  
Effective from 23/12/2020

DOCUMENT END

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**Form 18**

Section 181

**APPLICATION BY A RESPONSIBLE AUTHORITY FOR THE MAKING OF A  
RECORDING OF AN AGREEMENT**

*Planning and Environment Act 1987*

Lodged at the Land Titles Office by:

**Name:** Maddocks  
**Phone:** 9288 0555  
**Address:** 140 William Street, Melbourne 3000 or DX 259 Melbourne  
**Ref:** TGM:5234519 **Customer Code:** 1167E

The Authority having made an agreement referred to in section 181(1) of the *Planning and Environment Act 1987* requires a recording to be made in the Register for the land.

Land: Volume 10808 Folio 226, Volume 8328 Folio 822 and Volume 9381 Folio 087

Authority: Knox City Council, 511 Burwood Highway, Wantirna South, Victoria 3152

Section and Act under which agreement made: Section 173 of the *Planning and Environment Act 1987*.

A copy of the agreement is attached to this application

Signature for the Authority: *[Handwritten Signature]*

Name of officer: **CLAIRE ANDERSON**

Office held: **PROJECT MANAGER - STRATEGIC PLANNING**

Date: **18/2/09**

[5234519: 6071691\_1]



**AG370823M**



Date *12 1 2* /2009



**Maddocks**

Lawyers  
140 William Street  
Melbourne Victoria 3000 Australia  
Telephone 61 3 9288 0555  
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[www.maddocks.com.au](http://www.maddocks.com.au)  
DX 259 Melbourne

**Agreement under Section 173 of the  
Planning and Environment Act 1987**

Land: Norvel Road Quarry

Knox City Council

and

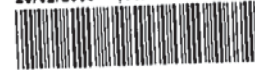
Robertson Industries Pty Ltd ACN 004 435 376

Affiliated offices  
Adelaide, Brisbane, Colombo, Dubai,  
Hong Kong, Jakarta, Kuala Lumpur,  
Manila, Mumbai, New Delhi, Perth,  
Singapore, Sydney, Tianjin

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*ML*  
*Jln*

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## Agreement under Section 173 of the Planning and Environment Act 1987

DATE 12 / 2 / 2009

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### BETWEEN

**KNOX CITY COUNCIL**  
of Municipal Offices, 511 Burwood Highway, Wantirna South 3152

(Council)

### AND

**ROBERTSON INDUSTRIES PTY LTD ACN 004 435 376**  
care of Pitcher Partners Level 19, 15 William Street, Melbourne 3000

(Owner)

### RECITALS

- A. Council is a Planning Authority for the Planning Scheme.
- B. The Owner is or is entitled to be the registered proprietor of the Robertson Land.
- C. Council is entitled to be the registered proprietor Triangular Land.
- D. Council and the Owner have agreed to an exchange of part of the Robertson Land in return for the Triangular Land upon certain terms and wish to record those terms in this Agreement.
- E. The Owner has asked Council to prepare an amendment to the Planning Scheme to allow the balance of the Robertson Land after the land exchange facilitated by this Agreement to be developed for residential and associated purposes.
- F. On 11 July 2006, Council resolved to prepare an amendment to the Planning Scheme provided the Owner enters into an agreement to provide for a land exchange as described in this Agreement.
- G. The parties enter into this Agreement to give effect to the requirements of the Council Resolution and by entering into it the parties intend to achieve or advance the objectives of planning in Victoria or the objectives of the Planning Scheme.

### THE PARTIES AGREE

#### 1. DEFINITIONS

In this Agreement the words and expressions set out in this clause have the following meanings unless the context admits otherwise:

**Act** means the *Planning and Environment Act 1987*.

**Agreement** means this agreement and any agreement executed by the parties expressed to be supplemental to this Agreement.

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**Amendment** means an amendment to the Planning Scheme which rezones the Robertson Land excluding the Open Space Land and the Northern Parcel to Residential 1 Zone with a Development Plan Overlay and which may include the use of other planning scheme provisions.

**Approval Date** means the date on which a copy of the Notice of Approval of the Amendment is published in the Government Gazette.

**Approved Management and Rehabilitation Plan** means the management plan lodged under clause 3.3.1 of this Agreement and approved by Council.

**Commencement Date** means the date of this Agreement.

**Development** means the development of the Robertson Land for the purposes envisaged by the Amendment.

**Ministerial Direction** means "Direction No. 1 Potentially Contaminated Land" prepared pursuant to Section 12(2)(a) of the Act and dated 27 September 2001 (or as amended).

**Mortgagee** means the person or persons registered or entitled from time to time to be registered by the Registrar of Titles as Mortgagee of the Robertson Land or any part of it.

**Northern Parcel** means that part of the Robertson Land situated at the northern end and which has an area of 7922 square metres and which is identified and delineated as "Land Exchange" on the Survey Plan.

**Open Space Land** means that part of the Robertson Land which is identified and delineated on the Survey Plan as Public Open Space and having an area of 4980 square metres.

**Open Space Works** means any works to construct or landscape any area of land which is intended to be Open Space.

**Original Agreement** means the agreement dated 10 June 1980 between Council and Robertson Industries Pty Ltd made under the Town and Country Planning Act 1961.

**Owner** means the person or persons registered or entitled from time to time to be registered by the Registrar of Titles as proprietor or proprietors of an estate in fee simple of the Robertson Land or any part of it and includes a Mortgagee-in-possession.

**party or parties** means the Owner and Council under this Agreement as appropriate.

**Planning Scheme** means the Knox Planning Scheme and any other planning scheme that applies to the Robertson Land.

**Quarry** means the quarry on the Robertson Land.

**Residential Lot** means a lot which by virtue of its size and dimensions, is intended for final use as a home site.

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**Robertson Land** means the land situated at Norvel Road, Ferntree Gully being the land more particularly referred to in Certificates of Title Volume 10808 folio 226 ✓ Volume 8328 Folio 822 and Volume 9381 Folio 087 and any reference to the Robertson Land in this Agreement includes any lot created by the subdivision of the Robertson Land or any part of it.

**Subdivision Plan** means any plan lodged as a supporting document to a planning permit application seeking the subdivision of the Robertson Land so as to create a lot or lots comprising the Northern Parcel and the Public Open Space.

**Survey Plan** means the plan prepared by H J Macey land surveyor reference 1080 sheet 1 of 1 dated 2 June 2006 and which is attached to this agreement as Annexure 1

**Triangular Land** means land which is part of the Robertson Land and which is triangular in shape having an area of 6593 square metres and which is located in the south east corner of the Robertson Land and delineated on the Survey Plan.

**Urban Design Guidelines** means the "Norvel Road Quarry, Ferntree Gully Urban Design Guidelines, prepared for the Knox City Council by Jones & Whitehead Pty Ltd (Amended by Council, Draft May 2006) or as amended from time to time with the consent of the Responsible Authority and the Owner.

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## 2. INTERPRETATION

In this Agreement unless the context admits otherwise:

- 2.1 The singular includes the plural and vice versa.
- 2.2 A reference to a gender includes a reference to each other gender.
- 2.3 A reference to a person includes a reference to a firm, corporation or other corporate body and that person's successors in law.
- 2.4 If a party consists of more than one person this Agreement binds them jointly and each of them severally.
- 2.5 A term used in this Agreement has its ordinary meaning unless that term is defined in this Agreement. If a term is not defined in this Agreement and it is defined in the Act it has the meaning as defined in the Act.
- 2.6 A reference to an Act, Regulation or the Planning Scheme includes any Acts, Regulations or amendments amending, consolidating or replacing the Act, Regulation or Planning Scheme.
- 2.7 The introductory clauses to this Agreement are and will be deemed to form part of this Agreement.
- 2.8 The obligations of the Owner under this Agreement, will take effect as separate and several covenants which are annexed to and run at law and equity with the Robertson Land provided that if the Robertson Land is

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subdivided, this Agreement must be read and applied so that each subsequent owner of a lot is only responsible for those covenants and obligations which relate to that owner's lot.

### **3. SPECIFIC OBLIGATIONS OF THE OWNER**

The Owner agrees that:

#### **3.1 Transfer of the Northern Parcel**

- 3.1.1 it must transfer or vest the Northern Parcel to or in Council as the case may be;
- 3.1.2 the transfer or vesting of the Northern Parcel to or in Council must be effected within 90 days of the Approval Date unless each of the parties agree in writing to a different time frame;

#### **3.2 Transfer of the Open Space Land**

- 3.2.1 it will transfer or vest the Open Space Land to or in Council as the Public Open Space contribution that would otherwise be required under clause 52.01 of the Planning Scheme for the subdivision of the balance of the Robertson Land;
- 3.2.2 the transfer or vesting of the Open Space Land to Council must be effected within 90 days of the Approval Date unless each of the parties agree in writing to a different time frame.

#### **3.3 Management and Rehabilitation Plan**

- 3.3.1 within 28 days of the Approval Date, it will submit a management and rehabilitation plan to the satisfaction of and for approval by Council in respect of:
  - o the continued operation of the quarry which addresses how the continued operation of the quarry will avoid the removal of vegetation on the Northern Parcel and on the Open Space Land;
  - o the rehabilitation of the quarry so that its final contours are such as to be suitable for residential development and use;
  - o proposed security measures that will be put in place in respect of the Northern Parcel, the Open Space Land and the Quarry;
  - o access arrangements (including the grant of licenses for access) that are to be put in place in respect of the Northern Parcel to enable Council and its servants and agents access to the land prior to its transfer or vesting in Council; and
  - o how it is proposed to fill the Quarry as part of the rehabilitation of the land including proposed finished contour levels;

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3.3.2 the Quarry and its subsequent rehabilitation must be conducted in accordance with the Approved Management and Rehabilitation Plan and otherwise in such a manner that does not result in the damage or destruction of any vegetation on the Open Space Land or the Northern Parcel;

#### 3.4 Fencing

3.4.1 it will keep in place and maintain in good condition the cyclone wire fence situated on the boundary of the Northern Parcel and the Open Space Land until completion of the obligations under this Agreement; and

3.4.2 it will allow Council to install a fence to demarcate the boundary between the Northern Parcel and the Quarry to the satisfaction of Council.

#### 4. ACKNOWLEDGMENT AND OBLIGATIONS OF COUNCIL

Council agrees that:

##### 4.1 Triangular Land

it will forego its rights to the Triangular Land under the Original Agreement;

##### 4.2 Other lands

it will forego its rights to the land described as Industrial Buffer under the Original Agreement;

##### 4.3 Public Open Space Contribution

the transfer or vesting of the Open Space Land to or in Council in accordance with the terms of this Agreement by the Owner will comprise and be treated as the open space contribution required by clause 52.01 of the Planning Scheme for the subdivision of the balance of the Robertson Land notwithstanding that the contribution is made prior to the making of the requirement under clause 52.01 of the Scheme;

##### 4.4 Preparation of the Amendment

it will expeditiously seek authorisation under the Act and use its best endeavours to prepare and exhibit the Amendment to the Planning Scheme and undertake the necessary statutory processes required to submit the Amendment to the Minister for approval by the Minister; and

##### 4.5 Erection of a fence

it will construct at its cost a fence to demarcate the boundary between the Northern Parcel and the Quarry.

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**5. ACKNOWLEDGMENT BY BOTH PARTIES**

Council and the Owner agree that:

- 5.1 immediately upon the Commencement Date, the Original Agreement ends and Council will make application to the Registrar of titles to remove the recording of that agreement from the title to the Robertson Land;
- 5.2 notwithstanding anything contained in clause 3.3 of this Agreement, the Owner may remove vegetation from the Open Space Land and the Northern Parcel provided it is removed in accordance with a written consent of Council;
- 5.3 in seeking consent to remove any native vegetation from the relevant area under this Agreement, the Owner must demonstrate how the Owner has endeavoured to avoid the removal of native vegetation and if avoidance is not possible, how the removal of native vegetation has been minimised;
- 5.4 the southern boundary of the Northern Parcel may be realigned by agreement in writing between the parties prior to its transfer or vesting to or in Council;
- 5.5 the Schedule to the Development Plan Overlay (applied to the Robertson Land by the Amendment) should generally reflect the principles of the Urban Design Guidelines to the extent possible having regard to the form of development and use of the Robertson Land proposed by the Owner at the time of preparation of the Amendment; ;
- 5.6 in preparing the Amendment, the parties (including Council in its capacity as planning authority for the Amendment), will ensure that the Amendment complies with the Ministerial Direction by requiring that the land to be rezoned to Residential 1 Zone be included within an Environmental Audit Overlay in the Planning Scheme in the event that one or both of the parties considers that an Environmental Audit Overlay is necessary in the circumstances;
- 5.7 the Owner, at its discretion, may continue to extract clay from any area of the Robertson Land that is licensed for clay extraction purposes for a period of up to two (2) years after the Approval Date (**Clay Extraction**). The Clay Extraction will be undertaken in a manner that results in a final land form suitable for residential development without incurring construction cost penalties associated with excessive slope of the land;
- 5.8 the Owner may only continue the Clay Extraction in accordance with clause 5.7 at an extraction rate that is at or less than the average rate of extraction achieved in the 12 month period immediately prior to 11 July 2006.

**6. FURTHER OBLIGATIONS OF THE OWNER**

**6.1 Notice and Registration**

The Owner further covenants and agrees that the Owner will bring this Agreement to the attention of all prospective purchasers, lessees, mortgagees, chargees, transferees and assigns.



7

**AG370823M**

25/02/2009 \$99.90 173

**6.2 Further actions**

The Owner further covenants and agrees that:

- 6.2.1 the Owner will do all things necessary to give effect to this Agreement;
- 6.2.2 the Owner will consent to Council making application to the Registrar of Titles to make a recording of this Agreement in the Register on the Certificate of Title of the Robertson Land in accordance with Section 181 of the Act and do all things necessary to enable Council to do so including signing any further agreement, acknowledgment or document or procuring the consent to this Agreement of any mortgagee or caveator to enable the recording to be made in the Register under that section.

**6.3 Council's Costs to be Paid**

The Owner further covenants and agrees that the Owner will immediately pay to Council, an amount equal to 50% of Council's reasonable costs and expenses, including legal expenses) of and incidental to the preparation, drafting, finalisation, engrossment, execution and registration of this Agreement which are and until paid will remain a debt due to Council by the Owner.

**7. AGREEMENT UNDER SECTION 173 OF THE ACT**

Council and the Owner agree that without limiting or restricting the respective powers to enter into this Agreement and, insofar as it can be so treated, this Agreement is made as a Deed pursuant to Section 173 of the Act and specifies the conditions pursuant to which the Robertson Land may be used or developed for specified purposes.

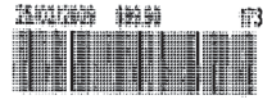
**8. OWNER'S WARRANTIES**

Without limiting the operation or effect which this Agreement has, the Owner warrants that apart from the Owner and any other person who has consented in writing to this Agreement, no other person has any interest, either legal or equitable, in the Robertson Land which may be affected by this Agreement.

**9. SUCCESSORS IN TITLE**

Without limiting the operation or effect that this Agreement has, the Owner must ensure that, until such time as a memorandum of this Agreement is registered on the title to the Robertson Land, successors in title shall be required to:

- 9.1 give effect to and do all acts and sign all documents which will require those successors to give effect to this Agreement; and
- 9.2 execute a deed agreeing to be bound by the terms of this Agreement.

**AG370823M**

## **10. GENERAL MATTERS**

### **10.1 Notices**

A notice or other communication required or permitted to be served by a party on another party must be in writing and may be served:

- 10.1.1 by delivering it personally to that party;
- 10.1.2 by sending it by prepaid post addressed to that party at the address set out in this Agreement or subsequently notified to each party from time to time; or
- 10.1.3 by sending it by facsimile provided that a communication sent by facsimile shall be confirmed immediately in writing by the sending party by hand delivery or prepaid post.

### **10.2 Service of Notice**

A notice or other communication is deemed served:

- 10.2.1 if delivered, on the next following business day;
- 10.2.2 if posted, on the expiration of two business days after the date of posting; or
- 10.2.3 if sent by facsimile, on the next following business day unless the receiving party has requested retransmission before the end of that business day.

### **10.3 No Waiver**

Any time or other indulgence granted by Council to the Owner or any variation of the terms and conditions of this Agreement or any judgment or order obtained by Council against the Owner will not in any way amount to a waiver of any of the rights or remedies of Council in relation to the terms of this Agreement.

### **10.4 Severability**

If a court, arbitrator, tribunal or other competent authority determines that a word, phrase, sentence, paragraph or clause of this Agreement is unenforceable, illegal or void then it must be severed and the other provisions of this Agreement will remain operative.

### **10.5 No Fettering of Council's Powers**

It is acknowledged and agreed that this Agreement does not fetter or restrict the power or discretion of Council to make any decision or impose any requirements or conditions in connection with the granting of any planning approval or certification of any plans of subdivision applicable to the Robertson Land or relating to any use or development of the Robertson Land.

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**11. COMMENCEMENT OF AGREEMENT**

This Agreement commences upon the Commencement Date.

**12. ENDING OF AGREEMENT**

- 12.1 This Agreement ends when the Owner has complied with all of the obligations imposed on the Owner under this Agreement as evidenced in writing by a letter from Council to that effect.
- 12.2 At the time Council issues a Statement of Compliance under the *Subdivision Act* 1988 in respect of any stage of the Robertson Land, provided the Owner has fulfilled all of the obligations of this Agreement relating to that stage to the satisfaction of Council, Council will, at the request and expense of the Owner, prepare and execute an application pursuant to section 183(2) of the Act to enable this Agreement to be removed from the Certificate of Title(s) to every lot within that stage of the Robertson Land.

[5234519: 4570277v1] ; tmp154

AG370823M

25/02/2009 \$99.90 173



SIGNED, SEALED AND DELIVERED as a Deed by the parties on the date set out at the commencement of this Agreement.

THE COMMON SEAL OF THE KNOX CITY COUNCIL was hereunto affixed in the presence of:



Handwritten signatures of three individuals on dotted lines.

Mayor  
Councillor

Chief Executive Officer

Councillor

Executed by ROBERTSON INDUSTRIES PROPRIETARY LIMITED ACN 004 435 376 in accordance with section 127 of the Corporations Act 2001:

[Signature]  
Director/company secretary

[Signature]  
Director

PETER RAYTON ROBERTSON  
Name of director/company secretary (BLOCK LETTERS)

JENNIFER MARY ROBERTSON  
Name of director (BLOCK LETTERS)

**Annexure 1 – Survey Plan**

The plan which is annexure "1" has been removed from this counterpart of the Section 173 Agreement due to difficulties with imaging for recording purposes.

A copy of the plan identified is included in each of the counterparts to this section 173 agreement which are held by:

- The Minister for Planning;
- The responsible authority
- The Owner of the land as at the date the agreement was executed

A copy of the counterpart agreement together with Annexure A is available for inspection at Council offices during normal business hours upon giving the Council reasonable notice.



A handwritten signature in black ink, appearing to be 'J. Lusk'.

Delivered by LANDATA®, timestamp 12/02/2021 16:23 Page 1 of 1

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<b>TITLE PLAN</b>		<b>EDITION 1</b>	<b>TP 297137X</b>						
<b>Location of Land</b> Parish: SCORESBY Township: Section: Crown Allotment: 54A (PT) Crown Portion:  Last Plan Reference: LP 4115 Derived From: VOL 9381 FOL 087 Depth Limitation: NIL		<b>Notations</b>  ANY REFERENCE TO MAP IN THE TEXT MEANS THE DIAGRAM SHOWN ON THIS TITLE PLAN							
<b>Description of Land / Easement Information</b>		THIS PLAN HAS BEEN PREPARED FOR THE LAND REGISTRY, LAND VICTORIA, FOR TITLE DIAGRAM PURPOSES AS PART OF THE LAND TITLES AUTOMATION PROJECT COMPILED: 31/01/2000 VERIFIED: P.C.							
<table border="1" style="width:100%; border-collapse: collapse;"> <tr> <th colspan="2" style="text-align: center;">TABLE OF PARCEL IDENTIFIERS</th> </tr> <tr> <td colspan="2" style="font-size: small;">WARNING: Where multiple parcels are referred to or shown on this Title Plan this does not imply separately disposable parcels under Section 8A of the Sale of Land Act 1962</td> </tr> <tr> <td colspan="2" style="font-size: small;">PARCEL 1 = LOT E (PT) ON LP 4115</td> </tr> </table>				TABLE OF PARCEL IDENTIFIERS		WARNING: Where multiple parcels are referred to or shown on this Title Plan this does not imply separately disposable parcels under Section 8A of the Sale of Land Act 1962		PARCEL 1 = LOT E (PT) ON LP 4115	
TABLE OF PARCEL IDENTIFIERS									
WARNING: Where multiple parcels are referred to or shown on this Title Plan this does not imply separately disposable parcels under Section 8A of the Sale of Land Act 1962									
PARCEL 1 = LOT E (PT) ON LP 4115									
LENGTHS ARE IN METRES	Metres = 0.3048 x Feet Metres = 0.201168 x Links	Sheet 1 of 1 sheets <b>97</b>							

Register Search Statement - Volume 11909 Folio 762

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REGISTER SEARCH STATEMENT (Title Search) Transfer of Land Act 1958

VOLUME 11909 FOLIO 762

Security no : 124088097295Y  
Produced 12/02/2021 04:08 PM

LAND DESCRIPTION

Lot 1 on Title Plan 963860L.  
PARENT TITLES :  
Volume 08328 Folio 822      Volume 10808 Folio 226  
Created by Application No. 137158W 23/12/2016

REGISTERED PROPRIETOR

Estate Fee Simple  
Sole Proprietor  
NORVEL ESTATE PTY LTD  
AQ306807L 03/10/2017

ENCUMBRANCES, CAVEATS AND NOTICES

Any encumbrances created by Section 98 Transfer of Land Act 1958 or Section 24 Subdivision Act 1988 and any other encumbrances shown or entered on the plan set out under DIAGRAM LOCATION below.

AGREEMENT Section 173 Planning and Environment Act 1987  
AG370823M 25/02/2009

DIAGRAM LOCATION

SEE TP963860L FOR FURTHER DETAILS AND BOUNDARIES

ACTIVITY IN THE LAST 125 DAYS

NUMBER	STATUS	DATE
AT904728V	CONVERT A PCT TO AN ECT Completed	23/12/2020

-----END OF REGISTER SEARCH STATEMENT-----

Additional information: (not part of the Register Search Statement)

Street Address: 41Q NORVEL ROAD FERNTREE GULLY VIC 3156

ADMINISTRATIVE NOTICES

NIL

eCT Control      14973C D Y & CO LAWYERS









Effective from 23/12/2020

DOCUMENT END

**The information supplied has been obtained by SAI Global Property Division Pty Ltd who is licensed by the State of Victoria to provide this information via LANDATA® System. Delivered at 12/02/2021, for Order Number 66515469. Your reference: MA10554.**







Objectives	Standard (Summary)	Assessment
<b>CLAUSE 56.02: Policy Implementation</b>		
<p><b>Clause 56.02-1</b>  <b>Strategic implementation objective</b>                      To ensure that the layout and design of a subdivision is consistent with and implements any objective, policy, strategy or plan for the area set out in this scheme.</p>	<p><b>Standard C1</b>                      An application must be accompanied by a written statement that describes how the subdivision is consistent with and implements any relevant growth area, activity centre, housing, access and mobility, community facilities, open space and recreation, landscape (including any native vegetation precinct plan) and urban design objective, policy, strategy or plan for the area set out in this scheme.</p>	<p><b>Complies</b>                      The layout and design of the subdivision is consistent with the subdivision pattern of the surrounding area and is supported by State and Local policy objectives for the area.</p>
<b>CLAUSE 56.03: Liveable &amp; Sustainable Communities</b>		
<p><b>Clause 56.03-1</b>  <b>Compact and walkable neighbourhoods objectives</b>                      To create compact neighbourhoods that are oriented round easy walking distances to activity centres, schools and community facilities, public open space and public transport.                      To allow easy movement through and between neighbourhoods for all people.</p>	<p><b>Standard C2</b>                      A subdivision should implement any relevant growth area or any approved land-use and development strategy, plan or policy for the area set out in this scheme.</p> <ul style="list-style-type: none"> <li>▪ An application for subdivision must include a plan of the layout of the subdivision that:</li> <li>▪ Meets the objectives (if relevant to the class of subdivision specified in the zone) of:                             <ul style="list-style-type: none"> <li>- Clause 56.03-2 Activity centres</li> <li>- Clause 56.03-3 Planning for community facilities</li> <li>- Clause 56.04-1 Lot diversity and distribution</li> <li>- Clause 56.06-2 Walking and cycling network</li> <li>- Clause 56.06-3 Public transport network</li> <li>- Clause 56.06-4 Neighbourhood street network</li> </ul> </li> <li>▪ Shows the 400 metre street walking distance around each existing or proposed bus stop, 600 metres street walking distance around each existing or proposed tram stop and 800 metres street walking distance around each existing or proposed railway station and shows the estimated number of dwellings within those distances.</li> </ul>	<p><b>Complies</b>                      The proposal seeks to create a compact neighbourhood that has a highly permeable movement network. All allotments within this precinct are within proximity to:</p> <ul style="list-style-type: none"> <li>• Passive open space;</li> <li>• A future parkland area associated with the wetland;</li> <li>• A new shared path connecting the site to Blind Creek Corridor and the surrounding residential area; and</li> <li>• Upgrading of the existing shared pathway along the western boundary of the site.</li> </ul> <p>All allotments are located within proximity to existing public transport routes.                      The accompanying traffic report prepared by Cardno provides details of the proposed road and street network that create a well-connected and pedestrian friendly</p>



Objectives	Standard (Summary)	Assessment
	<ul style="list-style-type: none"> <li>▪ Shows the layout of the subdivision in relation to the surrounding area.</li> <li>▪ Is designed to be accessible for people with disabilities.</li> </ul>	environment. The subdivision layout is in accordance with the street hierarchy set by Clause 52.06 of the Knox Planning Scheme.
<p><b>Clause 56.03-2</b>  <b>Activity centre objective</b>                      To provide for mixed-use activity centres, including neighbourhood activity centres, of appropriate area and location.</p>	<p><b>Standard C3</b>                      A subdivision should implement any relevant activity centre strategy, plan or policy for the area set out in this scheme.                      Subdivision should be supported by activity centres that are:</p> <ul style="list-style-type: none"> <li>▪ Accessible by neighbourhood and regional walking and cycling networks.</li> <li>▪ Served by public transport that is connected to the regional public transport network.</li> <li>▪ Located at public transport interchange points for the convenience of passengers and easy connections between public transport services.</li> <li>▪ Located on arterial roads or connector streets.</li> <li>▪ Of appropriate size to accommodate a mix of uses that meet local community needs.</li> <li>▪ Oriented to support active street frontages, support street-based community interaction and pedestrian safety.</li> </ul>	<p><b>Not applicable</b>                      No activity centres are proposed as part of this subdivision.</p>
<p><b>Clause 56.03-3</b>  <b>Planning for community facilities objective</b>                      To provide appropriately located sites for community facilities including schools, libraries, preschools and childcare, health services, police and fire stations, recreation and sports facilities.</p>	<p><b>Standard C4</b>                      A subdivision should:</p> <ul style="list-style-type: none"> <li>▪ Implement any relevant regional and local community facility strategy, plan or policy for the area set out in this scheme.</li> <li>▪ Locate community facilities on sites that are in or near activity centres and public transport.</li> </ul> <p>School sites should:</p> <ul style="list-style-type: none"> <li>▪ Be integrated with the neighbourhood and located near activity centres.</li> <li>▪ Be located on walking and cycling networks.</li> <li>▪ Have a bus stop located along the school site boundary.</li> </ul>	<p><b>Complies</b>                      The proposal includes the provision of a wetland and parkland area at the north-west corner of the site which will provide an active recreation space for future residents.                      Moreover, a public pathway is proposed through the Blind Creek Corridor and associated bushland reserve to connect the site to this area and the surrounding residential area beyond. Further, it is proposed to upgrade an existing shared pathway along the site’s western boundary.</p>



Objectives	Standard (Summary)	Assessment
	<ul style="list-style-type: none"> <li>▪ Have student drop-off zones, but parking and on-street parking in addition to other street functions in abutting streets.</li> <li>▪ Adjoin the public open space network and community sporting and other recreation facilities.</li> <li>▪ Be integrated with community facilities.</li> <li>▪ Be located on land that is not affected by physical, environmental or other constraints.</li> </ul> <p>Schools should be accessible by the Principal Public Transport Network in Metropolitan Melbourne and on the regional public transport network outside Metropolitan Melbourne.</p> <p>Primary schools should be located on connector streets and not on arterial roads.</p> <p>New State Government school sites must meet the requirements of the Department of Education and Training and abut at least two streets with sufficient widths to provide student drop-off zones, bus parking and on-street parking in addition to other street functions.</p>	
<p><b>Clause 56.03-4</b>  <b>Built environment objective</b>                      To create urban places with identity and character.</p>	<p><b>Standard C5</b>                      The built environment should:</p> <ul style="list-style-type: none"> <li>▪ Implement any relevant urban design strategy, plan or policy for the area set out in this scheme.</li> <li>▪ Provide living and working environments that are functional, safe and attractive.</li> <li>▪ Provide an integrated layout, built form and urban landscape.</li> <li>▪ Contribute to a sense of place and cultural identity.</li> </ul> <p>An application should describe the identity and character to be achieved and the elements that contribute to that identity and character.</p>	<p><b>Complies</b>                      The proposed subdivision will contribute towards the creation of a distinctive residential character and identity for the site.                      It is proposed to update the urban design guidelines applying to the site to guide the future development of the site and to ensure that the site provides functional, safe and attractive environments for future residents.</p>
<p><b>Clause 56.03-5</b>  <b>Neighbourhood character objective</b></p>	<p><b>Standard C6</b>                      Subdivision should:</p>	<p><b>Not Applicable</b>                      This application contains more than 60 lots and is therefore not subject to this clause.</p>





Objectives	Standard (Summary)	Assessment
<p>To design subdivisions that respond to neighbourhood character.</p>	<ul style="list-style-type: none"> <li>▪ Respect the existing neighbourhood character or achieve a preferred neighbourhood character consistent with any relevant neighbourhood character objective, policy or statement set out in this scheme.</li> <li>▪ Respond to and integrate with the surrounding urban environment.</li> <li>▪ Protect significant vegetation and site features.</li> </ul>	
<b>CLAUSE 56.04: Lot Design</b>		
<p><b>Clause 56.04-1</b> <b>Lot diversity and distribution objectives</b></p> <p>To achieve housing densities that support compact and walkable neighbourhoods and the efficient provision of public transport services.</p> <p>To provide higher housing densities within walking distance of activity centres.</p> <p>To achieve increased housing densities in designated growth areas.</p> <p>To provide a range of lot sizes to suit a variety of dwelling and household types.</p>	<p><b>Standard C7</b></p> <p>A subdivision should implement any relevant housing strategy, plan or policy for the area set out in this scheme.</p> <p>Lot sizes and mix should achieve the average net residential density specified in any zone or overlay that applies to the land or in any relevant policy for the area set out in this scheme.</p> <p>A range and mix of lot sizes should be provided including lots suitable for the development of:</p> <ul style="list-style-type: none"> <li>▪ Single dwellings.</li> <li>▪ Two dwellings or more.</li> <li>▪ Higher density housing.</li> <li>▪ Residential buildings and Retirement villages.</li> </ul> <p>Unless the site is constrained by topography or other site conditions, lot distribution should provide for 95 per cent of dwellings to be located no more than 400 metre street walking distance from the nearest existing or proposed bus stop, 600 metres street walking distance from the nearest existing or proposed tram stop and 800 metres street walking distance from the nearest existing or proposed railway station.</p> <p>Lots of 300 square metres or less in area, lots suitable for the development of two dwellings or more, lots suitable for higher density housing and lots suitable for Residential buildings and Retirement villages should be located in and within 400 metres street walking distance of an activity centre.</p>	<p><b>Complies</b></p> <p>The layout of the proposed development utilises a range of housing densities, to provide for the needs of differing groups of people.</p> <p>138 residential lots are provided as part of this proposal ranging between 116 to 581 square metres in size. All lots will be capable of accommodating a single or double storey dwelling.</p> <p>Further the site has good access to several key public transport links including:</p> <ul style="list-style-type: none"> <li>• Boronia Train Station (1.33km north east)</li> <li>• Bus route 755 (860m east)</li> <li>• Bus route 732 (836m south west)</li> <li>• Bus route 737 and 753 (940 metres north)</li> </ul> <p>The site is also located approximately 890 metres south of the Boronia Activity Centre and 1 kilometre north of Mountain Gate Shopping Centre</p>
<b>Clause 56.04-2</b>	<b>Standard C8</b>	<b>Complies</b>



Objectives	Standard (Summary)	Assessment
<p><b>Lot area and building envelopes objective</b></p> <p>To provide lots with areas and dimensions that enable the appropriate siting and construction of a dwelling, solar access, private open space, vehicle access and parking, water management, easements and the retention of significant vegetation and site features.</p>	<p>An application to subdivide land that creates lots of less than 300 square metres should be accompanied by information that shows:</p> <ul style="list-style-type: none"> <li>▪ That the lots are consistent or contain building envelope that is consistent with a development approved under this scheme, or</li> <li>▪ That a dwelling may be constructed on each lot in accordance with the requirements of this scheme.</li> </ul> <p>Lots of between 300 square metres and 500 square metres should:</p> <ul style="list-style-type: none"> <li>▪ Contain a building envelope that is consistent with a development of the lot approved under this scheme, or</li> <li>▪ If no development of the lot has been approved under this scheme, contain a building envelope and be able to contain a rectangle measuring 10 metres by 15 metres, or 9 metres by 15 metres if a boundary wall is nominated as part of the building envelope.</li> </ul> <p>If lots of between 300 square metres and 500 square metres are proposed to contain dwellings that are built to the boundary, the long axis of the lots should be within 30 degrees east and 20 degrees west of north unless there are significant physical constraints that make this difficult to achieve.</p> <p>Lots greater than 500 square metres should be able to contain a rectangle measuring 10 metres by 15 metres, and may contain a building envelope.</p> <p>A building envelope may specify or incorporate any relevant siting and design requirement. Any requirement should meet the relevant standards of Clause 54, unless:</p> <ul style="list-style-type: none"> <li>▪ The objectives of the relevant standards are met, and</li> <li>▪ The building envelope is shown as a restriction on a plan of subdivision registered under the Subdivision Act 1988, or is specified as a covenant in an agreement under Section 173 of the Act.</li> </ul> <p>Where a lot with a building envelope adjoins a lot that is not on the same plan of subdivision or is not subject to the same agreement relating to the relevant building envelope:</p>	<p>All allotments have been designed to accommodate a single or double storey dwelling and to achieve:</p> <ul style="list-style-type: none"> <li>• Appropriate solar access.</li> <li>• An appropriate area of secluded private open space.</li> <li>• Safe vehicle access and adequate on-site parking.</li> <li>• Access to a full range of utilities.</li> </ul> <p>Urban Design guidelines apply to the site and are enforced via a Section 173 Agreement applying to each title. These guidelines will guide the final form of the building envelopes where appropriate.</p>



Objectives	Standard (Summary)	Assessment
	<ul style="list-style-type: none"> <li>▪ The building envelope must meet Standards A10 and A11 of Clause 54 in relation to the adjoining lot, and</li> <li>▪ The building envelope must not regulate siting matters covered by Standards A12 to A15 (inclusive) of Clause 54 in relation to the adjoining lot. This should be specified in the relevant plan of subdivision or agreement.</li> </ul> <p>Lot dimensions and building envelopes should protect:</p> <ul style="list-style-type: none"> <li>▪ Solar access for future dwellings and support the siting and design of dwellings that achieve the energy rating requirements of the Building Regulations.</li> <li>▪ Existing or proposed easements on lots.</li> <li>▪ Significant vegetation and site features.</li> </ul>	
<p><b>Clause 56.04-3</b>  <b>Solar orientation of lots objective</b>                      To provide good solar orientation of lots and solar access for future dwellings.</p>	<p><b>Standard C9</b>                      Unless the site is constrained by topography or other site conditions, at least 70 percent of lots should have appropriate solar orientation. Lots have appropriate solar orientation when:</p> <ul style="list-style-type: none"> <li>▪ The long axis of lots are within the range north 20 degrees west to north 30 degrees east, or east 20 degrees north to east 30 degrees south.</li> <li>▪ Lots between 300 square metres and 500 square metres are proposed to contain dwellings that are built to the boundary, the long axis of the lots should be within 30 degrees east and 20 degrees west of north.</li> <li>▪ Dimensions of lots are adequate to protect solar access to the lot, taking into account likely dwelling size and the relationship of each lot to the street.</li> </ul>	<p><b>Complies</b>                      The vast majority of allotments have been designed to satisfy the solar orientation standard.</p>
<p><b>Clause 56.04-4</b>  <b>Street orientation objective</b>                      To provide a lot layout that contributes to community social</p>	<p><b>Standard C10</b>                      Subdivision should increase visibility and surveillance by:</p> <ul style="list-style-type: none"> <li>▪ Ensuring lots front all roads and streets and avoid the side or rear of lots being oriented to connector streets and arterial roads.</li> </ul>	<p><b>Complies</b>                      A number of features are proposed in the subdivision to enable the creation of a safe</p>



Objectives	Standard (Summary)	Assessment
interaction, personal safety and property security.	<ul style="list-style-type: none"> <li>▪ Providing lots of 300 square metres or less in area and lots for 2 or more dwellings around activity centres and public open space.</li> <li>▪ Ensuring streets and houses look onto public open space and avoiding sides and rears of lots along public open space boundaries.</li> <li>▪ Providing roads and streets along public open space boundaries.</li> </ul>	<p>community and to promote interaction between residents including:</p> <ul style="list-style-type: none"> <li>• Lots proposed generally have primary frontage to a road.</li> <li>• The open space network offers an opportunity for residents to play, relax and interact together</li> <li>• Roads are generally proposed along public open space boundaries.</li> </ul>
<p><b>Clause 56.04-5</b> <b>Common area objectives</b></p> <p>To identify common areas and the purpose for which the area is commonly held.</p> <p>To ensure the provision of common area is appropriate and that necessary management arrangements are in place.</p> <p>To maintain direct public access throughout the neighbourhood street network.</p>	<p><b>Standard C11</b></p> <p>An application to subdivide land that creates common land must be accompanied by a plan and a report identifying:</p> <ul style="list-style-type: none"> <li>▪ The common area to be owned by the body corporate, including any streets and open space.</li> <li>▪ The reasons why the area should be commonly held.</li> <li>▪ Lots participating in the body corporate.</li> <li>▪ The proposed management arrangements including maintenance standards for streets and open spaces to be commonly held.</li> </ul>	<p><b>Not applicable</b></p> <p>No common land is created as a result of this subdivision.</p>
<b>CLAUSE 56.05: Urban Landscape</b>		
<p><b>Clause 56.05-1</b> <b>Integrated urban landscape objectives</b></p> <p>To provide attractive and continuous landscaping in streets and public open spaces that contribute to the character and identity of new neighbourhoods and urban places or</p>	<p><b>Standard C12</b></p> <p>An application for subdivision that creates streets or public open space should be accompanied by a landscape design.</p> <p>The landscape design should:</p> <ul style="list-style-type: none"> <li>▪ Implement any relevant streetscape, landscape, urban design or native vegetation precinct plan, strategy or policy for the area set out in this scheme.</li> </ul>	<p><b>Complies</b></p> <p>The primary public areas within the subdivision that require landscape design will be the streetscapes and open space areas.</p> <p>The design rationale has stemmed from the residential and landscape character of the surrounding area and create a strong</p>



Objectives	Standard (Summary)	Assessment
<p>to existing or preferred neighbourhood character in existing urban areas.</p> <p>To incorporate natural and cultural features in the design of streets and public open space where appropriate.</p> <p>To protect and enhance native habitat and discourage the planting and spread of noxious weeds.</p> <p>To provide for integrated water management systems and contribute to drinking water conservation.</p>	<ul style="list-style-type: none"> <li>▪ Create attractive landscapes that visually emphasise streets and public open spaces.</li> <li>▪ Respond to the site and context description for the site and surrounding area.</li> <li>▪ Maintain significant vegetation where possible within an urban context.</li> <li>▪ Take account of the physical features of the land including landform, soil and climate.</li> <li>▪ Protect and enhance any significant natural and cultural features.</li> <li>▪ Protect and link areas of significant local habitat where appropriate.</li> <li>▪ Support integrated water management systems with appropriate landscape design techniques for managing urban run-off including wetlands and other water sensitive urban design features in streets and public open space.</li> <li>▪ Promote the use of drought tolerant and low maintenance plants and avoid species that are likely to spread into the surrounding environment.</li> <li>▪ Ensure landscaping supports surveillance and provides shade in streets, parks and public open space.</li> <li>▪ Develop appropriate landscapes for the intended use of public open space including areas for passive and active recreation, the exercising of pets, playgrounds and shaded areas.</li> <li>▪ Provide for walking and cycling networks that link with community facilities.</li> <li>▪ Provide appropriate pathways, signage, fencing, public lighting and street furniture.</li> <li>▪ Create low maintenance, durable landscapes that are capable of a long life.</li> </ul> <p>The landscape design must include a maintenance plan that sets out maintenance responsibilities, requirements and costs.</p>	<p>canopy tree framework that will provide a link to the adjoining bushland reserve.</p> <p>Further, 173 street trees are proposed to contribute to the garden character of Knox's residential areas.</p> <p>Please refer to section 5.5 of the town planning report for future details.</p>



Objectives	Standard (Summary)	Assessment
<p><b>Clause 56.05-2</b></p> <p><b>Public open space provision objectives</b></p> <p>To provide a variety of open spaces with links to other open spaces and regional parks where possible.</p> <p>To ensure that public open space of appropriate quality and quantity is provided in convenient locations to meet the recreational and social needs of the community.</p> <p>To support active and healthy communities.</p>	<p><b>Standard C13</b></p> <p>The provision of public open space should:</p> <ul style="list-style-type: none"> <li>▪ Implement any relevant open space plan, strategy or policy for the area set out in this scheme.</li> <li>▪ Provide a network of well-distributed regional and local open space that includes:                             <ul style="list-style-type: none"> <li>- Regional public open space where appropriate, including along foreshores, streams and permanent water bodies.</li> <li>- Regional parks of at least 3 hectares, combining passive and active use, within 2 kilometres of all dwellings.</li> <li>- Large local parks of at least 1 hectare for active and passive use, within 500 metres safe walking distance from all dwellings.</li> <li>- Small local parks within 150 metres to 300 metres safe walking distance of all dwellings, where appropriate.</li> </ul> </li> <li>▪ Include land used for drainage control or stream and floodway purposes if generally available for recreational use.</li> <li>▪ Be integrated with urban water management systems including watercourses and water bodies.</li> <li>▪ Incorporate natural and cultural features where appropriate.</li> <li>▪ Encourage shared use of active open space.</li> <li>▪ Adjoin schools and other community facilities where practical.</li> <li>▪ Meet the social, cultural, recreational and sporting needs of the community including different age groups and abilities.</li> <li>▪ Be linked to existing or proposed future public open spaces where appropriate.</li> <li>▪ Include publicly owned plazas or parks in activity centres where appropriate.</li> </ul> <p>Land provided for public open space should be:</p>	<p><b>Complies</b></p> <p>The proposed subdivision provides appropriate open space for the needs of residents.</p> <p>Appropriate linkages with the Blind Creek Corridor will be provided, offering future residents with a variety of recreational opportunities to help achieve a healthy lifestyle and active community.</p>



Objectives	Standard (Summary)	Assessment
	<ul style="list-style-type: none"> <li>▪ Of a quality, quantity and character that makes it fit for its potential functions.</li> <li>▪ Located so that every lot in the subdivision is within 500 metres street walking distance of existing or proposed public open space.</li> <li>▪ Related to the street and lot layout in a manner that promotes personal safety and surveillance of users of the public open space from streets along public open space boundaries.</li> <li>▪ Of an area and dimensions to allow easy adaptation to different uses in response to changing community sport and recreational preferences.</li> </ul>	
<b>CLAUSE 56.06: Access and Mobility Management</b>		
<p><b>Clause 56.06-1</b>  <b>Integrated mobility objectives</b>                      To achieve an urban structure where compact and walkable neighbourhoods are clustered to support larger activity centres on the Principal Public Transport Network in Metropolitan Melbourne and on the regional public transport network outside Metropolitan Melbourne.                      To provide for walking (including persons with impaired mobility), cycling, public transport and other motor vehicles in an integrated manner.                      To contribute to reduced car dependence, improved energy efficiency, reduced greenhouse gas emissions and reduced air pollution.</p>	<p><b>Standard C14</b>                      An application for a subdivision must include a plan of the layout of the neighbourhood that meets the objectives of:</p> <ul style="list-style-type: none"> <li>▪ Clause 56.06-2 Walking and cycling network.</li> <li>▪ Clause 56.06-3 Public transport network.</li> <li>▪ Clause 56.06-4 Neighbourhood street network.</li> </ul>	<p><b>Complies</b>                      The traffic report prepared by Cardno details the capacity of the roads and access points, the walking and cycling network and the neighbourhood street network.                      The walking and cycling network includes the upgrade of the existing shared path along the western boundary of the site and the creation of a new pathway through Blind Creek Corridor. This new pathway links the subject site and Blind Creek Corridor to the surrounding residential area and assists in supporting sustainable transport options.</p>



Objectives	Standard (Summary)	Assessment
<p><b>Clause 56.06-2</b>  <b>Walking and cycling network objectives</b></p> <p>To contribute to community health and well being by encouraging walking and cycling as part of the daily lives of residents, employees and visitors.</p> <p>To provide safe and direct movement through and between neighbourhoods by pedestrians and cyclists.</p> <p>To reduce car use, greenhouse gas emissions and air pollution.</p>	<p><b>Standard C15</b></p> <p>The walking and cycling network should be designed to:</p> <ul style="list-style-type: none"> <li>▪ Implement any relevant regional and local walking and cycling strategy, plan or policy for the area set out in this scheme.</li> <li>▪ Link to any existing pedestrian and cycling networks.</li> <li>▪ Provide safe walkable distances to activity centres, community facilities, public transport stops and public open spaces.</li> <li>▪ Provide an interconnected and continuous network of safe, efficient and convenient footpaths, shared paths, cycle paths and cycle lanes based primarily on the network of arterial roads, neighbourhood streets and regional public open spaces.</li> <li>▪ Provide direct cycling routes for regional journeys to major activity centres, community facilities, public transport and other regional activities and for regional recreational cycling.</li> <li>▪ Ensure safe street and road crossings including the provision of traffic controls where required.</li> <li>▪ Provide an appropriate level of priority for pedestrians and cyclists.</li> <li>▪ Have natural surveillance along streets and from abutting dwellings and be designed for personal safety and security particularly at night.</li> <li>▪ Be accessible to people with disabilities.</li> </ul>	<p><b>Complies</b></p> <p>Pedestrian and shared paths will be provided as described above and will provide connections to:</p> <ul style="list-style-type: none"> <li>• The Blind Creek Corridor.</li> <li>• Surrounding residential areas.</li> </ul> <p>All pedestrian and shared paths will be constructed to accommodate persons of limited mobility.</p>
<p><b>Clause 56.06-3</b>  <b>Public transport network objectives</b></p> <p>To provide an arterial road and neighbourhood street network that supports a direct, efficient and safe public transport system.</p> <p>To encourage maximum use of public transport.</p>	<p><b>Standard C16</b></p> <p>The public transport network should be designed to:</p> <ul style="list-style-type: none"> <li>▪ Implement any relevant public transport strategy, plan or policy for the area set out in this scheme.</li> <li>▪ Connect new public transport routes to existing and proposed routes to the satisfaction of the relevant public transport authority.</li> <li>▪ Provide for public transport links between activity centres and other locations that attract people using the Principal Public Transport</li> </ul>	<p><b>Objective and standard achieved</b></p> <p>The site has good access to several key public transport links including:</p> <ul style="list-style-type: none"> <li>• Boronia Train Station (1.33km north east)</li> <li>• Bus route 755 (860m east)</li> <li>• Bus route 732 (836m south west)</li> <li>• Bus route 737 and 753 (940 metres north)</li> </ul>





Objectives	Standard (Summary)	Assessment
	<p>Network in Metropolitan Melbourne and the regional public transport network outside Metropolitan Melbourne.</p> <ul style="list-style-type: none"> <li>▪ Locate regional bus routes principally on arterial roads and locate local bus services principally on connector streets to provide:                             <ul style="list-style-type: none"> <li>- Safe and direct movement between activity centres without complicated turning manoeuvres.</li> <li>- Direct travel between neighbourhoods and neighbourhood activity centres.</li> <li>- A short and safe walk to a public transport stop from most dwellings.</li> </ul> </li> </ul>	<p>No public transport services are proposed within the site.</p>
<p><b>Clause 56.06-4</b>  <b>Neighbourhood street network objective</b>                      To provide for direct, safe and easy movement through and between neighbourhoods for pedestrians, cyclists, public transport and other motor vehicles using the neighbourhood street network.</p>	<p><b>Standard C17</b>                      The neighbourhood street network must:</p> <ul style="list-style-type: none"> <li>▪ Take account of the existing mobility network of arterial roads, neighbourhood streets, cycle paths, cycle paths, footpaths and public transport routes.</li> <li>▪ Provide clear physical distinctions between arterial roads and neighbourhood street types.</li> <li>▪ Comply with the Roads Corporation’s arterial road access management policies.</li> <li>▪ Provide an appropriate speed environment and movement priority for the safe and easy movement of pedestrians and cyclists and for accessing public transport.</li> <li>▪ Provide safe and efficient access to activity centres for commercial and freight vehicles.</li> <li>▪ Provide safe and efficient access to all lots for service and emergency vehicles.</li> <li>▪ Provide safe movement for all vehicles.</li> <li>▪ Incorporate any necessary traffic control measures and traffic management infrastructure.</li> </ul> <p>The neighbourhood street network should be designed to:</p>	<p><b>Complies</b>                      The neighbourhood street network will be constructed in accordance with the requirements of Clause 52.06 of the Knox Planning Scheme.                      All carriageways will be constructed to accommodate emergency vehicles and where appropriate, service vehicles.                      Please refer to the traffic report prepared by Cardno and Section 5.6 of the town planning report for further details.</p>



Objectives	Standard (Summary)	Assessment
	<ul style="list-style-type: none"> <li>▪ Implement any relevant transport strategy, plan or policy for the area set out in this scheme.</li> <li>▪ Include arterial roads at intervals of approximately 1.6 kilometres that have adequate reservation widths to accommodate long term movement demand.</li> <li>▪ Include connector streets approximately halfway between arterial roads and provide adequate reservation widths to accommodate long term movement demand.</li> <li>▪ Ensure connector streets align between neighbourhoods for direct and efficient movement of pedestrians, cyclists, public transport and other motor vehicles.</li> <li>▪ Provide an interconnected and continuous network of streets within and between neighbourhoods for use by pedestrians, cyclists, public transport and other vehicles.</li> <li>▪ Provide an appropriate level of local traffic dispersal.</li> <li>▪ Indicate the appropriate street type. Provide a speed environment that is appropriate to the street type.</li> <li>▪ Provide a street environment that appropriately manages movement demand (volume, type and mix of pedestrians, cyclists, public transport and other motor vehicles). Encourage appropriate and safe pedestrian, cyclist and driver behaviour.</li> <li>▪ Provide safe sharing of access lanes and access places by pedestrians, cyclists and vehicles.</li> <li>▪ Minimise the provision of cul-de-sacs.</li> <li>▪ Provide for service and emergency vehicles to safely turn at the end of a dead-end street.</li> <li>▪ Facilitate solar orientation of lots.</li> <li>▪ Facilitate the provision of the walking and cycling network, integrated water management systems, utilities and planting of trees.</li> <li>▪ Contribute to the area’s character and identity.</li> </ul>	



Objectives	Standard (Summary)	Assessment
<p><b>Clause 56.06-5</b>  <b>Walking and cycling network detail objectives</b></p> <p>To design and construct footpaths, shared path and cycle path networks that are safe, comfortable, well constructed and accessible for people with disabilities.</p> <p>To design footpaths to accommodate wheelchairs, prams, scooters and other footpath bound vehicles.</p>	<p>▪ Take account of any identified significant features.</p> <p><b>Standard C18</b>  Footpaths, shared paths, cycle paths and cycle lanes should be designed to:</p> <ul style="list-style-type: none"> <li>▪ Be part of a comprehensive design of the road or street reservation.</li> <li>▪ Be continuous and connect.</li> <li>▪ Provide for public transport stops, street crossings for pedestrians and cyclists and kerb crossovers for access to lots.</li> <li>▪ Accommodate projected user volumes and mix.</li> <li>▪ Meet the requirements of Table C1.</li> <li>▪ Provide pavement edge, kerb, channel and crossover details that support safe travel for pedestrians, footpath bound vehicles and cyclists, perform required drainage functions and are structurally sound.</li> <li>▪ Provide appropriate signage.</li> <li>▪ Be constructed to allow access to lots without damage to the footpath or shared path surfaces.</li> <li>▪ Be constructed with a durable, non-skid surface.</li> <li>▪ Be of a quality and durability to ensure: <ul style="list-style-type: none"> <li>- Safe passage for pedestrians, cyclists, footpath bound vehicles and vehicles.</li> <li>- Discharge of urban run-off.</li> <li>- Preservation of all-weather access.</li> <li>- Maintenance of a reasonable, comfortable riding quality.</li> <li>- A minimum 20 year life span.</li> </ul> </li> <li>▪ Be accessible to people with disabilities and include tactile ground surface indicators, audible signals and kerb ramps required for the movement of people with disabilities.</li> </ul>	<p><b>Complies</b></p> <p>All pedestrian and shared paths will be constructed to a high-quality standard and will be accessible by persons of limited mobility.</p>



Objectives	Standard (Summary)	Assessment
<p><b>Clause 56.06-6</b>  <b>Public transport network detail objectives</b></p> <p>To provide for the safe, efficient operation of public transport and the comfort and convenience of public transport users.</p> <p>To provide public transport stops that are accessible to people with disabilities.</p>	<p><b>Standard C19</b></p> <p>Bus priority measures must be provided along arterial roads forming part of the existing or proposed Principal Public Transport Network in Metropolitan Melbourne and the regional public transport network outside Metropolitan Melbourne to the requirements of the relevant roads authority.</p> <p>Road alignment and geometry along bus routes should provide for the efficient, unimpeded movement of buses and the safety and comfort of passengers.</p> <p>The design of public transport stops should not impede the movement of pedestrians.</p> <p>Bus and tram stops should have:</p> <ul style="list-style-type: none"> <li>▪ Surveillance from streets and adjacent lots.</li> <li>▪ Safe street crossing conditions for pedestrians and cyclists.</li> <li>▪ Safe pedestrian crossings on arterial roads and at schools including the provision of traffic controls as required by the roads authority.</li> <li>▪ Continuous hard pavement from the footpath to the kerb.</li> <li>▪ Sufficient lighting and paved, sheltered waiting areas for forecast user volume at neighbourhood centres, schools and other locations with expected high patronage.</li> <li>▪ Appropriate signage.</li> </ul> <p>Public transport stops and associated waiting areas should be accessible to people with disabilities and include tactile ground surface indicators, audible signals and kerb ramps required for the movement of people with physical disabilities.</p>	<p><b>Not Applicable</b></p> <p>No public transport services are proposed within the site.</p>
<p><b>Clause 56.06-7</b>  <b>Neighbourhood street network detail objective</b></p> <p>To design and construct street carriageways and verges so that the</p>	<p><b>Standard C20</b></p> <p>The design of streets and roads should:</p> <ul style="list-style-type: none"> <li>▪ Meet the requirements of Table C1. Where the widths of access lanes, access places, and access streets do not comply with the requirements</li> </ul>	<p><b>Complies</b></p> <p>The neighbourhood street network will be constructed in accordance with, and often exceeds the minimum requirements of Clause 52.06 of the Knox Planning Scheme.</p>



Objectives	Standard (Summary)	Assessment
<p>street geometry and traffic speeds provide an accessible and safe neighbourhood street system for all users.</p>	<p>of Table C1, the requirements of the relevant fire authority and roads authority must be met.</p> <ul style="list-style-type: none"> <li>▪ Provide street blocks that are generally between 120 metres and 240 metres in length and generally between 60 metres to 120 metres in width to facilitate pedestrian movement and control traffic speed.</li> <li>▪ Have verges of sufficient width to accommodate footpaths, shared paths, cycle paths, integrated water management, street tree planting, lighting and utility needs.</li> <li>▪ Have street geometry appropriate to the street type and function, the physical land characteristics and achieve a safe environment for all users.</li> <li>▪ Provide a low-speed environment while allowing all road users to proceed without unreasonable inconvenience or delay.</li> <li>▪ Provide a safe environment for all street users applying speed control measures where appropriate.</li> <li>▪ Ensure intersection layouts clearly indicate the travel path and priority of movement for pedestrians, cyclists and vehicles.</li> <li>▪ Provide a minimum 5 metre by 5 metre corner splay at junctions with arterial roads and a minimum 3 metre by 3 metre corner splay at other junctions unless site conditions justify a variation to achieve safe sight lines across corners.</li> <li>▪ Ensure streets are of sufficient strength to:                             <ul style="list-style-type: none"> <li>- Enable the carriage of vehicles.</li> <li>- Avoid damage by construction vehicles and equipment.</li> </ul> </li> <li>▪ Ensure street pavements are of sufficient quality and durability for the:                             <ul style="list-style-type: none"> <li>- Safe passage of pedestrians, cyclists and vehicles.</li> <li>- Discharge of urban run-off.</li> <li>- Preservation of all-weather access and maintenance of a reasonable, comfortable riding quality.</li> </ul> </li> </ul>	<p>All carriageways will be constructed to accommodate emergency vehicles and where appropriate, service vehicles.</p> <p>Please refer to the traffic report prepared by Cardno and Section 5.6 of the town planning report for further details.</p>



Objectives	Standard (Summary)	Assessment
	<ul style="list-style-type: none"> <li>▪ Ensure carriageways of planned arterial roads are designed to the requirements of the relevant road authority.</li> <li>▪ Ensure carriageways of neighbourhood streets are designed for a minimum 20 year life span.</li> <li>▪ Provide pavement edges, kerbs, channel and crossover details designed to:                             <ul style="list-style-type: none"> <li>- Perform the required integrated water management functions.</li> <li>- Delineate the edge of the carriageway for all street users.</li> <li>- Provide efficient and comfortable access to abutting lots at appropriate locations.</li> <li>- Contribute to streetscape design.</li> </ul> </li> <li>▪ Provide for the safe and efficient collection of waste and recycling materials from lots.</li> <li>▪ Be accessible to people with disabilities.</li> </ul> <p>A street detail plan should be prepared that shows, as appropriate:</p> <ul style="list-style-type: none"> <li>▪ The street hierarchy and typical cross-sections for all street types.</li> <li>▪ Location of carriageway pavement, parking, bus stops, kerbs, crossovers, footpaths, tactile surface indicators, cycle paths and speed control and traffic management devices.</li> <li>▪ Water sensitive urban design features.</li> <li>▪ Location and species of proposed street trees and other vegetation.</li> <li>▪ Location of existing vegetation to be retained and proposed treatment to ensure its health.</li> <li>▪ Any relevant details for the design and location of street furniture, lighting, seats, bus stops, telephone boxes and mailboxes.</li> </ul>	
<p><b>Clause 56.06-8</b> <b>Lot access objective</b></p>	<p><b>Standard C21</b> Vehicle access to lots abutting arterial roads should be provided from service roads, side or rear access lanes, access places or access streets</p>	<p><b>Complies</b> The proposed road reservation widths are wide enough to accommodate the pavement and</p>



Objectives	Standard (Summary)	Assessment		
<p>To provide for safe vehicle access between roads and lots.</p>	<p>where appropriate and in accordance with the access management requirements of the relevant roads authority.</p> <p>Vehicle access to lots of 300 square metres or less in area and lots with a frontage of 7.5 metres or less should be provided via rear or side access lanes, places or streets.</p> <p>The design and construction of a crossover should meet the requirements of the relevant road authority.</p> <p><b>Table C1 Design of roads and neighbourhood streets</b></p>	<p>verge widths for the different category roads as specified in Table C1 (Cl. 56.06-8).</p> <p>Please refer to the traffic report prepared by Cardno for more details.</p>		
	<p><b>Access Lane</b></p> <p>A side or rear lane principally providing access to parking on lots with another street frontage.</p>			
	<table border="1"> <tr> <td>• Traffic volume<sup>1</sup></td> <td>300vpd</td> </tr> </table>		• Traffic volume <sup>1</sup>	300vpd
	• Traffic volume <sup>1</sup>		300vpd	
	<table border="1"> <tr> <td>• Target speed<sup>2</sup></td> <td>10kph</td> </tr> </table>		• Target speed <sup>2</sup>	10kph
	• Target speed <sup>2</sup>		10kph	
	<table border="1"> <tr> <td>• Carriageway width<sup>3</sup> &amp; parking provision within street reservation</td> <td>5.5m<sup>6</sup> wide with no parking spaces to be provided</td> </tr> </table>		• Carriageway width <sup>3</sup> & parking provision within street reservation	5.5m <sup>6</sup> wide with no parking spaces to be provided
	• Carriageway width <sup>3</sup> & parking provision within street reservation		5.5m <sup>6</sup> wide with no parking spaces to be provided	
	<table border="1"> <tr> <td>• Verge width<sup>4</sup></td> <td>No verge required.</td> </tr> </table>		• Verge width <sup>4</sup>	No verge required.
	• Verge width <sup>4</sup>		No verge required.	
<table border="1"> <tr> <td>• Kerbing<sup>5</sup></td> <td></td> </tr> </table>	• Kerbing <sup>5</sup>			
• Kerbing <sup>5</sup>				
<table border="1"> <tr> <td>• Footpath provision</td> <td>None Carriageway designed as a shared zone and appropriately signed.</td> </tr> </table>	• Footpath provision	None Carriageway designed as a shared zone and appropriately signed.		
• Footpath provision	None Carriageway designed as a shared zone and appropriately signed.			
<table border="1"> <tr> <td>• Cycle path provision</td> <td></td> </tr> </table>	• Cycle path provision			
• Cycle path provision				
<p><b>Access Place</b></p> <p>A minor street providing local residential access with shared traffic, pedestrian and recreation use, but with pedestrian priority.</p>				
<table border="1"> <tr> <td>• Traffic volume<sup>1</sup></td> <td>300vpd to 1000vpd</td> </tr> </table>	• Traffic volume <sup>1</sup>	300vpd to 1000vpd		
• Traffic volume <sup>1</sup>	300vpd to 1000vpd			
<table border="1"> <tr> <td>• Target speed<sup>2</sup></td> <td>15kph</td> </tr> </table>	• Target speed <sup>2</sup>	15kph		
• Target speed <sup>2</sup>	15kph			



Objectives	Standard (Summary)		Assessment
	<ul style="list-style-type: none"> <li>Carriageway width<sup>3</sup> &amp; parking provision within street reservation</li> </ul>	5.5m wide with 1 hard standing verge parking space per 2 lots. or 5.5m wide with parking on carriageway – one side Appropriately signed	
	<ul style="list-style-type: none"> <li>Verge width<sup>4</sup></li> </ul>	7.5m minimum total width. For services provide a minimum of 3.5m on one side and a minimum of 2.5m on the other.	
	<ul style="list-style-type: none"> <li>Kerbing<sup>5</sup></li> </ul>	Semi-mountable rollover or flush and swale or other water sensitive urban design treatment area.	
	<ul style="list-style-type: none"> <li>Footpath provision</li> </ul>	Not required if serving 5 dwellings or less and the carriageway is designed as a shared zone and appropriately signed. or 1.5m wide footpath offset a minimum distance of 1m from the kerb.	
	<ul style="list-style-type: none"> <li>Cycle path provision</li> </ul>	None	
	<b>Access Street – Level 1</b> A street providing local residential access where traffic is subservient, speed and volume are low and pedestrian and bicycle movements are facilitated.		
	<ul style="list-style-type: none"> <li>Traffic volume<sup>1</sup></li> </ul>	1000vpd to 2000vpd	
	<ul style="list-style-type: none"> <li>Target speed<sup>2</sup></li> </ul>	30kph	





Objectives	Standard (Summary)		Assessment
	<ul style="list-style-type: none"> <li>Carriageway width<sup>3</sup> &amp; parking provision within street reservation</li> </ul>	5.5m wide with 1 hard standing verge parking space per 2 lots.	
	<ul style="list-style-type: none"> <li>Verge width<sup>4</sup></li> </ul>	4m minimum each side	
	<ul style="list-style-type: none"> <li>Kerbing<sup>5</sup></li> </ul>	Semi-mountable rollover or flush and swale or other water sensitive urban design treatment area.	
	<ul style="list-style-type: none"> <li>Footpath provision</li> </ul>	1.5m wide footpaths on both sides. Footpaths should be widened to 2.0m in vicinity of a school, shop or other activity centre. Be offset a minimum distance of 1m from the kerb.	
	<ul style="list-style-type: none"> <li>Cycle path provision</li> </ul>	Carriageway designed as a shared zone and appropriately signed.	
	<p><b>Access Street – Level 2</b> A street providing local residential access where traffic is subservient, speed and volume are low and pedestrian and bicycle movements are facilitated.</p>		
	<ul style="list-style-type: none"> <li>Traffic volume<sup>1</sup></li> </ul>	2000vpd to 3000vpd	
	<ul style="list-style-type: none"> <li>Target speed<sup>2</sup></li> </ul>	40kph	
	<ul style="list-style-type: none"> <li>Carriageway width<sup>3</sup> &amp; parking provision within street reservation</li> </ul>	7m-7.5m <sup>7</sup> wide with parking on both sides of carriageway.	
	<ul style="list-style-type: none"> <li>Verge width<sup>4</sup></li> </ul>	4.5m minimum each side	
	<ul style="list-style-type: none"> <li>Kerbing<sup>5</sup></li> </ul>	Semi-mountable rollover or flush and swale or other water sensitive urban design treatment area.	



Objectives	Standard (Summary)		Assessment
	<ul style="list-style-type: none"> <li>Footpath provision</li> </ul>	1.5m wide footpaths on both sides. Footpaths should be widened to 2.0m in vicinity of a school, shop or other activity centre. Be offset a minimum distance of 1m from the kerb.	
	<ul style="list-style-type: none"> <li>Cycle path provision</li> </ul>	Carriageway designed as a shared zone and appropriately signed.	
	<b>Connector Street – Level 1</b> A street that carries higher volumes of traffic. It connects access places and access streets through and between neighbourhoods.		
	<ul style="list-style-type: none"> <li>Traffic volume<sup>1</sup></li> </ul>	3000vpd	
	<ul style="list-style-type: none"> <li>Target speed<sup>2</sup></li> </ul>	50kph <sup>8</sup> reduced to 40kph at schools and 20kph at pedestrian and cycle crossing points.	
	<ul style="list-style-type: none"> <li>Carriageway width<sup>3</sup> &amp; parking provision within street reservation</li> </ul>	6m-6.5m wide with indented parking on both sides on a bus route. or 7m-7.5m wide with indented parking on one side an kerbside parking opposite on a bus route. or 7.2m-7.5m wide with parking on both sides of carriageway.	
	<ul style="list-style-type: none"> <li>Verge width<sup>4</sup></li> </ul>	4.5m minimum each side with adequate road reserve width for widening for future bus route if required.	



Objectives	Standard (Summary)		Assessment
	<ul style="list-style-type: none"> <li>• Kerbing<sup>5</sup></li> </ul>	Layback or flush and swale or other water sensitive urban design treatment area.	
	<ul style="list-style-type: none"> <li>• Footpath &amp; cycle path provision</li> </ul>	2.5m wide shared path on each side. or 1.5m wide footpath on each side and 1-1.5m cycle lane marked on carriageway on each side.	
	<p><b>Connector Street – Level 2</b> A street that carries higher volumes of traffic. It connects access places and access streets through and between neighbourhoods.</p>		
	<ul style="list-style-type: none"> <li>• Traffic volume<sup>1</sup></li> </ul>	3000vpd to 7000vpd	
	<ul style="list-style-type: none"> <li>• Target speed<sup>2</sup></li> </ul>	60kph <sup>9</sup>	
	<ul style="list-style-type: none"> <li>• Carriageway width<sup>3</sup> &amp; parking provision within street reservation</li> </ul>	2x5.5m wide carriageways with central median. Parallel parking should be provided in locations that allow cars to exit in a forward direction. or 7.2m-7.5m wide carriageway with indented parking on both sides and turning lanes at intersections with other Level 2 connector Streets and Arterial Roads. Bus bays to be indented.	
	<ul style="list-style-type: none"> <li>• Verge width<sup>4</sup></li> </ul>	6m minimum each side (plus central median).	



Objectives	Standard (Summary)		Assessment
	<ul style="list-style-type: none"> <li>• Kerbing<sup>5</sup></li> </ul>	Layback or flush and swale or other water sensitive urban design treatment area.	
	<ul style="list-style-type: none"> <li>• Footpath &amp; cycle path provision</li> </ul>	2.5m wide shared path on each side. or 1.5m wide footpath on each side and 1-1.5m cycle lane marked on carriageway on each side appropriately signed.	
	<b>Arterial Road</b>		
	<ul style="list-style-type: none"> <li>• Traffic volume<sup>1</sup></li> </ul>	Greater than 7000vpd	
	<ul style="list-style-type: none"> <li>• Target speed<sup>2</sup></li> </ul>	Arterial road design as required by the relevant roads authority.	
	<ul style="list-style-type: none"> <li>• Carriageway width<sup>3</sup> &amp; parking provision within street reservation</li> </ul>	Arterial road design as required by the relevant roads authority.	
	<ul style="list-style-type: none"> <li>• Verge width<sup>4</sup></li> </ul>	Arterial road design as required by the relevant roads authority.	
	<ul style="list-style-type: none"> <li>• Kerbing<sup>5</sup></li> </ul>	Arterial road design as required by the relevant roads authority.	
	<ul style="list-style-type: none"> <li>• Footpath &amp; cycle path provision</li> </ul>	2.5m wide shared path on each side or as otherwise required by the relevant roads authority.	
<p><b>Key to Table C1</b></p> <p>1. Indicative maximum traffic volume for 24-hour period. These volumes depend upon location. Generation rates may vary between existing and newly developing areas.</p> <p>2. Target speed is the desired speed at which motorists should travel. This is not necessarily the design speed and is not greater than the marked legal speed limit.</p> <p>3. The maximum width within the range should be used when bus use is anticipated or when upright kerbs are used. Width is measured from kerb invert to kerb invert. Widening may be required at bends to allow for wider vehicle paths using appropriate Australian Standards for on street and off-street parking but should not negate the function of bends serving as slow points.</p>			



Objectives	Standard (Summary)	Assessment
	4. Verge width includes footpaths. Additional width may be required to accommodate a bicycle path. 5. Where drainage is not required a flush pavement edge treatment can be used. Layback kerbs are preferred for safety reasons. Upright kerbs may be considered for drainage purposes or in locations where on-street parking should be clearly defined and parking within the verge is not desired. 6. Turning requirements to access and egress parking on abutting lots may require additional carriageway width. The recommended carriageway width of 5.5m will provide adequate access to a standard 3.5m wide single garage built to the property line. 7. 7m-7.5m widths should be used when parking is required on each side. 8. 50kph is the default urban speed limit in Victoria. 9. Target speed must not exceed the legal speed limit.	
<b>CLAUSE 56.07: Integrated Water Management</b>		
<b>Clause 56.07-1 Drinking water supply objectives</b> To reduce the use of drinking water. To provide an adequate, cost-effective supply of drinking water.	<b>Standard C22</b> The supply of drinking water must be: <ul style="list-style-type: none"> <li>▪ Designed and constructed in accordance with the requirements and to the satisfaction of the relevant water authority.</li> <li>▪ Provided to the boundary of all lots in the subdivision to the satisfaction of the relevant water authority.</li> </ul>	<b>Complies</b> Water supply will occur via an existing 150mm dia water main in Norvel Road. Further, an existing 100mm dia water main will be updated to 150mm dia so that it can extend into the development as the primary source of water supply. Connections to existing mains in Castricum Place and Dion Street will also be required to service the proposal.
<b>Clause 56.07-2 Reused and recycled water objective</b> To provide for the substitution of drinking water for non-drinking purposes with reused and recycled water.	<b>Standard C23</b> Reused and recycled water supply systems must be: <ul style="list-style-type: none"> <li>▪ Designed, constructed and managed in accordance with the requirements and to the satisfaction of the relevant water authority, Environment Protection Authority and Department of Human Services.</li> <li>▪ Provided to the boundary of all lots in the subdivision where required by the relevant water authority.</li> </ul>	<b>Complies</b> Reused and recycled water supply systems will be provided to the boundary of all lots where required by the relevant water authority.
<b>Clause 56.07-3 Waste water management objective</b>	<b>Standard C24</b> Waste water systems must be:	<b>Complies</b> Waste water systems will be designed, constructed and managed in accordance



Objectives	Standard (Summary)	Assessment
<p>To provide a waste water system that is adequate for the maintenance of public health and the management of effluent in an environmentally friendly manner.</p>	<ul style="list-style-type: none"> <li>▪ Designed, constructed and managed in accordance with the requirements and to the satisfaction of the relevant water authority and the Environment Protection Authority.</li> <li>▪ Consistent with any relevant approved domestic waste water management plan.</li> </ul> <p>Reticulated waste water systems must be provided to the boundary of all lots in the subdivision where required by the relevant water authority.</p>	<p>with the requirements of the relevant water authorities. Reticulated waste water systems will be provided to the boundary of all lots where required by the relevant water authority.</p>
<p><b>Clause 56.07-4</b> <b>Urban run-off management objectives</b></p> <p>To minimise damage to properties and inconvenience to residents from stormwater.</p> <p>To ensure that the street operates adequately during major storm events and provides for public safety.</p> <p>To minimise increases in stormwater and protect the environmental values and physical characteristics of receiving waters from degradation by stormwater.</p> <p>To encourage stormwater management that contributes to cooling, local habitat improvements and provision of attractive and enjoyable spaces.</p>	<p><b>Standard C25</b></p> <p>The stormwater management system must be:</p> <ul style="list-style-type: none"> <li>▪ Designed and managed in accordance with the requirements and to the satisfaction of the relevant drainage authority.</li> <li>▪ Designed and managed in accordance with the requirements and to the satisfaction of the water authority where reuse of stormwater is proposed.</li> <li>▪ Designed to meet the current best practice performance objectives for stormwater quality as contained in the <i>Urban Stormwater – Best Practice Environmental Management Guidelines</i> (Victorian Stormwater Committee 1999).</li> <li>▪ Designed to ensure that flows downstream of the subdivision site are restricted to pre-development levels unless increased flows are approved by the relevant drainage authority and there are no detrimental downstream impacts.</li> <li>▪ Designed to contribute to cooling, improving local habitat and providing attractive and enjoyable spaces.</li> </ul> <p>The stormwater management system should be integrated with the overall development plan including the street and public open space networks and landscape design.</p> <p>For all storm events up to and including the 20% Average Exceedence Probability (AEP) standard:</p>	<p><b>Complies</b></p> <p>The proposed stormwater management approach relies on the existing billabong to the north-west for detention and water quality mitigation and the construction of a sediment basin which will disperse overflow into adjoining bushland reserve</p> <p>Please refer to the Storm Water Management Report prepared by Cardno for further details.</p>



Objectives	Standard (Summary)	Assessment
	<ul style="list-style-type: none"> <li>▪ Stormwater flows should be contained within the drainage system to the requirements of the relevant authority.</li> <li>▪ Ponding on roads should not occur for longer than 1 hour after the cessation of rainfall.</li> </ul> <p>For storm events greater than 20% AEP and up to and including 1% AEP standard:</p> <ul style="list-style-type: none"> <li>▪ Provision must be made for the safe and effective passage of stormwater flows.</li> <li>▪ All new lots should be free from inundation or to a lesser standard of flood protection where agreed by the relevant floodplain management authority.</li> <li>▪ Ensure that streets, footpaths and cycle paths that are subject to flooding meet the safety criteria <math>d_a V_{ave} &lt; 0.35 \text{ m}^2/\text{s}</math> (where, <math>d_a</math> = average depth in metres and <math>V_{ave}</math> = average velocity in metres per second).</li> </ul> <p>The design of the local drainage network should:</p> <ul style="list-style-type: none"> <li>▪ Ensure stormwater is retarded to a standard required by the responsible drainage authority.</li> <li>▪ Ensure every lot is provided with drainage to a standard acceptable to the relevant drainage authority. Wherever possible, stormwater should be directed to the front of the lot and discharged into the street drainage system or legal point of discharge.</li> <li>▪ Ensure that inlet and outlet structures take into account the effects of obstructions and debris build up. Any surcharge drainage pit should discharge into an overland flow in a safe and predetermined manner.</li> <li>▪ Include water sensitive urban design features to manage stormwater in streets and public open space. Where such features are provided, an application must describe maintenance responsibilities, requirements and costs.</li> </ul>	



Objectives	Standard (Summary)	Assessment
	Any flood mitigation works must be designed and constructed in accordance with the requirements of the relevant floodplain management authority.	
<b>CLAUSE 56.08: Site Management</b>		
<p><b>Clause 56.08-1</b>  <b>Site management objectives</b>                      To protect drainage infrastructure and receiving waters from sedimentation and contamination.                      To protect the site and surrounding area from environmental degradation or nuisance prior to and during construction of subdivision works.                      To encourage the re-use of materials from the site and recycled materials in the construction of subdivisions where practicable.</p>	<p><b>Standard C26</b>                      A subdivision application must describe how the site will be managed prior to and during the construction period and may set out requirements for managing:</p> <ul style="list-style-type: none"> <li>▪ Erosion and sediment.</li> <li>▪ Dust.</li> <li>▪ Run-off.</li> <li>▪ Litter, concrete and other construction wastes.</li> <li>▪ Chemical contamination.</li> <li>▪ Vegetation and natural features planned for retention.</li> </ul> <p>Recycled material should be used for the construction of streets, shared paths and other infrastructure where practicable.</p>	<p><b>Complies</b>                      Appropriate site management plans will be prepared prior to commencement of works, in accordance with the relevant planning permit conditions.</p>
<b>CLAUSE 56.09: Utilities</b>		
<p><b>Clause 56.09-1</b>  <b>Shared trenching objectives</b>                      To maximise the opportunities for shared trenching.                      To minimise constraints on landscaping within street reserves.</p>	<p><b>Standard C27</b>                      Reticulated services for water, gas, electricity and telecommunications should be provided in shared trenching to minimise construction costs and land allocation for underground services.</p>	<p><b>Complies</b>                      Reticulated services will be constructed within trenches where appropriate.                      Please refer to the utility services infrastructure report prepared by Cardno for further details.</p>





Objectives	Standard (Summary)	Assessment
<p><b>Clause 56.09-2</b>  <b>Electricity, telecommunications and gas objectives</b></p> <p>To provide public utilities to each lot in a timely, efficient and cost effective manner.</p> <p>To reduce greenhouse gas emissions by supporting generation and use of electricity from renewable sources.</p>	<p><b>Standard C28</b></p> <p>The electricity supply system must be designed in accordance with the requirements of the relevant electricity supply agency and be provided to the boundary of all lots in the subdivision to the satisfaction of the relevant electricity authority.</p> <p>Arrangements that support the generation or use of renewable energy at a lot or neighbourhood level are encouraged.</p> <p>The telecommunication system must be designed in accordance with the requirements of the relevant telecommunications servicing agency and should be consistent with any approved strategy, policy or plan for the provision of advanced telecommunications infrastructure, including fibre optic technology. The telecommunications system must be provided to the boundary of all lots in the subdivision to the satisfaction of the relevant telecommunications servicing authority.</p> <p>Where available, the reticulated gas supply system must be designed in accordance with the requirements of the relevant gas supply agency and be provided to the boundary of all lots in the subdivision to the satisfaction of the relevant gas supply agency.</p>	<p><b>Objective and standard achieved</b></p> <p>The proposal will incorporate the construction of a high voltage cable from the existing high voltage line in McMahons Road to the south to a new kiosk station within the site</p> <p>The proposal will require the installation of a telecommunications pit and people infrastructure with the installation of fibre optic cable to be carried out by NBN Co.</p> <p>Please refer to the utility services infrastructure report prepared by Cardno for further details.</p>
<p><b>Clause 56.09-3</b>  <b>Fire hydrants objective</b></p> <p>To provide fire hydrants and fire plugs in positions that enable fire fighters to access water safely, effectively and efficiently.</p>	<p><b>Standard C29</b></p> <p>Fire hydrants should be provided:</p> <ul style="list-style-type: none"> <li>▪ A maximum distance of 120 metres from the rear of the each lot.</li> <li>▪ No more than 200 metres apart.</li> </ul> <p>Hydrants and fire plugs must be compatible with the relevant fire service equipment.</p>	<p><b>Objective and standard achieved</b></p> <p>Fire hydrants will be installed to satisfy this standard.</p>
<p><b>Clause 56.09-4</b>  <b>Public lighting objective</b></p> <p>To provide public lighting to ensure the safety of pedestrians, cyclists and vehicles.</p>	<p><b>Standard C30</b></p> <p>Public lighting should be provided to streets, footpaths, public telephones, public transport stops and to major pedestrian and cycle paths including public open spaces that are likely to be well used at night to assist in providing safe passage for pedestrians, cyclists and vehicles.</p>	<p><b>Objective and standard achieved</b></p> <p>Public lighting will be provided within the street network, to help contribute towards a safe movement network.</p>



Objectives	Standard (Summary)	Assessment
<p>To provide pedestrians with a sense of personal safety at night.</p> <p>To contribute to reducing greenhouse gas emissions and to saving energy.</p>	<p>Public lighting should be designed in accordance with the relevant Australian Standards.</p> <p>Public lighting should be consistent with any strategy, policy or plan for the use of renewable energy and energy efficient fittings.</p>	

# Traffic and Transport Assessment

Norvel Estate Residential Development

V161919



Prepared for  
Norvey Estate Pty. Ltd.

10 February 2021



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## 1 Introduction

---

Cardno has been retained by Norvey Estate Pty. Ltd. to prepare the following Traffic and Transport Assessment for the proposed subdivision of land at 29Q Norvel Road, Ferntree Gully.

In the course of preparing this assessment the subject site and its environs have been inspected, plans of the development examined, and all relevant traffic data collected and analysed.

## 2 Background and Existing Conditions

### 2.1 Location and Land Use

#### 2.1.1 Site Location

The subject site has an approximate area of 9.22 hectares and is located on land addressed as 29Q Norvel Road, Ferntree Gully.

The site is rectangular in shape and is partially bound by Castricum Place to the west and Norvel Road to the south. Dion Street intersects the eastern boundary of the site.

Figure 2-1 shows the location of the site and the surrounding road network.

**Figure 2-1 Site Locality Plan**



The site has approximately 175 metres frontage to Norvel Road along the southern site boundary and 150 metres frontage to Castricum Place along the western site boundary. The remainder of the western and northern site boundaries abut Council owned reserves.

The subject site most recently operated as a quarry but is currently vacant.

Notable land uses in the vicinity of the site include Wattleview Primary School and Fairhills Primary School, which are located approximately 270 metres south-east of the site and 500 metres west of the site respectively. Mountain Gate Shopping Centre is located approximately 1,200 metres south of the site and Boronia Central Shopping Centre is located approximately 1,200 metres north-east of the site.

The site is situated within City of Knox Council and is located approximately 27 kilometres east of the Melbourne CBD.





**2.1.2 Existing Vehicle and Pedestrian Access Arrangements**

Vehicular access to the site is currently provided via:

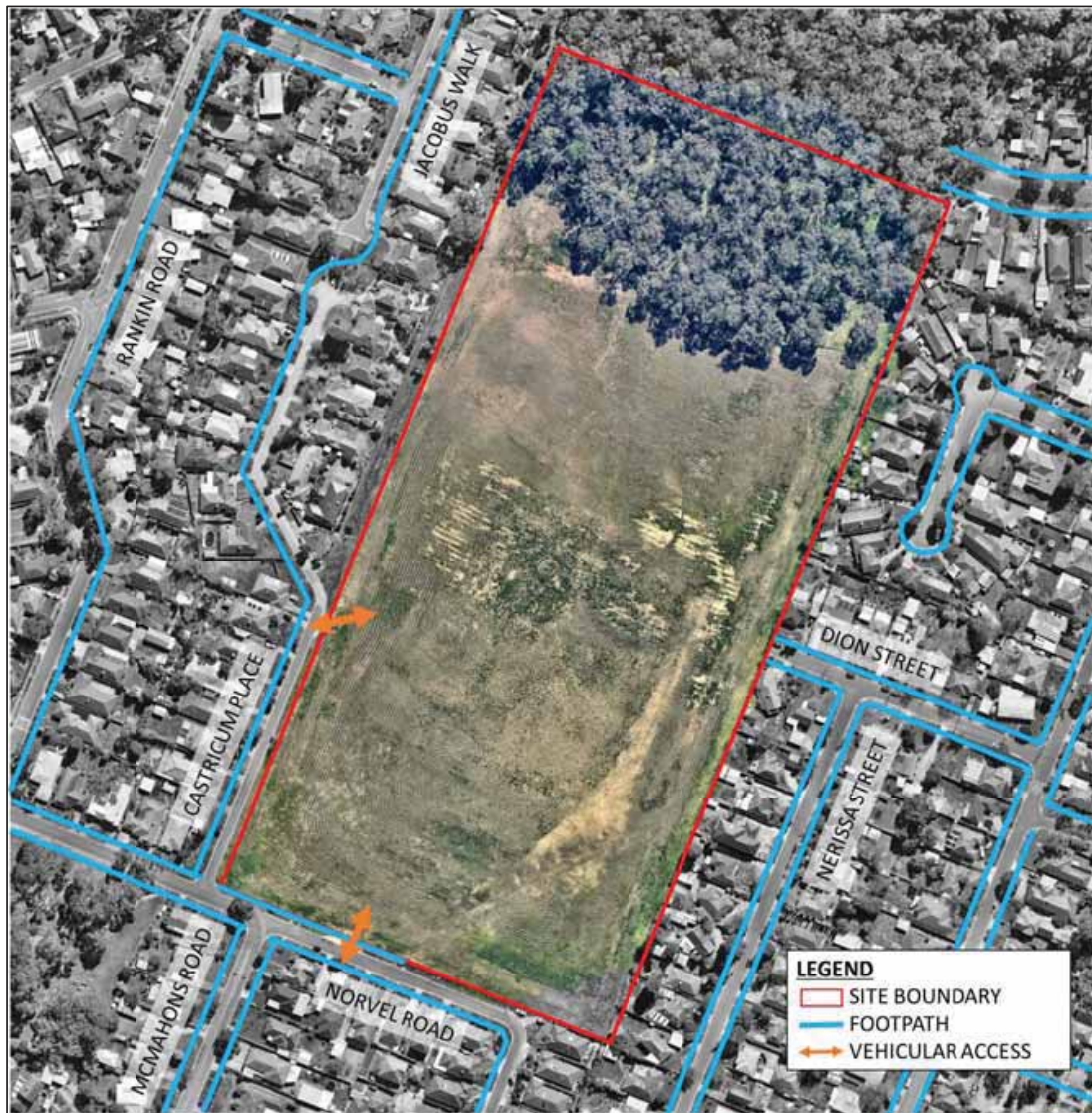
- > A 14-metre wide crossover to Castricum Place, located just prior to the kink in the Castricum Place alignment approximately 130 metres north of Norvel Road; and
- > A 21-metre wide crossover to Norvel Road located approximately 25 metres east of McMahons Road.

Dion Street intersects the eastern boundary of the site where a chain wire fence along the site boundary currently restricts vehicular access.

A 1.4-metre wide footpath extends eastward from Castricum Place along the southern boundary of the site, terminating approximately 20 metres east of the Norvel Road crossover.

The aerial photograph at Figure 2-2 illustrates the existing vehicle and pedestrian access arrangements at the site.

**Figure 2-2 Existing Site Conditions**





## 2.2 Planning Zones

Figure 2-3 shows the location of the site as defined by the Knox City Council Land Zoning Maps.

**Figure 2-3 Knox Planning Scheme Land Zoning Map Extract**

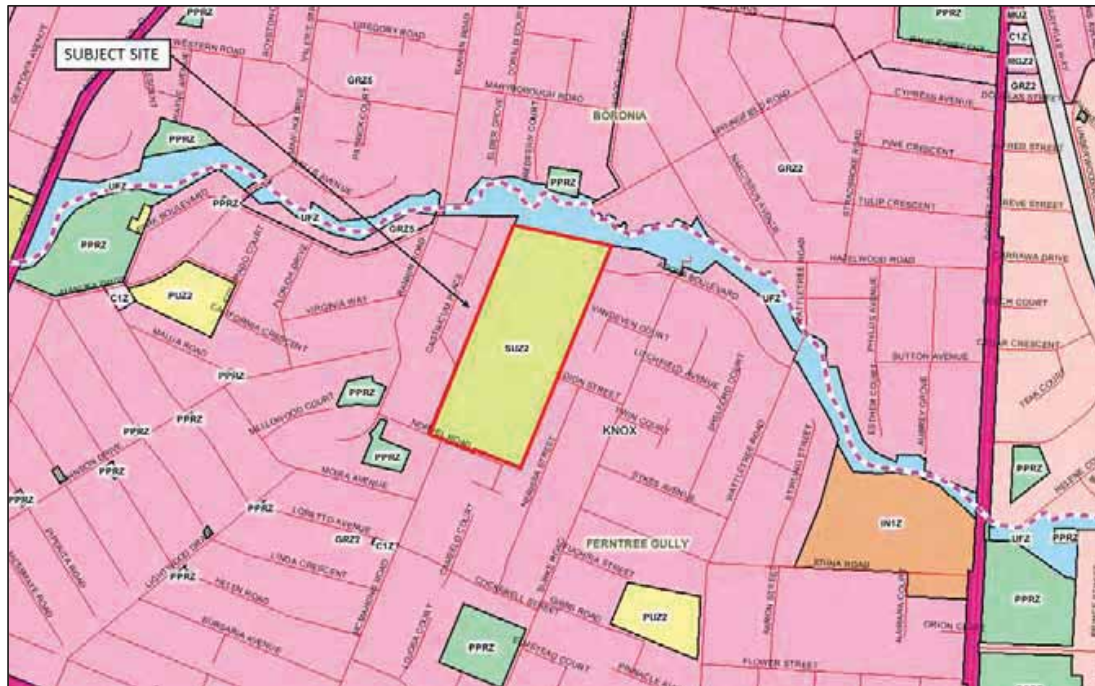


Figure 2-3 demonstrates that the subject site is located within a Special Use Zone (SUZ2).

The permitted uses within the Special Use Zone are listed at Clause 37.01 of the Knox Planning Scheme.

## 2.3 Road Network

### 2.3.1 Norvel Road

Norvel Road is a local street that extends in an approximately east-west alignment along the southern boundary of the site, bending to the south approximately 40 metres from the eastern site boundary and terminating at a hammerhead treatment.

To the west of the site, Norvel Road forms part of a link route that along with McMahoans Road to the south and Rankin Road to the north, provides a connection from Burwood Highway at its southern end to Boronia Road at its northern end.

Norvel Road at the site frontage accommodates a single two-way carriageway of approximately 7 metres width which narrows to 5.5 metres width towards the east of the site. No on-street car parking restrictions are applicable. A pedestrian footpath is partially provided along the site frontage and along southern side of the road reservation.

To the west of the site, Norvel Road accommodates speed humps and Local Area Traffic Measures (LATM) to control through vehicle movements in the area.

The default speed limit along Norvel Road is 50km/h.

The photographs at Figure 2-4 and Figure 2-5 illustrate the existing road configuration along Norvel Road at the south of the site.



**Figure 2-4 Norvel Road, looking east along the southern site frontage**



**Figure 2-5 Norvel Road, looking west from the south-western corner of the site**



### **2.3.2 Castricum Place**

Castricum Place is a local street under the jurisdiction of Knox City Council that extends northward from Norvel Road along the western boundary of the site. The street kinks to the west approximately 150 metres north of Norvel Road and continues to the north, where it terminates in a hammerhead arrangement.

Castricum Place accommodates a single two-way carriageway of approximately 5 metres width with no on-street car parking restrictions. A footpath is provided along the western side of the road reservation only.

The default speed limit along Castricum Place is 50km/h.



The photograph at Figure 2-6 illustrates the existing roadway formation of Castricum Place at the west of the site.

**Figure 2-6 Castricum Place, looking south along the site boundary**



A Council reservation extends along the western boundary of the site from the kink in the Castricum Place alignment, as shown in the photograph at Figure 2-7 below.

**Figure 2-7 Council Reservation along Western Boundary**



### **2.3.3 Dion Street**

Dion Street is a local street under the jurisdiction of Knox City Council that extends in an approximate east-west alignment from the subject site at its western end to Burke Road at its eastern end.

Dion Street accommodates a single two-way carriageway of approximately 7.5 metres width, which permits parallel kerbside parking on both sides of the carriageway. Pedestrian footpaths are provided along both sides of the road reservation.

The default speed limit along Dion Street is 50km/h.



The photograph at Figure 2-8 illustrates the existing roadway configuration of Dion Street.

**Figure 2-8 Dion Street, looking west towards the subject site.**



#### **2.3.4 McMahons Road**

McMahons Road is a local street under the jurisdiction of Knox City Council that along with Norvel Road and Rankin Road forms a through link from Burwood Highway at its southern end to Boronia Road at its northern end.

McMahons Road accommodates a single two-way carriageway of approximately 8.5 metres width which permits parallel kerbside parking in locations and provides LATM measures such as splitter islands and speed cushions to control through vehicle movements.

The default speed limit along McMahons Road is 50km/h.

The photograph at Figure 2-9 illustrates the existing roadway configuration of McMahons Road.



Figure 2-9 McMahons Road, looking south from Norvel Road





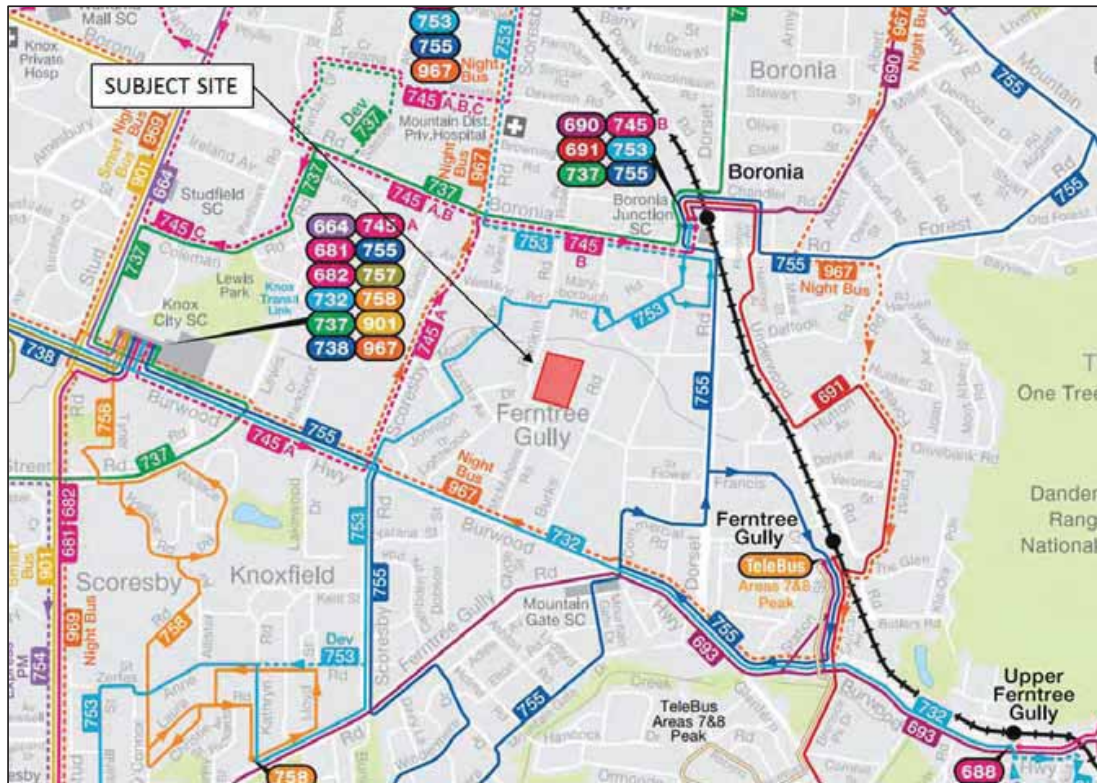
## 2.4 Public Transport

Bus services form the primary mode of public transport available in the area. Figure 2-10 illustrates the bus services near to the site, which are summarised in Table 2-1 below.

**Table 2-1 Proximate Public Transport Services**

Service	Route No	Route Description	Nearest Stop	Approximate Walking Distance & Walking Time
Bus	732	Box Hill – Upper Ferntree Gully	Burwood Highway	850 metres (10 mins)
	745	Knox City - Bayswater	Scoresby Road	1,500 metres (18 mins)
	753	Glen Waverley - Bayswater	Rankin Road	650 metres (9 mins)
	755	Bayswater – Knox City	Dorset Road	1,200 metres (15 mins)

**Figure 2-10 Proximate Public Transport Services**



The nearest train station is Boronia Railway Station, which is located approximately 2.1km walking distance or approximately a 25-30 minute walk from the site.



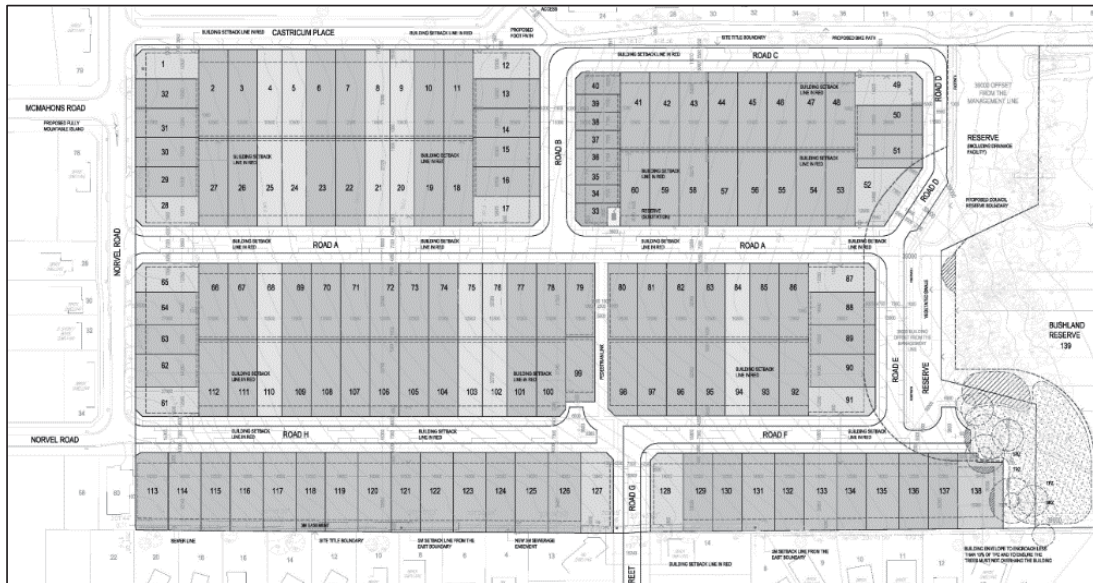
### 3 Proposed Development

#### 3.1 General

It is proposed to subdivide the land for the purposes 138 residential lots, and an additional lot that has been nominated as bushland reserve at the northern end of the site.

A development plan for the proposal has been prepared by Peddle Thorp Architects which is attached at Appendix A. An extract from the plan is presented at Figure 3-1 below.

**Figure 3-1 Development Plan (Extract)**



An internal road network of public roads will be constructed to provide access to most of the dwellings, although 21 dwellings will have direct access to either Norvel Road or Castrium Place and will not rely upon the internal road network.

#### 3.2 Car Parking

Car parking for residents of individual lots will be provided within their title, with additional parking available within the local road network, as per existing residential areas surrounding the site. It is estimated that on-street parking of up to 150 spaces is achievable.

#### 3.3 Access Arrangements

##### 3.3.1 Vehicular Access

Vehicular access to the site is proposed via three connections to the external road network, comprising:

- > A new roadway connection to Norvel Road at the south of the site, slightly east of the site’s existing crossover to Norvel Road;
- > A new connection from Norvel Road at the site’s eastern boundary, converting the previous bend in Norvel Road into a T-intersection; and
- > The extension of Dion Street into the site at the eastern site boundary.

No public vehicular access is proposed to Castrium Place at the west of the site, however a pedestrian connection with bollards is proposed at that location to provide emergency access if required.

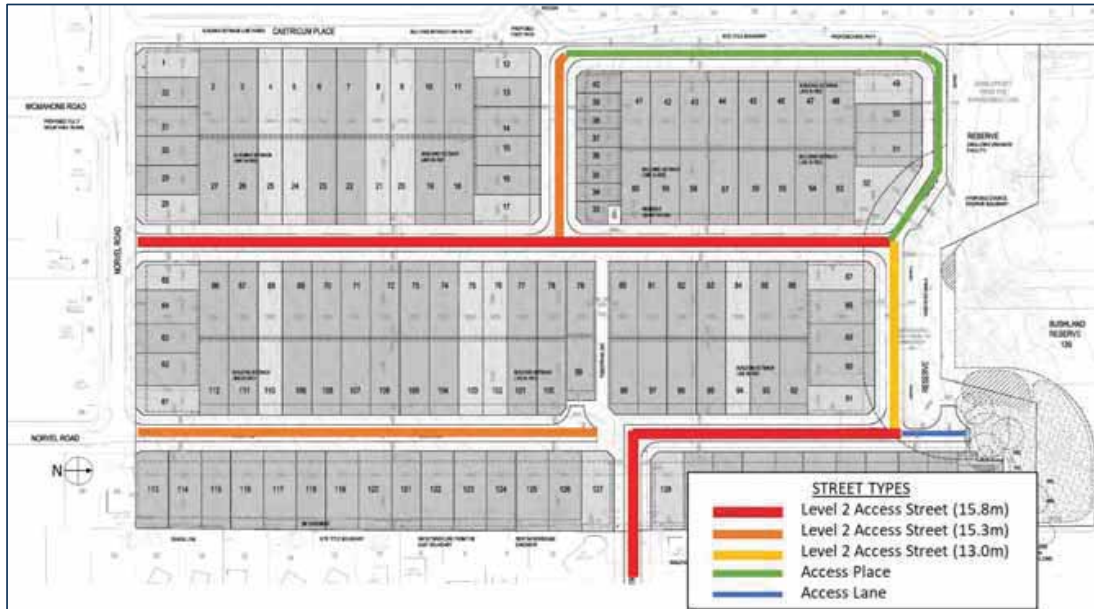




### 3.3.2 Internal Vehicular Circulation

Vehicular circulation throughout the site is proposed via the construction of a public road network. The street types proposed throughout the subdivision are illustrated at Figure 3-2 below.

**Figure 3-2 Proposed Internal Street Types**



A review of the above figure indicates:

- > Access Streets (Level 2) are proposed throughout the majority of the subdivision. The cross sections of these vary, but all are provided with 7.3 metre carriageways to ensure consistent function.
- > Access Places are proposed abutting reserves in the north-west corner of the site where dwellings are only located on one side of the road; and
- > An Access Lane is proposed to provide access to three dwellings at the north-east corner of the site.
- > Hammer head treatments will be provided at the end of two roads to facilitate vehicles turning.



### **3.3.3 Pedestrian Access & Circulation**

Pedestrian footpaths are proposed to be constructed along all streets with residential frontages, including the northern side of Norvel Road and eastern side of Castricum Place adjacent to the site.

In addition to the above, a shared path is proposed to be constructed along the Council reserve at the west of the site and pedestrian walkways are proposed to be constructed through to the nature reserve at the north of the site.

These arrangements will link the subject site to the Blind Creek Trail, the existing pedestrian network provided at Norvel Road to the south, Dion Street to the east, and both Springfield Road and Agora Boulevard to the north.



## 4 Traffic Considerations

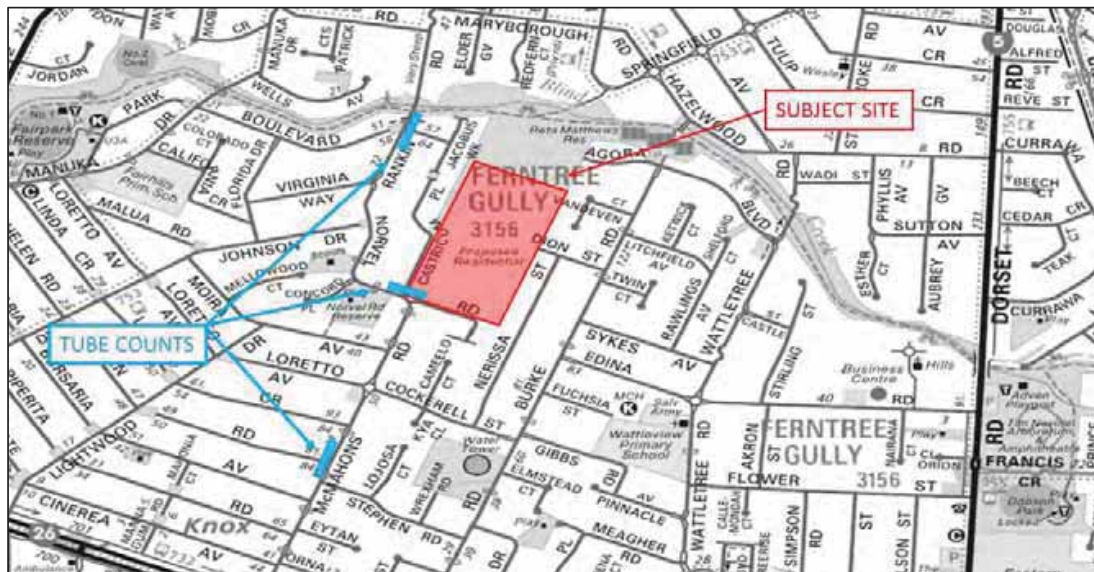
### 4.1 Site-Generated Traffic Volume

#### 4.1.1 Traffic Generation Rates

Cardno commissioned TransTraffic Surveys to install counting tubes in the three (3) locations illustrated at Figure 4-1 over the 7-day period from Thursday 31<sup>st</sup> August 2017 to Wednesday 6<sup>th</sup> September, 2017.

The tubes were installed to determine the existing trip generation rate of stand-alone dwellings in the immediate vicinity of the site.

Figure 4-1 Tube Count Surveys



The tube count locations were chosen as they formed the only point of vehicular access to catchments of dwellings due to the existing road layout (truncations and court bowls). In all, the trip generating characteristics of eighty-four (84) dwellings were captured as outlined in Table 1, below.

Table 1: Surveyed Trip Generation Rates

Street	Location	No. of Dwellings Served
Castricum Place	Immediately north of Norvel Road	24 no.
Park Street	Immediately east of Rankin Road	21 no.
Helen Road	Immediately west of McMahon's Road	39 no.
<b>Total</b>		<b>84 no.</b>

The survey data indicated the following:

- > The average weekday trip generation rate was 8.29 vehicle movements per dwelling; and
- > The average daily trip generation rate (including weekends) was 8.17 vehicle movements per dwelling.



#### **4.1.2 Site Generated Traffic Estimate**

The subdivision plan indicates provision of 138 residential lots.

To allow for a conservative estimate of site-generated traffic a daily trip generation rate of 9 vehicle movements per dwelling has been adopted. This rate is consistent with the stand-alone dwelling trip generation rate outlined in the RTA publication "Guide to Traffic Generating Characteristics" (October 2002).

Based on the above, the subject site is anticipated to generate in the order of 1,242 vehicle movements per day.

Peak hour traffic typically accounts for around 10% of the daily traffic volume, which equates to around 124 vehicle movements during both the AM and PM peak periods.

#### **4.2 Internal Traffic Volumes**

The subdivision plan indicates that of the 138 dwellings proposed on the site:

- > 117 lots are accessed from the internal street network; and;
- > 21 lots have frontages to either Norvel Road at the south of the site or Castricum Place at the west of the site.

Therefore the traffic volume generated by the dwellings internal to the site is estimated at 1,053 vehicle movements a day.

On this basis, and given there will be little desire for outside traffic to cut through the site, no street within the subdivision will carry a daily traffic volume in excess of 1,000 vehicle movements a day.

To estimate the traffic volume along each length of street, the following assumptions have been made:

- > 29 dwellings have access via Road H, which is a dead end and provides no through connectivity to the remainder of the site.
- > Of the balance of the development utilising internal roads (88 dwellings), it is estimated that approximately 30% will arrive and depart the site to the east via Dion Street, with 70% utilising the main Norvel Road Access (Road A).

Based on the above, the likely daily traffic volume at each of the subdivision access points is illustrated at Figure 4-2.



**Figure 4-2 Anticipated Development Traffic Volumes at Subdivision Access Points**



Whilst there are likely to be variations to this distribution of vehicle movements on a daily basis, it is evident that no length of street within the development is anticipated to carry a daily traffic volume in excess of 1,000 vehicle moments per day.

These daily traffic volumes are within the environmental capacities suggested for these carriageway widths at Section 5.3 of this report and therefore, the internal street network has been designed appropriately for this form of development.

### 4.3 External Peak Hour Traffic Impact

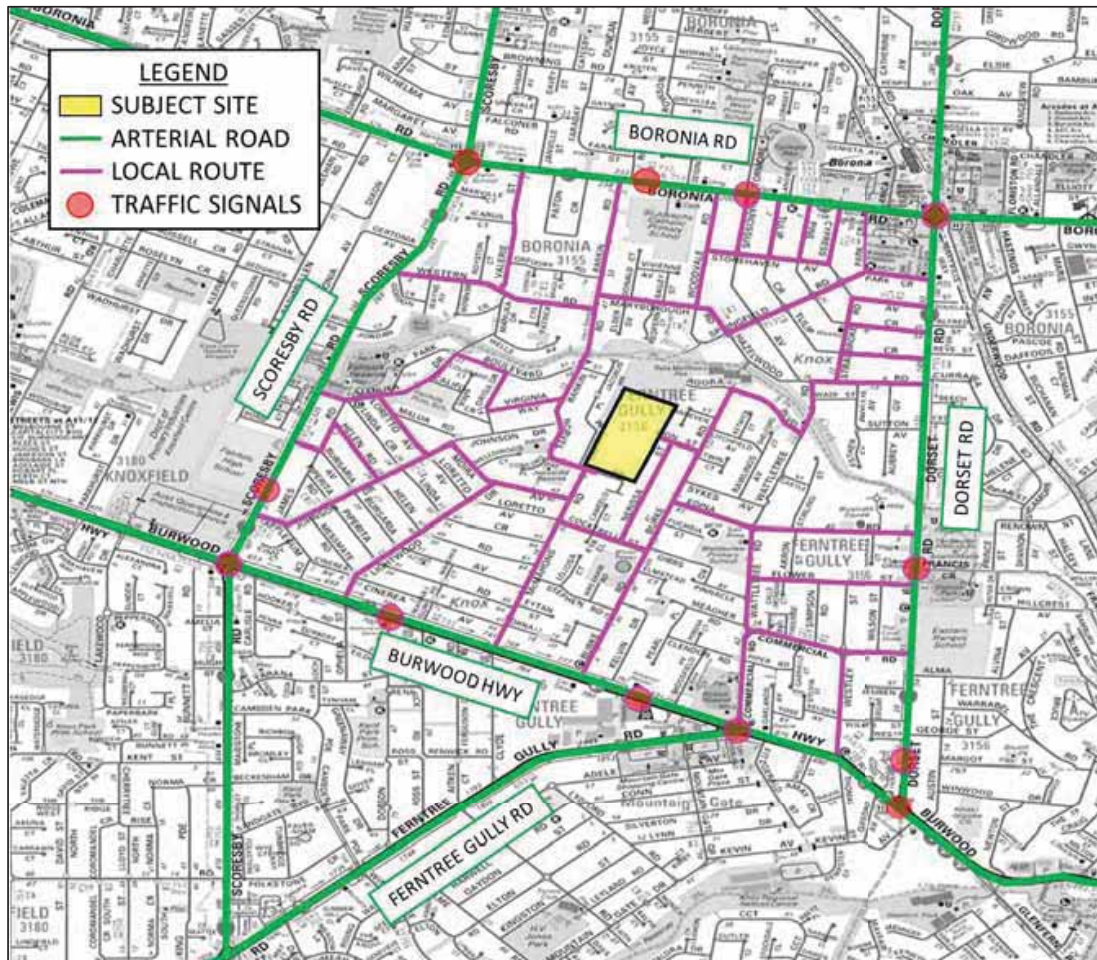
#### 4.3.1 Site Location

The subject site is located in the approximate centre of an arterial grid network, which is formed by Boronia Road to the north, Burwood Highway to the south, Dorset Road to the east and Scoresby Road to the west.

Figure 4-3 illustrates the location of the site proximate to these roads and highlights several of the local routes available from the subject site to the external road network. It is evident that there are numerous routes that drivers may choose to access the site, depending upon their origin/destination and their preference.



Figure 4-3 Location of Subject Site to Arterial Road Network



**4.3.2 Peak Hour Directional Splits**

Section 4.1 indicates that the development is likely to generate in the order of 124 vehicle movements during each of the AM and PM peak commuter periods.

Residential peak hour traffic is typically split 20% inbound and 80% outbound during the morning peak period and 60% inbound and 40% outbound during the afternoon / evening peak period.

Based on this split, the peak hour traffic volume anticipated to be generated by the site is presented at Table 4-1 below.

**Table 4-1 Development Traffic Generation and Distribution**

Period	In	Out	Total
AM Peak (vehicle movements per hour)	25	99	124
PM Peak (vehicle movements per hour)	74	50	124
Daily (vehicle movements per day)	621	621	1,242



#### 4.3.3 **Peak Hour Distribution**

The Victorian Integrated Survey of Travel and Activity (VISTA) is an ongoing survey of household travel activity conducted across Greater Melbourne, Geelong and, periodically, in selected regional centres. The information collated from the survey is used to inform transport and land-use planning decisions.

The survey indicates that morning and afternoon trips in outer metropolitan areas, such as the subject site, are typically generated by the purposes listed at Table 4-2.

**Table 4-2 VISTA Trip Generation**

Period	Work	Shopping	Education	Recreation	Other	Total
AM	52%	6%	28%	2%	12%	100%
PM	45%	18%	11%	5%	21%	100%

Based on the above, Cardno has distributed the peak hour traffic generated by the above categories based on the following principles:

- > 'Work' generated traffic has been weighted in accordance with employment locations and distributed between the subject site and arterial intersections based upon GPS route guidance. To inform the distribution of 'Work' generated traffic, Cardno sourced data from the 2016 ABS Census for the employment location (municipality) of resident workers that live within the City of Knox;
- > 'Shopping' generated traffic has been distributed 50% to the south-west (Westfield) 30% to the north-east (Boronia Central) and 20% to the south-west (Mountain View S.C.), with an even number of vehicles approaching and departing the arterial intersections along the bounding arterial roads illustrated in Figure 4-3;
- > 'Education' generated traffic has been distributed evenly to the north-east, south-east and south-west arterial intersections based on the location of State and Religious Secondary Schools to the site. Around half the education generated traffic volume (30 vehicle movements during the AM period and 12 movements during the PM period) is assumed to be internal to the arterial grid due to the location of 3 Primary Schools (2 State and 1 Catholic) within the grid;
- > 'Recreation' and 'Other' generated traffic has been distributed evenly to all four (4) arterial intersections with an even number of vehicles approaching / departing the arterial intersections along the bounding arterial roads.

Based on the preceding, the approach and departure volumes from each of the four (4) arterial intersections proximate to the site during the AM and PM peak commuter periods are illustrated at Figure 4-4 and Figure 4-5.



Figure 4-4 Estimated Site-Generated Traffic Volumes at Proximate Arterial Intersections – AM Peak

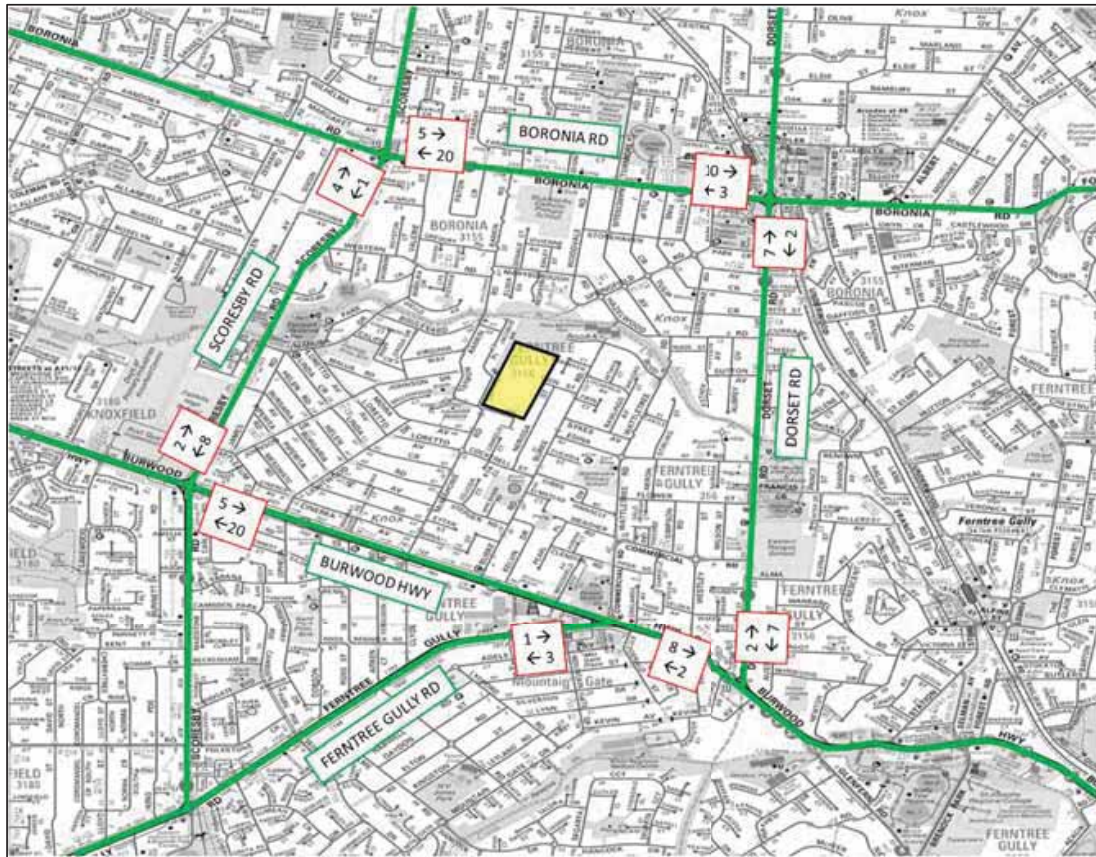
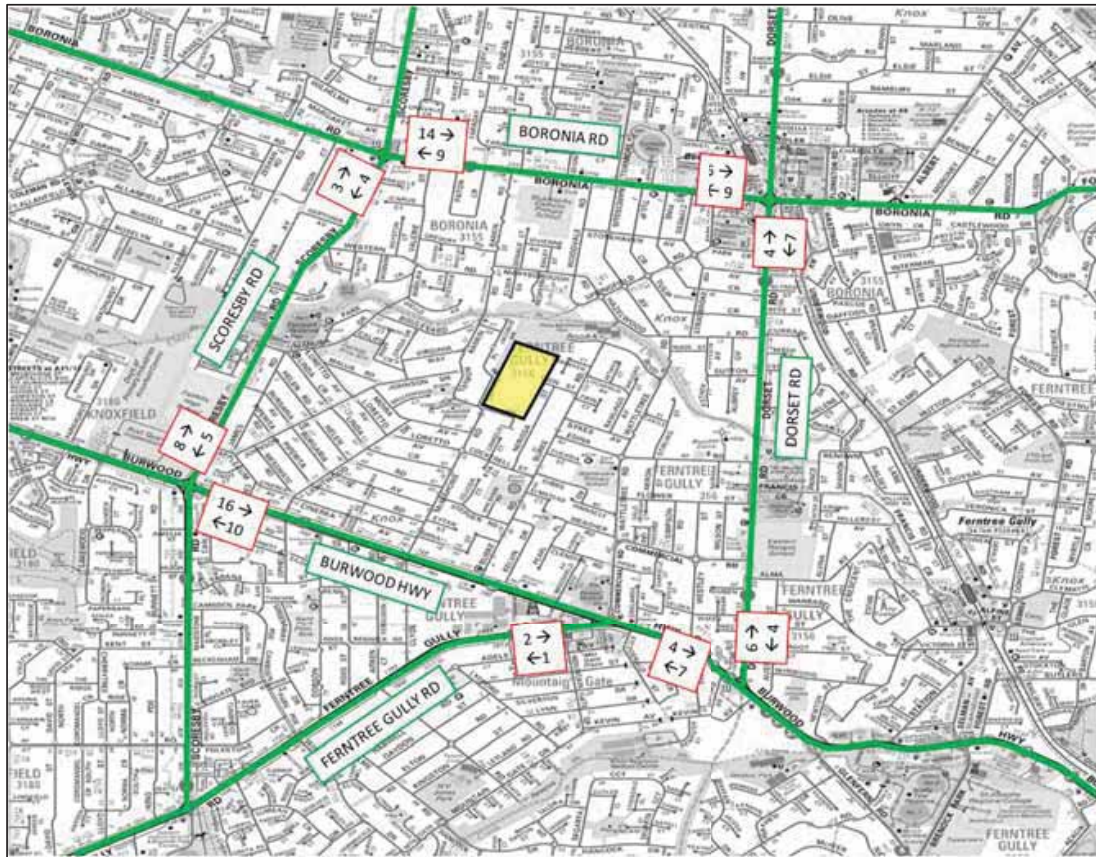






Figure 4-5 Estimated Site-Generated Traffic Volumes at Proximate Arterial Intersections – PM Peak



Based on the preceding, Table 4-3 summarises the forecast increases in traffic volume at the four (4) major arterial intersections proximate to the site as a result of the development during both peak periods.

Table 4-3 Forecast Increase in Traffic Volumes at Proximate Intersections

Peak Period	Intersection			
	Boronia Rd / Scoresby Rd	Boronia Rd / Dorset Rd	Burwood Hwy / Scoresby Rd	Burwood Hwy / Dorset Rd
AM Peak	+30 vph	+22 vph	+35 vph	+19 vph
PM Peak	+30 vph	+26 vph	+39 vph	+21 vph

The above table indicates that there will be an increase of around 19 to 39 vehicle movements at each of the arterial intersections proximate to the site during the AM and PM peak periods. This is equivalent to less than one vehicle movement (inbound and outbound combined) every minute, which is considered low in a traffic engineering context.



For comparison, Cardno has sourced approach volume data for the four (4) intersections from the VicRoads Open Data Portal. The existing approach volumes, and the percentage increase as a result of the development is presented at Table 4-4, below

**Table 4-4 Percentage Increase at Proximate Intersections**

Intersection	Existing Approach Volume	AM Peak		Existing Approach Volume	PM Peak	
		Net Increase	% Increase		Net Increase	% Increase
Boronia Rd / Scoresby Rd	3,381vph*	+30	<b>0.9%</b>	3,750vph*	+30	<b>0.8%</b>
Boronia Rd / Dorset Rd	3,488vph*	+22	<b>0.6%</b>	4,250vph*	+26	<b>0.6%</b>
Burwood Hwy / Scoresby Rd	4,531vph*	+35	<b>0.8%</b>	4,913vph*	+39	<b>0.8%</b>
Burwood Hwy / Dorset Rd	5,838vph	+19	<b>0.3%</b>	5,933vph	+21	<b>0.4%</b>

Note: There are no inductive loops installed under the left-turn slip lanes at these intersections to count vehicles and therefore the existing approach volumes are likely to be considerably higher. As a result, the percentage increases as a result of development are likely to be overstated.

The above table indicates that the additional traffic generated by development of the site will cause no perceptible increases to approach movements at each of the arterial intersections. As a result, no adverse impacts are anticipated across the wider road network.

With regard to localised traffic impacts, Figure 4-3 illustrates that the road network immediately surrounding the site is highly connective, allowing motorists to approach and depart the site via many routes to/from the arterial road network. As a result, vehicle movements generated by the site are likely to be diluted throughout the local road network and form minor increases to turning volumes at several minor intersections along the arterial roads.



## 5 Design Considerations

### 5.1 Site Access

Vehicular access to the site is proposed via three (3) connections to the existing external road network, comprising:

- > A connection to Norvel Road at the south of the site. This connection is located in a similar location to the existing site access;
- > A secondary access to Norvel Road, adjacent to where Norvel Road makes a 90 degree bend. This connection provides access to 29 dwellings, and ends prior to Dion Street to prevent vehicles utilising it as a through route; and
- > The continuation of Dion Street into the site, which will replicate the existing carriageway and verge alignment.

No connection to Castricum Place at the west of the site has been provided as requested by Council, other than a bollarded access which can be utilised by emergency vehicles when required.

The number of connections to the external road network will allow traffic to conveniently approach and depart the site in all directions and are considered appropriate for the development.

### 5.2 Road Hierarchy

The general hierarchy of the internal road network has been based upon the design principles at Clause 56.06 of the Knox Planning Scheme.

The main determinant of street types for a subdivision is daily traffic volume. The likely Average Weekday Traffic Volumes (AWDT) for each length of street within the subdivision has been determined using typical traffic generation rates from the immediate area and are presented in Section 4.

No single stretch of internal road is anticipated to carry more than 1,000 vehicle movements per day. Based on these daily traffic volumes, Clause 56.06 of the Knox Planning Scheme states that the use of 5.5-metre wide carriageways would be adequate to accommodate the estimated daily traffic loadings throughout the entire subdivision, in accordance with the guidelines for the design of Access Places. However, it has been determined through consultation with Council that 7.3 metre carriageways are considered more practical for the majority of the site.

As such, the subdivision layout has been based around 7.3 metre carriageways in accordance with the guidelines for the design of Level 2 Access Streets. This road class is designed to carry traffic volumes in the order of 2,000 to 3,000 vehicle movements per day, which is much greater than the anticipated traffic generation levels associated with the proposal.

Roads abutting reserves will be constructed as Access Places, providing a 5.5 metre carriageway. These roads are expected to carry less than 200 vehicle movements per day, which is well within the indicative capacity of 1,000 to 2,000 vehicles per day for a Level 1 Access Street.

Three dwellings in the north-east corner of the site will be accessible via an Access Lane, which can accommodate up to 300 vehicle movements per day. The anticipated traffic generation of these three dwellings is likely to be in the order of 30 vehicle movements per day, which is more than adequately accommodated by an Access Lane, as set out in the Knox Planning Scheme.

Therefore, the proposed subdivision typically provides street types that are greater than those required by the Knox Planning Scheme.

### 5.3 Road Cross Sections

Cross sections for each of the proposed road reservations have been prepared and are attached at Appendix B. The general provision of these road cross sections is shown in Figure 3-2.

Three road cross sections are proposed to facilitate access to lots within the development, and have been determined to reflect the intended purpose and anticipated traffic volumes throughout the site.



The following sub-sections summarise the road types that are proposed throughout the development.

**5.3.1 Level 2 Access Streets**

This is the primary street type provided throughout the subdivision, and in terms of function is in accordance with the guidelines for “Access Street – Level 2” as set out in the Knox Planning Scheme.

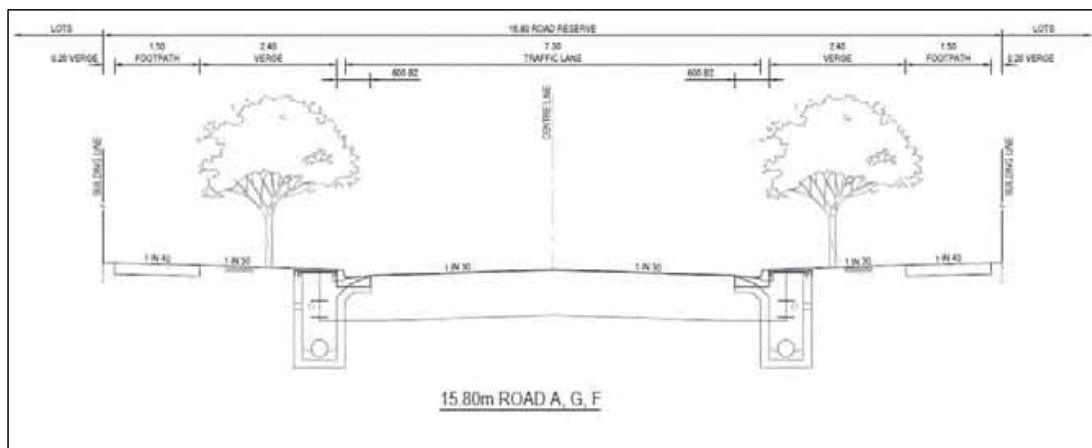
The road reservation on the Level 2 Access Streets vary slightly, depending upon the required verge width for services, but consistent 7.3 metre wide carriageways ensure that the function of these roads is not compromised. A 7.3 metre carriageway is consistent with many streets in the surrounding road network, and enables unrestricted parking on both sides of the carriageway with sufficient room for a vehicle to pass between two parked vehicles if needed.

Footpaths will be provided along both sides of the road, although along Road E, the footpath will be located within the adjacent reserve rather than within the road reservation.

The forecast daily traffic volumes for these roads are 567 vehicle movements per day at the southern end of Road A and 243 vehicle movements per day at the continuation of Dion Street (Road G). These volumes will be more than adequately catered for by the proposed cross section.

Figure 5-1 shows the proposed cross section for the majority of the subdivision, classed as Level 2 Access Streets in accordance with Clause 56 of the Knox Planning Scheme.

**Figure 5-1 Indicative Level 2 Access Street Cross Section**



**5.3.2 Access Place**

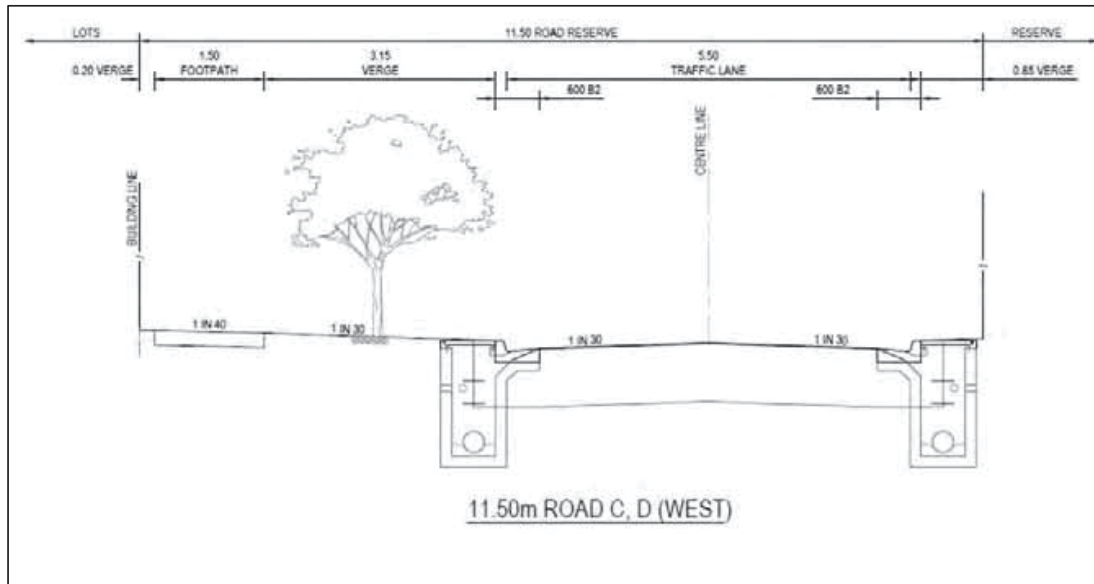
Roads abutting the reserves in the north-west corner of the site will be designed as Access Places, generally in accordance with the Knox Planning Scheme.

Carriageways of 5.5 metres width will accommodate two-way traffic flow, with parking permitted along one side. This will prevent vehicles from parking on both sides of the carriageway and blocking through traffic. Traffic volumes are anticipated to be low along these roads, as there is no network connectivity through this section of the site, and as such a 5.5 metre carriageway is considered acceptable.

Figure 5-2 shows the cross section of the proposed Access Places.



**Figure 5-2 Indicative Access Place Cross Section**



### 5.3.3 Access Lane

Three dwellings at the north-east corner of the site will obtain access to and from their homes via a short Access Lane.

With only three dwellings utilising this short section of road, it is anticipated that traffic volumes will not exceed approximately 30 vehicle movements per day, which is very low and will more than adequately be accommodated by the proposed lane.

### 5.3.4 Crossover Design

Vehicular crossovers are to be designed in accordance with the requirements of the City of Knox. Access to each of the lots is proposed via the construction of a vehicle crossover, in accordance with the Development Plan.

## 5.4 Intersections

The majority of roads within the site intersect at 90 degrees, creating T-intersections or bends in alignment that will slow vehicles on approach. The exception is the intersection of Roads A, D and E, at the northern end of the site. Road D intersects on an angle, however given the low traffic volumes anticipated to access the north-west corner of the site, this intersection is expected to operate adequately.

These intersection arrangements, combined with the provision of on-street car parking on both sides of the 7.3 metre wide carriageways and one side of the 5.5-metre wide carriageways will serve as a traffic calming measure to keep vehicle speeds low throughout the development and create a movement network where the carriageway can be shared by motorists and cyclists alike.

Corner splays measuring 3.0m wide by 3.0m long have been provided at all intersecting corners in accordance with the pedestrian sightline requirements at Clause 56.06 of the Knox Planning Scheme. The 90-degree intersections proposed throughout the site and the relatively consistent downward slope from south to north should allow horizontal and vertical sightlines to be provided in accordance with the AustRoads Guidelines.

Swept path diagrams have been prepared to demonstrate that concurrent opposing vehicle movements can pass one another at each of the internal intersections and are attached in Appendix C.



## 5.5 Pedestrian Links

Pedestrian access throughout the subdivision is proposed via the construction of dedicated footpaths along all sides of roads fronted by residential development. These footpaths, and the road reservations that they are within, will follow the general topography of the land. Pram ramps will be provided in accordance with DDA requirements.

Along the northern extent of the residential component of the site, a footpath will be constructed within the adjoining reserve adjacent to Roads D and E.

Several additional pedestrian facilities are also proposed, including:

- > The construction of a 3.0-metre wide shared path from the bend in the Castricum Place alignment to the existing pathway through the Blind Creek Reserve;
- > The construction of a boardwalk from the park area at the north-west of the site through the Bushland Reserve to Agora Street; and
- > The construction of a boardwalk from the north-eastern corner of the site to Agora Street.

These measures will link all houses within the site to the external footpath network and also provide access from the site to several recreational trails while improving local amenity by facilitating access through the site.

## 5.6 Car Parking

On internal roads with a functional width of 7.3m, parallel kerbside parking will be permitted on both sides of the carriageway. Where vehicles are parked opposite one another, adequate width is maintained for one vehicle to pass at a time, which additionally acts as a traffic calming measure to slow vehicle speeds throughout the subdivision.

On internal roads with a functional width of 5.5m, parallel kerbside parking will be permitted on one side of the carriageway, to ensure that traffic flow is not hindered. This complies with the design guidelines at Clause 56.06 of the Knox Planning Scheme. 'No Stopping' signs could be installed at street corners and along the lengths of kerbside which parking is proposed to be banned if considered necessary to control the parking of vehicles.

It is estimated, that the internal roads could accommodate in the order of 150 on-street parking spaces, depending upon user behaviour with regards to vehicle spacing. A plan has been prepared to show the availability of visitor parking on the internal road network, and is attached at Appendix D. It is noted that this plan is indicative only, as it is not intended that car parking should be linemarked, as per the norm in standard residential streets. Additional parking would also be available on the road network surrounding the site for those lots who face either Norvel Road or Castricum Place.

The availability of on-street parking is considered more than adequate for the proposed development and exceeds the requirement for one space for every two dwellings.

## 5.7 Refuse Collection

Cardno has been advised by Leigh Design Pty. Ltd. that City of Knox Council uses side-lift refuse collection vehicles with a nominal length of 9.6 metres.

Cardno has prepared swept path diagrams through each of the internal intersections using a slightly larger (9.8m length) waste collection vehicle, which are attached in Appendix C.

Hammer head treatments will be provided at dead ends, in order to ensure that the waste collection vehicle is able to turn around. Swept path diagrams have been prepared to demonstrate that the Council waste vehicles can adequately utilise the hammer head treatments.

The diagrams demonstrate that an adequate refuse collection service can be provided via Council kerbside collection vehicles.



## 5.8 Emergency Access

The CFA document 'Requirements for Water Supplies and Access for Subdivisions in Residential 1 and 2 and Township Zones (October 2006)' provides guidelines for providing emergency access throughout developments such as the subject proposal.

The document states that Access Places with parking provided on one side of the carriageway may have a width of 5.5 metres, and Level 2 Access Streets constructed with rollover kerb may have a width of 7.0 metres with rollover curbs or 7.3 metres with non-rollover kerbs. The subject proposal satisfies both of these minimum carriageway requirements.

The document further states that a standard fire pumper appliance has a length of 7.7 metres. This vehicle is smaller than the refuse collection vehicle used to prepare swept paths throughout the subdivision confirming that the site layout has been designed appropriately for emergency vehicle access.

It is noted that an additional vehicle access will be available from Castricum Place, with lockable bollards preventing access to the site at this location for other road users. It is anticipated that the use of this connection would be very rare, however having the connection there allows flexibility for emergency services needing access to the site.



## 6 Conclusions

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Norvey Estate Pty. Ltd. proposes to subdivide land located at 29Q Norvel Road, Ferntree Gully to allow for the development of 138 residential lots, plus an additional lot for a bushland reserve.

The proposal is summarised in a traffic engineering context as follows:

- > The internal road network has been designed appropriately for this form of development. Notably:
  - The internal road types proposed throughout the site will accommodate the daily traffic volumes likely to be generated by the subdivision at full development;
  - The internal roads will accommodate traffic volumes that will allow the carriageway to be shared by both motorists and cyclists;
  - Footpaths have been proposed on all sides of the carriageway fronting residential development;
  - Adequate verge widths are provided to accommodate underground services;
  - No cross intersections are proposed, and a tight geometry is provided at all 90-degree intersections and bends in alignment to control vehicle speeds;
  - Appropriate carriageway widths are provided to allow on-street car parking, refuse collection and emergency vehicle access.
- > The subject proposal is estimated to generate a daily traffic volume in the order of 1,242 vehicle movements, comprising a peak hour component of around 124 vehicle movements during the AM and PM peak commuter periods;
- > The local road network in the immediate vicinity of the site is highly connective, allowing vehicles to approach and depart the site via multiple routes, mitigating the impact of the development on the local road network;
- > The distribution of vehicle movements generated by the site, based on the location of employment, education and shopping precincts, will have a negligible impact on the arterial intersections proximate to the site.



Norvel Estate Residential  
Development

APPENDIX

A

DEVELOPMENT PLAN



**PEDDLE THORP**

RESIDENTIAL SUBDIVISION OF 290, 410 NORVELL ROAD AND 180 QUILN STREET FERNTREE GULLY 36-0125

LAND SUBDIVISION MASTER PLAN

FEB 2021 | REV G | 1:750 @ A1 | 1:1500 @ A3

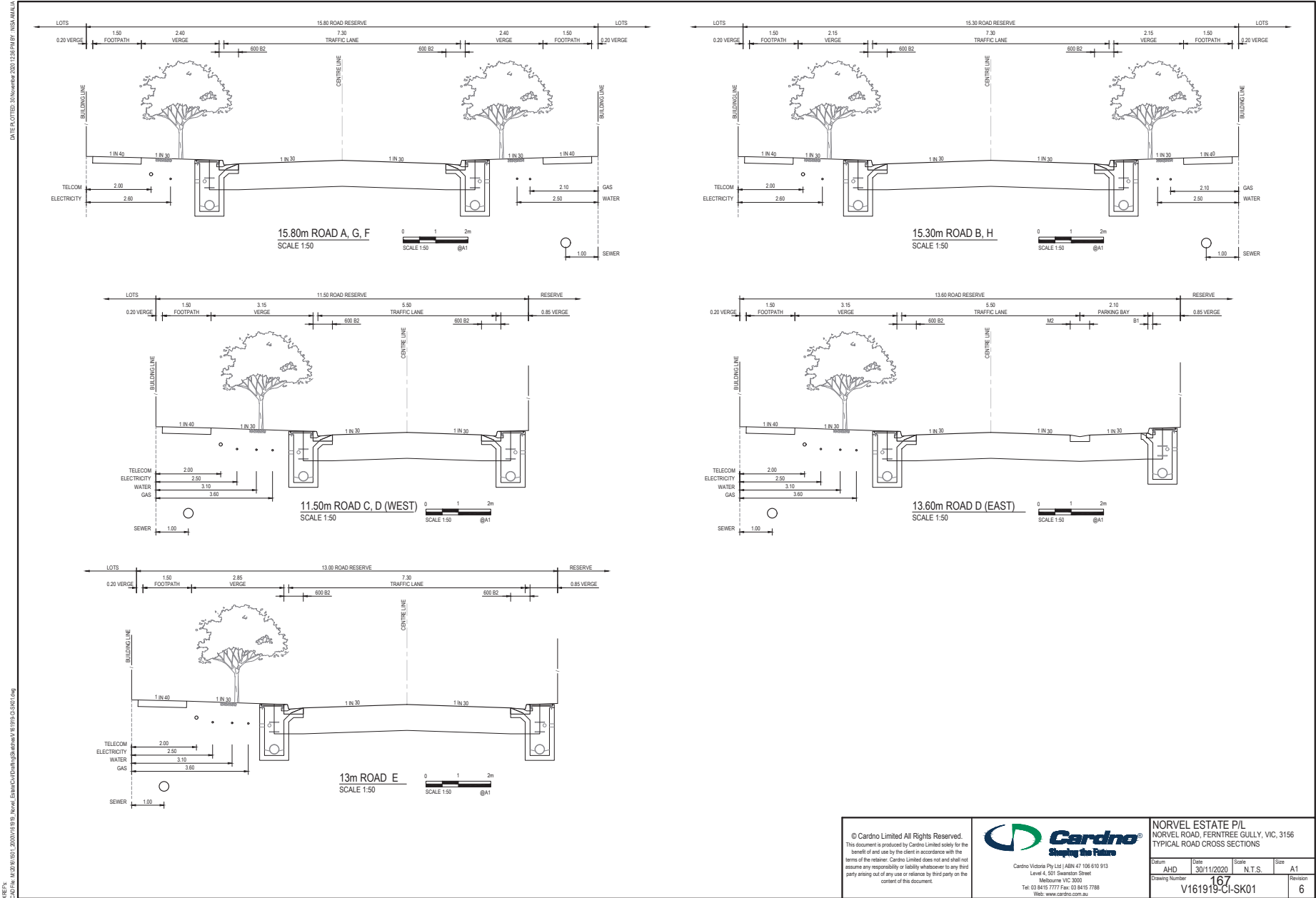


Norvel Estate Residential  
Development

APPENDIX

B

CROSS SECTIONS



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Norvel Estate Residential  
Development

APPENDIX

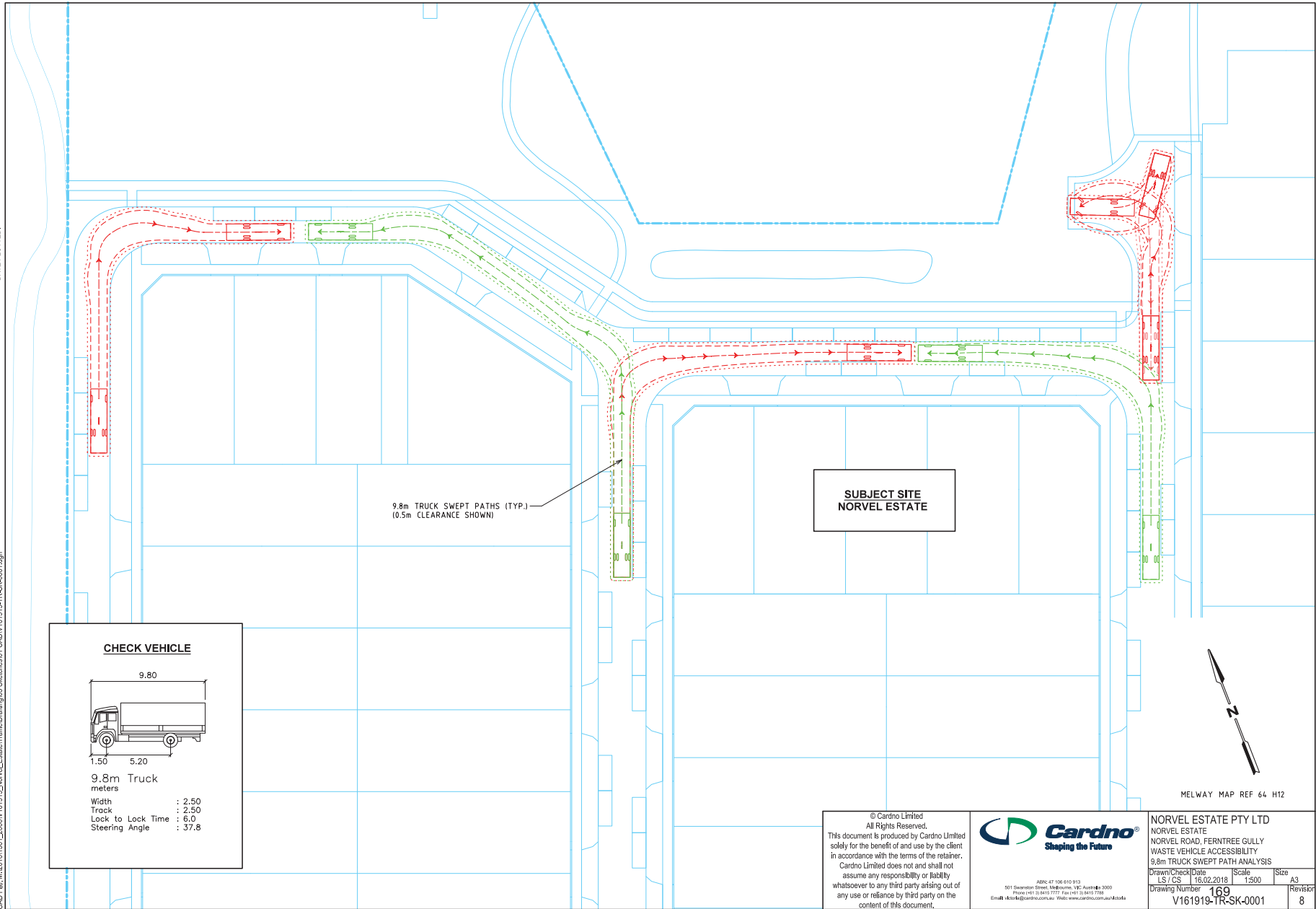
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SWEPT PATH DIAGRAMS

BY: User:mh.jajara

DATE PLOTTED: 10/02/2021 12:17:24 PM

CAD File: M:\2016\1501\_2000\161919\_Norvel\_Estate\Traffic\Drafting\03\_Sweeps\01\_CAD\161919-TR-SK-001.dgn



**CHECK VEHICLE**

9.60  
1.50 5.20

9.8m Truck  
meters

- Width : 2.50
- Track : 2.50
- Lock to Lock Time : 6.0
- Steering Angle : 37.8

9.8m TRUCK SWEEP PATHS (TYP.)  
(0.5m CLEARANCE SHOWN)

**SUBJECT SITE  
NORVEL ESTATE**



MELWAY MAP REF 64 H12

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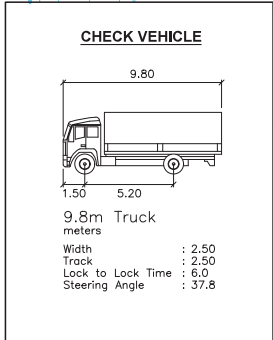
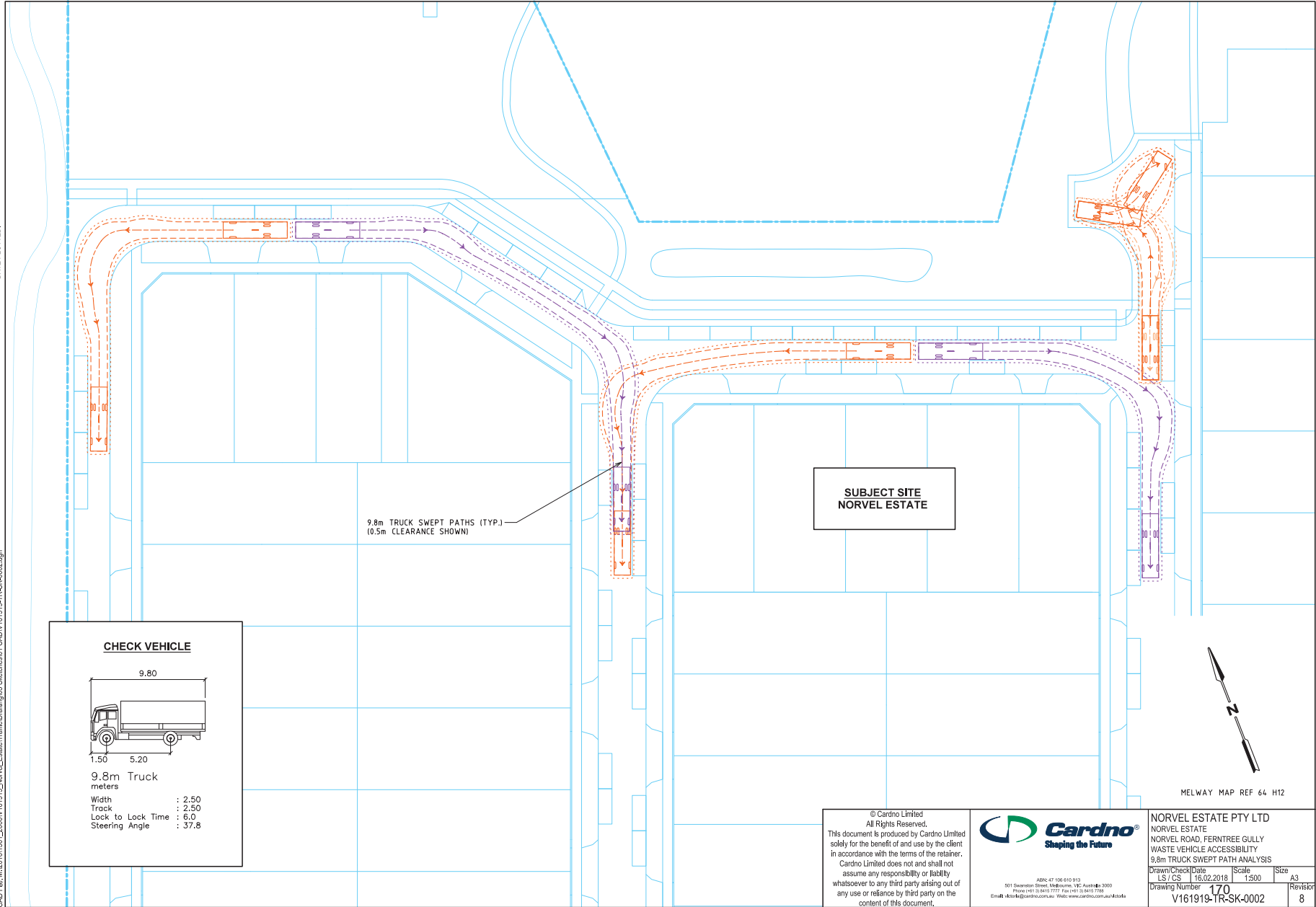


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NORVEL ESTATE PTY LTD NORVEL ESTATE NORVEL ROAD, FERNTREE GULLY WASTE VEHICLE ACCESSIBILITY 9.8m TRUCK SWEEP PATH ANALYSIS		
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LS/CS 16.02.2019	1:500	A3
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BY: User:mh.baara  
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MELWAY MAP REF 64 H12

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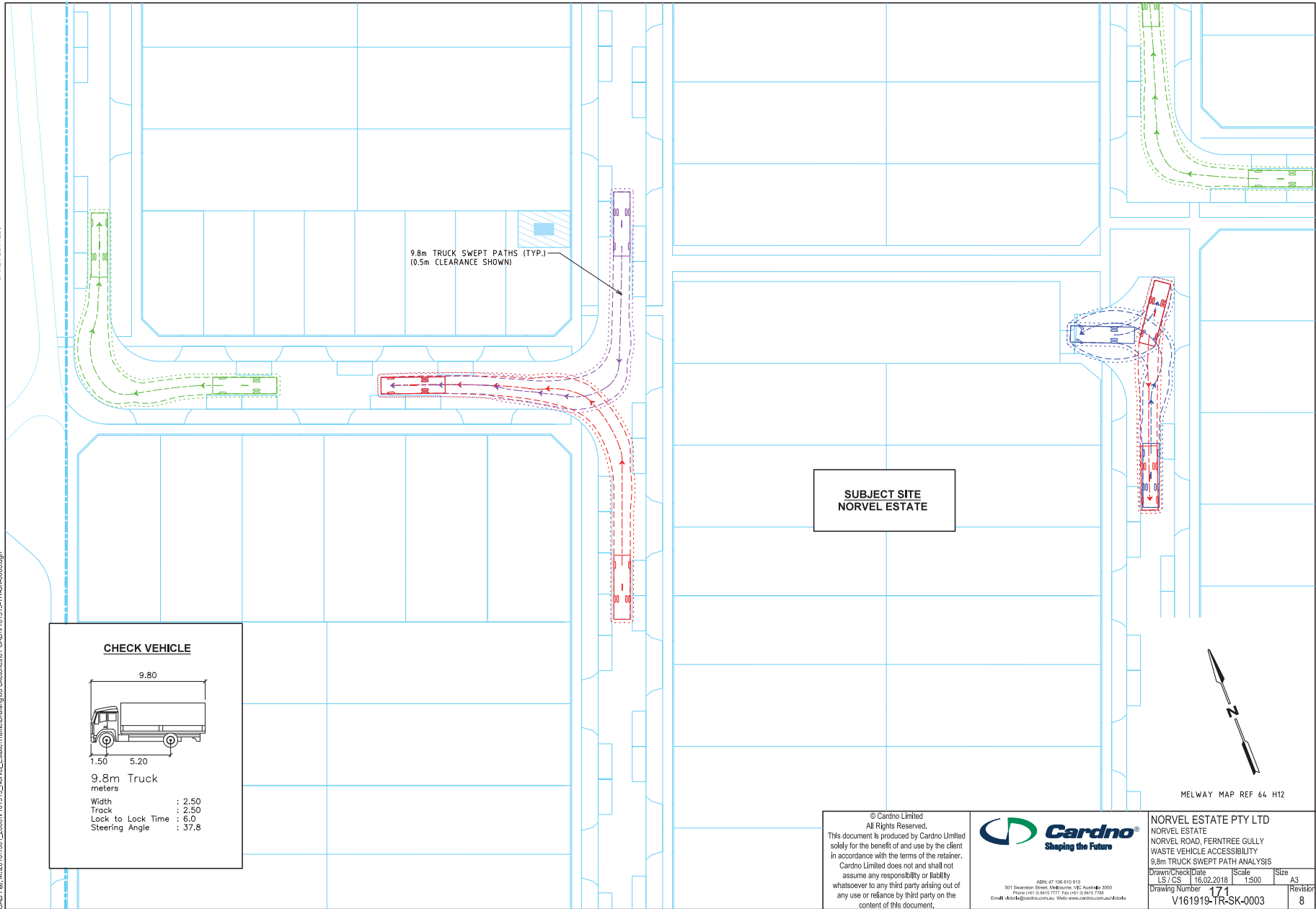
ABN: 47 108 010 913  
501 Swanton Street, Melbourne, VIC, Australia 3000  
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Email: [info@cardno.com.au](mailto:info@cardno.com.au) Website: [www.cardno.com.au](http://www.cardno.com.au) [www.melb.cdn.com.au](http://www.melb.cdn.com.au)

NORVEL ESTATE PTY LTD NORVEL ESTATE NORVEL ROAD, FERNTREE GULLY WASTE VEHICLE ACCESSIBILITY 9.8m TRUCK SWEEP PATH ANALYSIS			
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**CHECK VEHICLE**

9.8m Truck  
meters

- Width : 2.50
- Track : 2.50
- Lock to Lock Time : 6.0
- Steering Angle : 37.8

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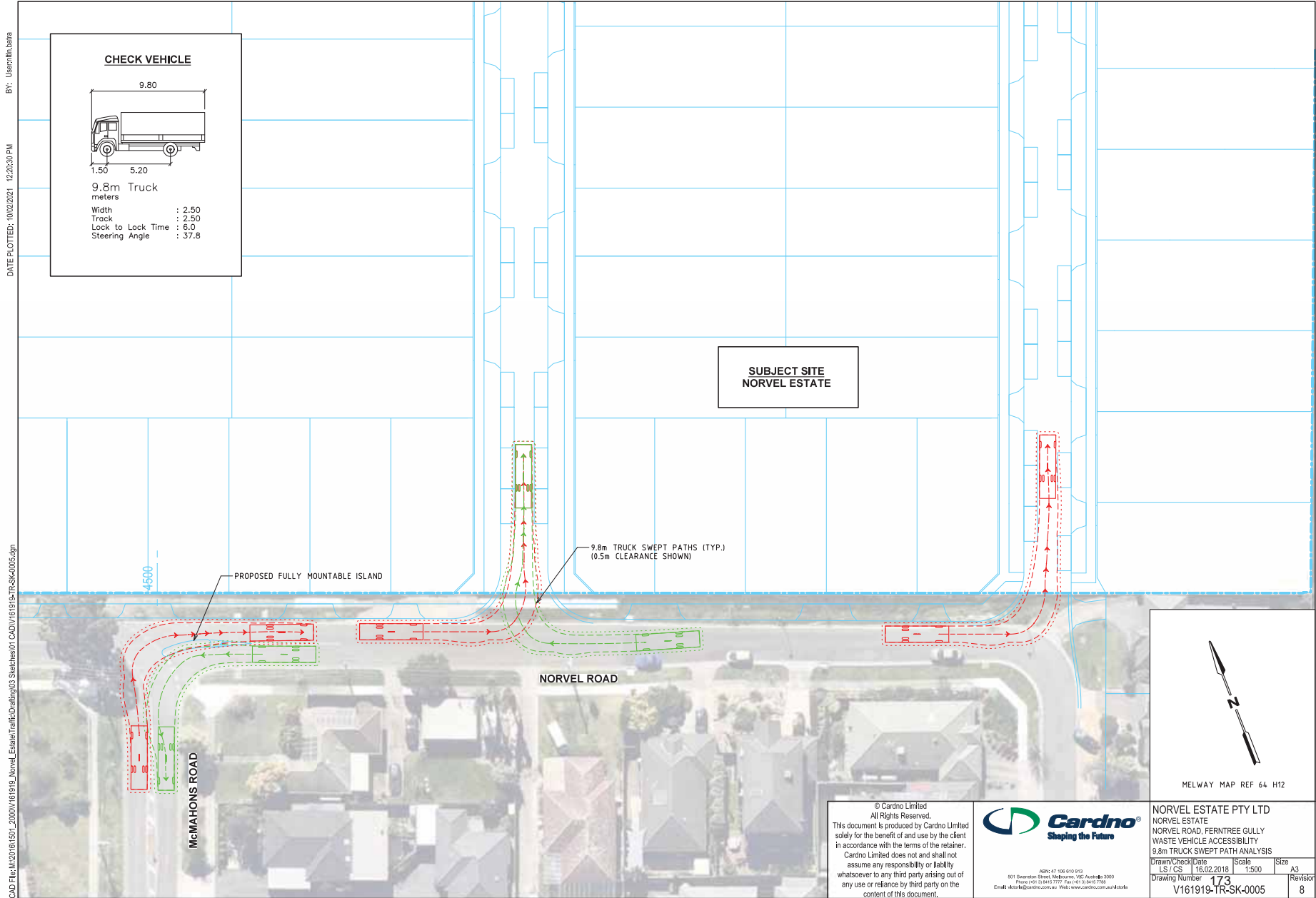


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NORVEL ESTATE PTY LTD NORVEL ESTATE NORVEL ROAD, FERNTREE GULLY WASTE VEHICLE ACCESSIBILITY 9.8m TRUCK SWEEP PATH ANALYSIS		
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**CHECK VEHICLE**

9.80

1.50 5.20

9.8m Truck  
meters

Width : 2.50  
Track : 2.50  
Lock to Lock Time : 6.0  
Steering Angle : 37.8

**SUBJECT SITE  
NORVEL ESTATE**

9.8m TRUCK SWEEP PATHS (TYP.)  
(0.5m CLEARANCE SHOWN)

PROPOSED FULLY MOUNTABLE ISLAND

NORVEL ROAD

McMAHONS ROAD

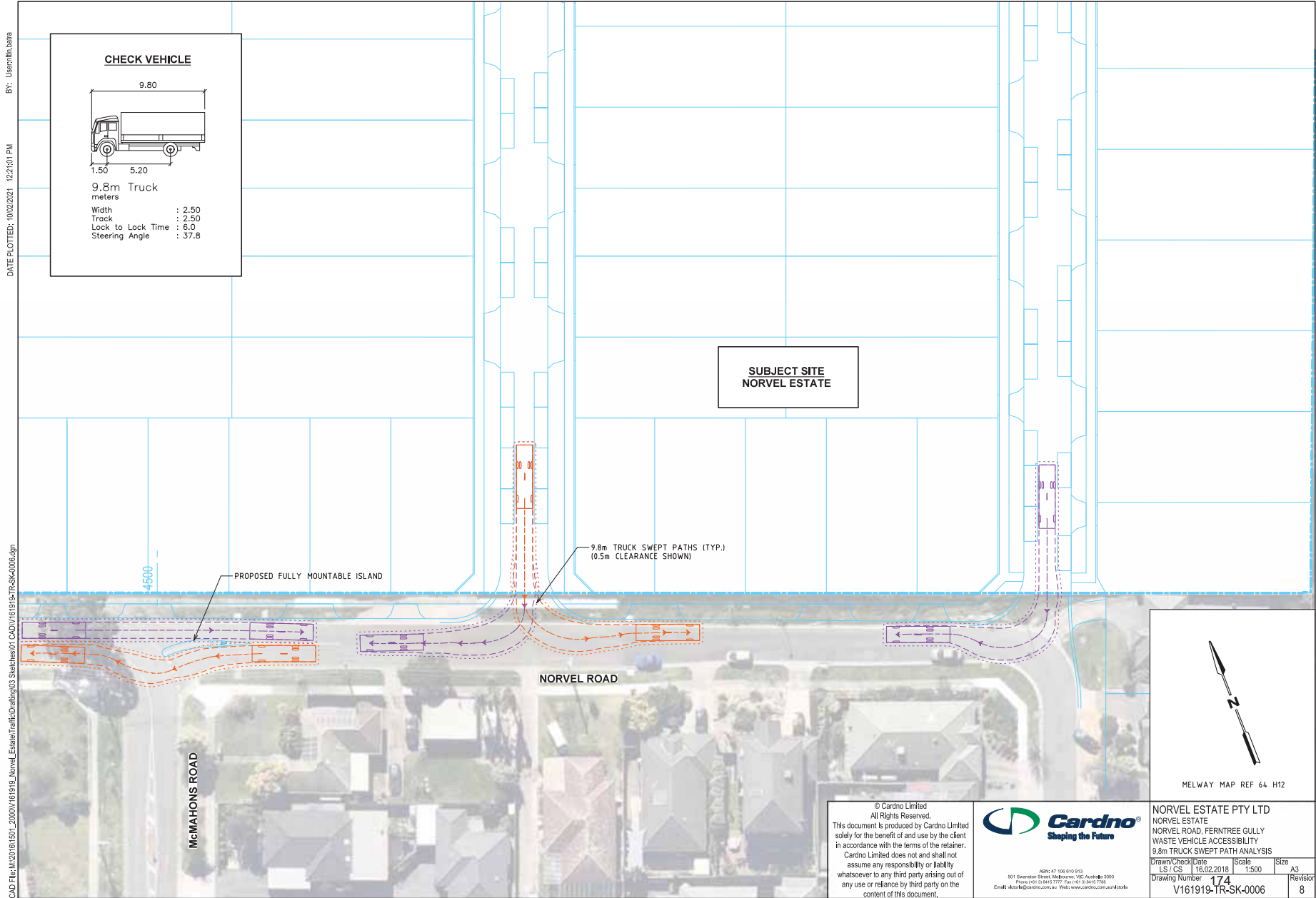
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NORVEL ESTATE PTY LTD			
NORVEL ESTATE			
NORVEL ROAD, FERNTREE GULLY			
WASTE VEHICLE ACCESSIBILITY			
9.8m TRUCK SWEEP PATH ANALYSIS			
Drawn/Check Date	Scale	Size	
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**CHECK VEHICLE**

9.80

1.50 5.20

9.8m Truck  
meters

Width : 2.50  
Track : 2.50  
Lock to Lock Time : 6.0  
Steering Angle : 37.8

**SUBJECT SITE  
NORVEL ESTATE**

9.8m TRUCK SWEEP PATHS (TYP.)  
(0.5m CLEARANCE SHOWN)

PROPOSED FULLY MOUNTABLE ISLAND

NORVEL ROAD

MCMAHONS ROAD

MELWAY MAP REF 64 H12

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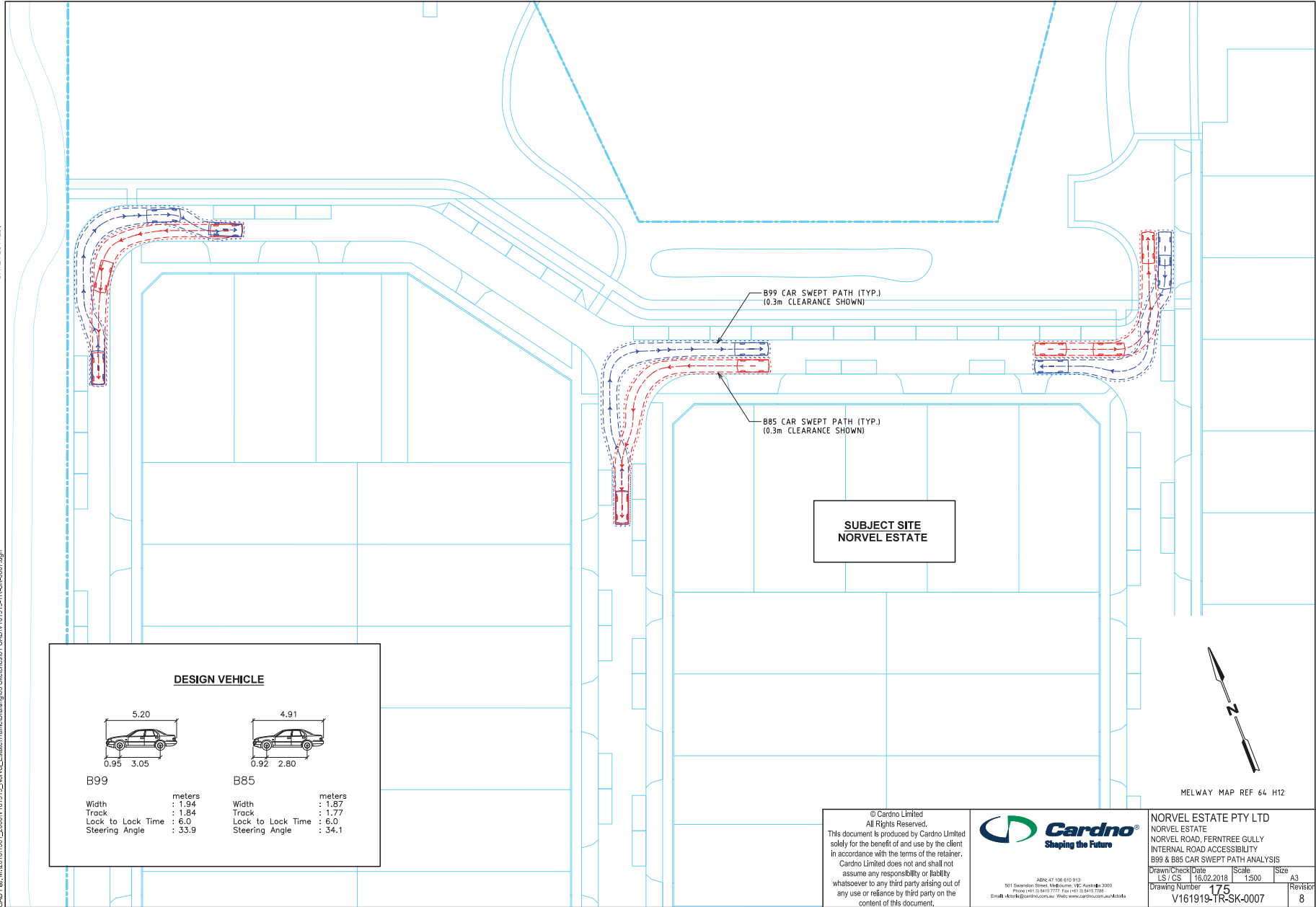
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NORVEL ESTATE PTY LTD NORVEL ESTATE NORVEL ROAD, FERNTREE GULLY WASTE VEHICLE ACCESSIBILITY 9.8m TRUCK SWEEP PATH ANALYSIS			
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BY: User:mh.baara

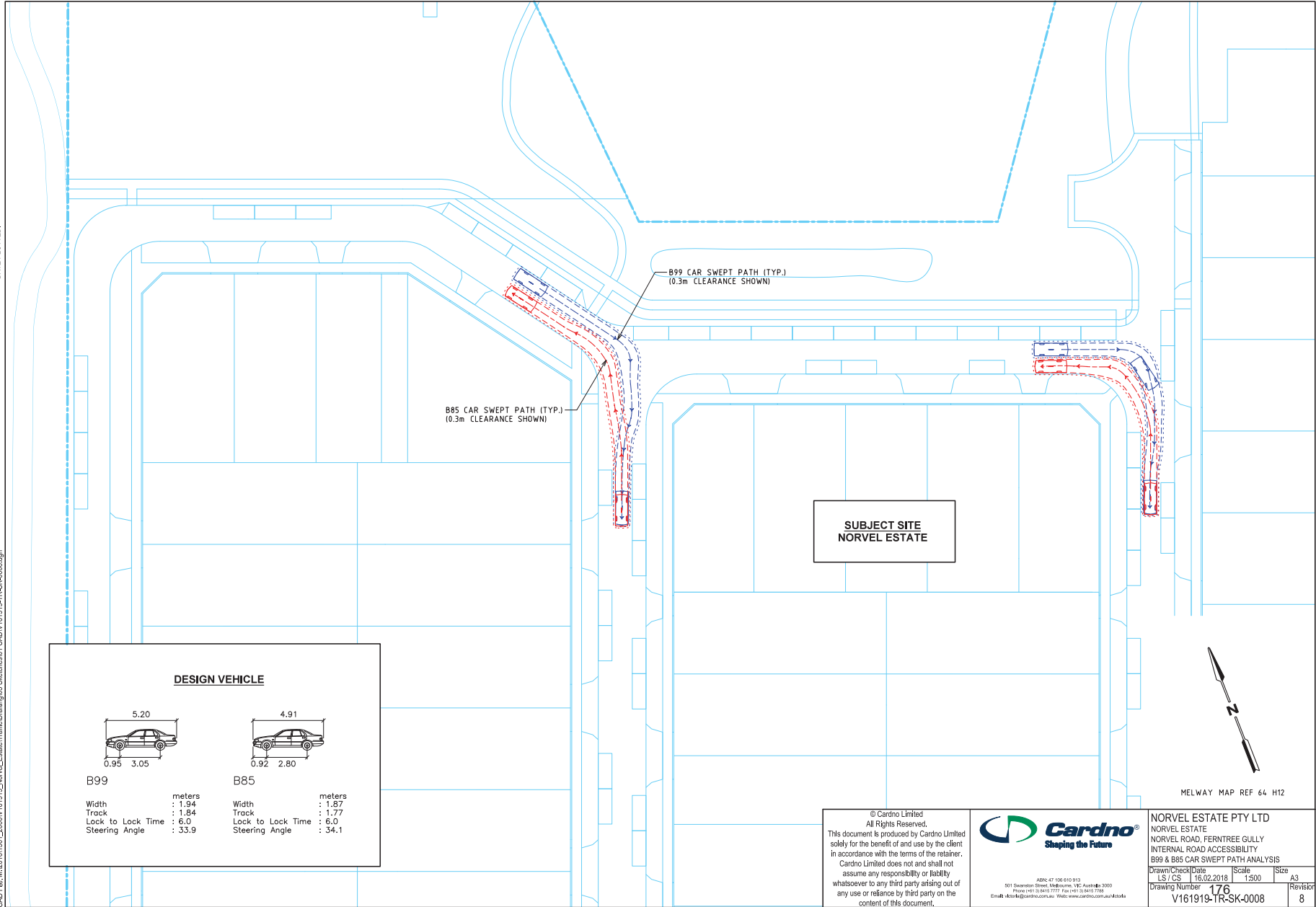
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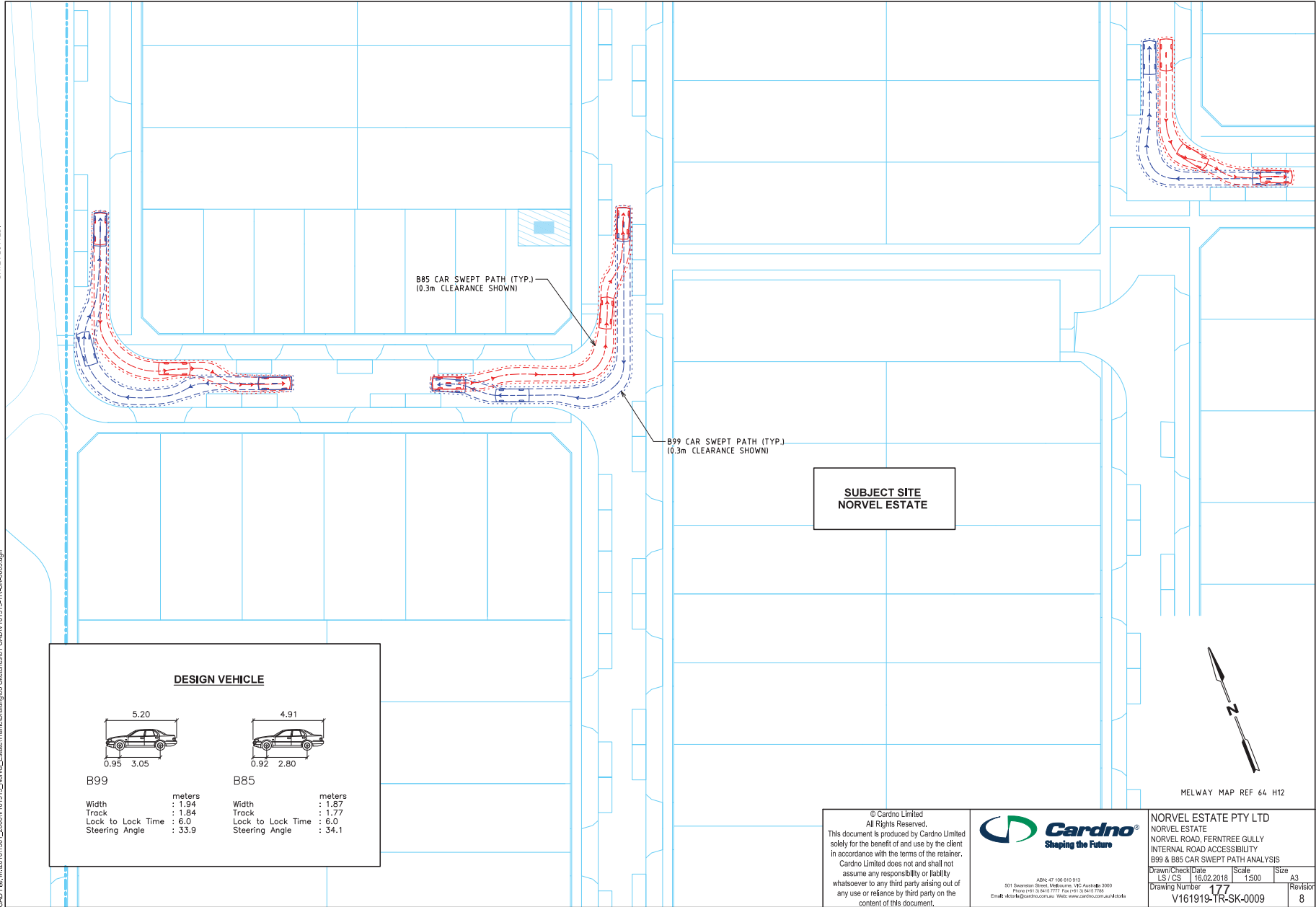
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BY: User:mha.baara

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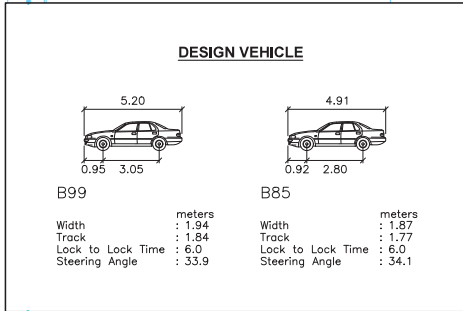
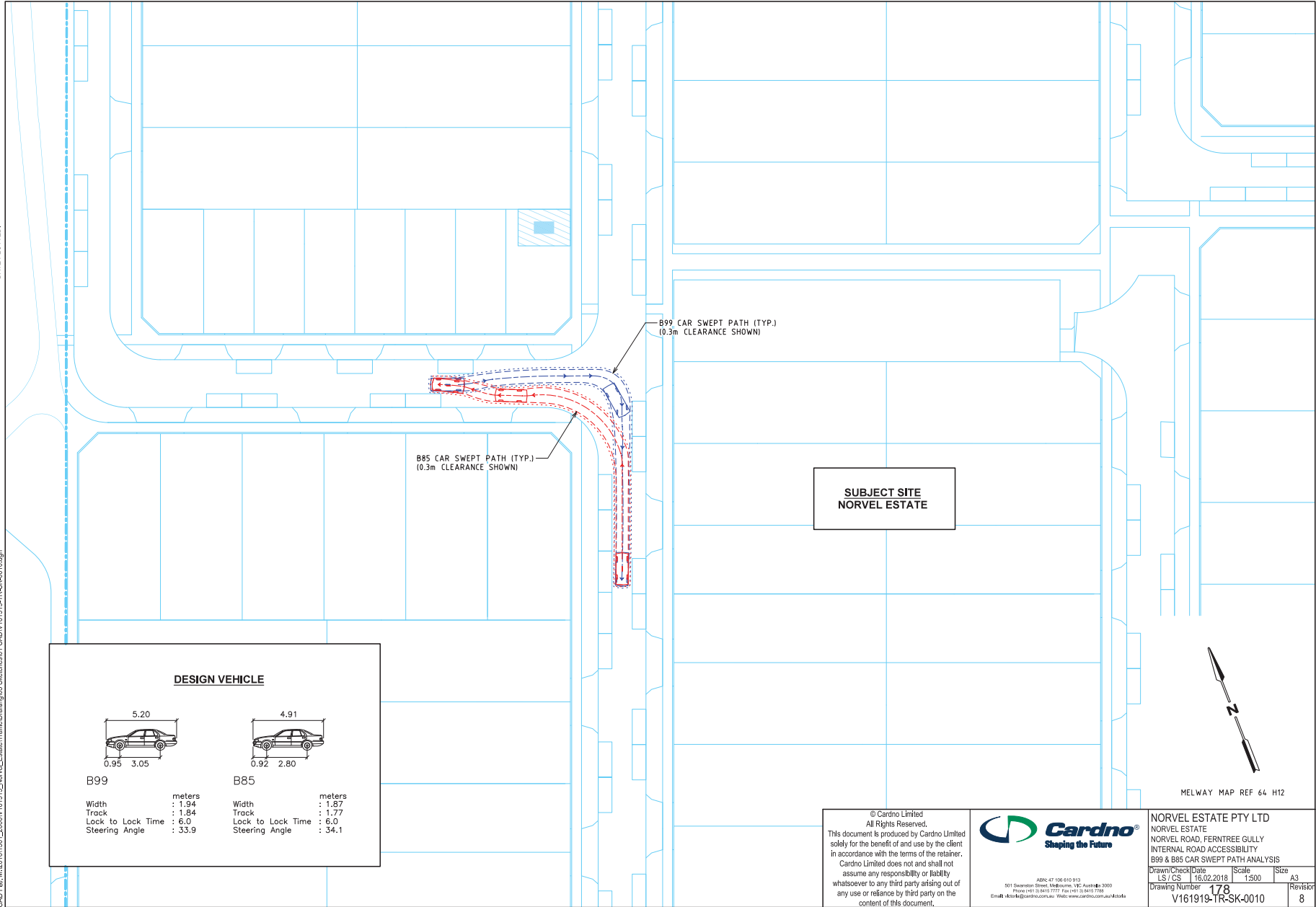
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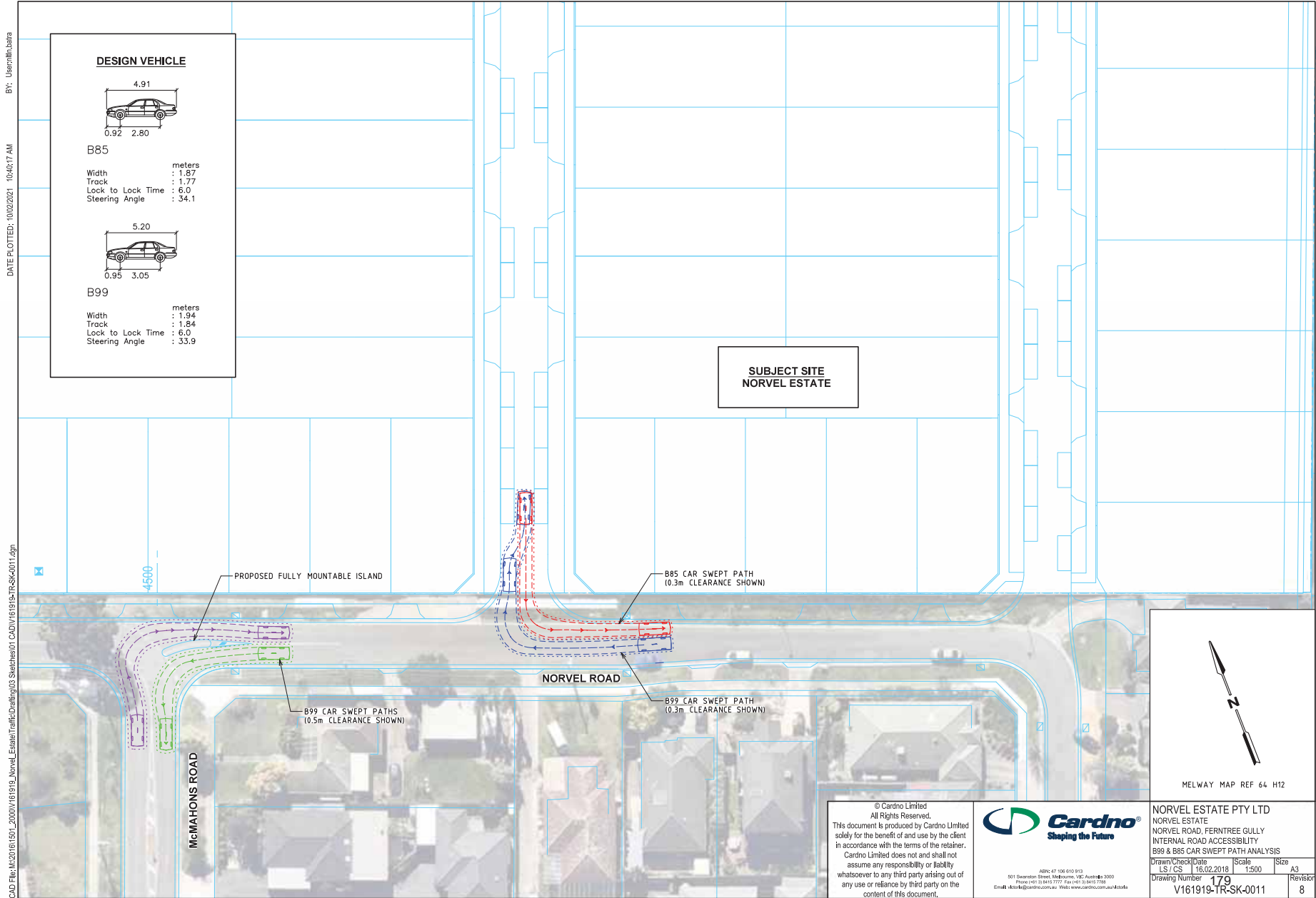


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NORVEL ESTATE PTY LTD NORVEL ESTATE NORVEL ROAD, FERNTREE GULLY INTERNAL ROAD ACCESSIBILITY B99 & B85 CAR SWEEP PATH ANALYSIS			
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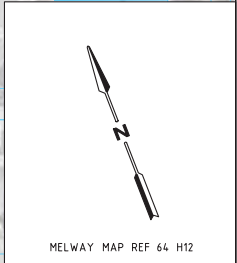


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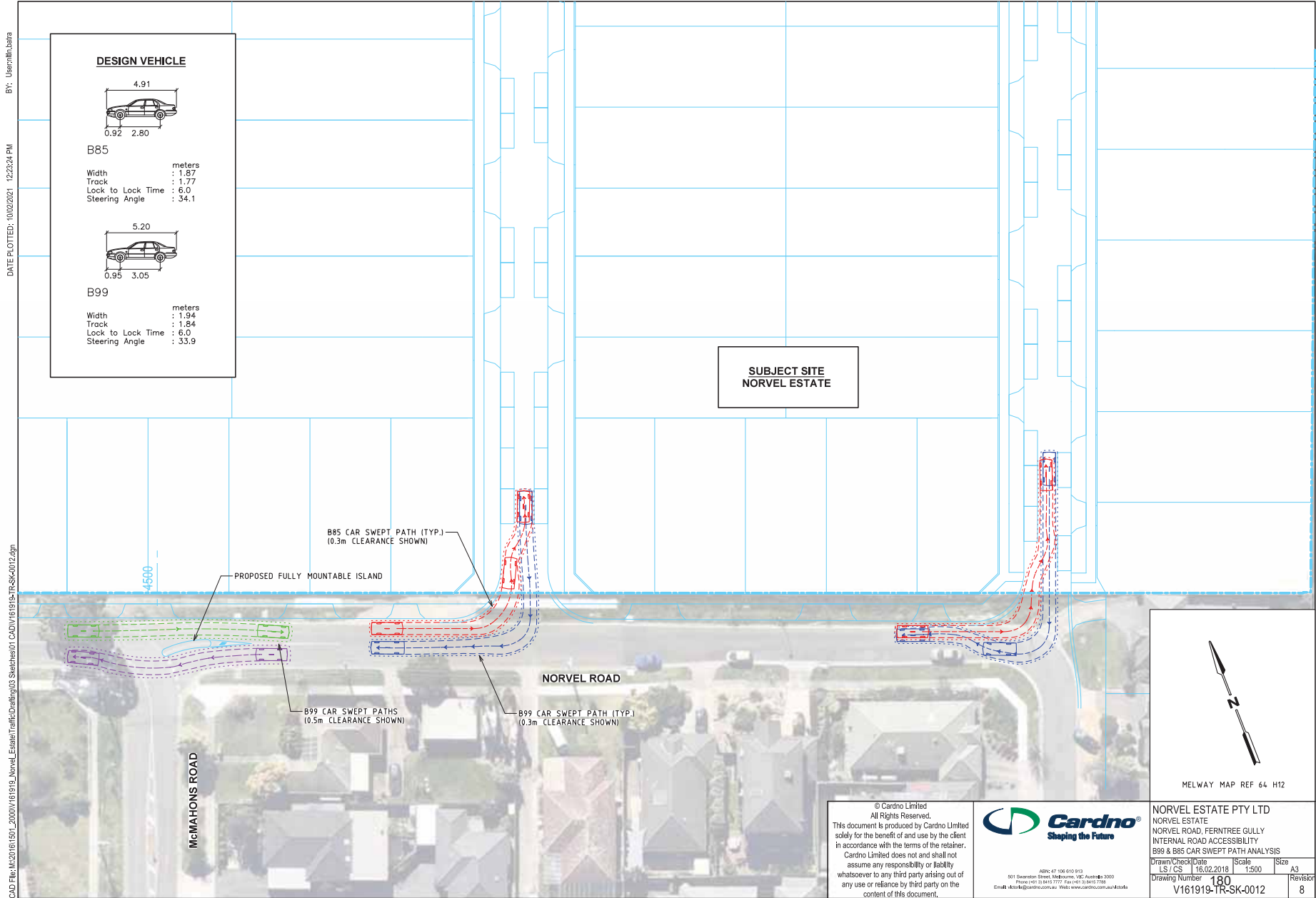


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NORVEL ESTATE PTY LTD NORVEL ESTATE NORVEL ROAD, FERNTREE GULLY INTERNAL ROAD ACCESSIBILITY B99 & B85 CAR SWEEP PATH ANALYSIS			
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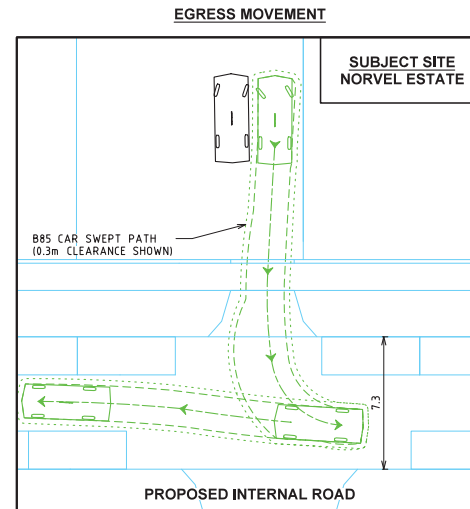
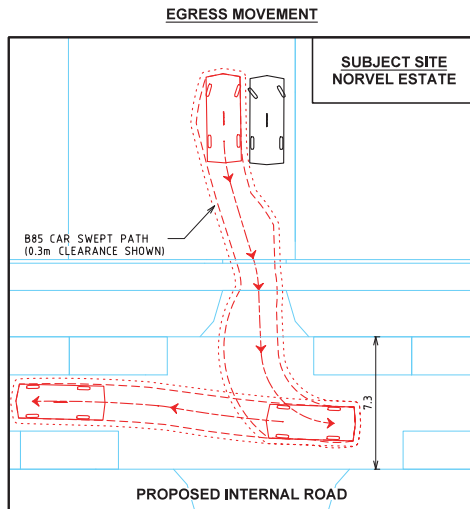
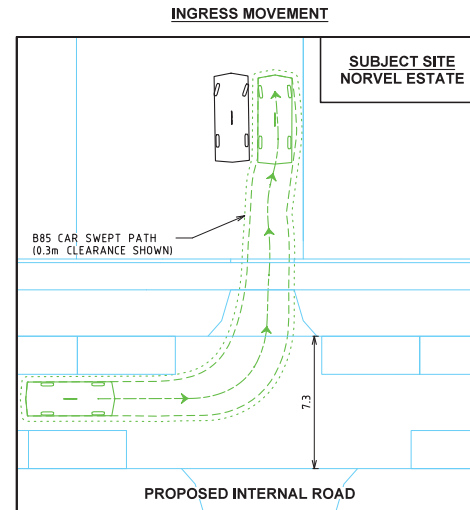
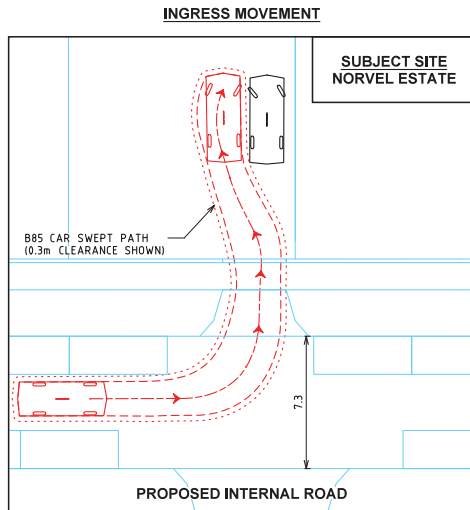




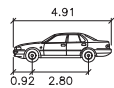
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**DESIGN VEHICLE**



B85	meters
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Track	: 1.87
Lock to Lock Time	: 1.77
Steering Angle	: 6.0
	: 34.1

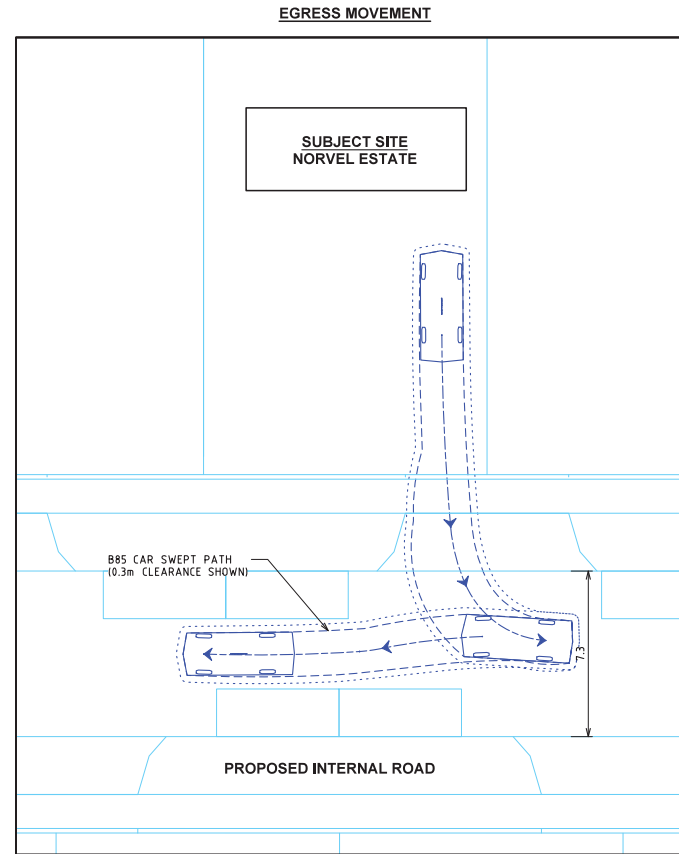
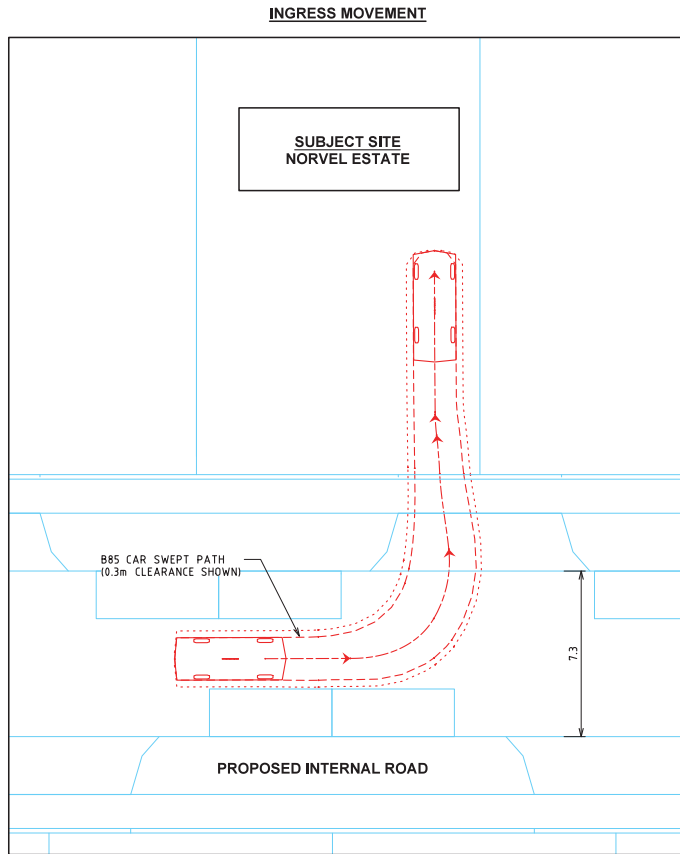


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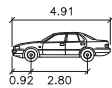
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BY: User:mh.baara DATE PLOTTED: 10/02/2021 12:24:18 PM

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**DESIGN VEHICLE**



B85

Width	: 1.87	meters
Track	: 1.77	
Lock to Lock Time	: 6.0	
Steering Angle	: 34.1	



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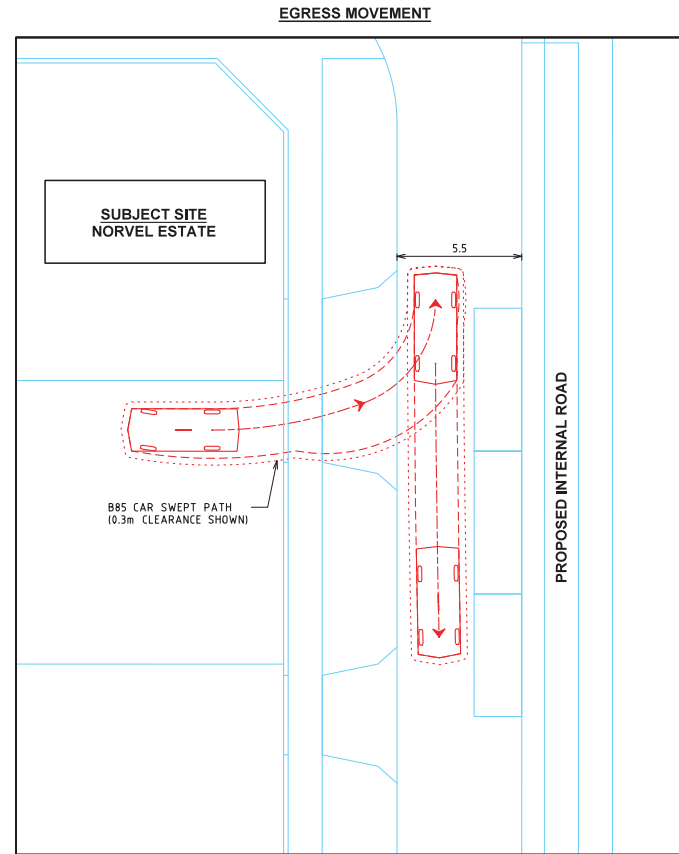
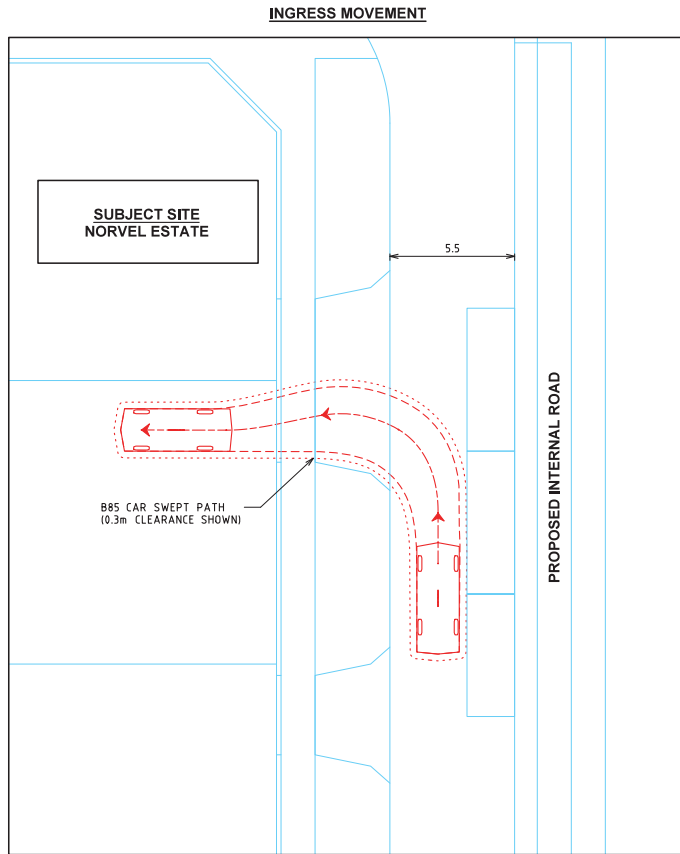
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NORVEL ESTATE PTY LTD			
NORVEL ESTATE			
NORVEL ROAD, FERNTREE GULLY			
SHARED DRIVEWAY GARAGE ACCESSIBILITY			
B85 CAR SWEEP PATH ANALYSIS			
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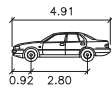
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**DESIGN VEHICLE**



B85

Width	: 1.87	meters
Track	: 1.77	
Lock to Lock Time	: 6.0	
Steering Angle	: 34.1	



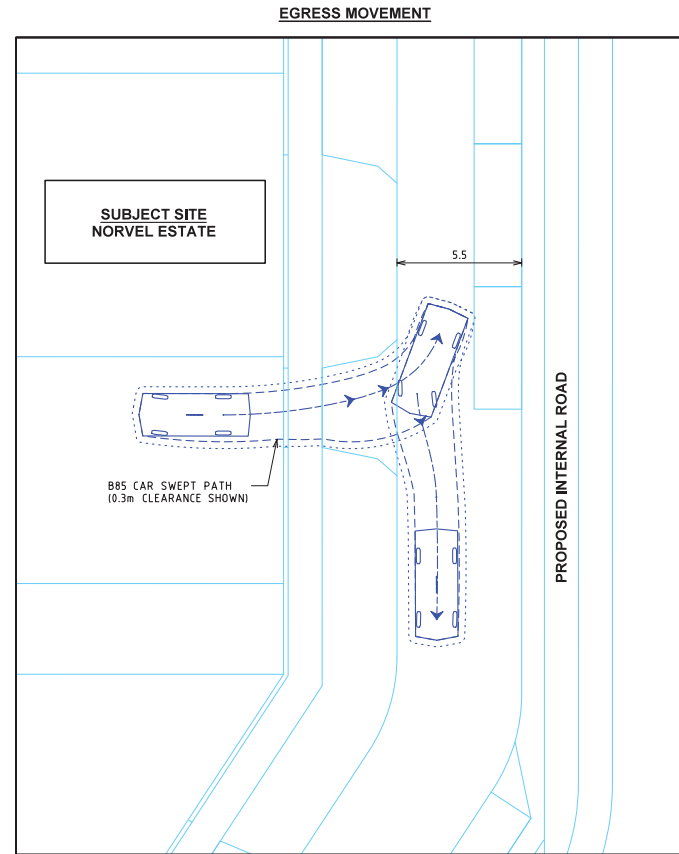
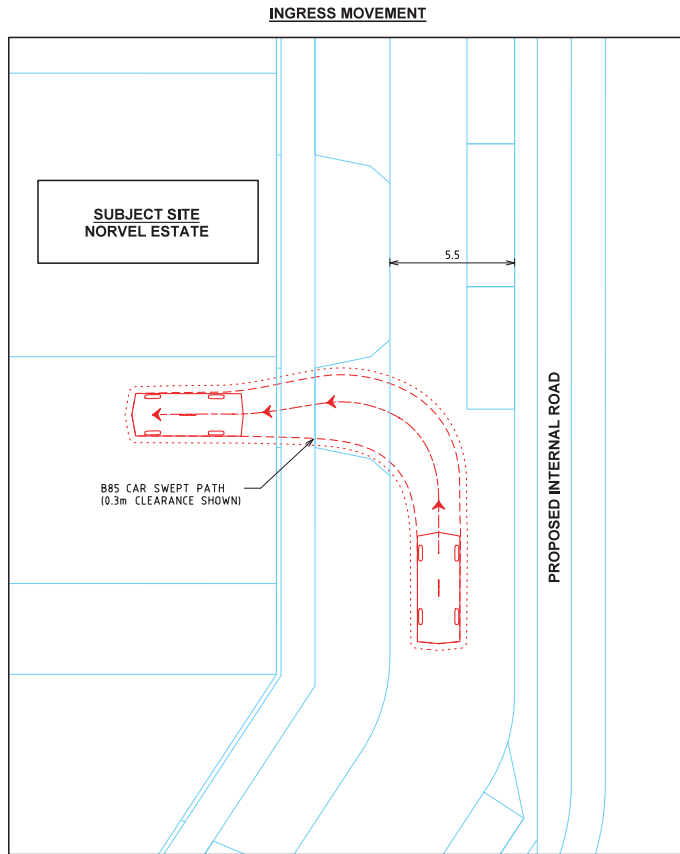
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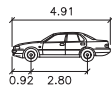
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**DESIGN VEHICLE**



B85

Width	: 4.91	meters
Track	: 2.80	
Lock to Lock Time	: 6.0	
Steering Angle	: 34.1	



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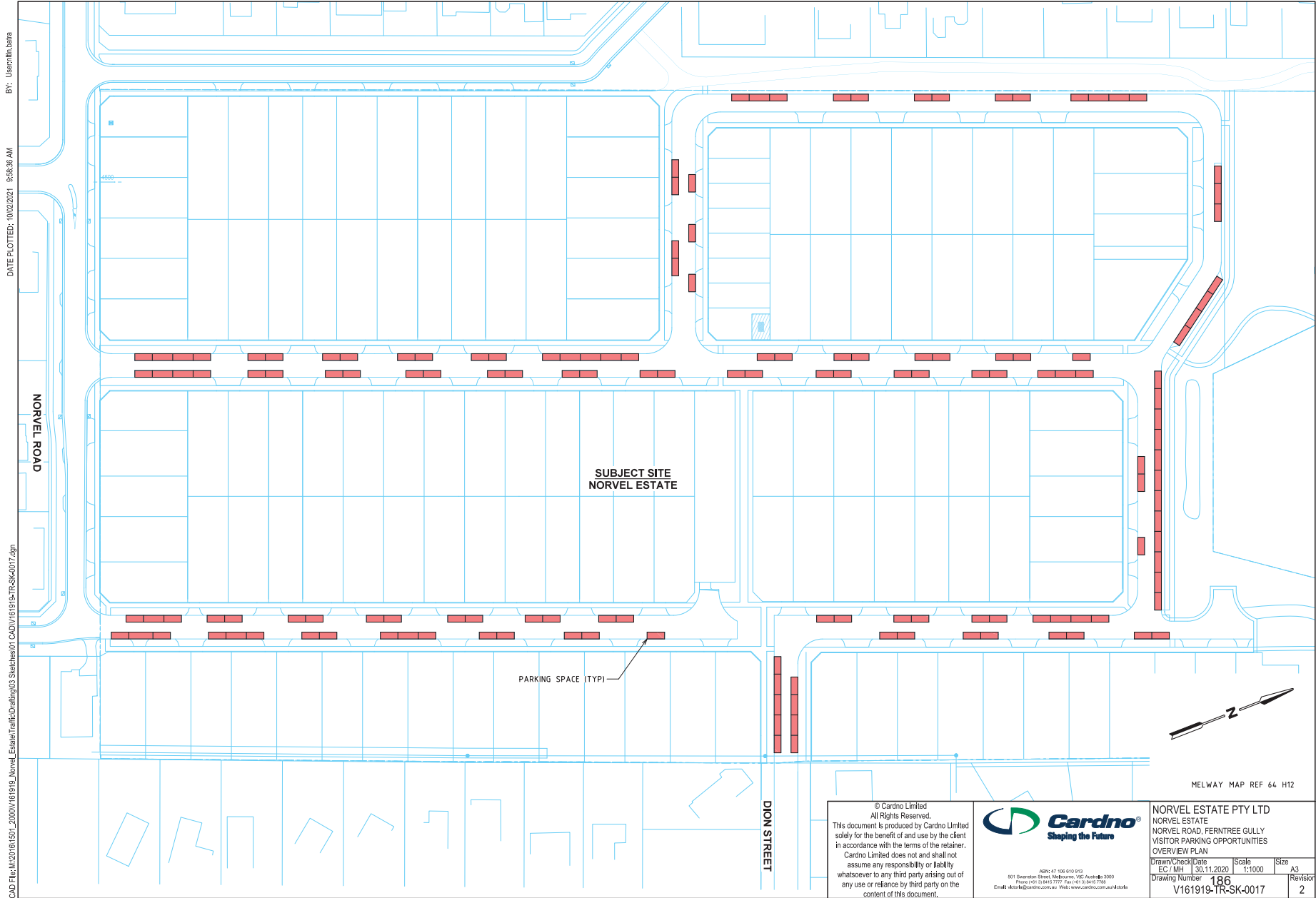
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Drawing Number	Revision		
184	8		
V161919-TR-SK-0016			

Norvel Estate Residential  
Development

APPENDIX

D

ON-STREET PARKING OPPORTUNITIES



# Stormwater Management Plan

Proposed Residential Development,  
Norvel Road, Ferntree Gully

V161919



Prepared for  
Norvel Estate Pty Ltd

25 May 2021





## Document Information

Prepared for	Norvel Estate Pty Ltd
Project Name	Proposed Residential Development, Norvel Road, Ferntree Gully
File Reference	V161919 Stormwater Management Plan V09.docx
Job Reference	V161919
Date	09 February 2021

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## Document Control

Version	Date	Author	Author Initials	Reviewer	Reviewer Initials
D01	4/01/18	Ed Henty	EH	Sophie Cant	SC
V01	08/02/18	Ed Henty	EH	Sophie Cant	SC
V02	12/02/18	Ed Henty	EH	Sophie Cant	SC
V03	18/07/18	Simon Ims	SI	Ed Henty	EH
V04	16/10/18	Simon Ims	SI	Ed Henty	EH
V05	22/11/18	Richard Pulimoottil	RP	Ed Henty	EH
V06	18/11/19	Ed Henty	EH	Ed Henty	EH
V07	03/09/20	Anass Jerrari	AJ	Anass Jerrari	AJ
V08	09/02/21	Dillon Van Heer	DVH	David Stone	DS
V09	25/05/21	Priyanka Wickramasuriya	PW	Hamid Ghajarnia	HG



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## 1 Site Description

Norvel Estate Pty Ltd has engaged Cardno to prepare a Stormwater Management Plan for the proposed residential development of the site in Norvel Road, Ferntree Gully.

The Norvel Road site is located on the north side of Norvel Road and extends north to the Blind Creek reserve as shown in the figure below. The site is bounded to the east by existing residential development, and has frontage to Castricum Place for part of the western frontage, with the balance of the western boundary abutting a Council linear reserve at the rear of existing residential development. The total site is approximately 9.2 ha in area, with a development area of 7.5 ha. The remaining 1.7 ha is attributed to a nature reserve located at the north of the site. This area is part of the Blink Creek Reserve and is a protected bushland that has environmental and social significance.



Figure 1-1 Site Locality Plan (Red – Boundary & Green - Billabong Location)

Historically, this site was formerly a quarry and upon closure was filled and graded so that the site falls towards the bushland. There are minimal external flows into the site. The majority of runoff generated from the site passes through the bushland as overland/sheet flow prior to discharging into Blind Creek. Knox City Council has indicated that that these flows are critical to the health of the bushland.



## 2 Development Proposal

The current masterplan for the site, prepared by the architects, is shown in Figure 2-1 below. This retains the existing vegetation at the northern end of the site as a 'Bushland Reserve'. It is the intention that all discharge from the development into the reserve will attempt to achieve the relevant water quality targets. As the remaining 1.7ha area of the site is classed as protected bushland, this area will largely remain undeveloped where vegetation exists. However, where no vegetation exists, it is the intention that this is where proposed flood controls and stormwater treatment assets will be located.



Figure 2-1 Subdivision Masterplan

It must be noted that this Stormwater Management Plan and the conceptual design presented as Appendix B in this document is not to be confused with mitigation controls approved in the flooding assessments which is provided in Appendix A.

The flooding mitigation assessments detailed in Section 4 of this report do not consider stormwater treatment aspects, while the stormwater conceptual design plans presented in Appendix B do not consider the flooding mitigation options directly.

It is intended that both the flooding mitigation and water quality objectives are met given the interaction and relativity of the two aspects.



### 3 Flooding and Proposed Mitigation

Flooding for the Norvel Road Development has been assessed by Cardno through multiple impact and mitigation assessments. These assessments have been undertaken to address key comments by Knox City Council. Upon completion of the assessments, Knox City Council has approved the flooding component of the development. The flooding assessments have been included as part of Appendix A. The key outcomes can be summarised as follows:

- > The assessments were undertaken to determine if the proposed development increases flooding in the 1% AEP event at the following locations:
  - o Downstream of the site (bushland to the north)
  - o Blind Creek
  - o Surrounding properties
- > Initial flood assessment works identified that increased runoff would be generated as a result of the development due to an increase in impervious areas. This was expected to have a minor impact on some of the surrounding properties, but no impact downstream of the site and on Blind Creek.
- > Therefore, mitigation options were investigated at a high level to establish conceptual options that would mitigate flooding on the surrounding properties. These were later refined to ensure that they were feasible and feasible for the detailed design phase of the Project and addressed flooding concerns of the initial assessments.
- > The refined mitigation options were ultimately accepted by Council as flooding mitigation options demonstrated that the future detailed design of the mitigation controls can achieve alleviation of flood waters on the surrounding properties. This has been specified as conditions on the permit.
- > Approved mitigation options are shown Figure 3-1 and included:
  - o A Proposed Raised Bicycle Path
    - Raised by more than 300m to ensure it effectively mitigates flood waters from entering the surrounding properties
    - Alignment slightly altered from proposed site layout to allow for a swale along the back of the property boundary to the extent of the raised section of the proposed bicycle path
  - o Proposed Swale along the Property Boundary
    - Lowered and graded from the start of the raised section of the proposed bicycle path to the existing walking track, where the elevation ties in to the existing levels
  - o Proposed Culvert under Existing Foot Path
    - A 300mm x 600mm box culvert with 300mm cover to the surface
    - Invert levels for upstream and downstream set at the proposed swale levels giving the culvert an approximate slope of 1 in 40
  - o Proposed Bund between the Proposed Site Road and Localised High Point
    - Raised approximately 300mm to ensure that runoff from the site does not contribute any flows to the proposed swale along the rear of the properties
    - Uses the current site grading and localised high point



- > The 1% AEP Difference Plot for Existing (E03) and Mitigation (M03) Conditions are shown in Figure 3-2 and outcomes ultimately showed:
  - o There were no adverse impacts on or within the surrounding properties
  - o There was a very minor increase in flood depths of no greater than 5cm on the existing footpath;
  - o There was a minor increase in flood waters of no greater than 10cm within the bushland downstream of the existing footpath;
  - o There was an increase in flood depths of greater than 5cm within the reserve corridor, the bushland to the north of the site and on site; and
  - o There was no change in flood levels observed in Blind Creek



Figure 3-1 Approved mitigation options (M03)

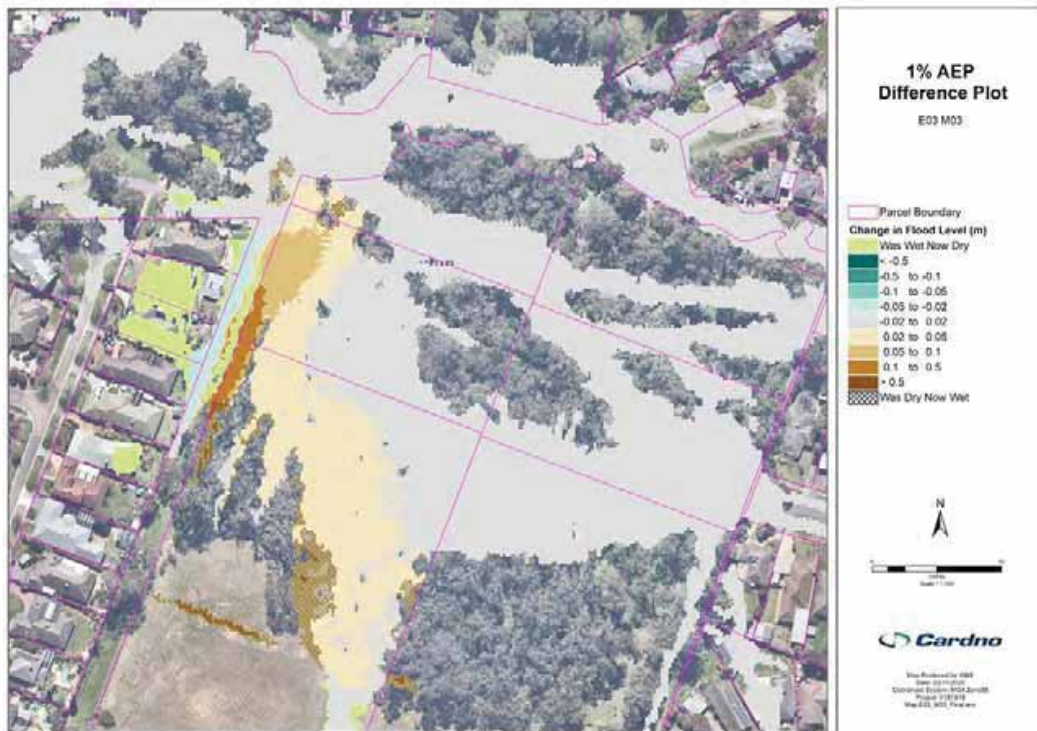


Figure 3-2 1% AEP Difference Plot for Existing (E03) and Mitigation (M03) Conditions



## 4 Stormwater Quality Management

### 4.1 Background and Management Approach

An initial site inspection was undertaken with council drainage and water quality officers on the 4<sup>th</sup> of September 2017. During this site inspection, council officers indicated that they wanted to maintain the hydrology of the downstream billabong. This billabong is located in the council reserve near the northern edge near Blind Creek adjacent to the existing Blind Creek Trail. As a result, council confirmed that they would accept the use of the existing Billabong (See Figure 1-1) for detention and water quality treatment, with the condition that a sediment basin was to be constructed to pre-treat runoff. Additionally, it was identified that any flows into the billabong were to be dispersed throughout the bushland to ensure the environmental values were preserved.

Cardno used this initial information and conditions as the basis of the stormwater management plan for the Norvel Road development. However, after numerous conceptual designs, it was subsequently determined that there was no practical and feasible conceptual design that utilised the billabong. This is because all design options would ultimately impact the existing vegetation and be cost prohibitive given the location and characteristics of the billabong.

Given the extended timeframe, Cardno organised two meetings with Council on the 18<sup>th</sup> of November 2020 and 3<sup>rd</sup> of December 2020 to clearly identify the Council's requirements and water quality treatment objectives for the site. Also, we received the council's comments on the draft version of the stormwater report issued 09/02/2021. Outcomes from these meetings and the council responses were:

- > Council would prefer a low maintenance system with maintenance requirements similar to a shallow bioretention with no underdrain system;
- > It is the Council's preference that bioretention assets with shallow filter media and no underdrain replaces the ephemeral waterway to achieve the maximum treatment efficiency with minimal demand for maintenance;
- > Gross Pollutant Traps (GPTs) are acceptable; however, these are to be considered economically and rationally given the high costs for maintenance. Rolca CDS units are preferred GPT types due to the familiarity of the council maintenance team with these assets;
- > Water quality targets must be met for Gross Pollutants (GP) and Total Suspended Solids (TSS);
- > Water quality targets for Total Phosphorous (TP) and Total Nitrogen (TN) will be assessed on merit given that council's preference for a low maintenance treatment system without filtration makes achieving targets challenging and limits options to achieve typical targets;
- > The proposed treatment system attempts to achieve the best possible water quality treatment given council's preferences, the constraints related to vegetation (including canopies and root zones) due to its protected status and that flows are to be distributed across the bushland reserve; and
- > The proposed treatment system in the submitted stormwater management plan is feasible and practical for community use.





## 4.2 Water Quality Objectives

The water quality objectives for the site are based on “Best Practice Environmental Management Guidelines” (CSIRO 1999) and are consistent with the Knox City Council Stormwater Management Strategy (2010). Both of these documents provide best practice management targets for water quality and are outlined in Table 4-1.

**Table 4-1 Best Practice Water Quality Targets**

Pollutant	Target Reduction
Total Suspended Solids (TSS)	80%
Total Nitrogen (TN)	45%
Total Phosphorus (TP)	45%
Gross Pollutants (GP)	70%

## 4.3 Water Sensitive Urban Design

### 4.3.1 Proposed Treatment Measures

The proposed treatment measures for the site are shown in Figure 4-1 and include the following:

- > Three Gross Pollutant Traps (GPTs)
- > Cascading raingardens separated by rock weirs
- > An ephemeral wetland

It must be noted that the conceptual design is a proof of concept for gaining the required approval for the Norvel Road development, and the treatment measures have been considered at the concept level.

It is intended that aspects will be redefined at the detailed design stage. The full conceptual design plans are provided in Appendix B. These have been selected and designed accordingly with the initial feasibility and practicability of construction considered.

Low flow and high flow bypasses for the treatment measure has to be estimated in alignment with the conceptual design, and this will require reassessment at the detailed design stage.





Given, these have been considered only at a concept level, the following limitations are therefore applicable:

- > The stormwater controls and conceptual design are subject to detailed design and these treatment measures and associated stormwater controls may change. All changes to stormwater and flooding aspects must be updated within this document where and as required.
- > The concept design featured in this document has been assessed for feasibility and practicality with respect to underground services such that a nominal cover, pipe sizing and invert levels has been considered although these have not been specified as they must be designed appropriately in detailed design.
- > It must be noted that site characteristics such as road alignments, footpaths and landscaping has been considered where reasonably practical and detailed design will require amendments to one or more aspects to ensure that the water quality objectives are met.
- > The contributing catchments and drainage layout have been developed specifically for water quality treatment and may not be applicable for conveying and/or directing flows. It is the intent that appropriate sizing and layout will be redefined at detailed design. Adjustment of these layouts will need to be reassessed if changed.
- > Council is supportive of rock forebays because of their natural look in oppose to concrete forebays; the detailed design of these assets will be provided in the next phase.
- > The concept design includes the approximate location of two forebay dispersion flow controls to provide distributed flows to the wetland and bushland. It is expected that this will be appropriately refined in detailed design to deliver flows to the entire bushland. A bund has been included in the conceptual design, however, this is subject to detailed design.
- > A free draining is feasible for more than 85% of the wetland volume to the downstream bushland area through designated rock forebay and outlet. Details of the outlet will be provided in the detailed design phase.
- > Previous submissions of the stormwater management plan (V1 to V8) included several variations for the location and mechanisms for site discharge. It must be noted that with the restrictions of works through the protected bushland that pipe jacking to outlet into the Melbourne Water asset and/or council network adjacent to Blind Creek is not practically feasible. Therefore, site discharge has been proposed through the forebay dispersion flow control and proposed low flow allowances from the swale. It is expected that high flows will discharge from the site similarly to those observed pre-development.
- > The proposed treatment measure will require maintenance in alignment with best practice and will likely require the closure of community spaces to ensure appropriate maintenance. This is due to the site characteristics (road and footpath alignments, bushland reserve etc) and requirements for community safety. The dewatering area specified in the plans is not sufficient to meet best practice unless additional areas are closed to the community during this period.

In order to determine the effectiveness of the proposed treatment measure in achieving the water quality objectives, stormwater quality modelling was performed using the Model for Urban Stormwater Improvement Conceptualisation (MUSIC) Version 6.3.0.

#### **4.3.2 MUSIC Model Setup**

The MUSIC model requires the user to specify meteorological data (rainfall and evaporation), soil properties and pollutant generation parameters. MUSIC modelling was undertaken in accordance with the 2018 Melbourne Water MUSIC Modelling Guidelines.

The Melbourne Water Music Rainfall Templates data for the Narre Warren North station was adopted. This included 6min interval rainfall from 1984 to 1993 with the associated default evapotranspiration data applied to establish the meteorological conditions.



As the development will only have residential properties i.e. no commercial or industrial areas, the residential MUSIC node was selected for each of the contributing subcatchments. The rainfall-runoff parameters adopted are detailed in Table 4-2.

Parameter	Source Node
Rainfall threshold (mm)	1
Soil storage capacity (mm)	120
Initial Storage (%)	25
Field Capacity (mm)	50
Infiltration Capacity Coefficient - a	200
Infiltration Capacity Exponent - b	1
Initial Depth (mm)	10
Daily Recharge rate (%)	25
Daily Baseflow Rate (%)	5
Daily deep Seepage Rate (%)	0

**Table 4-2 MUSIC Rainfall Runoff Parameters**

The 2018 Melbourne Water MUSIC Modelling Guidelines requires residential nodes to reflect the appropriate allotment sizes and therefore, subcatchments have been delineated accordingly as shown in Figure 4-2.

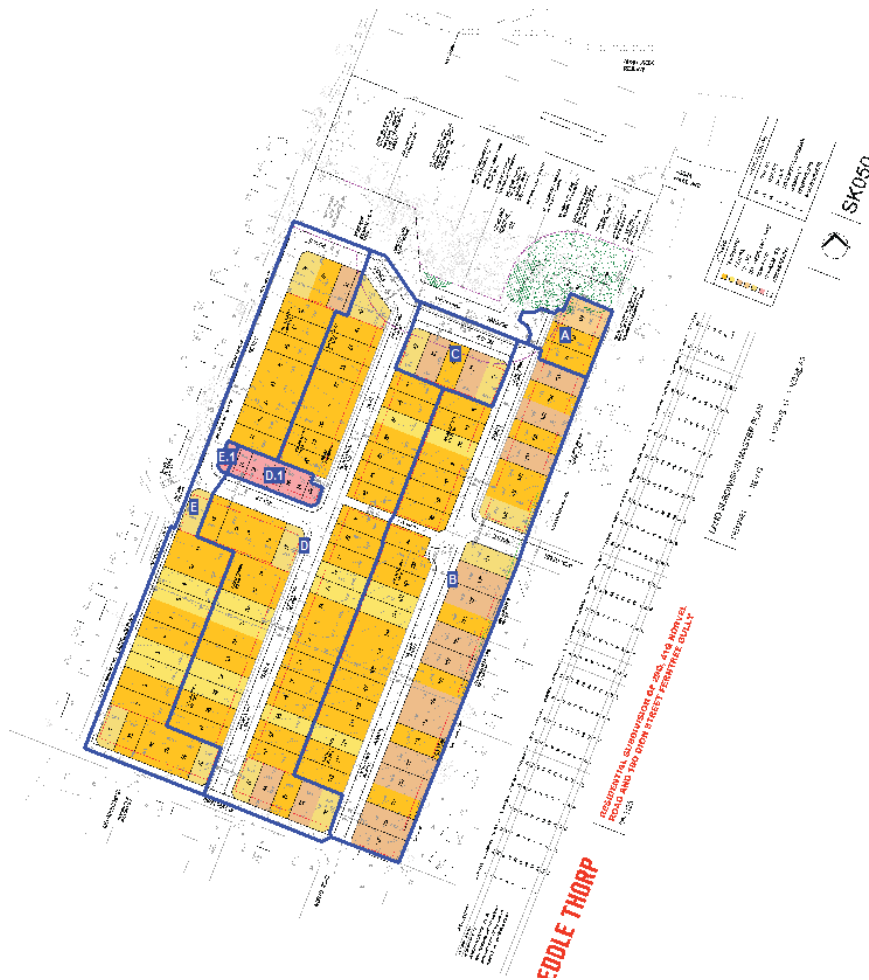


Figure 4-2 MUSIC Subcatchment Delineation

The subcatchments and their parameters used in the MUSIC model are further detailed in Table 4-3 below.

Subcatchment ID	Assigned Description (MW MUSIC Modelling Guidelines - 2018)	Area (ha)	Assigned Imperviousness (MW MUSIC Modelling Guidelines - 2018)
A	Standard densities. (Allotment size 300m <sup>2</sup> – 600m <sup>2</sup> )	0.173	0.75
B	Standard densities. (Allotment size 300m <sup>2</sup> – 600m <sup>2</sup> )	2.450	0.75
C	Standard densities. (Allotment size 300m <sup>2</sup> – 600m <sup>2</sup> )	0.290	0.75
D	Standard densities. (Allotment size 300m <sup>2</sup> – 600m <sup>2</sup> )	2.719	0.75
D.1	High densities. (Allotment size <300m <sup>2</sup> )	0.107	0.85



E	Standard densities. (Allotment size 300m <sup>2</sup> – 600m <sup>2</sup> )	1.504	0.75
E.1	High densities. (Allotment size <300m <sup>2</sup> )	0.014	0.85

Table 4-3 MUSIC Subcatchment Parameters

These subcatchment parameters and the proposed treatment measures were implemented in the MUSIC model as shown below in Figure 4-3.

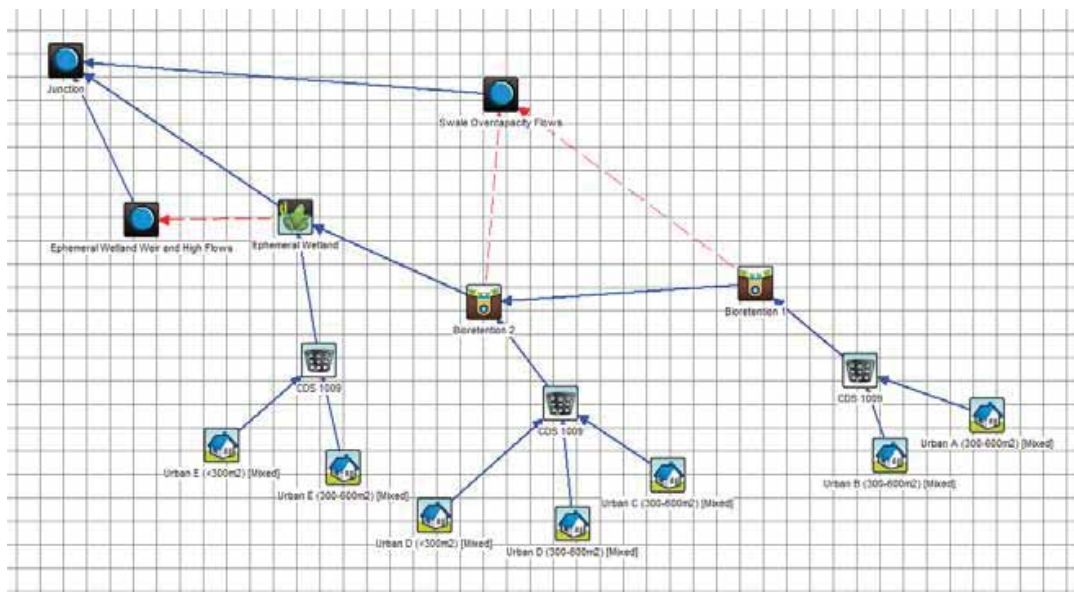


Figure 4-3 MUSIC Model Layout

**4.3.2.1 Gross Pollutant Trap (GPT) Parameters**

A Rocla CDS unit node was selected for MUSIC Modelling and obtained directly from the manufacturer’s website. Parameters were adjusted in accordance with the Melbourne Water Music Modelling Guidelines (2018) and Council specifications such that the GPT node does not remove any Total Nitrogen (TN) or Total Phosphorus (TP). All remaining parameters, including the capacities, inlet properties, the target elements and their concentration based capture efficiency (gross pollutants and total suspended solids) were left as default.

Three nodes were implemented in the MUSIC modelling to represent the GPTs for the site. This did not require any sizing or determination of which Rocla CDS unit model is appropriate for the site as this will be undertaken in detailed design. The high and low flow parameters were left as specified by the manufacturer. It must be noted that this will require an update for detailed design.

**4.3.2.2 Bioretention Parameters**

It is the intention that the bioretention will be separated by rock weirs to form a long cascading bioretention. The bioretention will convey flows from the location of GPTs to the proposed ephemeral wetland. It must be noted that a forebay has been included at the end of the raingarden to ensure that flows are dispersed into the ephemeral wetland.

Council have specified that the raingardens be modelled assuming no underdrain and minimal-to-no filter medium depth. For the purposes of this Stormwater Management Plan, these have been modelled using bioretention nodes separately and can be identified by their respective surface area, filter area and unlined



filter media perimeter as shown below in **Error! Reference source not found.** and Figure 4-5, respectively. It must be noted that each of these sections have been designed to treat the incoming flows from contributing subcatchments, as seen in the concept design plans (Appendix B).

Figure 4-4 Bioretention 1 - MUSIC Model Parameters

Figure 4-5 Bioretention 2 - MUSIC Model Parameters



**4.3.2.3 Ephemeral Wetland Parameters**

The ephemeral wetland was conceptually developed for the site using 12D. This again considered site topography and vegetation restrictions to ensure that the feasibility of the proposed treatment measure was practical and constructible for the detailed design phase. It must be noted that while Council has a preference towards minimal maintenance, this asset will require a dewatering area and has been specified in the plans. This will require refinement at detailed design given the current area is only 90m<sup>2</sup>, and best practice approximates a required area of at least 140m<sup>2</sup>. An access path has also been specified in the conceptual design.

As specified by best practice for this treatment type, it is the intention that this ephemeral wetland will meet the recommended Extended Detention Depth (EDD) with a proposed EDD of 0.35m while also attempting to meet best practice such that the detention time of flows is within the 48 to 72 hours specified for the best treatment in a wetland. Detailed design will provide the specific detention time for the system; however, to achieve this, a bund has been proposed on the northern side of the asset to hold and treat flows within the asset. It must be noted that a second forebay will distribute the flows leaving the ephemeral wetland to the bushland. The location of both the bunding and forebay is adequate for conceptual design, however, will need to be refined for detailed design.

This has conceptually been designed to perform similarly to a detention basin whereby runoff will be temporarily stored within the asset until it evaporates. This asset will specifically experience ponding when rainfall events occur and will typically dry out in summer between rain events. As a result, the vegetation specified in the submitted landscaping plan will require further refinement upon detailed design to ensure its health is maintained during both periods.

A conservative approach for ponding has been adopted to reflect the dry season in the modelling, although this could alternatively have been modelled for the rain events which would ultimately see a greater performance. There has been no low flow bypass specified as this will be determined in detailed design while the high flow bypass was calculated using the 63.2 AEP event (1-year ARI) flow for the developed site. A nominal outlet size has been specified but will require sizing in detailed design. The modelled specifications for the ephemeral wetland are shown in Figure 4-6.

Location		Ephemeral Wetland
<b>Inlet Properties</b>		
Low Flow By-pass (cubic metres per sec)		0.00000
High Flow By-pass (cubic metres per sec)		0.40000
Inlet Pond Volume (cubic metres)		0.0
Estimate Inlet Volume		
<b>Storage Properties</b>		
Surface Area (square metres)		420.0
Extended Detention Depth (metres)		0.35
Permanent Pool Volume (cubic metres)		0.0
Initial Volume (cubic metres)		0.00
Vegetation Cover (% of surface area)		50.0
Exfiltration Rate (mm/hr)		0.00
Evaporative Loss as % of PET		125.00
<b>Outlet Properties</b>		
Equivalent Pipe Diameter (mm)		22
Overflow Weir Width (metres)		15.0
Notional Detention Time (hrs)		61.2
<input type="checkbox"/> Use Custom Outflow and Storage Relationship		
Define Custom Outflow and Storage		Not Defined
Re-use...    Fluxes...    Notes...    More		
<input type="button" value="Cancel"/> <input type="button" value="Back"/> <input type="button" value="Finish"/>		





Figure 4-6 Ephemeral Wetland Parameters

4.3.3 **MUSIC Modelling Results**

The results of the MUSIC modelling are shown in Table 3-4. Results indicate that with the implementation of the proposed treatment measure that Gross Pollutants (GP), Total Suspended Solids (TSS) and Total Phosphorous (TP) water quality objectives for the site are met. However, as expected, the water quality objectives for Total Nitrogen (TN) are not met and is approximately 15% below the target. To meet TN targets, there would need to be consideration of alternative treatment measures that are not preferred by Council or Norvel Estate Pty Ltd.

	Sources	Residual Load	% Reduction
<b>Flow (ML/yr)</b>	48	44.8	6.7
<b>Total Suspended Solids (kg/yr)</b>	9010	1280	85.7
<b>Total Phosphorus (kg/yr)</b>	19	7.07	62.7
<b>Total Nitrogen (kg/yr)</b>	135	94.4	30.3
<b>Gross Pollutants (kg/yr)</b>	1800	6.12	99.7

Table 4-4 Water Quality Modelling Results



## 5 Summary

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Cardno has prepared this Stormwater Management Plan for Norvel Estate Pty Ltd for the proposed residential development of the site in Norvel Road, Ferntree Gully.

The current masterplan for the site intends to retain the 1.7ha protected bushland to the north of the site (adjacent to Blind Creek) while identifying a residential development for the remaining 7.5ha. The protected bushland has been identified as environmentally and socially valuable.

A flooding assessment for the proposed development was undertaken by Cardno through multiple impact and mitigation assessments. These assessments were undertaken to address flooding concerns by Knox City Council. A final flood mitigation assessment was approved by Council which included significant detail of proposed flood mitigation controls. Council were satisfied that all flooding related concerns could be addressed via conditions in the permit with the intention that mitigation measures were subject to detailed design.

Previous Stormwater Management Plans were submitted to Council, although these were not approved due to Council's concerns related to maintenance and/or not meeting target requirements. Given the extended timeframe over which these submissions occurred, Cardno had two meetings with Council (18<sup>th</sup> of November 2020 and 3<sup>rd</sup> of December 2020). These meetings clearly identified Council's requirements and water quality treatment objectives for the site.

Following the meetings with Council, and the received comments from Council, Cardno established a revised concept design for achieving the newly specified outcomes. The concept design was firstly assessed for feasibility and practicality across several aspects and ultimately determined that the most appropriate for the site through a proposed treatment measure that included:

- > Three Gross Pollutant Traps (GPTs)
- > A raingarden
- > An ephemeral wetland

The aim of this concept design was to achieve the water quality objectives set out by best practice, while considering site constraints and Council's preferences. The intention is that the entire system has low maintenance requirements and behaves such that it will act as a dry system in summer between rain events, while during rain events and in the wetter months, it will treat runoff from the development. It must be noted that in this concept design, consideration towards maintaining the dispersed flows entering the bushland pre-development will also occur post development.

In order to assess the effectiveness of the proposed treatment measures, stormwater quality modelling was performed using the Model for Urban Stormwater Improvement Conceptualisation (MUSIC) Version 6.3.0. Modelling was undertaken in accordance with the 2018 Melbourne Water MUSIC Modelling Guidelines and physical parameters (ie. treatment measure dimensions) in the model were consistent with the concept design.

Results from the modelling indicate that the proposed treatment measures will meet Gross Pollutants (GP), Total Suspended Solids (TSS) and Total Phosphorous (TP) water quality objectives, although as expected, will not meet the water quality objectives set out for Total Nitrogen (TN).

APPENDIX

A

FLOOD IMPACT AND MITIGATION ASSESSMENTS





# Technical Memorandum

<b>Title</b>	Norvel Road Estate High Level Flood Impact Assessment		
<b>Client</b>	Norvel Estate Pty Ltd.	<b>Project No</b>	V161919
<b>Date</b>	22/07/2020	<b>Status</b>	Draft
<b>Author</b>	Dillon Van Heer	<b>Discipline</b>	Water
<b>Reviewer</b>	Rob Swan	<b>Office</b>	Melbourne

## 1.1 Background

Cardno has been engaged to undertake a high-level flood impact assessment of Norvel Road Estate, a proposed residential development that is adjacent to Blind Creek, Ferntree Gully.

The aim of the assessment is to determine if the proposed development increases flooding in the 1% AEP event at the following locations:

- > Downstream of the site (bushland to the north)
- > Blind Creek
- > Surrounding properties

## 1.2 Modelling Approach

Cardno has been provided with an approved council TUFLOW model for the site. This model extends approximately 1.5 km upstream of the site and 2 km downstream of the site. It has been most recently updated by Engeny with Water Technology originally developing the model.

It must be noted, that this model did not run when provided to Cardno by Engeny, and was not supplied with a hydrological model or corresponding report. Therefore, changes were made to the model to ensure it was operational and fit-for-purpose. These changes therefore make this model only applicable to this project.

Our assessment identified that several changes to the model were required to appropriately model the existing conditions at the Norvel site. These were undertaken to ensure the modelling was reflective of existing conditions and included:

- > Updating the site topography with the latest LiDAR available (2017)
- > Adjustment of Rainfall factors to match those of similar open spaces (the council modelling assumes the site is fully developed)
- > Manning's Roughness (n) to match 2020 aerial imagery

To represent developed conditions, Cardno made two major changes to the new existing model which included:

- > Applying the original rainfall factors provided with the original model
- > Modifying the Mannings 'n' value to be representative of faster flow down roads, outside of the proposed reserve areas.

The proposed development is in the planning stages and does not yet have a design surface. The modifications to the roughness values and fraction imperviousness are intended to be representative of the sites developed conditions for assessment purposes. These results are indicative only and are appropriate for a high-level assessment.



### 1.3 Results

The models were run for both the existing and developed conditions and the water surface elevations compared. The difference plot for the 1% AEP event is shown below in Figure 1-1.



Figure 1-1 1% AEP Difference Plot for Existing (E03) and Developed (D03) Conditions

From these results, it can be determined that:

- > There is an increase in flood waters downstream of the site (bushland to the north), attributable to the increased flows from the development
- > There is no change in flood level in Blind Creek
- > There is an increase in flood waters on two surrounding properties in the north west corner. This appears to be caused by two main factors:
  - The model topography has these two houses included as slight depressions
  - Some of the additional flows generated on the development site flow towards these properties

There is some additional flow direct towards Blind Creek as a result of the development, however, flood impacts associated with this extra flow are negligible once the effect of the larger Blind Creek catchment is considered. Cardno notes that these flows are also concentrated along the existing valley line, as the underlying model topography is not changed in the model. Cardno also understands that the proposed development (latest site plans) will be distributed outflows along the bushland sections, to ensure more even flooding of the remnant billabong and limit the erosion potential.

The impacts indicated on the two surrounding properties in the north west corner is due to flood waters backing up along the swale and entering these properties from a low point. Cardo has identified that there is likely to be a culvert at the end of this swale, however, this is missing in the provided TUFLOW model.

The impacts are likely related to some of the assumptions made in the model, however there are some simple mitigation options available to reduce and remove any impact. These include the implementation of



some minor earthworks and a culvert, as well as raising the proposed footpath along the western boundary to contain site flows.

Minor earthworks will be required to create a new swale at the point at which the current swale turns towards the site and allow flood waters to travel directly north towards Blind Creek with the new culvert under the existing footpath. An increase in 300 mm above current surface levels along the proposed footpath (seen in the latest site plans) to act as a levee will likely redirect these flows and ensure that flood waters generated from the site will not impact the properties.

An indicative mark-up of this potential mitigation option is shown in Figure 1-2.

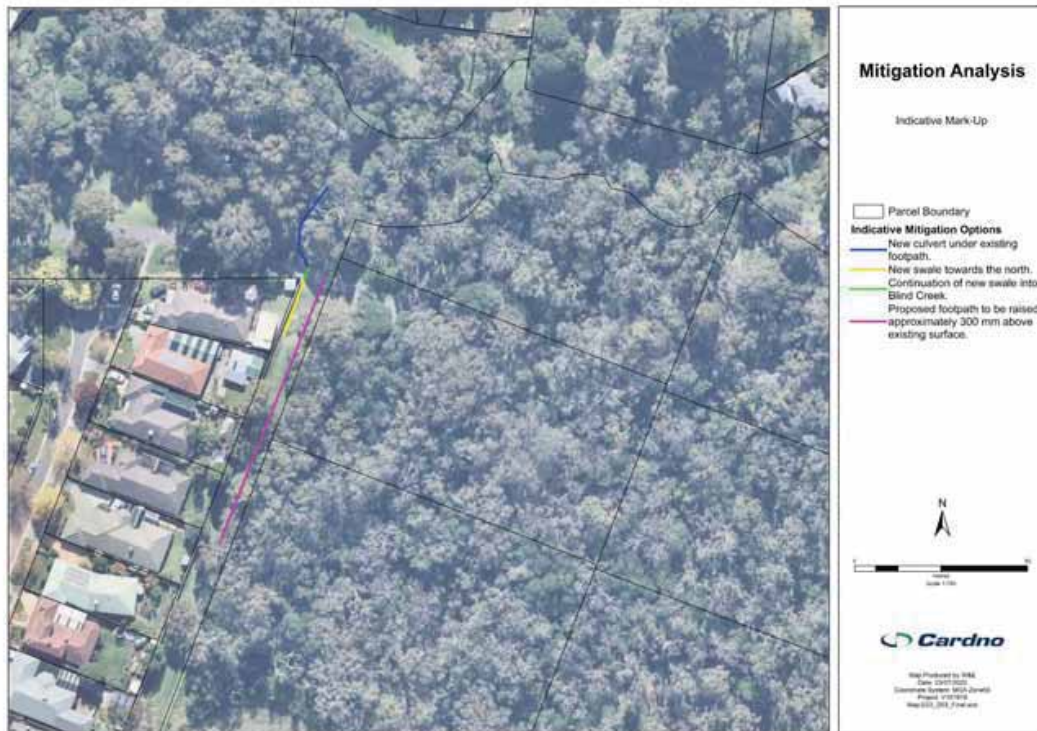


Figure 1-2 Proposed Mitigation Options and Indicative Locations

Cardno has also undertaken an assessment of the potential change in the maximum hazard classification of the flooding along the Blind Creek Trail. The hazard classification was assessed against Melbourne Water’s latest Technical Specifications for Flood Mapping. The results of the assessment indicate that for existing and developed conditions, there is no change and the maximum hazard classification along the Trail remains within Category 1.

This assessment was completed at a high level and will need to be re-assessed when modelling the design surface and potential mitigation option previously mentioned. The existing conditions (E03) maximum hazard plot is shown in Figure 1-3, while the developed conditions (D03) maximum hazard plot is shown in Figure 1-4.

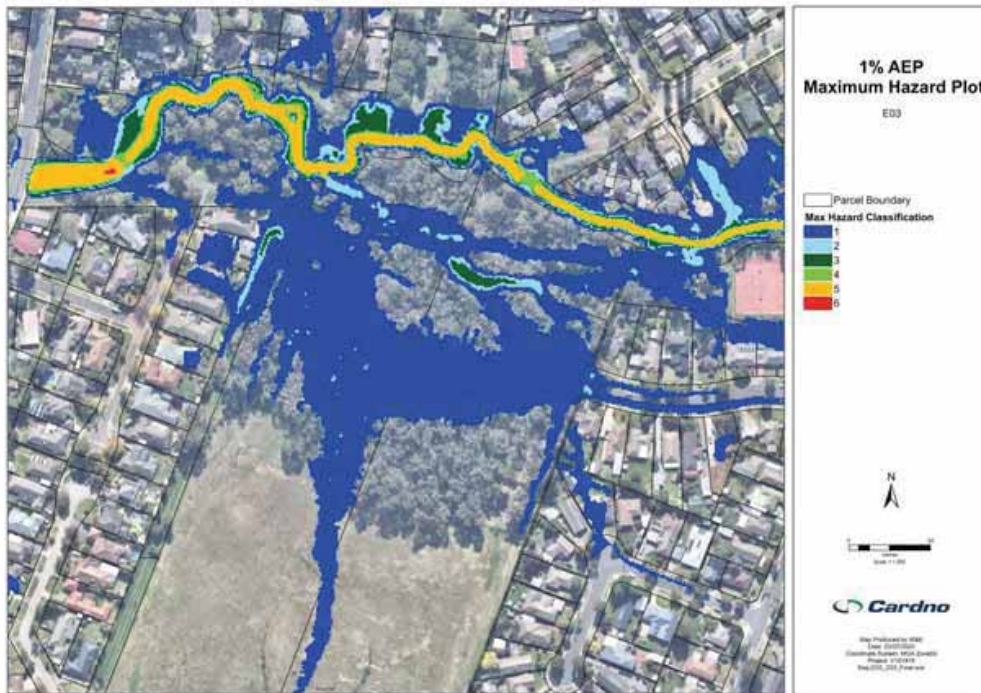


Figure 1-3 Existing Conditions 1% AEP Maximum Hazard Plot

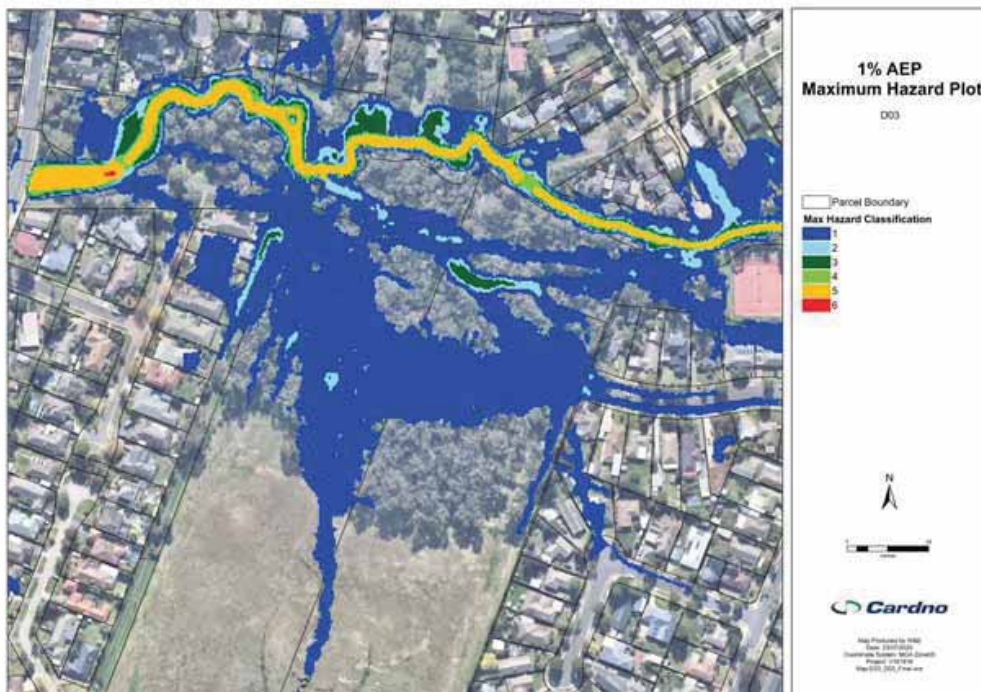


Figure 1-4 Developed Conditions 1% AEP Maximum Hazard Plot



#### **1.4 Conclusions and Recommendations**

The flood modelling results show that there are some impacts downstream of the site and on two surrounding properties in the north west corner but no impacts on Blind Creek.

All flooding impacts are indicative only as no design surface for the development has been modelled, and modelling of a design surface will confirm that flows will be dispersed rather than concentrated.

The offsite flood impacts are minor in nature and are likely to be easily mitigated through some minor surface and drainage modifications. Flows discharged through the formal drainage network of the proposed site will not have any impact on flood levels associated with Blind Creek. Cardno notes that the existing Council model has assumed that the site is fully developed.

A high-level assessment has indicated that the maximum hazard classification along Blind Creek Trail remains within Category 1 for existing and developed conditions.





# Technical Memorandum

<b>Title</b>	Norvel Road Estate Flood Mitigation Assessment		
<b>Client</b>	Norvel Estate Pty Ltd.	<b>Project No</b>	V161919
<b>Date</b>	03/09/2020	<b>Status</b>	Draft
<b>Author</b>	Dillon Van Heer	<b>Discipline</b>	Water
<b>Reviewer</b>	Rob Swan	<b>Office</b>	Melbourne

## 1.1 Background

Cardno has been engaged to undertake a flood mitigation assessment for Norvel Road Estate, a proposed residential development that is adjacent to Blind Creek, Ferntree Gully.

Potential mitigation options were identified as part of the previous Flood Impact Assessment (reference V161919\_M001\_Flood\_Impact\_Assessment.pdf) completed by Cardno and has been provided in Appendix A.

The aim of this assessment is to determine if the potential mitigation options address the potential flood impacts of the 1% AEP storm event observed in the previous modelling at the following locations:

- > Surrounding properties
- > Existing footpath (Blind Creek Trail)
- > Bushland between properties and Blind Creek

The proposed mitigation options from the previous Tech Memo is shown below in Figure 1-1 .

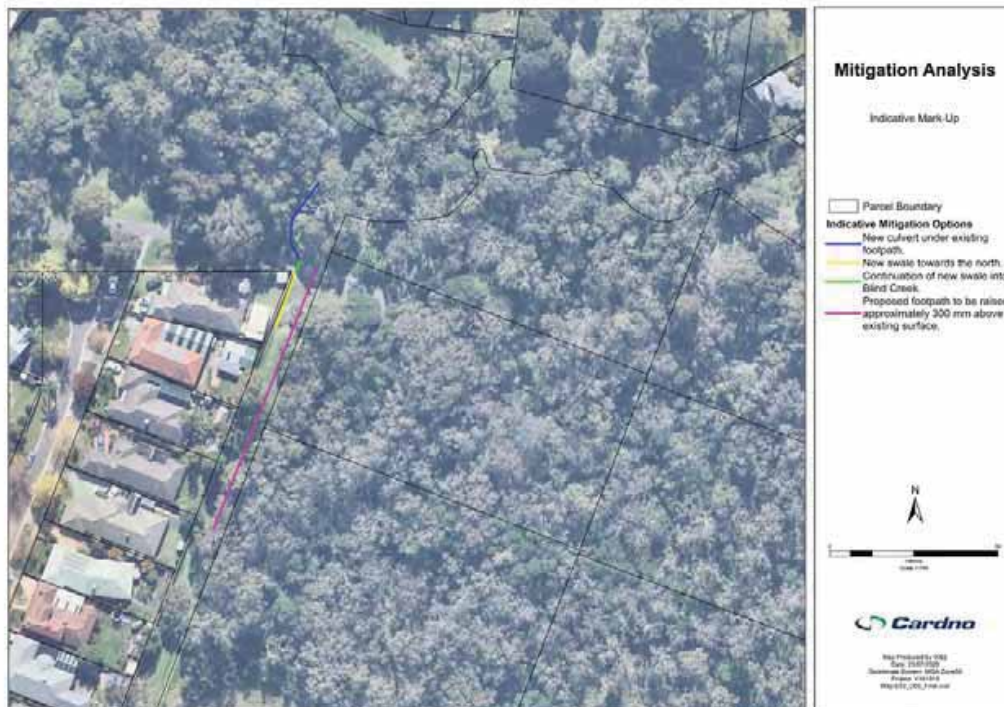


Figure 1-1 Proposed Mitigation Options and Indicative Locations



## 1.2 Modelling Approach

The flood model developed as part of the previous analysis was adopted as the base case conditions for this assessment. This model was then adapted to include the proposed mitigation options to create a mitigation conditions model.

The most recent site plan as shown in Figure 1-2 below was provided to Cardno and was used to implement the mitigation options into the model at the most appropriate locations.

The specific model parameters for each of the mitigation options implemented are further detailed below:

- > Proposed Raised Bicycle Path
  - o Raised by more than 300m to ensure it effectively mitigates flood waters from entering the surrounding properties
  - o Alignment slightly altered from proposed site layout to allow for a swale along the back of the property boundary to the extent of the raised section of the proposed bicycle path
- > Proposed Swale along the Property Boundary
  - o Lowered and graded from the start of the raised section of the proposed bicycle path to the existing walking track, where the elevation ties in to the existing levels
- > Proposed Culvert under Existing Foot Path
  - o A 300 mm x 600 mm box culvert with 300 m cover to the surface
  - o Invert levels for upstream and downstream set at the proposed swale levels giving the culvert an approximate slope of 1 in 40
- > Proposed Swale Downstream of the Proposed Culvert
  - o Lowered and graded from the outlet of the proposed box culvert into Blind Creek
  - o Alignment has been chosen to avoid a low point in the LiDAR so that an existing flow path does not worsen

The four specific model parameters mentioned above were the only changes made to the previously submitted development conditions (D03) model.

It should be noted that the modelling of these mitigation options is conceptual only to provide a proof of concept on the ability of these mitigation options to reduce the flood impacts. Detailed design and modelling will be required in order to confirm the design intent.



Figure 1-2 Latest Site Plan (reference TP\_MASTER PLAN\_LOT DIVISION-LOT SUBDIV 1.1000.pdf)





As mentioned in the previous Technical Memorandum provided by Cardno, there is some additional flow directed towards Blind Creek as a result of the development. However, the flood impacts associated with this extra flow are negligible once the effect of the larger Blind Creek catchment is considered.

Similarly, Cardno notes that these flows are also concentrated along the existing valley line, as the underlying model topography is not changed in the comparison of the existing and mitigation conditions. Cardno also understands that the proposed development (latest site plans) will distribute outflows along the bushland sections, to ensure more even flooding of the remnant billabong and limit the erosion potential.

Cardo again can identify that there is likely to be a culvert at the end of the existing swale along the property boundary, however, this is missing in the provided hydraulic model. This may also provide additional mitigation.

**1.3.2 Flood Hazard**

Cardno has assessed the potential change in the maximum hazard classification of the flooding along the Blind Creek Trail for the mitigation results. Again, the hazard classification was assessed against Melbourne Water’s latest Technical Specifications for Flood Mapping.

The results of the assessment indicate that for the mitigation conditions, there is no change to the flood hazard, with the maximum hazard classification along the Trail remaining within Category 1. Cardno notes that there is an increase in hazard along the eastern side of the bicycle footpath as a result of the proposed swale. It is recommended that appropriate safety considerations are therefore incorporated into the design as required. The existing conditions (E03) maximum hazard plot is shown in Figure 1-4 while the mitigation conditions (M01) maximum hazard plot is shown in Figure 1-5.

It must be noted that this assessment was completed at a high level and will need to be re-assessed once the design surface of the development has been finalised along with detailed designs of the mitigation options.

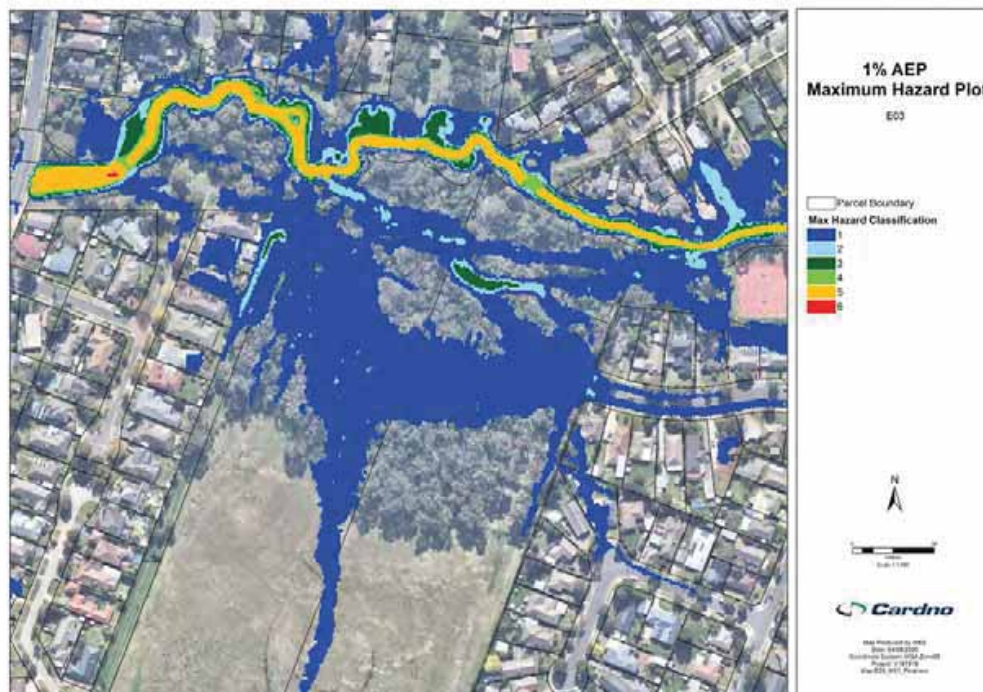


Figure 1-4 Existing Conditions 1% AEP Maximum Hazard Plot

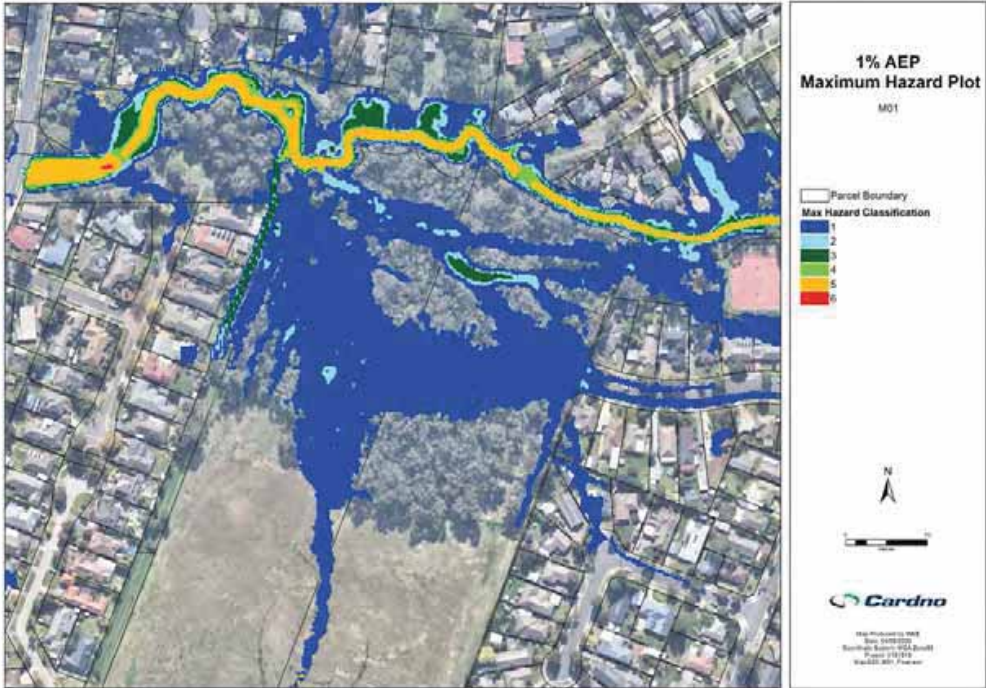


Figure 1-5 Mitigation Conditions 1% AEP Maximum Hazard Plot



#### **1.4 Conclusions and Recommendations**

Flood modelling results show that there is a reduction in flooding to the adjacent properties as a result of the implementation of the proposed flood mitigation options. The results also show that there are some small flood impacts in the downstream areas of the site, however, there are no impacts within Blind Creek itself.

Results also show some impacts on surrounding properties at the upstream end of the proposed swale. As a result of this, Cardno recommends that the final design must include a swale along the entire western boundary between the bicycle footpath and properties.

All flood impacts are indicative only as no design surface for the development has been modelled and the mitigation options modelled are conceptual only. Modelling of a design surface will confirm that flows will be dispersed rather than concentrated while modelling of the designed mitigation options will confirm that there is no impact on the adjacent properties.

It is recommended that modelling of the design surface, detailed mitigation option designs and the proposed billabong be undertaken in order to confirm that there is no adverse flood impacts to the surrounding properties as a result of the development.



# Technical Memorandum

<b>Title</b>	Norvel Road Estate Updated Flood Mitigation Assessment		
<b>Client</b>	Norvel Estate Pty Ltd.	<b>Project No</b>	V161919
<b>Date</b>	05/11/2020	<b>Status</b>	Draft
<b>Author</b>	Dillon Van Heer	<b>Discipline</b>	Water
<b>Reviewer</b>	Rob Swan	<b>Office</b>	Melbourne

## 1.1 Background

Cardno has been engaged to update a flood mitigation assessment for Norvel Road Estate, a proposed residential development that is adjacent to Blind Creek, Ferntree Gully.

Potential mitigation options were identified as part of the Flood Impact Assessment (reference V161919\_M001\_Flood\_Impact\_Assessment.pdf) and modelled indicatively as part of the previous Flood Mitigation Assessment (reference V161919\_M002\_Flood\_Mitigation\_Assessment.pdf).

The previous Flood Mitigation Assessment was submitted to council for approval, however, the Council provided the following feedback:

- > "The proposal to include a swale downstream of the footpath is a concern as the no details of the size of the swale and the impact on existing trees. This point requires detail that can be worked through post-permit. Council disagrees."
- > "The predicted impacts within the lots on Jacobus Walk identified mapped as >0.5m are not considered acceptable. The comment that the swale can be extended up to these properties to mitigate these impacts is questions due to existing trees and the lack of details of the swale dimensions. Cardno are confident that they can mitigate this issue and will deal with it via condition. Council disagrees."
- > "The hazard mapping will also be impeded by the lack of using the ultimate land shape. The identification of high hazard along the western edge within the swale is potentially a concern due to limited space within this corridor to add in safety considerations between the trees, swale and path. Cardno have advised that the land shape will have a significant impact on the modelling and will not fundamentally change the outcomes. Whilst this modelling can be done, it is submitted that this is significant detail that could be dealt with post-permit, via a condition. Council disagrees."

To address these comments, Cardno have undertaken further modelling of the mitigation options in greater detail and updated the flood mitigation assessment based on these new modelling outcomes.

## 1.2 Modelling Approach

The previous mitigation model (M01) was modelled to demonstrate that the mitigation options proposed would be likely to meet Councils requirements. Typically, the proposed stormwater management regime will be subject to detailed design whereby further assessment would occur to ensure that the detailed design is appropriate.

Council have requested some additional clarity on the performance of the proposed options, which requires some additional concept design to be incorporated into the model. The previous mitigation option has been further refined with additional site design components and amendments based on Council's feedback made the following changes to represent an updated mitigation model (M03):

1. The swale downstream of the footpath was removed completely from the model. This means everything downstream of the proposed mitigation pipe is the exact same as the existing model (E03) with changes only located within the site and reserve along the rear of the properties on the western boundary.
2. The swale located along the rear of properties on the western side of the site (reserve corridor) was redefined and resized (shortened) to ensure that no flood waters were accumulating the rear of properties in localised low points.





3. The raised bicycle footpath adjacent to the swale was redefined and resized (shortened) to ensure that flooding waters from the reserve were contained within the bushland reserve.
4. A section of the proposed site roads was implemented to ensure that flows from the south western edge reflected the developed site conditions such that flows will remain within the site.
5. A small bund located between the existing large bund on the site and the section of proposed site roads was implemented to ensure that runoff from the site does not contribute any flows to the swale along the rear of the properties.

The M03 model updates are shown below in Figure 1-1.



Figure 1-1 Updated Mitigation Model (M03)



## 1.3 Results

### 1.3.1 Flood Impacts

The flood model was run for both the existing (E03) and updated mitigation conditions (M03). A water surface elevation difference plot for the 1% AEP event is shown below in Figure 1-2 and provides an indication of the impacts of the proposed conditions after mitigation.

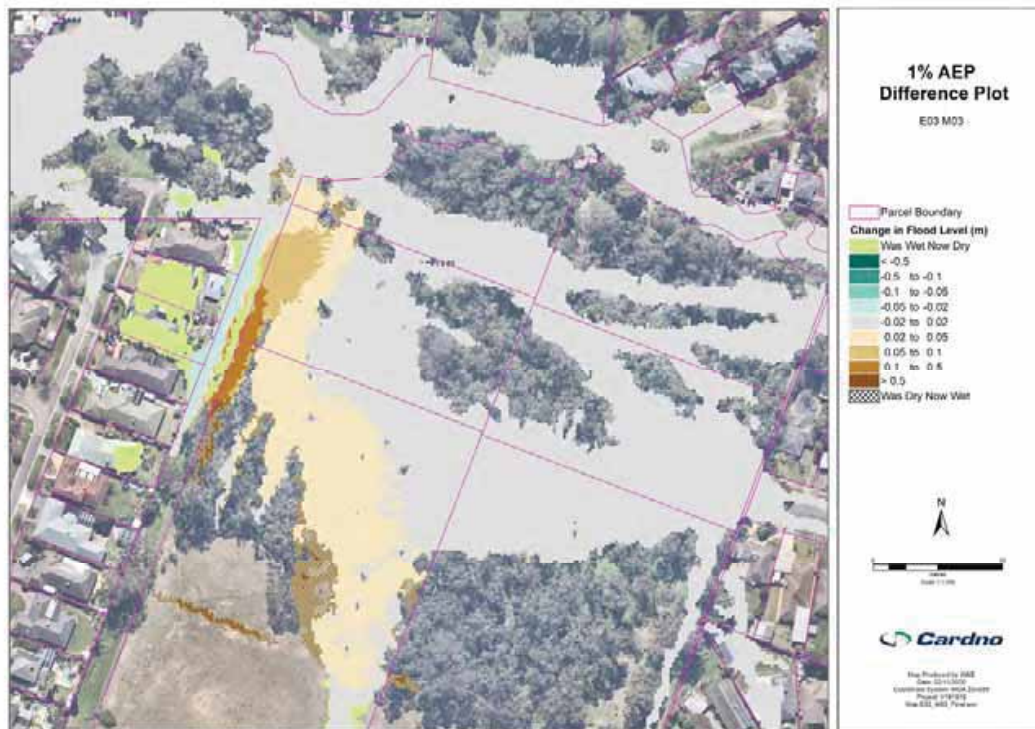


Figure 1-2 1% AEP Difference Plot for Existing (E03) and Mitigation (M01) Conditions

From these results, it can be determined that:

- > There are no adverse impacts on or within the lots on Jacobus Walk
- > There is a very minor increase in flood depths of no greater than 5cm on the existing footpath
- > There is a minor increase in flood waters of no greater than 10cm within the bushland downstream of the existing footpath
- > There is an increase in flood depths of greater than 5cm within the reserve corridor, the bushland to the north of the site and on site
- > There is no change in flood levels observed in Blind Creek as a result of the updated proposed mitigation options

The modelling undertaken and the results shown above again confirms that the modelled mitigation options are appropriate to alleviate the flood impacts as a result of the development. The removal of the downstream swale for the updated model demonstrates that no design or works is required downstream of the existing footpath. The refinement and resizing of the swale and bicycle path show that these two mitigation options are appropriate and will be designed accordingly when detailed design is required. The inclusion of a section of the site road and small bund indicate that the site detailed design will contribute to alleviating flood waters on the surrounding properties.



While there are increases in flood depths on the site and in the bushland north of the site (north west corner), it is likely that the site roads and drainage, along with the newly proposed rainwater garden will ensure that the flood waters are adequately contained within the site.

The increases in flood depths observed in the reserve corridor and over the existing footpath have been assessed according to the hazard classification as detailed in the section that follows.

**1.3.2 Flood Hazard**

Cardno has undertaken an assessment of maximum hazard classifications for the development. The existing conditions (E03) maximum hazard plot is shown in Figure 1-3 while the updated mitigation conditions (M03) maximum hazard plot is shown in Figure 1-4.

Specifically, these results demonstrate that the even though there is an increase in flood depth along the existing path, the maximum hazard classification along the entirety of the existing footpath remains a Category 1. This confirms that there is no additional risk to the community as a result of the development at this location.

Similarly, these results also show that even though there is an increase in flood depth within the reserve corridor, there is no increase to the maximum hazard classification and it remains a Category 3. The Category 3 observed in the existing conditions is approximately 20m in length while the mitigation conditions show this to be 30m. This can be considered to be low risk to the community given the fact that this is already a Category 3 and an extension in length of Category 3 will not impact on the community. The proposed bicycle path is flood free. The swale, which is not intended to be accessed by pedestrians or cyclists in the 1% AEP event, remains at hazard class 3, consistent with the existing conditions.

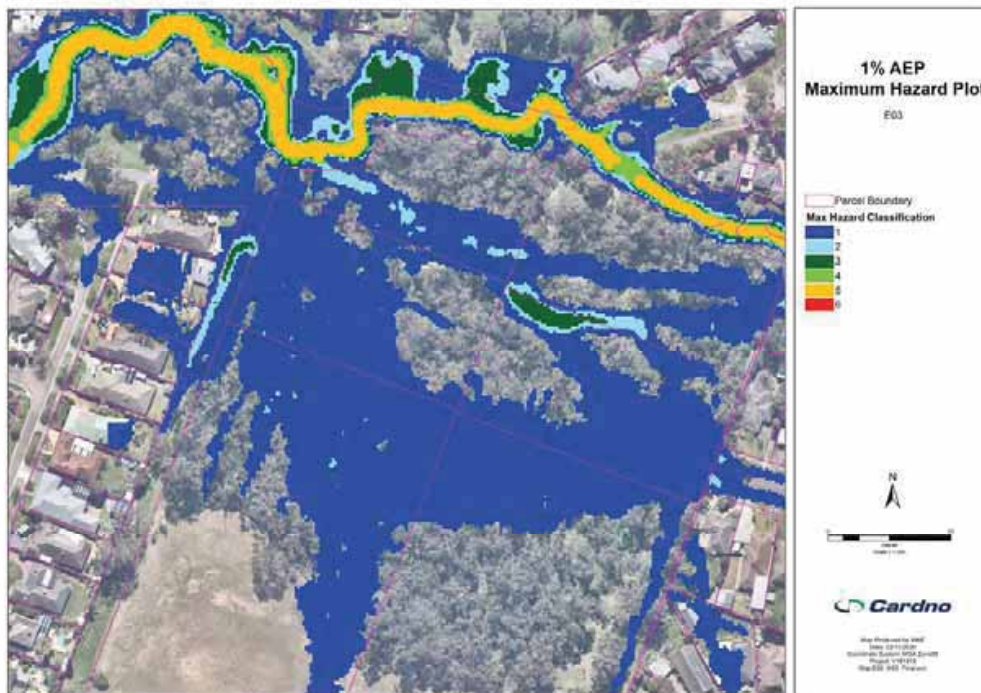


Figure 1-3 Existing Conditions 1% AEP Maximum Hazard Plot

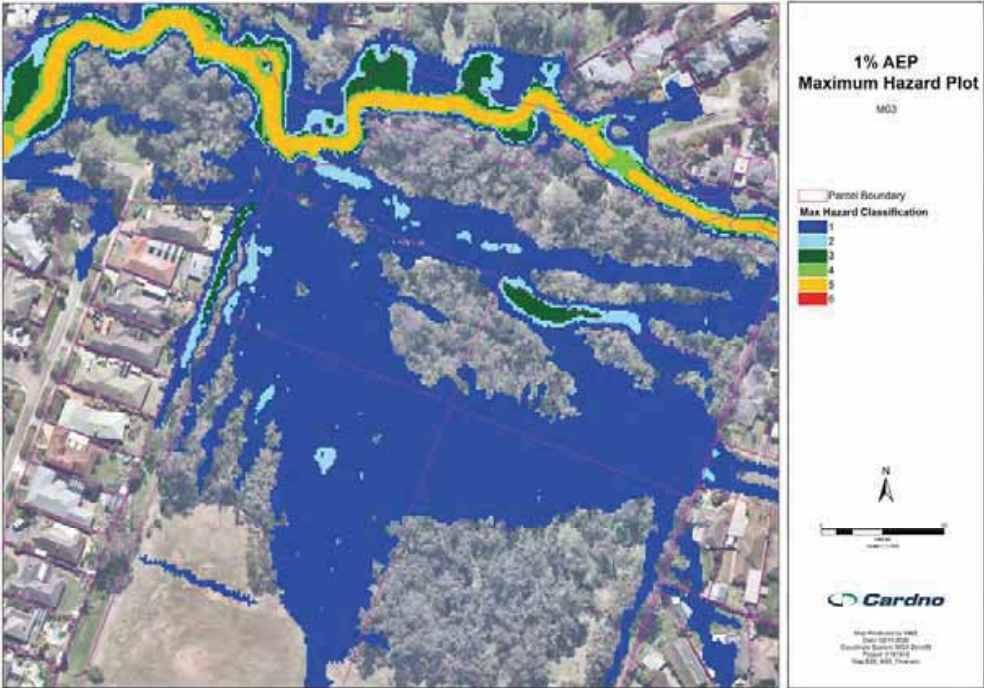


Figure 1-4 Mitigation Conditions 1% AEP Maximum Hazard Plot



#### 1.4 Conclusions and Recommendations

The current modelling includes consideration of design elements that will be included in the future works at the site. These features serve to limit the flood waters that cross the western site boundary. The lengths of the raised bike path is reduced and the existing swale is slightly realigned to facilitate the connection of the bike path to the existing footpath at the northern boundary of the development site. Relevant sections of road have been included in the model to reflect the intended grading of overland flows along the western boundary of the site.

The results indicate that:

- There is a decrease in flooding on all neighbouring residential properties as a result of the development
- The flood hazard is unchanged along the existing footpath at the northern boundary of the site.
- The proposed bike path is flood free.
- Flood hazard class 3 is shown in the modified swale – this is identical to the existing flood hazard in the swale.
- There are small increases in flood depth through the existing nature reserve.

With regard to Council's Comments:

- > A swale downstream of the existing footpath is no longer required – drainage outfall is provided for the properties in Jacobus Walk that drain to the swale along the existing reserve via a pipe under the footpath and a bubble-up pit. In all likelihood, as part of the detailed design, this swale would be connected to the Melbourne Water Main drain.
- > There are no impacts on neighbouring properties due to the modifications to the design of the bike path and the changes made on the site to reflect the development conditions. There are no increases in flood depth on properties in Jacobus Walk, in fact, flood levels are reduced on all impacted properties.
- > The proposed swale realignment along the rear of properties on Jacobus Walk is intended as a minor upgrade to the existing swale, consisting of an increase in depth of approximately 100-200mm. The alignment of the swale will typically follow the existing alignment, except where it interferes with the proposed bike path at the northern intersection with the existing footpath. The flood reduction along Jacobus Walk is mostly caused by limiting flows from the development site from entering and flowing down the reserve. As such the upgrades to the swale may not be required. The hazard class in the swale is 3, consistent with the existing swale.

It is considered that this modelling should provide Council with enough certainty that the flood related issues can be adequately dealt with via conditions on the permit.

APPENDIX

B

CONCEPTUAL STORMWATER ASSET  
PLANS



# NORVEL ESTATE CONCEPT STORMWATER DESIGN

## NORVEL RD, FERNTREE GULLY, VIC, 3156

FOR  
NORVEL ESTATE PTY LTD.



LOCALITY PLAN  
NOT TO SCALE

SCHEDULE OF DRAWINGS	
DRAWING No.	DESCRIPTION
SKETCHES	
V161919-WE-SK001	COVER PAGE, LOCALITY PLAN & SCHEDULE OF DRAWINGS
V161919-WE-SK005	DETAILED LAYOUT PLAN
V161919-WE-SK010	SWALE LONG SECTIONS, CROSS SECTIONS & BASIN SECTIONS
V161919-WE-SK020	TYPICAL DETAILS

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		<table border="1"> <tr> <td>MELWAYS REF</td> <td>Date</td> <td>Scale</td> <td>Size</td> </tr> <tr> <td>54142</td> <td>17/12/20</td> <td>NTS</td> <td>A1</td> </tr> <tr> <td>Drawing Number</td> <td colspan="2">Revision</td> <td></td> </tr> <tr> <td>V161919-WE-SK001</td> <td>226</td> <td>1</td> <td></td> </tr> </table>	MELWAYS REF	Date	Scale	Size	54142	17/12/20	NTS	A1	Drawing Number	Revision			V161919-WE-SK001	226	1
MELWAYS REF	Date	Scale	Size														
54142	17/12/20	NTS	A1														
Drawing Number	Revision																
V161919-WE-SK001	226	1															

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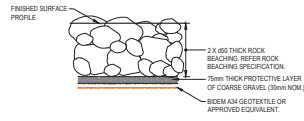






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**ROCK BEACHING TYPICAL SECTION**  
NOT TO SCALE

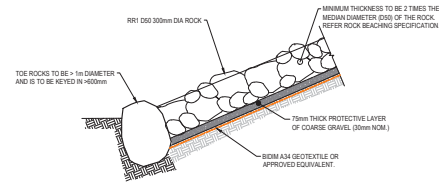
ROCK BEACHING SPECIFICATION		
TYPE	D50	THICKNESS OF ROCK BEACHING (2 X D50)
RR1	300mm	600mm

**ROCK BEACHING NOTES**

- ROCK USED SHALL COMPLY WITH THESE NOTES AND THE DRAWINGS. THE REQUIREMENT APPLIES TO BOTH IMPORTED ROCK AND IN-SITU ROCK WHICH IS BELIEVED.
- INDIVIDUAL ROCKS SHALL BE FREE FROM CRACKS, CLEAVAGE PLANES, SEAMS AND DEFECTS WHICH WOULD RESULT IN THE BREAKDOWN OF THE ROCK IN A WATER ENVIRONMENT.
- ROCK BEACHING SHALL CONFORM TO THE FOLLOWING CRITERIA:
- ROCKS SHALL BE ROUGH AND ANGULAR.
- ROCKS SHALL BE WEDGED AND LOCKED TOGETHER SUCH THAT THEY ARE NOT FREE TO MOVE.
- ROCK BEACHING SHALL NOT BE ROLLED OR DROPPED INTO POSITION, IT SHALL BE PLACED. THE METHOD OF ROCK PLACEMENT SHALL BE SUCH AS TO MINIMISE ITS BREAKDOWN ON HANDLING AND PRODUCTION OF FINES. MINIMISE THE SEGREGATION OF VARIOUS GRADES OF ROCK AND RESTRICT WATER CONTAMINATION.
- ROCKS TO BE HARD SOUND ROCK WITH SHARP EDGES. ROUNDED OR SUBSTANTIALLY WEATHERED ROCK IS NOT ACCEPTABLE.
- ROCK SIZES ARE BASED ON ROCK HAVING DENSITY OF 2.6 OR GREATER (2000kg/m<sup>3</sup>).
- THICKNESS OF ROCK ARMOUR BLANKET TO BE ON AVERAGE 2 x (MINIMUM WET STRENGTH OF ROCK ÷ 150pa).
- MINIMUM DRY STRENGTH OF ROCK > 28Mpa.
- NO ROCK SHOULD HAVE A LENGTH EXCEEDING 2.5 TIMES ITS BREADTH OR THICKNESS.
- ROCK SHOULD NOT BE SINGLE SIZED, BUT INSTEAD, SHOULD BE A WELL GRADED MATURE DESIGN TO ENSURE THAT ALL INTERSTICES BETWEEN LARGE ROCKS ARE FILLED WITH ROCKS OF PROGRESSIVELY SMALLER SIZE.

**GEOTEXTILE NOTES**

- SELECTION AND INSTALLATION OF GEOTEXTILE SHALL BE BDM AS AN APPROVED EQUIVALENT.
- GEOTEXTILE TO BE LAID ON A CONTINUOUS BED FREE OF VOIDS AND FREE OF SHARP OBJECTS TO PREVENT TEARING.
- GEOTEXTILE SHALL NOT BE PLACED IN STANDING WATER. DEWATERING SHALL BE CARRIED OUT PRIOR TO PLACEMENT OF ANY GEOTEXTILE.



**ROCK BEACHING WITH TOE ROCK ON EMBANKMENT TYPICAL DETAIL**  
NOT TO SCALE

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MELWAYS REF	Date	Scale	Size		
54142	17/12/20	AS SHOWN	A1		
Drawing Number	220	Revision			
V161919-WE-SK020		1			
Cardno Victoria Pty Ltd   ABN 47 106 610 913 Level 4, 501 Swanston Street Melbourne VIC 3000 Tel: 03 8415 7777 Fax: 03 8415 7788 Web: www.cardno.com.au					



December 2020

## Biodiversity Assessment, Norvel Road, Ferntree Gully



**Final Report**

**Prepared for:**

**Norvel Estate**

230

Biodiversity Assessment, Norvel Road, Ferntree Gully



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### Document Control

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### Cover Photograph

A photograph of the study area taken during the current assessment.

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Biodiversity Assessment, Norvel Road, Ferntree Gully



## Executive Summary

Ecolink Consulting Pty Ltd was engaged to undertake a Biodiversity Assessment at Lot 1 TP297137, Lot 1 PS523004, Lot 1 TP574584, Lot 1 TP83661 and Lot 1 TP 110814, on Norvel Road, Ferntree Gully (the study area). The purpose of the assessment was to assess and map the ecological values and constraints within the study area to support an application for a residential development.

The study area is located within the Gippsland Plain bioregion of Victoria and the Port Philip and Westernport Catchment Management Area. It is zoned Special Use Zone 2 within the Knox City Council municipality. The northern part of the study area is covered by an Environmental Significance Overlay – Schedule 2 (ESO2). This overlay aims to protect sites and vegetation of biological significance within the Knox City Council municipality from extinction, and to maintain and improve habitat corridors and connectivity.

The study area is located within a suburban setting, approximately 30 kms east of Melbourne. Vegetation surrounding the study area has been heavily modified, although a strip of riparian vegetation, associated with Blind Creek provides connectivity between the moderate quality vegetation within the north of the study area and other patches of vegetation within the municipality.

The study area was previously a clay quarry that has been filled and rehabilitated in the past eight years. The quarry occupied the southern two-thirds of the study area, but left the vegetation in the northern part of the study area relatively intact. This has resulted in the identification of three distinct remnant patches where native vegetation either persists or has regenerated. The remainder of the study area is dominated by exotic species, where Perennial Rye-grass *Lolium perenne* has been sown to stabilise the rehabilitation works.

Two remnant patches of native vegetation were identified within the study area. Habitat Scores indicate that the vegetation is of high quality in the north of the study area, with Habitat Scores ranging from 26 to 55 (out of 100). Other native vegetation, that is not classified as remnant, was recorded in the south of the study area. This area is likely to be regenerating from the seed bank that was dormant within the imported top soil used to rehabilitate the quarry and is exempt from offsets as it is less than ten years old. It is dominated by Hop Goodenia *Goodenia ovata*.

The northern portion of the study area supported relatively high quality remnant vegetation. The overstorey was dominated by Mealy Stringybark *Eucalyptus cephalocarpa* and Swamp Gum *Eucalyptus ovata*, with fewer occurrences of Messmate Stringybark *Eucalyptus obliqua*, Red Stringybark *Eucalyptus macrorhyncha*, Narrow-leaf Peppermint *Eucalyptus radiata*, as well as occasional occurrences of Green Scentbark *Eucalyptus fulgens* that is listed as state significant on the Advisory List.

The midstorey contained a dense shrub cover, generally dominated Sweet Bursaria *Bursaria spinosa* subsp. *spinosa*, Prickly Tea-tree *Leptospermum continentale*, Swamp Paperbark *Melaleuca ericifolia*, Prickly Currant-bush *Coprosma quadrifida*, Shiny Cassinia *Cassinia longifolia* and Prickly Moses *Acacia verticillata*. The understorey was also dominated by a diversity of native species, with the most dominant and widespread species including Kangaroo Grass *Themeda triandra*, Weeping Grass *Microlaena stipoides* var. *stipoides*, Wallaby-grasses *Rytidosperma* spp., Forest Wire-grass *Tetrarrhena juncea*, Bracken *Pteridium esculentum*, and Thatch Saw-sedge *Gahnia radula*, as well as

Biodiversity Assessment, Norvel Road, Ferntree Gully



herbs including Bidgee Widgee *Acaena novae-zelandiae*. Weeds were dominant in some locations including a substantial area with a moderate cover abundance (30-40%) of *Kikuyu Cenchrus clandestinus* and an area within a moderate cover of Panic Veldt-grass *Ehrharta erecta var. erecta*.

Only a relatively small proportion of RP1 and RP2, within the study area, will require vegetation removal for the proposed development. Three scattered indigenous trees were also recorded in an area that may support a trail to connect the development to Blind Creek and a sewer, but these trees are unlikely to require removal through sensitive design of these elements.

The project has avoided the removal of native vegetation wherever practicable and will minimise impacts to biodiversity values. Despite this, where removal of native vegetation is proposed biodiversity offsets will be required. The offset required is 0.126 General Habitat Units with a minimum Strategic Biodiversity Score of 0.202 located within the Port Phillip and Westernport Catchment Management Authority area, or Knox City Council municipality, as well as two large trees.

Ten fauna species were recorded within the study area, comprising a range of common native and introduced birds and reptile species. All of these species are common to the local area.

Although 18 threatened flora and fauna species have been previously recorded within three kilometres of the study area within the last thirty years, only one was recorded during the current assessment. Green Scentbark *Eucalyptus fulgens* was recorded within the study area. This species is listed as 'Rare' on the Advisory List of Rare and Threatened Plants in Victoria. Rosemary Grevillea *Grevillea rosmarinifolia* has also been recorded within the study area previously, but not during the current assessment. There is the potential that this species remains within the study area, although none of these species will be impacted by the proposed development. There is only a low likelihood that the previously recorded Grey Goshawk *Accipiter novaehollandiae novaehollandiae* utilises the study area, and it is unlikely to provide important habitat for this species.

In this context, and based on the relevant legislation and policies, the following recommendations are made:

- Minimising the amount of native vegetation removal within the study area;
- Provide a biodiversity offset of 0.126 General Habitat Units with a minimum Strategic Biodiversity Score of 0.202 located within the Port Phillip and Westernport Catchment Management Authority area, or Knox City Council, and two large trees;
- Prepare a Land Management Plan that includes managing the ecological values of the study area;
- Prepare a Construction Environmental Management Plan that includes the following management actions prior, during and post construction:
  - Appropriately fence and manage retained native vegetation;
  - Soil containment, sediment and erosion measures;
  - Weed management prescriptions, targeting noxious weeds; and
- A wildlife handler should be present when felling any trees.

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## Introduction

Ecolink Consulting Pty Ltd was engaged by Norvel Estate Pty Ltd to undertake a Biodiversity Assessment for the proposed development for a residential development of a parcel of land in Norvel Road, Ferntree Gully. The study area comprises five lots: Lot 1 TP297137, Lot 1 PS523004, Lot 1 TP574584, Lot 1 TP83661 and Lot 1 TP 110814.

The purpose of the Biodiversity Assessment is to assess and map the ecological constraints within the study area (if any exist), in particular, the location, extent and quality of native vegetation to support an application to remove any native vegetation under Clause 52.17 of the Planning Scheme, as described in the *Guidelines for the removal, destruction or lopping of native vegetation* (Department of Environment Land Water and Planning 2017b). A previous assessment of the vegetation within the study area was undertaken in 2005 (Brown 2005), under the 'Net Gain' policy (Department of Natural Resources and Environment 2002), which has been superseded by the *Guidelines for the removal, destruction or lopping of native vegetation* policy.

Therefore, this Biodiversity Assessment will:

- Review previous ecological assessments of the study area;
- Determine the current ecological values of the study area;
- Evaluate any impacts that are likely to occur to any ecological values as a result of the potential loss of vegetation at the study area;
- Evaluate the extent and quality of native vegetation within the study area, required under the *Guidelines for the removal, destruction or lopping of native vegetation* (Department of Environment Land Water and Planning 2017b); and,
- Make recommendations to minimise or mitigate impacts to these ecological values, based on relevant legislation and policies.

## Methods

### Desktop Assessment

In order to determine the ecological values that have previously been recorded within the study area, and its vicinity, the following databases and literature were consulted:

- Planning Schemes Online (Department of Environment Land Water and Planning 2018c) to identify the planning zones and overlays relating to environmental matters e.g. Vegetation Protection Overlays, or Environmental Significance Overlays;
- The Biodiversity Interactive Map from the Department of Environment, Land, Water and Planning (DELWP) to identify historic and current Ecological Vegetation Classes (EVCs) (Department of Environment Land Water and Planning 2017a);



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- The Victorian Biodiversity Atlas (Department of Environment Land Water and Planning 2018d) for records of threatened<sup>1</sup> flora and fauna within three kilometres of the study area within the previous 30 years;
- The Native Vegetation Information Management System (NVIM) to determine biodiversity offsets for native vegetation removal (Department of Environment Land Water and Planning 2018b);
- The 'Weeds of National Significance' database (Department of the Environment and Energy 2018b);
- The Protected Matters Search Tool from the Department of the Environment and Energy (DoEE) (Department of the Environment and Energy 2018a) to identify Matters of National Environmental Significance that may occur within three kilometres of the study area; and,
- Relevant legislation and policies (as required).

In addition three reports previously prepared for the site were also reviewed:

- Brown L (2005). Habitat hectare assessment of Daniel Robertson's Quarry, Ferntree Gully, Victoria. Unpublished report by Biosis Research Pty Ltd for Daniel Robertson Australia Pty Ltd. (Brown L: Port Melbourne);
- Mueck S and Organ A (2001). Flora and Fauna Assessment of Daniel Robertson's Quarry, Ferntree Gully, Victoria. Unpublished report by Biosis Research Pty Ltd for Daniel Robertson Australia Pty Ltd. (Mueck S and Organ A: Port Melbourne); and
- Treemap Arboriculture (2016). Arboricultural Assessment and Report; Norvel Road, Ferntree Gully. Unpublished report by Treemap Arboriculture for Norvel Estate Pty Ltd. (Treemap Arboriculture: Heidelberg).

## Field Assessment

### Flora and Fauna Assessment

The study area was assessed by Principal Ecologists, Simon Scott and Dr Stuart Cooney, on 9 February 2017. Both ecologists are suitably experienced at undertaking flora and fauna assessments and Simon holds a Vegetation Quality Assessors Accreditation from DELWP (No. 0015).

All flora species observed within the study area were recorded, with the exception of planted vegetation that was not considered a 'weed' (i.e. planted vegetation that was not spreading or reproducing). Where a species was not able to be confidently identified in the field, a sample was collected and later identified. Plants were identified to species level wherever possible, however, some plants that were planted, cultivars, hybrids, or plants that did not contain suitable fertile material used for identification were recorded to genus level.

Vegetation communities such as EVCs and nationally significant vegetation communities were recorded (if observed) and compared with their corresponding benchmarks or thresholds to ensure that they were accurately assigned.

<sup>1</sup>Threatened flora and fauna includes species listed under the Commonwealth *Environment Protection and Biodiversity Conservation Act 1999*, the Victorian *Flora and Fauna Guarantee Act 1988* and the DSE Advisory Lists (Department of Environment and Primary Industries (2009; 2013; 2014).

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A list of all fauna species observed within, and immediately surrounding, the study area was produced. This list consists of species seen, heard, or identified by other evidence of their presence (e.g. feathers, scats). Leica 12 X 50 binoculars and call mimicry/playback were used to assist in the identification species.

The presence of fauna habitat was noted, particularly in relation to potential habitats for threatened species. The greatest amount of time was spent surveying potential fauna habitats (e.g. trees, water bodies, crevices or under ground debris) during the assessment.

Threatened flora and fauna species were marked with a hand-held Garmin eTrex 10 GPS (accuracy +/- five metres) and key ecological values such as vegetation communities, scattered indigenous trees, fauna habitats, or threatened species habitats were mapped onto an aerial photograph of the study area.

### **Guidelines for the removal, destruction or lopping of native vegetation**

Although the initial site assessment was undertaken under the policy that existed prior to the introduction of the *Guidelines for the removal, destruction or lopping of native vegetation* (the Guidelines) (Department of Environment Land Water and Planning 2017b), this final version of the report has been updated to reflect the current native vegetation removal policy in terms of reporting, terminology and offset requirements.

The Guidelines require that information regarding the biodiversity values of the site were obtained though:

- Site-based information that was measured or observed at a site, including:
  - Extent of native vegetation patches;
  - Large trees;
  - Native vegetation condition assessed in accordance with the *Vegetation Quality Assessment Manual – Guidelines for Applying the Habitat Hectares Scoring Method* (Department of Sustainability and Environment 2004);
  - Ecological Vegetation Classes (EVC); and
  - Sensitive wetlands and coastal areas.
- Landscape scale information that cannot be measured or observed at the site and includes maps and models procured from DELWP.

The Guidelines require a Habitat Hectare assessment in instances where the impact is to be assessed under the Detailed Assessment Pathway. It was not possible to determine the risk-based pathway for the loss of native vegetation, and we therefore opted to complete the Habitat Hectare assessment in accordance with the methodology prescribed within the *Vegetation Quality Assessment Manual – Guidelines for Applying the Habitat Hectares Scoring Method* (Department of Sustainability and Environment 2004) at patches<sup>2</sup> of vegetation. All indigenous vegetation was assessed, and then assigned a quality rating based on the Habitat Hectare score (Department of Sustainability and Environment 2004).

<sup>2</sup> A 'patch' is defined as an area with at least 25% cover abundance of perennial native vegetation, or a group (i.e. three or more) trees forming a continuous canopy.

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To determine offsets, the location and species of indigenous 'scattered trees'<sup>3</sup>, and any 'large trees'<sup>4</sup> within patches were mapped. Details of the location, extent of native vegetation (patches, scattered trees and large trees) that are proposed for removal was provided to DELWP who produced a Native Vegetation Removal report which details the required offsets for impacts to native vegetation patches, Large Trees and scattered trees.

### Limitations and Qualifications

The following limitations and qualifications apply to this report:

- The results of the desktop assessment are reliant on data obtained from various databases and other reports. The accuracy of these historical data and some of the results provided within these reports cannot be verified.
- Some flora and fauna species may only be recorded during certain times or seasons (e.g. plants that only contain above-ground biomass and are only visible annually, nocturnal mammals and birds, migratory birds, or fauna identified through seasonal breeding calls such as some frog species). The author has made an informed decision about the likely presence of threatened species that may be present, or that may utilise habitats within the study area, based on a detailed desktop assessment, a review of the species' biology, an understanding of the ecological values of the local area, and an assessment of flora and fauna as well as their habitats.
- As with all ecological assessments, a greater survey effort is likely to yield additional flora and fauna records. Where these additional flora and fauna records may alter the recommendations made within this report, (e.g. where additional threatened species may utilise habitats within the study area, or where threatened species may be impacted by the proposed development), further assessment may be recommended, depending on the implications of relevant policies and legislation.

Despite these limitations to the assessment, the results gained by both a desktop and a field assessments are adequate to address the purpose of this report.

<sup>3</sup> Scattered trees are defined as a native canopy tree that does not form a patch

<sup>4</sup> Large trees are defined as meeting the size threshold specified in the bioregional EVC Benchmark

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## Results

### Study Area

The study area is located within suburban Ferntree Gully, approximately 30 kms east of Melbourne. The northern boundary of the study area adjoins Blind Creek and the Blind Creek Billabong Reserve, while the rest of the study area is bordered by suburban housing lots (Figure 1). The landscape is generally flat, gently sloping towards Blind Creek in the north.

The study area was previously a clay quarry (Mueck and Organ 2001). The quarry occupied the southern two-thirds of the study area, with remnant woodland covering the northern section, interfacing with Blind Creek. A comparison of the maps provided in the previous reports prepared for the study area, suggests that some of the vegetation on the eastern boundary of the study area has been removed since those reports were prepared, although this happened prior to 2009, when Nearmap recorded its first aerial image of the study area (Nearmap 2018). The quarry was filled with material sourced off-site from mid-2014 to early-2016 (Nearmap 2018), and now comprises slashed exotic grasslands in the south, while the woodland remains in the north of the study area.

An additional area that is proposed for a trail and sewer was assessed along the western boundary of the study area that is largely flat and devoid of native vegetation (Plate 1).

## Flora

### Flora Species

A total of 101 plant and tree species were recorded during the current assessment. This comprised 64 indigenous and 37 exotic plant species (Table A1).

The south of the study area, in the location of the previous quarry had been sown with Perennial Rye-grass *Lolium perenne* and lacked an overstorey and mid-storey. Despite this, some areas of regrowth supported more than 25% cover abundance of native species, dominated by Hop Goodenia *Goodenia ovata*, which meant they met thresholds to be classified as patches of remnant vegetation. It is likely that these plants have regenerated from the seed bank of imported soil spread over the quarry as part of its rehabilitation. As this regrowth is less than 10 years old, although identified as patches of remnant vegetation, they are exempt from offsetting under the Biodiversity Assessment Guidelines (see below).

The northern portion of the study area supported relatively high quality remnant vegetation. The overstorey was dominated by Mealy Stringybark Eucalyptus *cephalocarpa* and Swamp Gum Eucalyptus *ovata*, with fewer occurrences of Messmate Stringybark Eucalyptus *obliqua*, Red Stringybark Eucalyptus *macrorhyncha*, Narrow-leaf Peppermint Eucalyptus *radiata*, as well as occasional occurrences of Green Scentbark Eucalyptus *fulgens* that is listed as state significant on the Advisory List (Department of Environment and Primary Industries 2014).

The midstorey contained a dense shrub cover, generally dominated Sweet Bursaria *Bursaria spinosa* subsp. *spinosa*, Prickly Tea-tree *Leptospermum continentale*, Swamp Paperbark *Melaleuca ericifolia*, Prickly Currant-bush *Coprosma quadrifida*, Shiny Cassinia *Cassinia longifolia* and Prickly Moses *Acacia verticillata*. The understorey was also dominated by a diversity of native species, with the most dominant and widespread species including Kangaroo Grass *Themeda triandra*, Weeping Grass

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*Microlaena stipoides* var. *stipoides*, Wallaby-grasses *Rytidosperma* spp., Forest Wire-grass *Tetrarrhena juncea*, Bracken *Pteridium esculentum*, and Thatch Saw-sedge *Gahnia radula* as well as herbs including Bidgee Widgee *Acaena novae-zelandiae*. Weeds were dominant in some locations including a substantial area with a moderate cover abundance (30-40%) of Kikuyu *Cenchrus clandestinus* and an area within a moderate cover of Panic Veldt-grass *Ehrharta erecta* var. *erecta*.

Compared with the results provided by Biosis (2001), we recorded fewer annual species such as lilies and orchids. This may be expected as the assessment was undertaken during late Summer, after a period of hot weather. It is likely that these annual species that were recorded by Biosis (2001) persist within the study area.

### Flora Habitat/Vegetation Communities

The vegetation within the study area was required to be assessed and classified against the policy and legislation stipulated by three tiers of government:

- *Local* – Where various overlays and policies may apply pursuant to the Knox City Council Planning Scheme (Department of Environment Land Water and Planning 2018c);
- *State* – Which includes DELWP’s EVC mapping of vegetation communities (Department of Environment Land Water and Planning 2018a) and consideration under the Biodiversity Assessment Guidelines (Department of Environment and Primary Industries 2013); and,
- *Commonwealth* – where vegetation may meet ‘thresholds’ to be classified as a federally listed community under the Commonwealth *Environment Protection and Biodiversity Conservation Act 1999* (Department of Sustainability Environment Water Population and Communities 2011).

#### Local

The study area is currently zoned Special Use Zone 2 (Department of Environment Land Water and Planning 2018c). It is located within the Knox City Council municipality. Special Use Zone 2 land is to provide for the earth and energy resources industry. It is expected that the proponent will seek to have this zoning changed prior to development of the residential estate.

The northern section of the study area is covered by an Environmental Significance Overlay (ESO) 2 (Figure 1) (Department of Environment Land Water and Planning 2018c). Although this largely covers the area proposed for a reserve, it extends to the northern part of the proposed development. The ESO2 recognises sites of biological significance within the Knox City Council municipality. It aims to protect these sites from extinction, maintain and improve habitat corridors and connectivity, use offsets to achieve a ‘Net Gain’ in vegetation where native vegetation is to be removed and ensure development is consistent with these goals. Applicants will need to justify any native vegetation removal, where the Council considers that a development may impact the environmental objectives of the ESO2. This report includes consideration of the ESO2 in its recommendations.

#### State

The study area is located within the Gippsland Plain bioregion of Victoria and the Port Philip and Westernport Catchment Management Area (Department of Environment Land Water and Planning 2016a). Historically, the study area is likely to have supported Ecological Vegetation Classes (EVC)

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127: Valley Heathy Forest in the south and EVC 937: Swampy Woodland in the north, associated with Blind Creek. EVC 127: Valley Heathy Forest is characterised as “a low, open forest to 15 metres tall with a sedgy/grassy understorey with a component of small ericoid shrubs and grass-trees. Soil and moisture factors are critical in delimiting the vegetation” (Department of Environment Land Water and Planning 2018a). EVC 937: Swampy Woodland is characterised as an “open eucalypt woodland to 15 metres tall with ground-layer dominated by tussock grasses and/or sedges and often rich in herbs. Occurs on poorly drained, seasonally waterlogged heavy soils, primarily on swamp deposits but extending to suitable substrates within some landscapes of sedimentary origin” (Department of Environment Land Water and Planning 2018a).

Current modelling of vegetation within the study area suggests that little of these vegetation types remain. The current modelling of EVC 127: Valley Heathy Forest is in the area cleared prior to 2009 in the east of the study area (Department of Environment Land Water and Planning 2017a). The site assessment confirmed that none of the modelled EVC 127: Valley Heathy Forest remains in the study area, however a large patch of relatively high quality EVC 937: Swampy Woodland persists in the north of the study area, contiguous with the vegetation associated with Blind Creek.

#### Commonwealth

Department of the Environment and Energy (2018a) modelling suggests that that the critically Endangered vegetation communities Natural Damp Grassland of the Victorian Coastal Plains and White Box-Yellow Box-Blakely's Red Gum Grassy Woodland and Derived Native Grassland may occur within the study area.

The remnant vegetation within the study area does not meet the criteria to qualify as Natural Damp Grassland of the Victorian Coastal Plains because it is characteristic of a woodland/forest type vegetation structure and not a grassland. It does qualify as White Box-Yellow Box-Blakely's Red Gum Grassy Woodland and Derived Native Grassland because the dominant overstorey species are not characteristic of this vegetation community.

#### Threatened Flora Species

Two threatened flora species have previously been recorded within three kilometres of the study area within the last 30 years: Rosemary Grevillea *Grevillea rosmarinifolia* and Giant Honey-myrtle *Melaleuca armillaris* subsp. *armillaris* (Figure 3). A further seven species are predicted to occur within the study area based on the Protected Matters Search Tool (Department of the Environment and Energy 2018a). A consolidated list of these threatened flora species as well as their conservation status, preferred habitats and likelihood of occurrence for each species is provided in Table A3.

One of the records of Rosemary Grevillia is from within the northern part of the study area in 2001. The current assessment did not relocate this plant, however it is possible that this species persists within the study area. It is currently proposed that the vegetation within the north of the study area will be retained within a reserve vested to council. On this basis, this plant would not be impacted by the proposed development of the study area.

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Giant Honey-myrtle is not indigenous to the area. Nearby records are from planted specimens, as it is widely used as an ornamental plant, or in windrows. Further consideration of this plant is not required.

One threatened species, Green Scentbark, was recorded during the current assessment. Four Green Scentbark trees were identified near the boundary of the reserve area during the current assessment and the Arborist's assessment (Treemap Arboriculture 2018); three of which may be impacted by the proposed development (Treemap tree numbers 92, 93 and 95: Figure 2). Other individuals are likely to occur within the reserve area, but will not be impacted by the proposed development. Green Scentbark is listed as 'Rare' on the Advisory List of Rare and Threatened Plants in Victoria (Department of Environment and Primary Industries 2014), so impacts to this species should be avoided or limited where possible.

No threatened species are likely to occur outside of the reserve area, because of the high level of land modification associated with the quarry. It is concluded that no other threatened flora species are likely to be impacted by the development given the protection of the highest quality vegetation within the study area and the current assessment of the remainder of the study area.

### Vegetation Assessment

Three patches of native vegetation were identified within the study area (Table 1; Figure 2), although a Habitat Hectare assessment was only completed on Patch 1 (RP1) and 2 (RP2).

Patch 3 cannot, by definition be 'remnant', as it is regenerating native plants from seed stock from imported soil. It is therefore exempt from requiring offsets under the 'regrowth' Clause of 52.17 within the Planning Scheme, and offsets are not required (Department of Environment Land Water and Planning 2018c).

The vegetation in the north of the study area (RP1) is the highest quality vegetation with a score of 55 out of 100 (Plate 3). This vegetation retains many of the characteristics of its natural state when compared with the EVC benchmark (Department of Environment Land Water and Planning 2018a). RP2 occurs on the fringes of this vegetation, the mid-storey/shrub layer has been removed, the understorey contains a lower diversity and there is a higher cover abundance of weeds).

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**Table 1.** Habitat Hectare Scores for the remnant patches of native vegetation within, and adjoining, the study area.

Quality Zone		RP1	RP2	
Bioregion		Gippsland Plain	Gippsland Plain	
EVC name		SW	SW	
EVC number		937	937	
Assessment Criteria	Maximum Score	Patch Score	Patch Score	
Site Condition	a. Large old trees	10	7	5
	b. Canopy cover	5	4	4
	c. Understorey	25	20	5
	d. Lack of weeds	15	9	2
	e. Recruitment	10	3	0
	f. Organic litter	5	5	5
	g. Logs	5	2	0
	h. Total (sum of a-g)	75	50	21
Landscape valve	i. Patch size	10	2	2
	j. Neighbourhood	10	1	1
	k. Distance to core	5	2	2
<b>I. Habitat Points (total)</b>		<b>100</b>	<b>55</b>	<b>26</b>
m. Habitat score ( $1 \div 100$ )		0.55	0.26	

**Table Notes:**

SW – Swampy Woodland

Only a relatively small portion of RP1 will require vegetation removal for the proposed development.

### Tree Assessment

Three scattered indigenous trees were also recorded in the laneway on the western boundary of the study area (Table 2). These trees, or their Tree Protection Zones<sup>5</sup> may be impacted by a proposed path and sewer between the new estate and the Blind Creek Trail that runs across the north of the

<sup>5</sup> The Tree Protection Zones have been determined in accordance with the Australian Standard for the Protection of Trees within Development Sites (AS 4970 - 2009) (Standards Australia 2009). It defines the Tree Protection Zone (TPZ) radius as 12 x DBH, but should not be less than 2 metres or greater than 15 metres. If an area greater than 10% of a tree's Tree Protection Zone is impacted by works, that tree will be considered lost and offset obligations will apply.



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study area. However, sensitive design of this infrastructure, with input from a qualified arborist, is likely to avoid impacts to these trees.

**Table 2.** Tree species recorded within the scattered tree area of study area

Tree No.	Species Name	Common Name	DBH (cm) <sup>1</sup>	TPZ Radius (cm)
1	<i>Eucalyptus ovata</i>	Swamp Gum	97	1,164
2	<i>Eucalyptus ovata</i>	Swamp Gum	101	1,212
3	<i>Eucalyptus ovata</i>	Swamp Gum	87	1,044

**Table Notes:**

<sup>1</sup> Diameter at breast height

## Fauna

### Fauna Species

Ten fauna species were recorded within the study area during the current assessment (Table A2, Appendix A). This included eight native bird species, one introduced bird species, and one native reptile. Other fauna species would be recorded if greater time was spent on-site.

All of the species are all typical of fauna that are expected to occur in the foothills of the Dandenong Ranges. Only one reptile was recorded during the site assessment, Garden Skink *Lampropholis guichenoti*, although it is likely that other frogs, skinks and snakes would utilise the study area on occasion. Further discussion on species that may occur within the various fauna habitats is provided below.

### Fauna Habitats

The remnant vegetation within the study area and adjoining properties provides moderate to high quality woodland habitat to a range of species. The large trees are likely to provide habitat to a range of common bird and arboreal mammal species. This is likely to include gregarious bird species such as Rainbow Lorikeets *Trichoglossus haematodus* and Noisy Miners *Manorina melanocephala*. Mammals such as Common Ringtail Possums *Pseudocheirus peregrinus* and Common Brushtail Possums *Trichosurus vulpecula* are also likely to forage in the canopy of these trees, whilst micro-bats are likely to use the fissures and flaking bark as diurnal roosting locations. Where the understory exists, smaller birds such as Superb Fairywrens *Malurus cyaneus* and Brown Thornbills *Acanthiza pusilla*, as well as a range of honeyeaters, are likely to find refuge from larger, more aggressive birds.

Most of the other native birds observed, such as the Crimson Rosella *Platycercus eximius*, Australian Magpie *Gymnorhina tibicen* and Little Raven *Corvus mellori*, are widespread and common throughout open areas, suburban areas and farmlands throughout eastern Melbourne.

The vegetation is likely to provide an important corridor for fauna species moving across the landscape. This vegetation connects to other vegetation associated with Blind Creek to the north of the study area. These connections within the landscape are important for many species' ability to adapt to seasonal changes in food abundance, dispersal from natal areas and to facilitate gene mixing within the broader population.

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### Threatened Fauna Species and Communities

A consolidated list of the 16 threatened fauna species previously recorded on, or within the vicinity of, the study area within the last thirty years, as well as a further 17 fauna species that may occur within the study area is provided in Table A4 (see also Figure 3). The conservation status, preferred habitats and likelihood of occurrence for each species is provided within this table.

There is a single record of a Grey Goshawk *Accipiter novaehollandiae novaehollandiae* from within the study area in 1997 (Figure 3). Grey Goshawks are largely sedentary birds, that favour large patches of vegetation (usually in excess of 10 hectares in size) (Marchant and Higgins 1993). The bird that was observed in 1997 may have been a juvenile bird looking for a new territory. It is unlikely that the study area provides important habitat for this species. Grey-headed Flying-foxes *Pteropus poliocephalus* are likely to fly over the study area on a regular basis, however, the lack of fruiting trees within the study area means that it is unlikely to provide important resources to this species. The majority of the other threatened fauna species listed in Table A4 are wetland dependent or aquatic species that unlikely to occur within the study area on a regular basis.

No threatened species were recorded during the current assessment. No fauna communities listed under the Victorian *Flora and Fauna Guarantee Act 1988* were recorded within the study area and none are likely to occur.

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## Discussion

A detailed summary of the legislation that was considered when preparing this report is provided in Appendix 2. The discussion presented in this section of the report does not re-iterate information provided in Appendix 2, but summarises the results and recommendations arising from the interpretation of this legislation.

### *Environment Protection and Biodiversity Conservation Act 1999 (Cth)*

The desktop assessment identified seven threatened flora, 15 threatened fauna species and two threatened vegetation community, listed under the EPBC Act that may occur within the study area. None of these species have previously been recorded within the study area and preferred habitat for these species does not occur within the study area, despite providing moderate to high quality habitat to a range of native species. This is largely attributed to local extinctions of the species that are modelled to occur or have historically occurred within the study area and its surrounds, as well as the type of habitat within the study area (i.e. many of the EPBC Act listed species that may occur within the landscape are associated with aquatic environments, which is limited within the study area).

On the basis of this, a referral to the Commonwealth Department of the Environment and Energy under the EPBC Act is not recommended.

### *Flora and Fauna Guarantee Act 1988 (Vic)*

The desktop assessment identified five flora and 20 fauna species listed under the FFG Act that may occur within the study area (Tables A3 and A4). One of these species (Grey Goshawk) has been recorded within the study area on one occasion, however the study area is unlikely to provide important core habitat to this species because of its limited size, but may provide habitat for dispersing immature animals moving between areas of more suitable habitat.

In addition, the FFG Act also lists 'protected flora'. Protected flora includes whole families or genera, not just plant species, such as daisies, heaths, orchids, and most Acacias. These species and genera are not necessarily regarded as threatened, but require an approved 'protected flora licence or permit' from DELWP prior to their removal from *public* land. As the development is not located in public land, a 'protected flora licence of permit' will not be required.

### *Planning and Environment Act 1987 (Vic)*

Although there is no native vegetation in the area covered by the VPO1, some of the vegetation within the ESO2 is proposed for removal (Figure 1 and 2). The removal of this vegetation is required to facilitate the road that will act as a buffer between the proposed reserve and the development (P. D'Emilio. Peddle Thorp Architects, *In litt.* 10 February 2017). The proposed development will require a planning permit from the City of Knox Council under Clause 52.17 prior to the removal, destruction or lopping of this native vegetation (Department of Environment Land Water and Planning 2017b). Biodiversity offsets will be required for any such impacts (discussed below).

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### ***Catchment and Land Protection Act 1994 (Vic)***

Primary considerations of the Catchment and Land Protection Act 1994 (Vic) relate to soil and water conservation, as well as the management of pest plants and animals.

The study area contains three weed species that are listed as 'noxious' within the Port Phillip and Westernport Catchment Management Area (Table A1). These include Blackberry *Rubus fruticosus* ssp agg., Boneseed *Chrysanthemoides monilifera* and Montpellier Broom *Genista monspessulana*, Hawthorn, Spear Thistle *Cirsium vulgare* and Sweet Briar *Rosa rubiginosa* which are listed as 'Regionally Controlled'. The proponent is required to 'control the spread' of all 'regionally controlled' species from their property (Melville 2008).

In addition, two species are listed as 'Restricted'; Bridal Creeper *Asparagus asparagoides* and Soursob *Oxalis pes-caprae*. There are limitations on the collection and trade of these species.

Four of these noxious species are also listed as Weeds of National Significance; Bridal Creeper, Boneseed, Blackberry and Montpellier Broom.

The proposed development should aim to remove these plants when construction commences, and ensure they are removed during the future the landscaping and maintenance of the study area. It is expected that weed management would form part of a Construction Environment Management Plan. Where revegetation is required, the palette of species to be used should represent the historic ECV of the study area (EVC 937: Swampy Woodland). All plants should be of local provenance and not include hybrid species.

The Construction Environment Management Plan provides guidance on the management of noxious weeds during the development and remove any weeds that establish post-construction. The Construction Environment Management Plan will also include details relating to the:

- Fence and exclude access to areas of retained native vegetation, including the remnant patches and the scattered trees;
- Maintenance of vehicle hygiene and vehicle wash-down areas;
- Use of clean fill (if required);
- Management of noxious that may establish post-construction through spraying with herbicide or hand-removal;
- Use of noxious species during any landscaping of the property.

Erosion and sediment control is also expected to be implemented as part of the Construction Environment Management Plan to EPA Standards in order to avoid direct and indirect impacts to the native vegetation and drain and Blind Creek downslope.

### ***Wildlife Act 1975 (Vic)***

It is likely that some locally common species of fauna will be displaced by the proposed development. Furthermore, there remains a low likelihood that animals may be accidentally injured when removing vegetation, particularly the large trees. All native vertebrate wildlife is protected under the *Wildlife Act 1975 (Vic)*, and therefore contractors must use due care when removing vegetation from the study area. It is recommended that an ecologist or wildlife handler is present during the felling of any trees that may contain resident fauna.

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### **Guidelines for the removal, destruction or lopping of native vegetation**

The location of the native vegetation within the study area means that the proposed development will inevitably result in the loss of some of that vegetation. Applicants who wish to remove native vegetation must generally demonstrate how the application meets the three-step approach 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; and
3. Provide an offset to compensate for the biodiversity impact from the removal, destruction or lopping of native vegetation (Department of Environment Land Water and Planning 2017b).

Most of the vegetation within the study area is modelled by DELWP as being 'Location 1' vegetation which is the lowest on a scale of 1, 2 and 3 (Department of Environment Land Water and Planning 2018b). However an area of Location 2 vegetation is modelled near the middle of the study area, and the southern boundary of the proposed reserve. Native vegetation that is to be impacted will need to be offset, consistent with Clause 52.17 of the Knox City Council planning scheme.

Based on the current assessment, and the Master Plan for the development (Peddle Thorp Architects, 36-0125, Rev E: dated November 2020), 1.129 hectares of native vegetation will be directly impacted by clearing for the proposed development (Figure 2). However, 0.738 hectares of this vegetation, that comprises RP3, is exempt from requiring offsets because it is classified as regeneration less than ten years old (Department of Environment Land Water and Planning 2017b). Most of the vegetation that is classified as Location 2 vegetation will be avoided. Offsets will be required for the remaining 0.391 hectares of native vegetation (parts of RP1 and RP2) (Appendix 3).

### **Native Vegetation Removal Report**

A Native Vegetation Removal Report has been prepared for the proposed development and is provided in Appendix 3. This report uses the Habitat Hectare scores and native vegetation polygons collected during the current assessment. The report includes the species specific offset test, which determines if the proposed vegetation removal will have a proportional impact on any Victorian rare or threatened species habitat above a specific offset threshold, which is set at 0.005 per cent of total habitat for each species. This test was applied to current proposal, and it was determined that no species specific offsets were required. Table 3 and Appendix 3 present the offset required for the removal of the remnant vegetation.

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**Table 3.** Native vegetation offset requirements under the current development plan

<b>Location Risk</b>	Location 2
<b>Risk Based Pathway</b>	Intermediate
<b>Total Extent Removed</b>	0.083ha
<ul style="list-style-type: none"> <li>• Remnant Patches</li> <li>• Scattered Trees</li> </ul>	<ul style="list-style-type: none"> <li>• 0.391ha</li> <li>• Nil</li> </ul>
<b>General Offset Requirements</b>	0.126 General Habitat Units Two Large Trees
<b>Specific Offset Requirements</b>	Nil
<b>Minimum Strategic Biodiversity Score</b>	0.202
<b>Offset Location</b>	Port Phillip and Western Port CMA or within the Knox City Council municipality

### Avoidance and Minimisation Statement

The development plan has undergone a number of iterations to avoid and minimise impacts to native vegetation. Iterations of the development plan have avoided impacts to modelled Rusty Velvet-bush *Lasiopetalum ferrugineum* within the study area and aimed to retain the highest quality native vegetation within the study area. This has resulted in the retention of vegetation adjoining the existing patch of native vegetation (RP1) that extends beyond the study area to the riparian vegetation of Blind Creek. Most of this vegetation was Location 2 vegetation (the second highest modelled risk rating), and has been generally avoided by the proponent. The result of these efforts has been to achieve an assessment under the Intermediate Risk-based pathway.

Subsequent development of the Master Plan has introduced buffers between the residential lots and the retained vegetation. These will serve the dual purposes of fire and habitat protection. In addition, the Water Treatment Area will further protect the retained vegetation the north of the study area. Where management of defensible space is required in the north of the property, partial removal of native vegetation is proposed to maintain as much the ecological value of the site as possible, particularly large trees, while ensuring the development is safe from bushfire attack.

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**Figures**

**Figure 1:** Location of the study area and results of the desktop assessment.

Norvel Road, Ferntree Gully, Victoria.

**Legend**

- Study Area
- Open Space**
- Bushland Reserve
- Reserve
- Planning Overlays**
- ESO2

\* Location of proposed open spaces as per Peddle Thorp Architects, 36-0125, Rev E: dated November 2020



PIN 1380 Figure 1. Aerial photography dated 8 November 2020 (Nearmap 2020), December 2020.

**Figure 2:** Results of the current assessment.

Norvel Road, Ferntree Gully, Victoria.

**Legend**

- Study Area
- Patches of Native Vegetation**
- RP1
- RP2
- Regrowth
- Impacted Vegetation**
- Full Removal
- Partial Removal
- Scattered Trees
- Tree Protection Zones
- Green Scentbark (with Treemap report numbers)

\* Location of impacted vegetation as per Peddle Thorp Architects, 36-0125, Rev E: dated November 2020



PIN 1380 Figure 2. Aerial photography dated 8 November 2020 (Nearmap 2020), December 2020.

**Figure 3: Threatened flora and fauna within 3kms of the study area.**

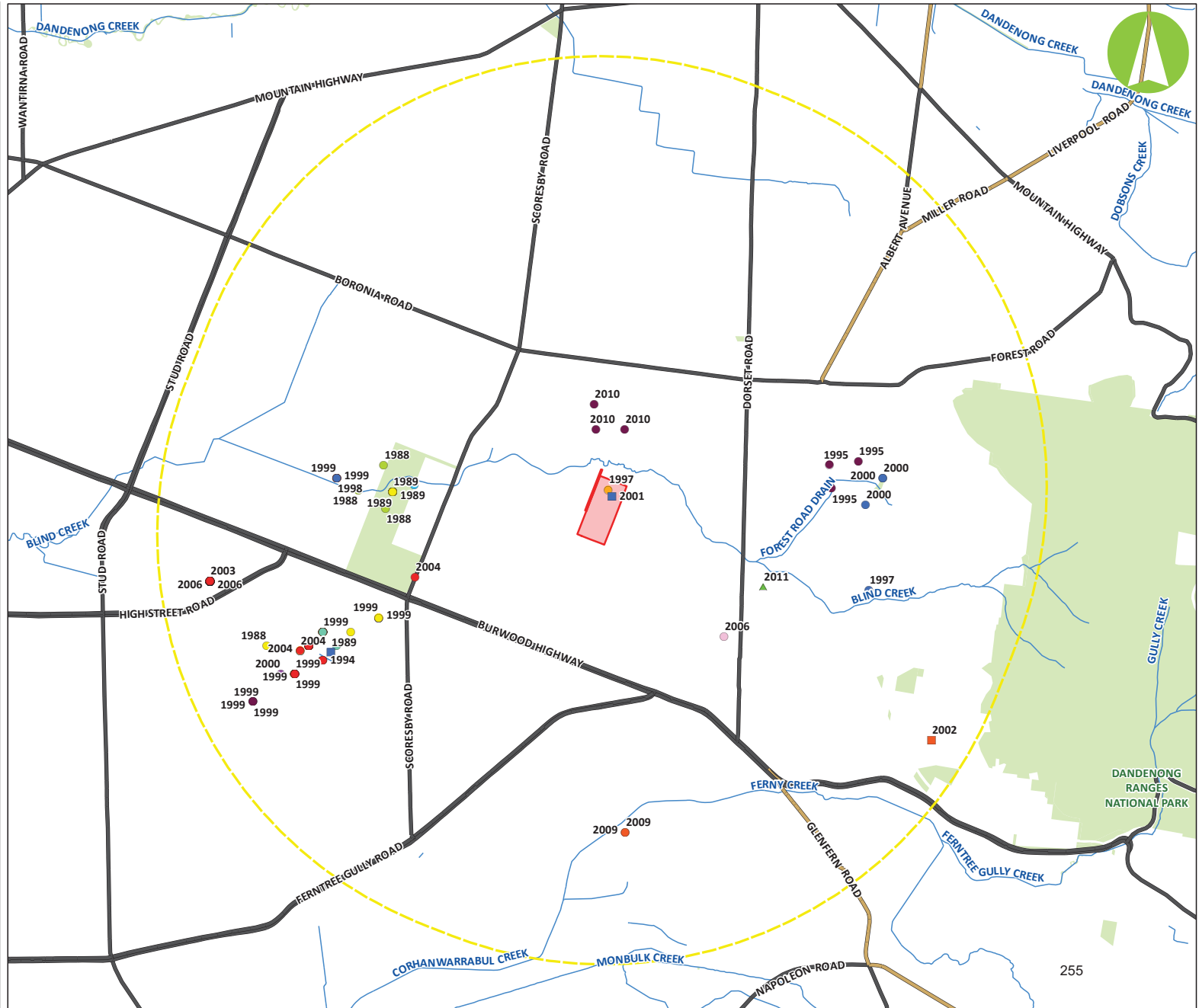
Norvel Road, Ferntree Gully, Victoria.

**Legend**

- Study Area
- 3km Buffer

**Common Name**

- Australasian Shoveler
- Australian Painted Snipe
- Blue-billed Duck
- Eastern Great Egret
- Grey Goshawk
- Hardhead
- Latham's Snipe
- Magpie Goose
- Musk Duck
- Pied Cormorant
- Powerful Owl
- Regent Honeyeater
- Royal Spoonbill
- Whiskered Tern
- White-throated Needletail
- Eastern Snake-necked Turtle
- Giant Honey-myrtle
- Rosemary Grevillea
- PLM25



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PIN 1380 Figure 3, February 2017.

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## Plates



**Plate 1.** The location of the proposed sewer and trail on the western boundary of the study area, looking south.



**Plate 2.** Regrowth from the seed-bank of the imported fill, showing the dominance of Hop Goodenia

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**Plate 3.** Remnant Patch 1

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## Appendices

### Appendix 1. Flora and Fauna Tables.

Table A1. Flora recorded within the study area

Origin	Common Name	Scientific Name	Weeds of National Significance	Noxious Weed Classification
	Austral Bracken	<i>Pteridium esculentum</i>	-	-
	Bidgee-widgee	<i>Acaena novae-zelandiae</i>	-	-
	Black Wattle	<i>Acacia mearnsii</i>	-	-
	Black-anther Flax-lily	<i>Dianella revoluta</i> s.l.	-	-
*	Blackberry	<i>Rubus fruticosus</i> spp. agg.	Yes	Regionally controlled
	Blackwood	<i>Acacia melanoxylon</i>	-	-
*	Boneseed	<i>Chrysanthemoides monilifera</i>	Yes	Regionally controlled
*	Bridal Creeper	<i>Asparagus asparagoides</i>	-	Restricted
	Bristly Wallaby-grass	<i>Rytidosperma setaceum</i>	-	-
*	Brown-top Bent	<i>Agrostis capillaris</i>	-	-
	Bundy	<i>Eucalyptus goniocalyx</i> s.s.	-	-
	Centella	<i>Centella cordifolia</i>	-	-
	Cherry Ballart	<i>Exocarpos cupressiformis</i>	-	-
*	Cleavers	<i>Galium aparine</i>	-	-
*	Cocksfoot	<i>Dactylis glomerata</i>	-	-
	Common Apple-berry	<i>Billardiera scandens</i> s.l.	-	-
	Common Blown-grass	<i>Lachnagrostis filiformis</i> s.l.	-	-
	Common Bog-sedge	<i>Schoenus apogon</i>	-	-
	Common Cassinia	<i>Cassinia aculeata</i> subsp. <i>aculeata</i>	-	-
*	Common Centaury	<i>Centaureum erythraea</i>	-	-
	Common Grass-sedge	<i>Carex breviculmis</i>	-	-
	Common Love-grass	<i>Eragrostis brownii</i>	-	-
	Common Raspwort	<i>Gonocarpus tetragynus</i>	-	-
	Common Rice-flower	<i>Pimelea humilis</i>	-	-
*	Common Sow-thistle	<i>Sonchus oleraceus</i>	-	-
	Common Spike-sedge	<i>Eleocharis acuta</i>	-	-
	Common Tussock-grass	<i>Poa labillardierei</i>	-	-
	Common Woodruff	<i>Asperula conferta</i>	-	-
	Cotton Fireweed	<i>Senecio quadridentatus</i>	-	-
*	Couch	<i>Cynodon dactylon</i> var. <i>dactylon</i>	-	-
	Cudweed	<i>Euchiton</i> sp.	-	-
	Dodder Laurel	<i>Cassytha</i> spp.	-	-
	Drooping Cassinia	<i>Cassinia</i> sp. aff. <i>arcuata</i>	-	-

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Origin	Common Name	Scientific Name	Weeds of National Significance	Noxious Weed Classification
		(Midlands)		
*	English Ivy	<i>Hedera helix</i>	-	-
*	Flatweed	<i>Hypochaeris radicata</i>	-	-
	Forest Wire-grass	<i>Tetrarrhena juncea</i>	-	-
	Grassland Wood-sorrel	<i>Oxalis perennans</i>	-	-
*	Hairy Bird's-foot Trefoil	<i>Lotus subbiflorus</i>	-	-
*	Hairy Hawkbit	<i>Leontodon saxatilis</i> subsp. <i>saxatilis</i>	-	-
	Hop Goodenia	<i>Goodenia ovata</i>	-	-
	Ivy-leaf Violet	<i>Viola hederacea</i> sensu Willis (1972)	-	-
	Kangaroo Grass	<i>Themeda triandra</i>	-	-
	Kidney-weed	<i>Dichondra repens</i>	-	-
*	Kikuyu	<i>Cenchrus clandestinus</i>	-	-
*	Large Quaking-grass	<i>Briza maxima</i>	-	-
	Love Creeper	<i>Comesperma volubile</i>	-	-
	Mealy Stringybark	<i>Eucalyptus cephalocarpa</i> s.s.	-	-
	Messmate Stringybark	<i>Eucalyptus obliqua</i>	-	-
	Milkmaids	<i>Burchardia umbellata</i>	-	-
*	Montpellier Broom	<i>Genista monspessulana</i>	Yes	Regionally controlled
	Mountain Clematis	<i>Clematis aristata</i>	-	-
*	Musky Heron's-bill	<i>Erodium moschatum</i>	-	-
	Myrtle Wattle	<i>Acacia myrtifolia</i>	-	-
*	Onion Grass	<i>Romulea rosea</i>	-	-
	Pale Flax-lily	<i>Dianella longifolia</i> s.l.	-	-
	Pale Rush	<i>Juncus pallidus</i>	-	-
*	Panic Veldt-grass	<i>Ehrharta erecta</i> var. <i>erecta</i>	-	-
*	Paspalum	<i>Paspalum dilatatum</i>	-	-
*	Perennial Rye-grass	<i>Lolium perenne</i>	-	-
*	Pimpernel	<i>Lysimachia arvensis</i>	-	-
*	Prairie Grass	<i>Bromus catharticus</i>	-	-
	Prickly Currant-bush	<i>Coprosma quadrifida</i>	-	-
	Prickly Moses	<i>Acacia verticillata</i>	-	-
	Prickly Tea-tree	<i>Leptospermum continentale</i>	-	-
*	Prunus	<i>Prunus</i> spp.	-	-
*	Radiata Pine	<i>Pinus radiata</i>	-	-
	Reed Bent-grass	<i>Deyeuxia quadriseta</i>	-	-
*	Ribwort	<i>Plantago lanceolata</i>	-	-
	Shiny Cassinia	<i>Cassinia longifolia</i>	-	-
	Shrubby Fireweed	<i>Senecio minimus</i>	-	-
	Silvertop Wallaby-grass	<i>Rytidosperma pallidum</i>	-	-



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Origin	Common Name	Scientific Name	Weeds of National Significance	Noxious Weed Classification
	Slender Speedwell	<i>Veronica gracilis</i>	-	-
	Slender Wallaby-grass	<i>Rytidosperma racemosum</i> var. <i>racemosum</i>	-	-
	Small Loosestrife	<i>Lythrum hyssopifolia</i>	-	-
	Small Poranthera	<i>Poranthera microphylla</i> s.l.	-	-
	Snowy Daisy-bush	<i>Olearia lirata</i>	-	-
	Soft Tussock-grass	<i>Poa morrisii</i>	-	-
*	Soursob	<i>Oxalis pes-caprae</i>	-	Restricted
	Spiny-headed Mat-rush	<i>Lomandra longifolia</i>	-	-
	Stinking Pennywort	<i>Hydrocotyle laxiflora</i>	-	-
*	Suckling Clover	<i>Trifolium dubium</i>	-	-
	Swamp Club-sedge	<i>Isolepis inundata</i>	-	-
	Swamp Gum	<i>Eucalyptus ovata</i>	-	-
	Swamp Paperbark	<i>Melaleuca ericifolia</i>	-	-
	Sweet Bursaria	<i>Bursaria spinosa</i> subsp. <i>spinosa</i>	-	-
#	Sweet Pittosporum	<i>Pittosporum undulatum</i>	-	-
*	Sweet Vernal-grass	<i>Anthoxanthum odoratum</i>	-	-
	Tall Rush	<i>Juncus procerus</i>	-	-
	Thatch Saw-sedge	<i>Gahnia radula</i>	-	-
*	Toowoomba Canary-grass	<i>Phalaris aquatica</i>	-	-
	Tree Everlasting	<i>Ozothamnus ferrugineus</i>	-	-
	Variable Stinkweed	<i>Opercularia varia</i>	-	-
	Variable Sword-sedge	<i>Lepidosperma laterale</i>	-	-
	Veined Spear-grass	<i>Austrostipa rudis</i>	-	-
*	Water Couch	<i>Paspalum distichum</i>	-	-
	Wattle Mat-rush	<i>Lomandra filiformis</i>	-	-
	Weeping Grass	<i>Microlaena stipoides</i> var. <i>stipoides</i>	-	-
*	White Clover	<i>Trifolium repens</i> var. <i>repens</i>	-	-
	Yellow Wood-sorrel	<i>Oxalis corniculata</i> s.l.	-	-
*	Yorkshire Fog	<i>Holcus lanatus</i>	-	-

**Table Notes:**

\* Exotic # Naturalised

This table does not include ornamental plants, trees or shrubs that were not spreading or reproducing beyond where they were planted.

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**Table A2. Fauna recorded within the study area**

Origin	Common Name	Species Name
<b>Birds</b>		
	Crested Pigeon	<i>Ocyphaps lophotes</i>
*	Spotted Dove	<i>Streptopelia chinensis</i>
	Sulphur-crested Cockatoo	<i>Cacatua galerita</i>
	Musk Lorikeet	<i>Glossopsitta concinna</i>
	Rainbow Lorikeet	<i>Trichoglossus haematodus</i>
	Crimson Rosella	<i>Platycercus elegans</i>
	Superb Fairy-wren	<i>Malurus cyaneus</i>
	Red Wattlebird	<i>Anthochaera carunculata</i>
	Little Raven	<i>Corvus mellori</i>
	Australian Magpie	<i>Cracticus tibicen</i>
<b>Reptiles</b>		
	Garden Skink	<i>Lampropholis guichenoti</i>

**Definitions**

\* - Introduced species

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**Table A3. Threatened flora that has previously been recorded within, or in the vicinity of the study area (Department of Environment Land Water and Planning 2017a), or that has habitat that may occur within the vicinity of the study area (Department of the Environment and Energy 2018a).**

Common Name	Species Name	National Status *	Victorian Status **	Habitat Preferences	Most Recent Sighting (no of sightings)	Habitat Present on Site	Likelihood of Presence
Clover Glycine	<i>Glycine latrobeana</i>	Vulnerable	Vulnerable FFG Listed	Grassy woodland; plains grassland; box woodland; dry sclerophyll forest.	NPR	No	Unlikely
Giant Honey-myrtle	<i>Melaleuca armillaris</i> subsp. <i>armillaris</i>	-	Rare	Mainly confined to near-coastal sandy heaths, scrubs slightly raised above saltmarsh, riparian scrubs, rocky coastlines and foothill outcrops eastwards from about Marlo. Occurrences to the west are naturalised.	2002 (1)	No	Unlikely
Leafy Greenhood	<i>Pterostylis cucullata</i>	Vulnerable	Endangered FFG Listed	Tea-tree heath	NPR	No	Unlikely
Lilac Leek-orchid	<i>Prasophyllum colemaniae</i>	Vulnerable	Extinct	Highly localised, growing among grass tussocks and shrubs in open forest. No populations are currently known to exist	NPR	No	Unlikely
Maroon Leek-orchid	<i>Prasophyllum frenchii</i>	Endangered	Endangered FFG Listed	Tea-tree heath; wattle tea-tree scrub; valley sclerophyll forest. Predominantly in or near coastal swamps. Rarely occupies sites more than 10 km inland	NPR	No	Unlikely
Matted Flax-lily	<i>Dianella amoena</i>	Endangered	Endangered FFG Listed	Grassy Wetland; Red Gum woodland; plains grassland; grassy woodlands.	NPR	No	Unlikely

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Common Name	Species Name	National Status *	Victorian Status **	Habitat Preferences	Most Recent Sighting (no of sightings)	Habitat Present on Site	Likelihood of Presence
River Swamp Wallaby-grass	<i>Amphibromus fluitans</i>	Vulnerable	-	Beside swamps in grassy low open forest, riparian scrub. Required moist soils, tolerates inundation.	NPR	No	Unlikely
Rosemary Grevillea	<i>Grevillea rosmarinifolia</i> subsp. <i>rosmarinifolia</i>	-	Rare	Prefers well drained soils in plains grasslands and dry sclerophyll forests	2001 (2)	No	Unlikely
Round-leaf Pomaderris	<i>Pomaderris vacciniifolia</i>	Critically Endangered	Endangered FFG Listed	Valley sclerophyll forest	NPR	No	Unlikely

## \* Likelihood of Presence Definitions:

*Unlikely* – Site does not contain habitat and/or it is outside the species' known, current distribution.

*Low* – Site contains some marginal habitat, but the species was not observed and has not been recently recorded in previous surveys in the area.

*Moderate* – Site contains preferred habitat that may support a population of the species. However, other factors, such as fragmentation, disturbance or predators may be impacting any local population.

*High* - Site contains the preferred habitat which is likely to support the species.

*Present* – Preferred habitat is present on the site, and the species was observed on the site, or recently recorded at the site.

NPR – No previous record, modelled presence only under the EPBC Protected Matters Search results (Department of the Environment and Energy 2018a).

Threatened status based on the Advisory List of Rare or Threatened Plants in Victoria (Department of Environment and Primary Industries 2014).

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**Table A4. Threatened fauna that has previously been recorded within, or in the vicinity of the study site (Department of Environment Land Water and Planning 2017a), or that has habitat that may occur within the vicinity of the site (Department of the Environment and Energy 2018a).**

Common Name	Species Name	National Status *	Victorian Status **	Habitat Preferences	Most Recent Record (no. of sightings)	Habitat Present on Site	Likelihood of Presence
<b>Birds</b>							
Magpie Goose	<i>Anseranas semipalmata</i>	-	Near Threatened, FFG Listed	Large seasonal wetlands and well-vegetated dams, wet, grasslands	1994 (21)	No	Unlikely
Blue-billed Duck	<i>Oxyura australis</i>	-	Endangered, FFG Listed	Well-vegetated freshwater swamps, large dams, lakes. More open waters in winter.	2011 (51)	No	Unlikely
Musk Duck	<i>Biziura lobata</i>	-	Vulnerable	Permanent swamps with dense vegetation, more open waters in non-breeding season.	2001 (2)	No	Unlikely
Australasian Shoveler	<i>Anas rhynchos</i>	-	Vulnerable	Heavily vegetated swamps and floodwaters.	1991 (2)	No	Unlikely
Hardhead	<i>Aythya australis</i>	-	Vulnerable	Deep, vegetated swamps, open water.	2007 (32)	No	Unlikely
Royal Spoonbill	<i>Platalea regia</i>	-	Near Threatened	Larger shallow waters (inland and coastal), well-vegetated shallow freshwater wetlands, floodplains, billabongs, sewage ponds, irrigation storages, tidal mudflats, estuaries, salt marshes, salt fields, mangroves, islands.	2007 (4)	No	Unlikely

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Common Name	Species Name	National Status *	Victorian Status **	Habitat Preferences	Most Recent Record (no. of sightings)	Habitat Present on Site	Likelihood of Presence
Australasian Bittern	<i>Botaurus poiciloptilus</i>	Endangered	Endangered	Reed beds, dense vegetation of freshwater swamps and creeks.	NPR	No	Unlikely
Eastern Great Egret	<i>Ardea modesta</i>	-	Vulnerable, FFG Listed	Floodwaters, rivers and shallows of wetlands, intertidal mud flats.	2009 (9)	No	Unlikely
Pied Cormorant	<i>Phalacrocorax varius</i>	-	Near Threatened	Large freshwater and saline wetlands and tidal bays along the coast.	1988 (2)	No	Unlikely
Grey Goshawk	<i>Accipiter novaehollandiae novaehollandiae</i>	-	Vulnerable, FFG Listed	Wet Eucalypt / mixed forest with closed canopy and generally low stem density	1997 (1)	No	Unlikely
Australian Painted-Snipe	<i>Rostratula australis</i>	Vulnerable	Critically Endangered, FFG Listed	Uncommon summer migrant to Victoria. Lowlands on shallow freshwater swamps with emergent vegetation, and flooded salt marshes.	NPR	No	Unlikely
Eastern Curlew	<i>Numenius madagascariensis</i>	Critically Endangered	Vulnerable, FFG Listed	Estuaries, tidal mudflats, mangroves, shallow river margins, coastal or inland	NPR	No	Unlikely
Curlew Sandpiper	<i>Calidris ferruginea</i>	Critically Endangered	Endangered, FFG Listed	Estuaries, tidal mudflats, mangroves, shallow river margins, coastal or inland	NPR	No	Unlikely
Latham's Snipe	<i>Gallinago hardwickii</i>	-	Near Threatened	Wet grasslands, open and wooded swamps.	2010 (21)	No	Unlikely
Whiskered Tern	<i>Chlidonias hybridus javanica</i>	-	Vulnerable	Lakes, swamps with emergent or floating plants, low bushes in saltmarsh and estuaries.	2006 (1)	No	Unlikely

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Common Name	Species Name	National Status *	Victorian Status **	Habitat Preferences	Most Recent Record (no. of sightings)	Habitat Present on Site	Likelihood of Presence
Swift Parrot	<i>Lathamus discolor</i>	Endangered	Endangered, FFG Listed	Winter migrant from Tasmania. Generally prefers Box-Ironbark forests and woodlands inland of the Great Dividing Range during winter.	NPR	No	Unlikely
Powerful Owl	<i>Ninox strenua</i>	-	Vulnerable, FFG Listed	Tall open forest and woodland.	2000 (4)	No	Low
White-throated Needletail	<i>Hirundapus caudacutus</i>	-	Vulnerable, FFG Listed	Aerial insectivore that rarely lands to perch, often sleeping on the wing	2010 (3)	No	Low
Regent Honeyeater	<i>Anthochaera phrygia</i>	Endangered	Critically Endangered, FFG Listed	Depends on nectar and insects from Box-Ironbark Eucalypt forests. Only breeding habitat lies in Northeast Victoria and central coast of NSW	2000 (1)	No	Unlikely
Painted Honeyeater	<i>Grantiella picta</i>	Vulnerable	Vulnerable, FFG Listed	Open box-ironbark forests and woodlands, particularly where trees are infested with mistletoe.	NPR	No	Unlikely
<b>Mammals</b>							
Spotted-tail Quoll	<i>Dasyurus maculatus maculatus</i>	Vulnerable	Endangered, FFG Listed	Forests including large intact areas of vegetation for foraging.	NPR	No	Unlikely
Swamp Antechinus	<i>Antechinus minimus maritimus</i>	Vulnerable	Near Threatened, FFG Listed	Heathy forest, wetlands, heathland and coastal scrub.	NPR	No	Unlikely
Greater Glider	<i>Petauroides volans</i>	-	Vulnerable	Wet sclerophyll forests, requires large tree hollows for nesting	NPR	No	Unlikely

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Common Name	Species Name	National Status *	Victorian Status **	Habitat Preferences	Most Recent Record (no. of sightings)	Habitat Present on Site	Likelihood of Presence
Grey-headed Flying-fox	<i>Pteropus poliocephalus</i>	Vulnerable	Vulnerable, FFG Listed	Roost sites commonly occur in gullies, in vegetation with dense canopy cover and close to water.	NPR	No	Moderate
Smoky Mouse	<i>Pseudomys fumeus</i>	Endangered	Endangered, FFG Listed	Dry sclerophyll forests with tussocky understorey	NPR	No	Unlikely
Broad-toothed Rat	<i>Mastacomys fuscus mordicus</i>	Vulnerable	Endangered, FFG Listed	A range of habitats from sub-alpine to coastal heathland, with high vegetative coverage in high rainfall areas	NPR	No	Unlikely
<b>Frogs</b>							
Growling Grass Frog	<i>Litoria raniformis</i>	Vulnerable	Endangered, FFG Listed	Permanent lakes, swamps, dams and lagoons.	NPR	No	Unlikely
<b>Reptiles</b>							
Eastern Long-necked Turtle	<i>Chelodina longicollis</i>	-	Data Deficient	Coastal and inland waterways, often seen wandering far from water	2011 (2)	No	Unlikely
<b>Fish</b>							
Australian Grayling	<i>Prototroctes maraena</i>	Vulnerable	Vulnerable, FFG Listed	Clear gravelly streams; deep slow flowing pools.	NPR	No	Unlikely
Dwarf Galaxias	<i>Galaxiella pusilla</i>	Vulnerable	Vulnerable, FFG Listed	Slow moving waters, including ephemeral drains.	NPR	No	Unlikely

**Table Notes:**

This table excludes species listed exclusively as 'migratory' or 'marine' under the EPBC Protected Matters Search results (Department of the Environment and Energy 2018a).

**\* Likelihood of Presence Definitions:**

Unlikely – Site does not contain habitat and/or it is outside the species' known, current distribution. Birds and bats may fly over.

Low – Site contains some marginal habitat, but the species was not observed and has not been recorded in previous recent surveys in the area. Birds and bats may fly over.





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Moderate – Site contains preferred habitat that may support a population of the species. Birds and bats may opportunistically or seasonally forage at the site.

High – Site contains preferred habitat which is likely to support the species. Birds and bats are likely to regularly (at least seasonally) forage or roost at the site.

Present – Preferred habitat is present on the site, and the species was observed on the site, or recently recorded on the site.

NPR – No previous record, modelled presence only under the EPBC Protected Matters Search results (Department of the Environment and Energy 2018a).

Threatened status based on the Advisory List of Threatened Vertebrate Fauna in Victoria (Department of Sustainability and Environment 2013) and the Advisory List of Threatened Invertebrate Fauna in Victoria (Department of Sustainability and Environment 2009).

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## Appendix 2. Legislation

### Commonwealth Legislation

#### ***Environment Protection and Biodiversity Conservation Act 1999 (Cth)***

The *Environment Protection and Biodiversity Conservation Act 1999 (Cth)* (EPBC Act) is to provide for the conservation of 'Matters of National Environmental Significance'. The Act defines eight Matters of National Environmental Significance:

- World Heritage properties;
- National Heritage Places;
- Ramsar wetlands of international significance;
- Nationally listed threatened species and ecological communities;
- Listed migratory species;
- Commonwealth marine areas;
- The Great Barrier Reef Marine Park; and,
- Nuclear actions.

Under the Act, actions that are likely to have a significant impact upon Matters of National Environmental Significance require approval from the Federal Environment Minister. This approval is sought through a referral process for a particular action. An action includes any project, development, undertaking, activity or series of activities. Consideration of the requirement for an 'EPBC Referral' to the Minister has been made within this report.

### State Legislation

#### ***Flora and Fauna Guarantee Act 1988 (Vic)***

The *Flora and Fauna Guarantee Act 1988 (Vic)* (FFG Act) provides a legal framework for enabling and promoting the conservation of all Victoria's native flora and fauna, and to enable management of potentially threatening processes on public land. The Act lists native species, communities, and processes that threaten native flora and fauna, under Schedules of the Act. This enables the assessor and regulators to establish management measures to mitigate impacts on listed values within Victoria.

A 'Protected Flora and Fauna Licence or Permit' from DSE is required to 'take' listed flora species that are members of listed communities or protected flora from public land. 'Taking' flora is defined as any action which results in the removal or death of a native plant. A permit is not required under the FFG Act for private land, unless listed species are present and the land is declared 'critical habitat' for the species.

An evaluation of the likelihood of the presence of significant flora and fauna species on the subject site, including those listed under the FFG Act that have previously been recorded in the vicinity of the site, has been undertaken.

#### ***Planning and Environment Act 1987 (Vic)***

The *Planning and Environment Act 1987 (Vic)* (P&E Act), later amended by the *Planning and Environment (Planning Schemes) Act 1996 (Vic)* provides the foundation of planning schemes in

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Victoria. Planning schemes set out policies and provisions for the development and protection of land within each municipality in Victoria.

The *Planning and Environment (Planning Schemes) Act 1996* provides for the Minister for Planning to prepare a set of standard provisions for planning schemes called the Victoria Planning Provisions (VPP). The VPP is a state-wide reference document or template from which planning schemes are sourced and constructed. Incorporation of references such as the *Permitted Clearance of Native Vegetation – Biodiversity Assessment Guidelines* into Section 12 of the VPP ensures that all municipalities must consider this policy. Local zones and overlays, such as Environmental Significance Overlays, may be incorporated into Section 30 and 40 of the planning provisions by each Council, but only remain relevant within that municipality.

The objectives of the P&E Act are to integrate local land use, development planning and development policy with environmental, social, economic, conservation and resource management policies at State, regional and municipal levels through a set of planning schemes. The Act also establishes a clear procedure for public participation in decision making in amending planning schemes.

Some important sections of the planning scheme, in relation to the ecological values of a site, include:

- Section 12 of the State Planning Policy Framework, which identifies, and aims to protect, key biodiversity assets from inappropriate development. It directly refers to Victoria’s No Net Loss policy and other legislation which must be considered when preparing a planning permit application;
- Provision 52.17 which identifies where native vegetation removal is exempt from requiring a planning permit;
- Provision 66.02 which identifies all of the mandatory referral authorities. In particular the Victorian Department of Environment and Primary Industries is identified as the recommending referral authority if a proponent proposes:
  - *To remove, destroy or lop native vegetation if the area to be cleared is 0.5 hectare or more.*
  - *To remove, destroy or lop native vegetation for the following class of application based on the risk-based pathway as defined in the Permitted clearing of native vegetation – Biodiversity assessment guidelines*
    - *High risk-based pathway.*
    - *To remove, destroy or lop native vegetation if a property vegetation plan applies to the site.*
    - *To remove, destroy or lop native vegetation on Crown land which is occupied or managed by the responsible authority (Department of Environment Land Water and Planning 2018c).*

#### ***Catchment and Land Protection Act 1994 (Vic)***

The *Catchment and Land Protection Act 1994 (Vic)* (CALP Act) is the principle legislation relating to the management of pest plants and animals in Victoria. Under this Act, landowners have a responsibility to avoid causing or contributing to land degradation. Where possible, landowners are

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required to conserve soil, protect water resources, eradicate 'regionally prohibited' weeds, prevent the growth and spread of 'regionally controlled' weeds and control pest animals. The CALP Act lists the species that are considered weeds and pest animals.

#### **Wildlife Act 1975 (Vic)**

Victoria's *Wildlife Act 1975* (Vic) and the *Wildlife Regulations 2002* (Vic) protect all indigenous vertebrate fauna, some non-indigenous vertebrate fauna, and some invertebrate fauna listed as 'threatened' under the FFG Act. The *Wildlife Act 1975* (Vic) prevents intentional injury to wildlife, and stipulates that a licence should be granted where there is a possibility that wildlife are injured, or where wildlife is to be kept, relocated or traded.

In most cases, where the proponent is planning to develop a site, a planning permit approval provides this licencing approval, however, this report advises if an additional permit is required. Circumstances where this legislation may not be relevant is where fish are involved, on public land where additional regulatory approval is required, or where other permits are required (such as where fauna are required to undergo invasive procedures or installation of telemetry systems).

#### **Fisheries Act 1995 (Vic)**

The *Fisheries Act 1995* (Vic) provides the legislative framework for the regulation, management conservation of Victorian fish species and their habitats. As with the Victorian *Wildlife Act 1975* described above, the key method to ensure compliance is through licencing. Where fish, or their habitats, are likely to be impacted, this report will identify additional requirements.

#### **Other relevant policy**

##### ***Guidelines for the removal, destruction or lopping of native vegetation* (Department of Environment Land Water and Planning 2017b)**

The *Guidelines for the removal, destruction or lopping of native vegetation* (Department of Environment Land Water and Planning 2017b) were released by DELWP in December 2017. These guidelines supersede the Biodiversity Assessment Guidelines (Department of Environment and Primary Industries 2013).

A permit to remove native vegetation under clause 52.16 and 52.17 of the Victoria Planning Provisions is required unless:

- The table of exemptions to this clause specifically states that a permit is not required;
- It is native vegetation or an area specified in the schedule to the clause;
- A Native Vegetation Precinct Plan corresponding to the land is incorporated into the relevant planning scheme; or
- Bushfire exemptions apply in bushfire prone areas (Department of Environment Land Water and Planning 2017b).

The Guidelines describe the permitting process for applications to remove native vegetation on private and public property within Victoria. A key strategy of the State Planning Policy Framework, relating to biodiversity, is to ensure that there is no net loss to biodiversity as a result of the

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removal, destruction or lopping of native vegetation. This is achieved through iteratively applying the three-step approach:

1. Avoiding the removal, destruction or lopping of native vegetation.
2. Minimising impacts from the removal, destruction or lopping of native vegetation that cannot be avoided.
3. Providing an offset to compensate for the biodiversity impact from the removal, destruction or lopping of native vegetation (Department of Environment Land Water and Planning 2017b; p. 4).

Native vegetation is defined in the Victoria Planning Provisions as 'plants that are indigenous to Victoria, including trees, shrubs, herbs and grasses' (Department of Environment Land Water and Planning 2017b).

Native vegetation is further classified into two categories (Department of Environment Land Water and Planning 2017b):

- A remnant patch of native vegetation (measured in hectares) is either:
  - An area of vegetation where at least 25 per cent of the total perennial understorey plant cover is native, or
  - Any area with three or more native canopy trees where the drip line of each tree touches the drip line of at least one other tree, forming a continuous canopy, or
  - Any mapped wetland included in the *Current Wetlands Map*, available in DELWP systems and tools.

OR

- A scattered tree (measured in number of trees), is a native canopy tree that does not form a patch (Department of Environment Land Water and Planning 2017b).

In addition, a canopy tree with a Diameter at Breast Height (DBH) greater than or equal to the large tree benchmark for the relevant bioregional EVC is defined as a large tree. Large trees can be either a large scattered tree or a large tree within a patch.

The contribution that is made by native vegetation to the biodiversity values of Victoria is determined through an assessment of both site-based information and landscape scale information.

At a site-based level, the contribution is determined through an assessment of:

- The extent of native vegetation;
- The number of large trees (either within a patch or scattered trees), relative to the appropriate EVC benchmark;
- The native vegetation condition, which is determined through a Habitat Hectare assessment
- The conservation status of the Ecological Vegetation Class (EVC) to which the vegetation can be classified; and,
- The presence of sensitive wetlands and coastal areas.

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At a landscape scale, the value of the vegetation is determined with reference to its strategic context in the Victorian landscape (Department of Environment and Primary Industries 2013). This is determined by the vegetation's 'Strategic Biodiversity Score' (SBS) and its 'Habitat Importance Score' (HIS) for its value to rare and threatened species (Department of Environment Land Water and Planning 2017b).

All native vegetation within Victoria has a SBS that has been determined through spatial modelling, based on its rarity, level of depletion, species habitats, and condition and connectivity (Department of Environment Land Water and Planning 2017b). SBS scores are between 0 and 1 and are used to determine the offset required for the loss of that vegetation. Native vegetation only has a HIS score if it is habitat for a particular rare or threatened species<sup>6</sup> (Department of Environment Land Water and Planning 2017b). There are two types of rare or threatened species habitats that may be provided by native vegetation:

- **Highly localised habitats for rare or threatened species** – where impact to this particular patch of native vegetation could result in a significant biodiversity impact, such as a breeding colony or species with a limited geographic extent.
- **Dispersed rare or threatened species habitats** – where habitat for the threatened species has become depleted or fragmented over time (Department of Environment Land Water and Planning 2017b).

The HIS is used to apply the decision guidelines in relation to the removal of a patch of native vegetation and to determine offset requirements (Department of Environment Land Water and Planning 2017b).

Applications to remove native vegetation are categorised against one of three assessment pathways. These pathways are categorised as:

- Basic – limited impacts on biodiversity.
- Intermediate – could impact on large trees, endangered EVCs, and sensitive wetlands and coastal areas.
- Detailed – could impact on large trees, endangered EVCs, sensitive wetlands and coastal areas, and could significantly impact on habitat for rare or threatened species (Department of Environment Land Water and Planning 2017b).

This is initially determined in two ways, based on the 'location map' and the extent risk of the vegetation proposed to be removed. The location risk is determined with reference to the *Native Vegetation Location Risk* map available on DELWP's website (Department of Environment Land

<sup>6</sup> Rare or threatened species are species listed in:

- DELWP's Advisory List of Rare or Threatened Plants in Victoria (DEPI 2014a) as 'endangered', 'vulnerable', or 'rare', but does not include the 'poorly known' category.
- DELWP's Advisory List of Threatened Vertebrate Fauna in Victoria (DEPI 2013) as 'critically endangered', 'endangered' or 'vulnerable', but does not include 'near threatened' or 'data deficient' categories
- DELWP's Advisory List of Threatened Invertebrate Fauna in Victoria (DEPI 2009) as 'critically endangered', 'endangered' or 'vulnerable', but does not include 'near threatened' or 'data deficient' categories.

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Water and Planning 2018b). This map shows whether native vegetation is classified as Location 1, 2 or 3.

The extent risk is determined based on the amount of native vegetation that is proposed for removal and includes the area (in hectares) of impact to native vegetation, the number of scattered trees, and the number of large trees (Table A5).

**Table A5.** Assessment pathways for removal of remnant patches of native vegetation (Department of Environment Land Water and Planning 2017b).

Extent	Location		
	Location 1	Location 2	Location 3
<b>Less than 0.5 hectares and not including any large trees</b>	Basic	Intermediate	Detailed
<b>Less than 0.5 hectares and including one or more large trees</b>	Intermediate	Intermediate	Detailed
<b>0.5 hectares or more</b>	Detailed	Detailed	Detailed

All applications to remove native vegetation must include the following information:

1. Information about the native vegetation to be removed, including:
  - a. The assessment pathway and reason for the assessment pathway;
  - b. A description of the native vegetation to be removed;
  - c. Maps showing the native vegetation and property in context;
  - d. The offset requirement, determined in accordance with section 5 of the Guidelines that will apply if the native vegetation is approved to be removed.
2. Topographic and land information relating to the native vegetation to be removed;
3. Recent, dated photographs of the native vegetation to be removed;
4. Details of any other native vegetation approved to be removed, or that was removed without the required approvals, on the same property or on contiguous land in the same ownership as the applicant, in the five year period before the application for a permit is lodged;
5. An 'Avoid and Minimise' statement;
6. A copy of any Property Vegetation Plan contained within an agreement made pursuant to section 69 of the *Conservation, Forests and Lands Act 1987 (Vic)* that applies to the native vegetation to be removed;
7. Where the removal of native vegetation is to create defensible space, a written statement explaining why the removal of native vegetation is necessary;
8. If the application is under Clause 52.16, a statement that explains how the proposal responds to the Native Vegetation Precinct Plan considerations at decision guideline 8, and
9. An offset statement providing evidence that an offset that meets the offset requirements for the native vegetation to be removed has been identified, and can be secured in accordance with the Guidelines (Department of Environment Land Water and Planning 2017b; p. 20-21).

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If the application will be assessed under the Detailed Assessment Methodology, the following additional requirements apply:

10. A site assessment report of the native vegetation to be removed, including:
  - a. A habitat hectare assessment of any patches of native vegetation, including the condition, extent (in hectares), Ecological Vegetation Class and bioregional conservation status.
  - b. The location, number, circumference (in centimetres measured at 1.3 metres above ground level) and species of any large trees within patches.
  - c. The location, number, circumference (in centimetres measured at 1.3 metres above ground level) and species of any scattered trees, and whether each tree is small or large.
11. Information about impacts on rare or threatened species habitat, including:
  - a. The relevant section of the Habitat importance map for each rare or threatened species requiring a species offset.
  - b. For each rare or threatened species that the native vegetation to be removed is habitat for, according to the Habitat importance maps: - the species' conservation status - the proportional impact of the removal of native vegetation on the total habitat for that species - whether their habitats are highly localised habitats, dispersed habitats, or important areas of habitat within a dispersed species habitat (Department of Environment Land Water and Planning 2017b; p. 22).

Ten decisions guidelines are identified within the Guidelines that the responsible or referral authority must consider when deciding on an application to remove native vegetation. These are summarised as follows:

1. The degree to which the application avoids and minimises impacts to native vegetation, and where vegetation is proposed to be removed, the highest quality vegetation is avoided;
2. The role that the vegetation to be removed has in relation to landscape services such as erosion control, ground-water quality, waterway quality;
3. The role of the vegetation in the preservation of landscape features;
4. Whether any part of the native vegetation to be removed, destroyed or lopped is protected under the *Aboriginal Heritage Act 2006* (Vic);
5. The need to remove, destroy or lop native vegetation to create defensible space to reduce the risk of bushfire to life and property, having regard to other available bushfire risk mitigation measures;
6. Whether the native vegetation to be removed is in accordance with any Property Vegetation Plan that applies to the site;
7. Whether an offset that meets the offset requirements for the native vegetation to be removed has been identified and can be secured in accordance with the Guidelines;
8. Whether the application is consistent with a Native Vegetation Precinct Plan (where relevant);
9. For applications in both the Intermediate and Detailed Assessment Pathway only, the impacts on biodiversity values that would occur as a result of vegetation removal; and,
10. For applications in the Detailed Assessment Pathway only, the impacts on habitat for rare or threatened species (Department of Environment Land Water and Planning 2017b).



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### *Offset requirements*

In all cases where native vegetation is approved for removal, the proponent is liable for the security of an offset site that meets the requirements under the Guidelines. An offset can be either a:

- First party offset – on the same property as the proposed removal of native vegetation, or on another property owned or managed (in the case of Crown land) by the party requiring the offset, or
- Third party offset – on another party's property. Third party offsets are traded as native vegetation credits.

In most cases a third party offset is the simplest and most cost effective means of securing the required offset.

There are three components to offset requirements:

1. Offset type (general or species).
2. Offset amount (measured in general or species habitat units).
3. Offset attributes.

Two types of offset are identified: General Offsets and Specific Offsets. Specific Offsets may only be required if the native vegetation to be removed is habitat for rare or threatened species that are identified in an Intermediate or Detailed Assessment Pathway application (Department of Environment Land Water and Planning 2017b). To determine this, a 'Specific Biodiversity Equivalence Score' is calculated by multiplying the habitat hectares with the HIS for each species that may be impacted. For each of the species, this figure is divided by the sum of all the Specific Biodiversity Value Scores calculated for the remaining vegetation under investigation to give a specific offset threshold for each species. If the amount of vegetation removed exceeds this threshold, then a Specific Offset is required. If it does not exceed the threshold, then only a General Habitat Offset is required (Table A6)(Department of Environment Land Water and Planning 2017b).

Table A6 summarises the offset requirements for each of the Assessment Pathways and offset types.

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**Table A6.** Offset requirements for the removal of native vegetation

Assessment Pathway	Offset Type	Offset amount		Offset attributes	
		Risk Adjusted Biodiversity Equivalence	Species Habitat Requirement	Vicinity	Strategic Biodiversity Score
Basic Assessment Pathway	General offset	1.5 times the general biodiversity equivalence score <sup>1</sup> of the native vegetation to be removed.	No restrictions.	In the same Catchment Management Authority boundary as the native vegetation to be removed.	At least 80 per cent of the SBS of the native vegetation to be removed.
Intermediate or Detailed Assessment Pathway	General offset	1.5 times the general biodiversity equivalence score of the native vegetation to be removed.	No restrictions.	In the same Catchment Management Authority boundary as the native vegetation to be removed.	At least 80 per cent of the SBS of the native vegetation to be removed.
	Specific offset	For each species impacted, 2 times the specific biodiversity equivalence score of the native vegetation to be removed.	Likely habitat for each rare or threatened species that a specific offset is required for, according to the specific-general offset test.	No restrictions.	No restrictions.

<sup>1</sup> The general biodiversity equivalence score is determined by multiplying the vegetation's habitat hectare score by its SBS.

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**Appendix 3. Native Vegetation Removal Report**

# Native vegetation removal report

This report provides information to support an application to remove, destroy or lop native vegetation in accordance with the *Guidelines for the removal, destruction or lopping of native vegetation*. The report **is not an assessment by DELWP** of the proposed native vegetation removal. Native vegetation information and offset requirements have been determined using spatial data provided by the applicant or their consultant.

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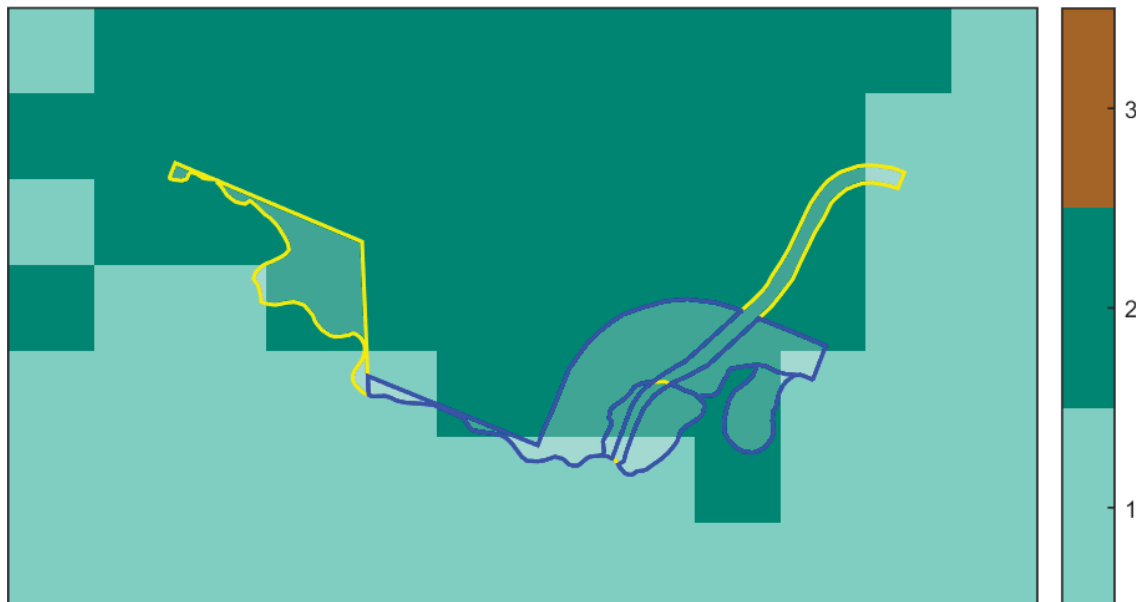
Report ID: ECL\_2020\_030

Project ID	1380_Norvel_Estate_EnSym_07122020
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## Assessment pathway

Assessment pathway	Intermediate Assessment Pathway
Extent including past and proposed	0.391 ha
Extent of past removal	0.000 ha
Extent of proposed removal	0.391 ha
No. Large trees proposed to be removed	2
Location category of proposed removal	Location 2 The native vegetation is in an area mapped as an endangered Ecological Vegetation Class (as per the statewide EVC map). Removal of less than 0.5 hectares of native vegetation in this location will not have a significant impact on any habitat for a rare or threatened species.

### 1. Location map





## Native vegetation removal report

### Offset requirements if a permit is granted

Any approval granted will include a condition to obtain an offset that meets the following requirements:

<b>General offset amount<sup>1</sup></b>	0.126 general habitat units
Vicinity	Port Phillip and Westernport Catchment Management Authority (CMA) or Knox City Council
Minimum strategic biodiversity value score <sup>2</sup>	0.202
Large trees	2 large trees

NB: values within tables in this document may not add to the totals shown above due to rounding

Appendix 1 includes information about the native vegetation to be removed

Appendix 2 includes information about the rare or threatened species mapped at the site.

Appendix 3 includes maps showing native vegetation to be removed and extracts of relevant species habitat importance maps

<sup>1</sup> The general offset amount required is the sum of all general habitat units in Appendix 1.

<sup>2</sup> Minimum strategic biodiversity score is 80 per cent of the weighted average score across habitat zones where a general offset is required

## Native vegetation removal report

### Next steps

Any proposal to remove native vegetation must meet the application requirements of the Intermediate Assessment Pathway and it will be assessed under the Intermediate Assessment Pathway.

If you wish to remove the mapped native vegetation you are required to apply for a permit from your local council. Council will refer your application to DELWP for assessment, as required. **This report is not a referral assessment by DELWP.**

This *Native vegetation removal report* must be submitted with your application for a permit to remove, destroy or lop native vegetation.

Refer to the *Guidelines for the removal, destruction or lopping of native vegetation* (the Guidelines) for a full list of application requirements. This report provides information that meets the following application requirements:

- The assessment pathway and reason for the assessment pathway
- A description of the native vegetation to be removed (met unless you wish to include a site assessment)
- Maps showing the native vegetation and property
- The offset requirements determined in accordance with section 5 of the Guidelines that apply if approval is granted to remove native vegetation.

Additional application requirements must be met including:

- Topographical and land information
- Recent dated photographs
- Details of past native vegetation removal
- An avoid and minimise statement
- A copy of any Property Vegetation Plan that applies
- A defensible space statement as applicable
- A statement about the Native Vegetation Precinct Plan as applicable
- An offset statement that explains that an offset has been identified and how it will be secured.

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Obtaining this publication does not guarantee that an application will meet the requirements of Clauses 52.16 or 52.17 of the Victoria Planning Provisions and Victorian planning schemes or that a permit to remove native vegetation will be granted.

Notwithstanding anything else contained in this publication, you must ensure that you comply with all relevant laws, legislation, awards or orders and that you obtain and comply with all permits, approvals and the like that affect, are applicable or are necessary to undertake any action to remove, lop or destroy or otherwise deal with any native vegetation or that apply to matters within the scope of Clauses 52.16 or 52.17 of the Victoria Planning Provisions and Victorian planning schemes.

## Appendix 1: Description of native vegetation to be removed

All zones require a general offset, the general habitat units each zone is calculated by the following equation in accordance with the Guidelines:

$$\text{General habitat units} = \text{extent} \times \text{condition} \times \text{general landscape factor} \times 1.5, \text{ where the general landscape factor} = 0.5 + (\text{strategic biodiversity value score}/2)$$

The general offset amount required is the sum of all general habitat units per zone.

### Native vegetation to be removed

Information provided by or on behalf of the applicant in a GIS file							Information calculated by EnSym					
Zone	Type	BioEVC	BioEVC conservation status	Large tree(s)	Partial removal	Condition score	Polygon Extent	Extent without overlap	SBV score	HI score	Habitat units	Offset type
0-A	Patch	gipp0937	Endangered	0	no	0.550	0.002	0.002	0.259		0.001	General
0-B	Patch	gipp0937	Endangered	2	no	0.550	0.086	0.086	0.230		0.044	General
0-C	Patch	gipp0937	Endangered	0	yes	0.275	0.131	0.131	0.259		0.034	General
0-D	Patch	gipp0937	Endangered	0	yes	0.130	0.033	0.033	0.260		0.004	General
0-E	Patch	gipp0937	Endangered	0	yes	0.130	0.030	0.030	0.260		0.004	General
0-F	Patch	gipp0937	Endangered	0	no	0.550	0.049	0.049	0.259		0.025	General
0-G	Patch	gipp0937	Endangered	0	no	0.260	0.009	0.009	0.260		0.002	General
0-H	Patch	gipp0937	Endangered	0	yes	0.130	0.009	0.009	0.260		0.001	General
0-I	Patch	gipp0937	Endangered	0	yes	0.275	0.042	0.042	0.260		0.011	General

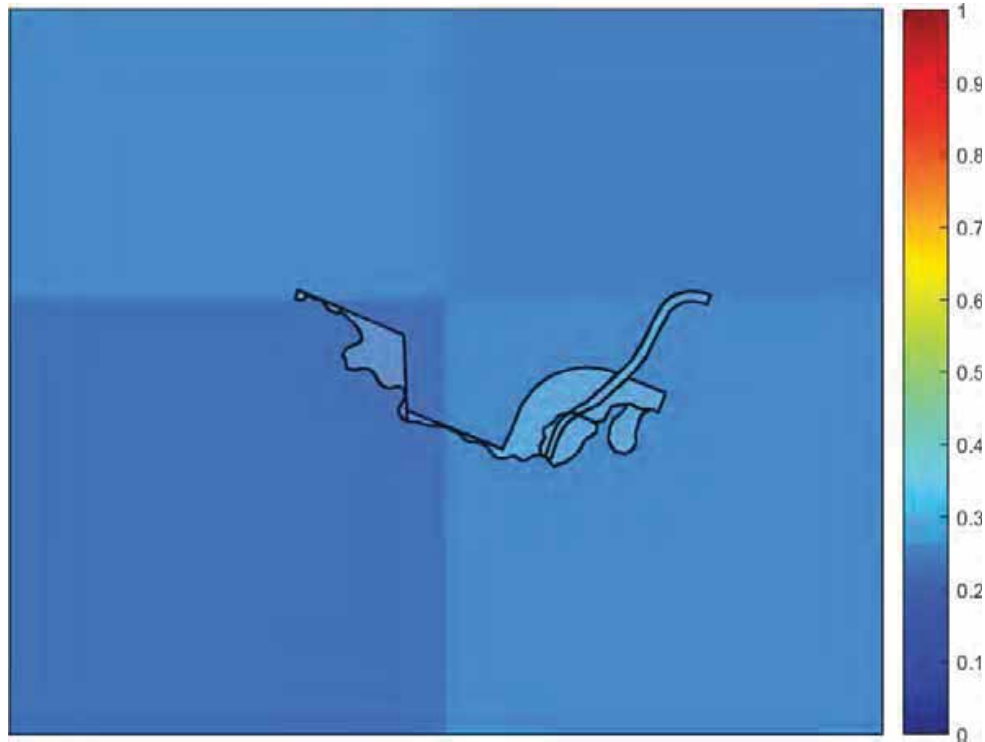
## Appendix 2: Information about impacts to rare or threatened species' habitats on site

This is not applicable in the Intermediate Assessment Pathway.



### Appendix 3 – Images of mapped native vegetation

#### 2. Strategic biodiversity values map



#### 3. Aerial photograph showing mapped native vegetation



4. Map of the property in context



Yellow boundaries denote areas of proposed native vegetation removal.

Blue boundaries denote zones of partial removal with a halved condition score.

The logo for URBIS, consisting of the word "URBIS" in a bold, white, sans-serif font, enclosed within a white square border.A wide-angle landscape photograph showing a green field in the foreground, a wooden fence, and rolling hills in the background under a cloudy sky. The text is overlaid on the left side of the image.

# NORVEL ESTATE, FERNTREE GULLY

## LANDSCAPE REPORT

PREPARED FOR  
NORVEL ESTATE PTY LTD / YONG NING PTY LTD  
17/02/21  
REV H

URBIS STAFF RESPONSIBLE FOR THIS REPORT:

Director - Peter Haack

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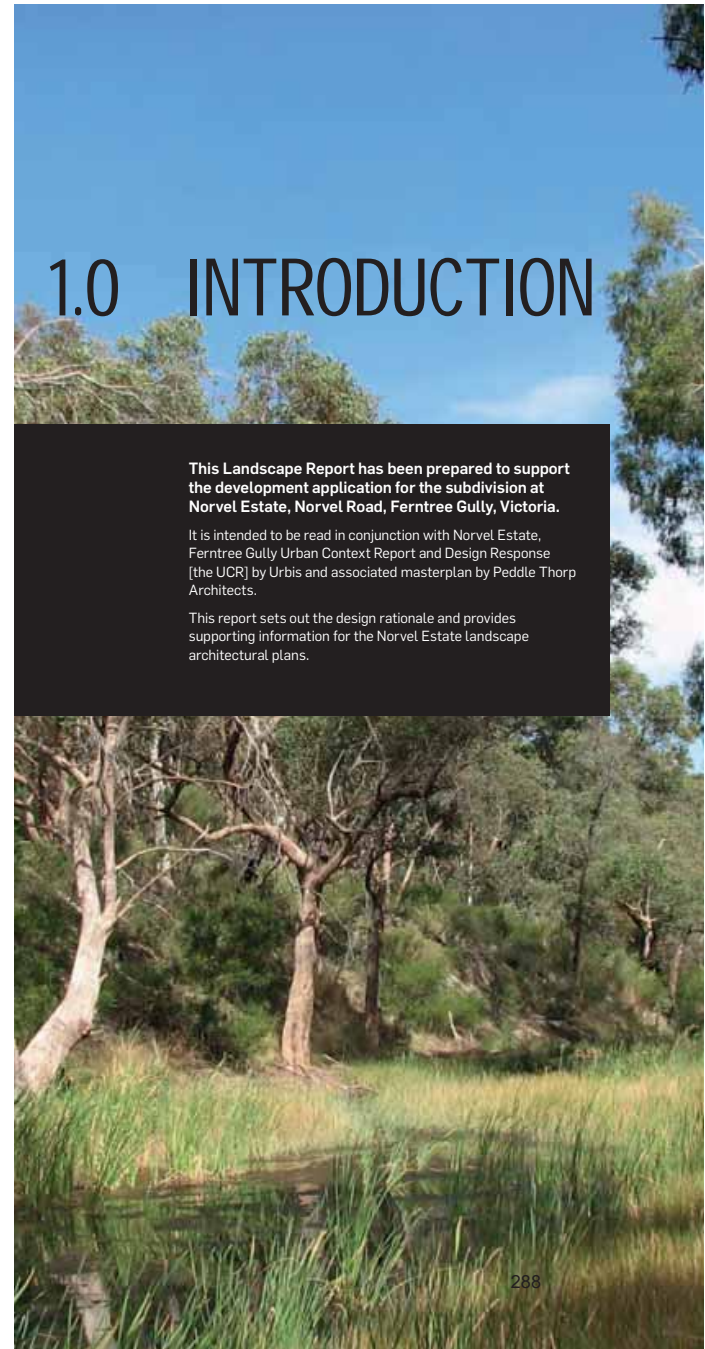
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## 1.0 INTRODUCTION

**This Landscape Report has been prepared to support the development application for the subdivision at Norvel Estate, Norvel Road, Ferntree Gully, Victoria.**

It is intended to be read in conjunction with Norvel Estate, Ferntree Gully Urban Context Report and Design Response [the UCR] by Urbis and associated masterplan by Peddle Thorp Architects.

This report sets out the design rationale and provides supporting information for the Norvel Estate landscape architectural plans.

# 2.0 DESIGN RATIONALE

The proposed landscape design for Norvel Estate seeks to preserve and enhance the leafy character of the area while referencing the history of the site.

The landscape creates a strong tree canopy framework for the streetscapes and the future built form. It also preserves the high value remnant vegetation in the north of the site, and provides improved connectivity for pedestrians and cyclists. It offers a well considered response to treating stormwater run off and the potential risk of bushfires.

## STREETSCAPE

### HARDSCAPE

- Brick and coloured concrete feature paving will be used in key nodes (Figure 2) and may incorporate etched custom graphics and/or text to interpret the site and its history (Figure 1).
- The site was formerly used as a quarry where clay was extracted for the production of Daniel Robertson bricks. In reference to this history, the bricks used for feature paving will be from the Daniel Robertson range.
- For ease of maintenance, uncoloured, broom finished in-situ concrete will be used for most footpaths outside of feature areas

### SOFTSCAPE

- As recommended in the Knox Green Streets Policy, nature strips will be grassed.
- Planting immediately adjacent to rear and side fences will include a mix of shrubs, groundcovers and tufting plants to provide some screening and visual interest.
- Planting within the central pedestrian link will be kept below 1m in height to keep the space feeling open

### STREET TREES

- Street tree species have all been specifically recommended by Council.
- They have been located to satisfy minimum setbacks from intersections (10m) and driveways (3m)
- Existing street trees on Norvel Road will be retained where possible, otherwise any new trees will be *Acer platanoides* 'Norwegian Sunset' to tie in with the existing dominant palette for the street.
- Although Castricum Place is mostly planted with Callistemons, based on Council advice *Eucalyptus polyanthemus* trees have been proposed instead.
- Deciduous trees will be planted on streets running east to west, and evergreen natives on streets running north to south. This approach balances a desire for mostly native trees while maximising opportunities for winter sun ingress using deciduous trees.
- The trees' integration with underground services is consistent with the Streetworks Code of Practice.
- The proposed extent of pavement and wide nature strips in Norvel Estate are appropriate to support the growth of the proposed street trees. There are numerous examples of large canopy trees growing successfully in more urbanised streets throughout Melbourne, in tree pits that are fully surrounded by paving. Such environments are less permeable than any of the street designs proposed for Norvel Estate.



Figure 1 Example of etched custom graphics and text in feature paving

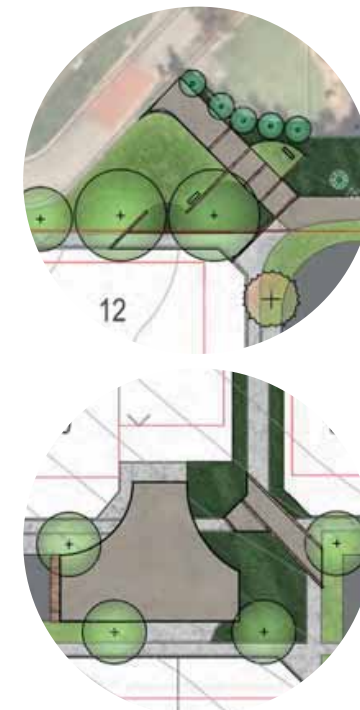


Figure 2 Feature paving nodes in the proposed streetscape

“  
 ‘GREENER AND LEAFIER’  
 HAS BEEN A COMMON  
 ASPIRATION OF KNOX  
 CITIZENS FOR THEIR  
 ENVIRONMENT FOR  
 MANY YEARS.

- Knox Urban Design Framework, p. 25.

- LEGEND**
- Feature paving node
  - Evergreen native / indigenous trees
  - Eucalyptus melliodora
  - Eucalyptus polyanthemos
  - Lophostemon confertus
  - Deciduous trees
  - Acer platanoides 'Norwegian Sunset'
  - Tilia cordata



Figure 3 Proposed tree species plan & feature paving nodes

## LINEAR RESERVE

A 10m wide x 150m long strip of land along Norvel Estate's western boundary connects Castricum Place with the Blind Creek Trail. As identified in the Urban Context Report, and as recommended by Council, this space has opportunity for enhancement and to be formalised as a shared use path (SUP).

The proposed design incorporates a 3m wide SUP along its length. The alignment of the SUP avoids existing trees as much as possible, however the removal of two smaller trees will be necessary. They will be supplemented by new indigenous trees. Native understorey planting is proposed to help screen existing fences in areas that are not adjacent to the bushland reserve or defensible area.

Pedestrians and cyclists will be welcomed to Norvel Estate and the SUP with a gateway landscape at the wider southern end, incorporating open grassed space with some seating, feature paving and indigenous canopy trees.

## BUSHLAND RESERVE

The northern end of the site is densely planted with remnant indigenous vegetation. This will be preserved and handed over to Council in accordance with the Section 173 Agreement.

The proposed design will allow the community to safely enjoy this green space while minimising any degradation. As identified in the Urban Context Report, there is an opportunity to improve local connectivity for pedestrians by providing informal paths through areas that are already disturbed and the more sparsely planted portions of the reserve. Council's advice on the approximate path alignment and materials has been adopted in the design. The exact alignment will be refined in detailed design phases to minimise impacts on vegetation.

The paths will connect the Blind Creek Trail and Agora Boulevard (currently a dead end) with Norvel Estate via the wetland area and Road F. In most cases, granitic sand will be used for the path to maintain a naturalistic appearance. In some portions where there may be risk of disturbing native vegetation (closer to the wetland), an at-grade or above-grade boardwalk will be installed.

The Agora Boulevard to Road F connection has been sized to accommodate occasional vehicle access for maintenance or in the event of an emergency.

## WATER SENSITIVE URBAN DESIGN ELEMENTS

Stormwater from the residential lots and streets of Norvel Estate will be collected and treated using gross pollutant traps, a swale (Figure 6) and a wetland prior to being discharged into the Bushland Reserve and Blind Creek.

Planting palettes have been selected for wetland, emergent and riparian zones within the swale and wetland. The plants in these palettes have been selected to suit the anticipated water conditions of the respective zones and all are indigenous.

Local coldstream rock ballast will be used for stabilisation where required.

## BUSHFIRE SAFETY

While preserving the integrity of the bushland reserve will be very positive ecologically, it does still present some risk of bushfire. The proposed design takes this into account and seeks to minimise dangers to life and property through the positioning of a road as a buffer, providing appropriate building setbacks, and by selecting appropriate plant species and positioning of plants.

The streetscapes and the portion of the linear reserve which is adjacent to the Bushland Reserve and defensible area all consist of low grass and hardscape, with clean-trunked trees that are loosely positioned so they do not form a continuous canopy. The tree species proposed here are "firewise" according to the criteria set out in the Country Fire Association's (CFA's) resource "Landscaping for Bushfire - Garden Design and Plant Selection".

Plant species proposed within the WSUD areas (vegetated swale and wetland) are all below 1m in height. This allows these areas to be classified as 'Shrubland' which has a default minimum building setback of 22m for the purposes of bushfire safety. However, this minimum could be increased through modelling (as has already been applied to the 'Forested' areas). The existing buildings to the west are all at least 23m away from the WSUD areas, while the proposed building setbacks within Norvel Estate allow for 19m to 21m setbacks (refer to landscape drawing #2 - "Bushland Reserve Interface").



Figure 4 Timber slat bench



Figure 5 Boardwalk



Figure 6 Vegetated swale



## TECHNICAL NOTES

The following technical notes are proposed to guide the the protection of existing vegetation and the successful establishment of the landscape.

### TREE PROTECTION

All trees to be retained are to be suitably protected:

- Maintain existing ground levels at the interface between the ground and the tree trunk.
- 'Tree Protection Zone (TPZ) fence radius locations are calculated by 12 x the DBH @ 1.4m above ground level or the area beneath the canopy whichever is greater. The protected trees should be fenced prior to the commencement of the construction activities'
- No excavation, filling, machinery or storage of materials shall occur within the fenced off area.

Install a maximum depth of 100mm approved organic mulch, e.g. woodchips, to the radius of the TPZs beneath the canopy (for grassed areas and garden beds- tapering mulch depth towards tree trunk).

Roots requiring severance beyond the tree TPZ shall be clean cut with hand saw and kept moist. All roots over 30mm dia. and any roots within the fenced area should not be cut without the approval from an experienced and approved arborist.

### SOIL PREPARATION

The area to be planted is to be thoroughly cleared of all building rubble and other debris, then ripped to a depth of 200mm.

### Topsoil

Only existing site soil is to be used.

### Garden beds

Evenly spread a minimum depth of 75mm approved clean, finely graded recycled wood mulch (20mm nom. Size) over topsoil. Ensure mulch is kept away from tree and shrub trunks.

### Levels/drainage/set-out

- Ground levels within all landscape areas should drain towards kerbs and pits in accordance with relevant regulations.
- Retaining walls in front yards are to be avoided between properties with the surface level to be graded to smoothly transition between driveways, landings, access paths and footpaths.
- All dimensions are to be verified on site prior to construction commencing. Any discrepancies are to be immediately reported to the Project Manager for further instruction.

### PLANTING

- All plants are to be true to species, healthy, free from pests disease and stress.
- As per the Knox Genetic Integrity policy, all indigenous species are to be of demonstrated local provenance.
- At the time of planting, fertilise all planting with an approved slow release fertilizer such as 'Osmocote' native fertiliser.
- Ensure all plants are well watered in at the time of planting and as necessary for the first year until established. Apply 10 litres of water per plant immediately following planting.

### Other notes

All trees shall be planted in locations shown on the plan. Any change to plant species must have the approval of the Landscape Architect.

### Underground services

The locations of underground services should be proven on site.

# 3.0 PALETTES

## LEGEND

Ind	Indigenous plant listed in Knox Landscape Plan Guidelines	Ex	Exotic plant
Ind#	Other indigenous plant	*	Recommended by Council for Norvel Estate
Ntv	Native plant listed in Knox Landscape Plan Guidelines	Dec	Deciduous
Ntv#	Other Native plant	EG	Evergreen

### PLANTING SCHEDULE

Code	Botanical Name	Common name	Origin	Foliage	Pot size	Size at maturity (HxW)	Density (per m <sup>2</sup> )	Qty
<b>STREET TREES</b>								
ACE NOR	<i>*Acer platanoides</i> 'Norwegian Sunset'	Norwegian Sunset Maple	Ex	Dec	45L	10 x 7m	as shown	5
EUC mel	<i>*Eucalyptus melliodora</i>	Yellow Box	Ind	EG	45L	20 x 10m	as shown	11
EUC pol	<i>*Eucalyptus polyanthemos</i>	Red Box	Ind	EG	45L	15 x 7m	as shown	76
LOP con	<i>*Lophostemon confertus</i>	Pink Box	Ntv	EG	45L	12 x 7m	as shown	54
TIL GRE	<i>*Tilia cordata</i> 'Greenspire'	Tilia Greenspire	Ex	Dec	45L	8 x 6m	as shown	27
								<b>173</b>
<b>SHRUBS</b>								
ACA GRE	<i>Acacia cognata</i> 'Green Mist #	Green Mist	Ntv		150mm	1.5 x 1.5m	1.2	
ACM CHE	<i>Acmena smithii</i> 'Cherry Surprise'	Cherry Surprise	Ntv		150mm	3 x 1.5m	1.2	
BAN SEN	<i>Banksia integrifolia</i> 'Sentinel'	Sentinel Banksia	Ntv		150mm	2.5 x 1.2m	1.2	
COR alb	<i>Correa alba</i>	White Correa	Ntv		150mm	1.5 x 1.5m	1.2	
COR gla	<i>Correa glabra</i>	Rock Correa	Ntv		150mm	2 x 2m	1.2	
IND aus	<i>Indigofera australis</i>	Austral Indigo	Ind		150mm	2 x 1.5m	1.2	
PHI myp	<i>Philotheca myoporoides</i>	Wax Flower	Ntv		150mm	1.5 x 1.5m	1.2	
WES fru	<i>Westringia fruticosa</i>	Coast Rosemary	Ntv		150mm	1.5 x 1.5m	1.2	
<b>TUFTING PLANTS</b>								
ANI PIN	<i>Anigozanthos</i> 'Pink Joey'	Pink Joey	Ntv		150mm	0.6 x 0.8m	4.0	
DIA CAS	<i>Dianella</i> 'Cassa Blue'	Cassa Blue	Ntv		150mm	0.5 x 0.4m	4.0	
DIA LIT	<i>Dianella</i> 'Little Jess'	Little Jess	Ntv		150mm	0.4 x 0.4m	4.0	
DIP mor	<i>Diplazena moreae</i>	White Iris	Ind		150mm	0.5 x 0.7m	4.0	
LOM LIM	<i>Lomandra</i> 'Lime Tuff'	Lime Tuff	Ntv		150mm	0.5 x 0.5m	4.0	
POA lab	<i>Lomandra</i> 'Seascape'	Seascape	Ntv		150mm	0.5 x 0.8m	4.0	

### PLANTING SCHEDULE


Code	Botanical Name	Common name	Origin	Foliage	Pot size	Size at maturity (HxW)	Density (per m <sup>2</sup> )	Qty
BAN CHE	<i>Banksia</i> 'Cherry Candles'	Cherry Candles	Ntv		150mm	0.5 x 0.5m	2.0	
BRA mul	<i>Brachyscome multifida</i>	Cut-leaf Daisy	Ind		150mm	0.2 x 0.7m	2.0	
COR DUS	<i>Correa</i> 'Dusky Bells'	Dusky Bells	Ntv		150mm	0.6 x 1m	2.0	
KEN pro	<i>Hardenbergia violacea</i>	Purple Coral Pea	Ind		150mm	3m Climbing	2.0	
LEU bro	<i>Leucophyta brownii</i>	Cushion Bush	Ntv		150mm	1 x 1m	2.0	
MYP YAR	<i>Myoporum parvifolium</i> 'Yareena' #	Yareena	Ntv		150mm	0.1 x 1m	2.0	
PAN pan	<i>Pandorea pandorana</i>	Wonga Wonga Vine	Ind		150mm	3m Climbing	2.0	
TET cil	<i>Chrysocephalum semipapposum</i>	Common Everlasting	Ind		150mm	0.2 x 1m	2.0	
WES AUS	<i>Westringia fruticosa</i> 'Aussie Box'	Aussie Box	Ntv		150mm	0.9 x 0.9m	2.0	
<b>WSUD - Wetland</b>								
CAR app	<i>Carex appresa</i>	Tall Sedge	Ind		150mm	1m x 1m	6.0	
FIC nod	<i>Ficinia nodosa</i> #	Knobby Club-Sedge	Ind#		150mm	1m x 1m	6.0	
JUN fla	<i>Juncus flavidus</i> #	Yellow Rush	Ind#		150mm	1m x 1m	6.0	
<b>WSUD - Emergent</b>								
LOM lon	<i>Lomandra longifolia</i>	Spiny-Headed Mat-Rush	Ind		150mm	1m x 1m	6.0	
DIA tas	<i>Dianella tasmanica</i>	Tasmanian Flax Lily	Ind		150mm	1m x 1m	6.0	
FIC nod	<i>Ficinia nodosa</i> #	Knobby Club-Sedge	Ind#		150mm	1m x 1m	6.0	
VIO hed	<i>Viola hederacea</i>	Native Violet	Ind		150mm	0.2m x 1m	6.0	
<b>WSUD - Riparian</b>								
DIA tas	<i>Dianella tasmanica</i>	Tasmanian Flax Lily	Ind		150mm	1m x 1m	4.0	
FIC nod	<i>Ficinia nodosa</i> #	Knobby Club-Sedge	Ind#		150mm	1m x 1m	4.0	
OLE ram	<i>Olearia ramulosa</i>	Twiggy Daisy-bush	Ind		150mm	1m x 1.5m	1.2	


STREET TREES



**LEGEND**

---

 Deciduous

 Evergreen

SHRUBS



Acacia cognata 'Green Mist'



Correa glabra



Banksia integrifolia 'Sentinel'



Indigofera australis



Correa alba



Acmena smithii 'Cherry Surprise'



Philotheca myoporoides



Westringia fruticosa

TUFTING PLANTS



Anigozanthos 'Pink Joey'



Dianella 'Cassa Blue'



Dianella 'Little Jess'



Diplarrena moreae



Lomandra 'Lime Tuff'



Lomandra 'Seascape'

GROUNDCOVERS & CLIMBERS



Westringia fruticosa 'Aussie Box'



Hardenbergia violacea



Pandorea pandorana



Myporum parvifolium 'Yareena'



Banksia 'Cherry Candles'



Brachyscome multifida



Leucophyta brownii



Correa 'Dusky Bells'



Chrysocephalum semipapposum

RIPARIAN



Dianella tasmanica



Ficinia nodosa



Juncus flavidus



Carex appressa



Viola hederacea



Olearia ramulosa



Lomandra longifolia

# HARDSCAPE

Materials are indicative and may be substituted for similar products.



In-situ concrete with colour pigment Abilox 'Champagne' 4.5%.



50mm bricks - Daniel Robertson 'Hawthorn Tan'



Sustainable Australian hardwood timber decking



Broom finish in-situ concrete (grey)



Compacted granitic sand



Coldstream rock ballast (WSUD areas)





**4.0 LANDSCAPE  
CONCEPT PLANS**



**LEGEND**

Existing		Grass	Existing understorey to be managed as defensible zone
Tree to be retained (not including bushland reserve and adjacent properties)	Garden bed	WSUD Planting - Wetland	WSUD Planting - Emergent
Tree to be removed	In-situ concrete, uncoloured	WSUD Planting - Riparian	Coldstream rock beaching
Proposed		Feature pavement - coloured concrete	
Evergreen tree	Feature pavement - brick banding	Compacted granitic sand	
Deciduous tree	Hardwood timber boardwalk		



**LANDSCAPE MASTER PLAN**  
**NORVEL ESTATE**

301  
 1:1000 @ A3  
 DATE: 17/02/21  
 JOB NO: ND1757  
 DWG NO: 01



**LEGEND**

<b>Existing</b>	Grass	Existing understorey to be managed as defensible zone
Tree to be retained (not including bushland reserve and adjacent properties)	Garden bed	WSUD Planting - Wetland
Tree to be removed	In-situ concrete, uncoloured	WSUD Planting - Emergent
<b>Proposed</b>	Feature pavement - coloured concrete	WSUD Planting - Riparian
Evergreen tree	Feature pavement - brick banding	Coldstream rock beaching
Deciduous tree	Compacted granitic sand	
	Hardwood timber boardwalk	

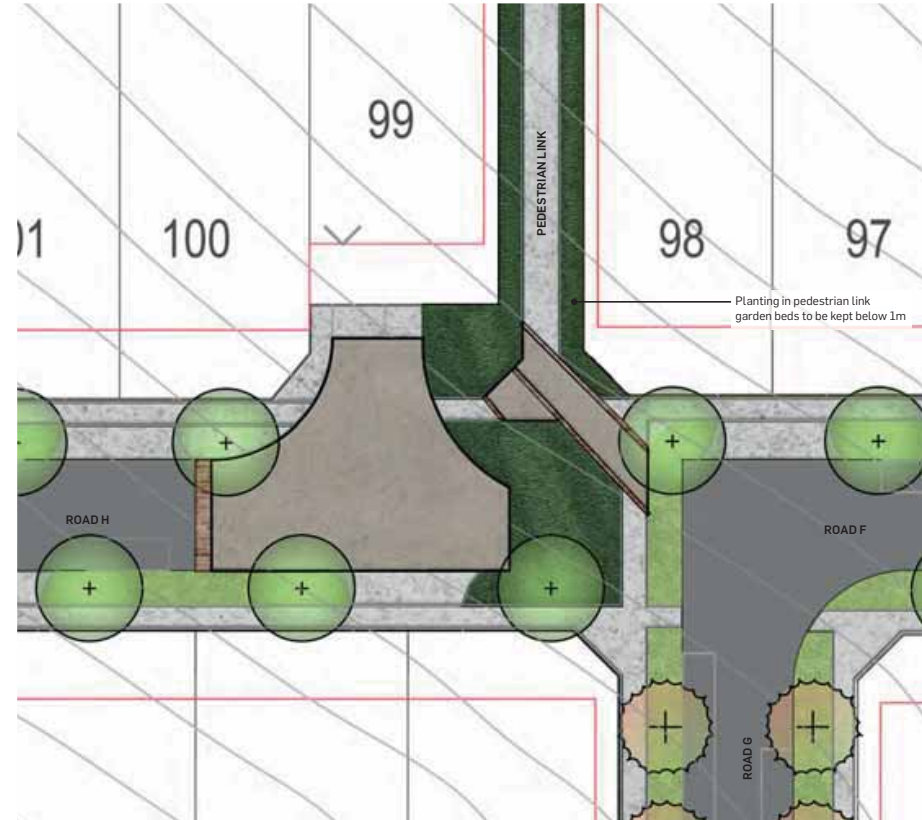


**BUSHLAND RESERVE INTERFACE  
NORVEL ESTATE**

DATE: 17/02/21  
 JOB NO: ND1757  
 DWG NO: 02



SHARED USE PATH ENTRY



PEDESTRIAN LINK ENTRY

LEGEND

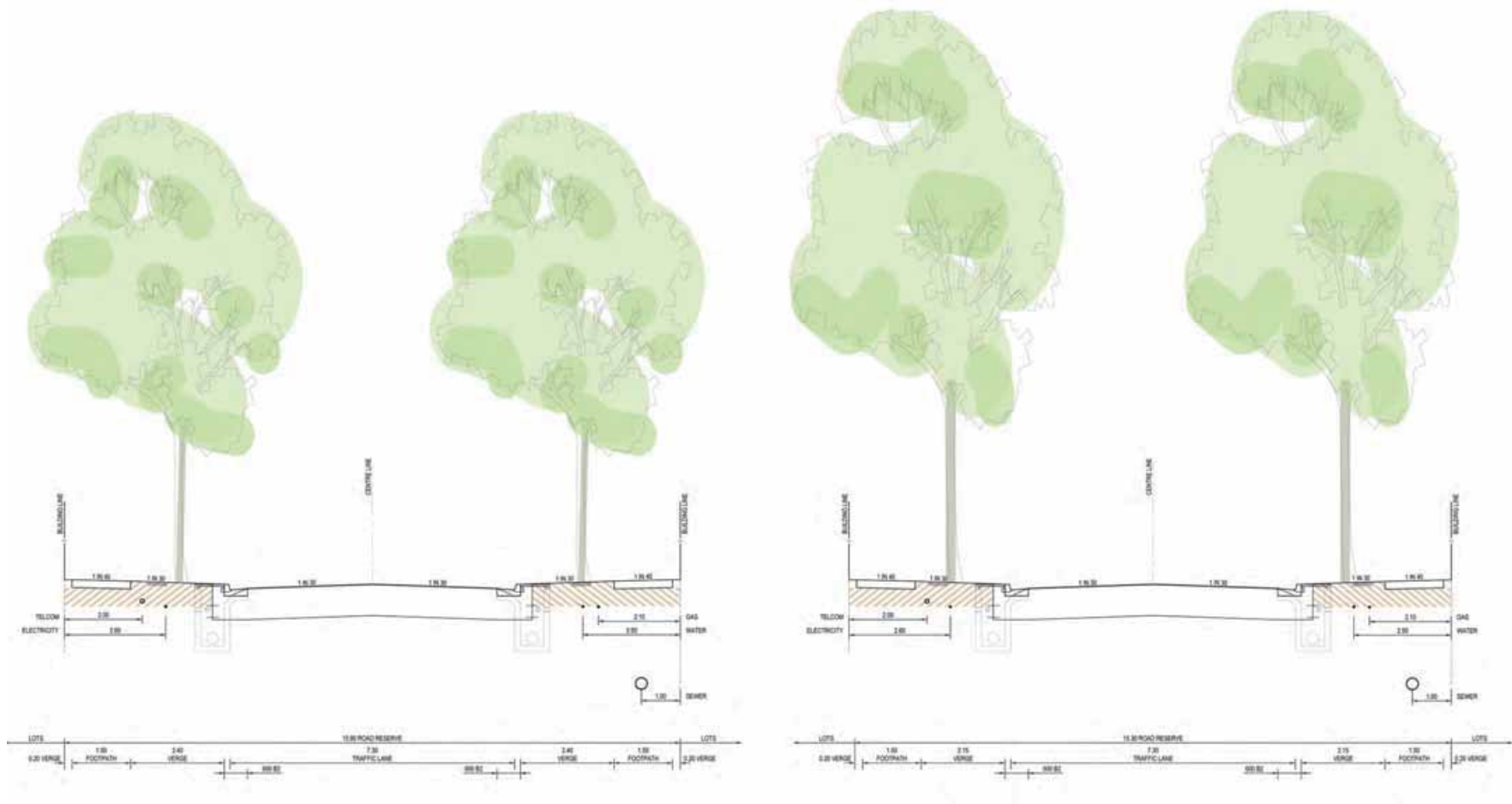
Existing		Grass	Existing understorey to be managed as defensible zone
Tree to be retained (not including bushland reserve and adjacent properties)	Garden bed	WSUD Planting - Wetland	WSUD Planting - Emergent
Tree to be removed	In-situ concrete, uncoloured	WSUD Planting - Riparian	Coldstream rock beaching
Proposed	Feature pavement - coloured concrete		
Evergreen tree	Feature pavement - brick banding		
Deciduous tree	Compacted granitic sand		
	Hardwood timber boardwalk		



FEATURE PAVEMENT AREAS  
NORVEL ESTATE - LANDSCAPE CONCEPT

303  
1:300 @ A3


DATE: 17/02/21  
JOB NO: ND1757  
DWG NO: 03



15.80m ROAD A, G, F  
SCALE 1:50  
(Trees for Road A shown)

15.30m ROAD B, H  
SCALE 1:50  
(Trees for Road H shown)

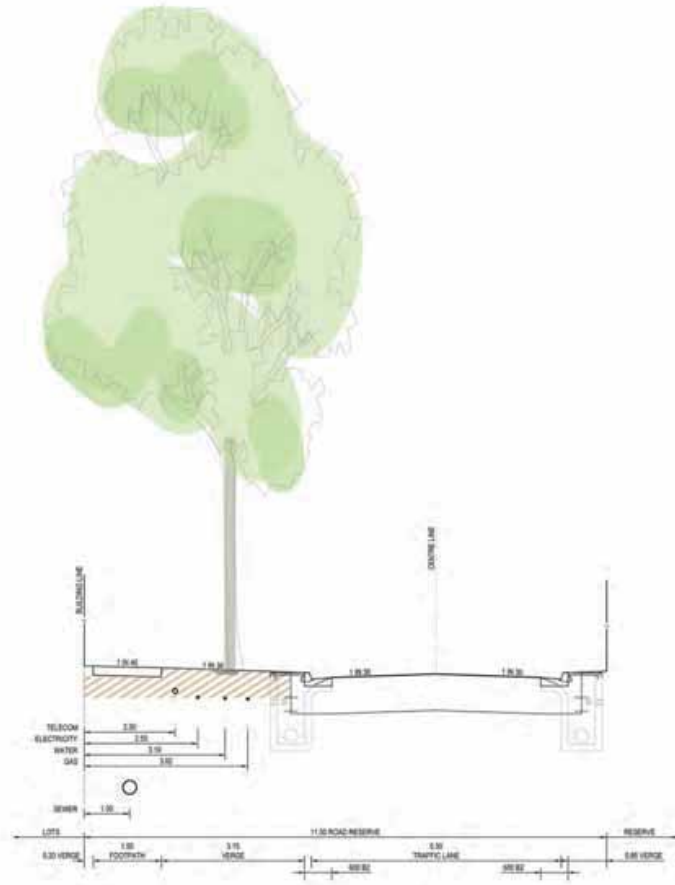
LEGEND

 Root zones (600mm depth)



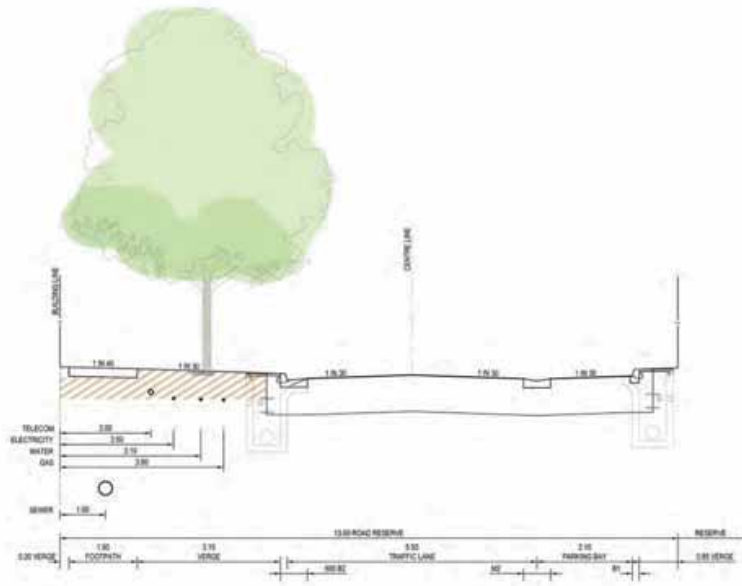
TYPICAL STREET SECTIONS  
NORVEL ESTATE

1:100 @ A3  
DATE: 17/02/21  
JOB NO: ND1757  
DWG NO: 04



11.50m ROAD C, D (WEST)  
SCALE 1:50

(Trees for Road C shown)



13.60m ROAD D (EAST)  
SCALE 1:50

LEGEND

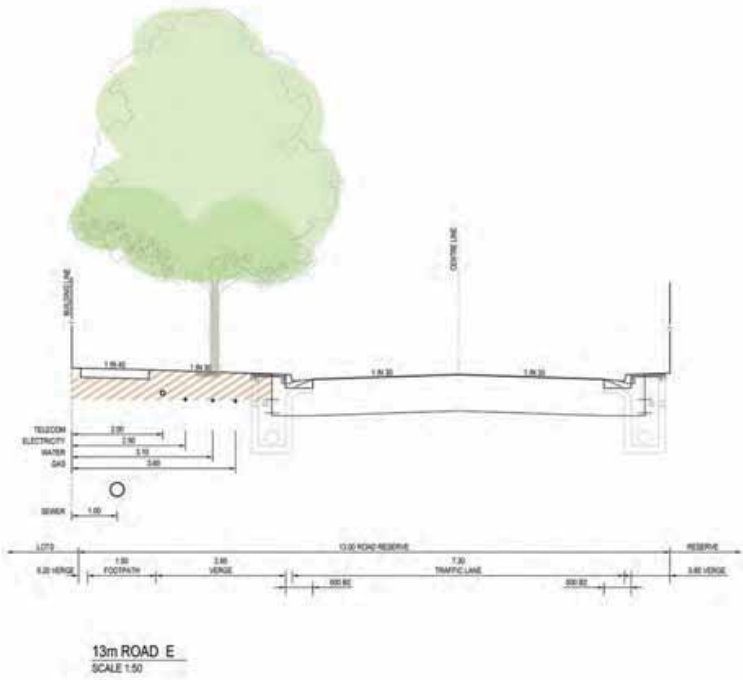
Root zones (600mm depth)



TYPICAL STREET SECTIONS  
NORVEL ESTATE



DATE: 17/02/21  
JOB NO: ND1757  
DWG NO: 05



LEGEND

Root zones (600mm depth)



TYPICAL STREET SECTIONS  
NORVEL ESTATE

DATE: 17/02/21  
JOB NO: ND1757  
DWG NO: 06





**TREEMAP**  
ARBORICULTURE



Arboricultural Assessment & Report  
Norvel Estate, Ferntree Gully

Treemap Arboriculture  
PO Box 465, Heidelberg VIC 3084  
ABN 20 325 463 261  
[www.treemap.com.au](http://www.treemap.com.au)

December 2020

Prepared for:  
Norvel Estate Pty Ltd

308



## 1 Name and address of consultant

Dean Simonsen  
 Treemap Arboriculture  
 PO Box 465, Heidelberg, Victoria 3084

## 2 Instructions

- 2.1 The instructions provided to Treemap Arboriculture on 31/01/17 by Norvel Estate Pty Ltd were to provide an Arboricultural assessment and report for specific trees located on or adjacent to the subject site, the subject site being a collection of land parcels including;
- 18Q Dion Street, Ferntree Gully
  - 29Q Norvel Road, Ferntree Gully
  - 41Q Norvel Road, Ferntree Gully
  - 59R Rankin Road, Ferntree Gully
- 2.2 Additional instructions were issued on 11/11/20 by Norvel Estate Pty Ltd to provide a revised Arboricultural assessment and report that identifies any impacts towards trees located on or adjacent to the subject site.

## 3 Introduction

- 3.1 The owners of the subject site are undertaking investigations to develop the property. As part of the design and application process, the owners are examining specific trees located on or near the site. This report examines the arboricultural matters associated with these trees.
- 3.2 Under AS4970-2009 (Australian Standard – Protection of trees on development sites), the following report would be defined as an 'Arboricultural impact assessment'. The standard indicates that "*The report will identify possible impacts on trees to be retained. The report will explain design and construction methods proposed to minimize impacts on retained trees where there is encroachment into the calculated TPZ.*"

## 4 Key Objectives

- 4.1 To undertake a general assessment of specific trees located on or adjacent to the subject site.
- 4.2 To provide an assessment of the subject trees with respect to their overall condition, structure, safety and suitability for preservation.
- 4.3 To provide recommendations on the suitability of the trees for protection, and provide approved methods of tree protection.

## 5 Method

- 5.1 A site and tree inspection were conducted on Friday 10<sup>th</sup> February, 2017 and Wednesday 9<sup>th</sup> December, 2020.
- 5.2 The tree assessment consisted of a visual inspection, which was undertaken with regard to modern arboricultural principles and practices. The assessment did not involve a detailed examination of

below ground or internal tree parts. The assessment was undertaken from the ground to determine health, structure, form and age class with measurements taken to establish trunk and crown dimensions. No tree samples or site soil samples were taken unless specified. The assessment provides ratings for particular tree attributes, which use broadly defined criteria (Refer to Appendix 2 for Tree descriptors). Trunk diameters for trees on adjoining land may be estimated due to site access limitations.

- 5.3 The trees have been allocated a retention value which combines tree condition factors with functional and aesthetic characteristics in the context of an urban landscape. The retention of trees may not depend solely on arboricultural considerations; therefore, the ratings may act as a guide to assist in decisions relating to tree management and retention decisions.
- 5.4 A feature plan was provided by the client (Plan of Existing Conditions, prepared by H.J.Macey, Ref. no: 5607/EC, and dated 10/03/17). The assessed trees have been numbered on this plan and Tree Protection Zones have also been provided for all trees (Appendix 3).
- 5.5 A proposed site plan was issued for analysis (Site Plan – Tree Removal & Retention prepared by Peddle Thorp, Ref:36-0125, TP058 & TP059, Revision B, dated November 2019). The assessed trees have been numbered on these plans and Tree Protection Zones have also been provided for all trees (Appendix 3a).

## 6 Observations

- 6.1 The site under review presented as a large allotment consisting of multiple land parcels. The site was formerly a clay quarry. The property adjoins residential style properties to the east. Norvel Road frontage is located to the south and Castricum Place adjoins part of the western boundary. Blind creek adjoins the northern boundary with an access track / easement along the western boundary. The southern three quarters of the site is practically devoid of any vegetation. The northern quarter of the site contained a dense native indigenous forest.



General view of significant remnant vegetation at northern end of site

- 6.2 One hundred & seventy-one (170) trees or shrubs were assessed in detail as part of the site review. This included 110 trees on the subject site, 52 neighbouring trees and 8 street trees (Tree no. 105 does not exist in the survey). The detail of each individual tree assessment is provided in table format at Appendix 1. Tree numbers within the assessment table correspond to those provided on the feature survey (Appendix 3).
- 6.3 The tree assessment conducted within the subject site only examined a proportion of the forested area to the north of the site. The tree assessment was focused towards larger trees (generally greater than 20cm in trunk diameter) at the interface between proposed changes associated with a residential subdivision. There were countless small specimens of *Acacia mearnsii* in the study area that were not examined or surveyed by this report.
- 6.4 Sections of the site are influenced by local vegetation controls. The northern section of the site is influenced a City of Knox Environmental Significance Overlay (ESO) and Schedule 2 to that Overlay (ESO2). This is based on a planning property report for the site being obtained from [www.planning.vic.gov.au/](http://www.planning.vic.gov.au/) on 09/12/20. The schedules to each overlay states;

#### **ESO2**

*A permit is not required to remove, destroy or lop vegetation that is:*

- *Not indigenous within Knox (e.g. Victorian species of Boronia or Grevillea).*
  - *A tree with its trunk within two metres of the main roof structure of an existing building used for accommodation (excluding a fence).*
  - *A tree overhanging the roof of a building used for Accommodation, excluding outbuildings and works normal to a dwelling. This exemption only allows the removal, destruction or lopping of that part of the tree which is overhanging the building consistent with the Australian Standard® AS 4373 – 2007, 'Pruning of amenity trees'.*
  - *Grass within a lawn, garden or other planted area and is to be mown or slashed for maintenance only.*
  - *Grass within existing pasture and is to be cut or grazed.*
  - *The minimum amount necessary to maintain a Minor utility installation in accordance with a current signed Memorandum of Understanding between Knox City Council and the relevant service provider.*
  - *Required to be removed for normal maintenance of artificial stormwater treatment ponds (except where the vegetation removal and/or associated works exceed one hectare in area, or where machinery access would result in damage to indigenous vegetation).*
  - *Seedlings or regrowth less than three years old and the land is being maintained for established pasture, crops or garden.*
  - *Woody plants on an existing dam wall.*
  - *For maintenance pruning only and no more than 1/3 of the foliage of any branch is removed from any individual plant. This exemption does not apply to:*
    - *Pruning or lopping of the trunk of a tree or shrub.*
    - *Vegetation within a road or railway reserve.*
- 6.5 Trees that are native to Victoria might also be influenced by Clause 52.17 (Native vegetation) of the planning scheme because the site is larger than 0.4ha. There are exemptions under this clause whereby “*No permit is required to remove, destroy or lop native vegetation to the minimum extent necessary if any of the following apply*”. The critical exemption in relation to this site is probably Planted Vegetation. The clause states at 52.17-7, Table of Exemptions;

***Planted vegetation***, *Native vegetation that is to be removed, destroyed or lopped that was either planted or grown as a result of direct seeding.*

*This exemption does not apply to native vegetation planted or managed with public funding for the purpose of land protection or enhancing biodiversity unless the removal, destruction or*

*lopping of the native vegetation is in accordance with written permission of the agency (or its successor) that provided the funding.*

- 6.6 Native vegetation is defined as '*Plants that are indigenous to Victoria, including trees, shrubs, herbs, and grasses*' under the Definitions of the State Planning provisions – Clause 72.
- 6.7 Approximately 107 trees are located within the footprint of Schedule 2 to the Environmental Significance Overlay (ESO2). The decision guidelines of this planning control would apply to the majority of trees in this zone.
- 6.8 The vast majority of trees would also be influenced by Clause 52.17 (Native vegetation) of the planning scheme because the site is larger than 0.4ha.
- 6.9 Amongst the 107 trees located on the site towards the northern natural forest area, the following species were identified:

Species	No. of trees
<i>Eucalyptus cephalocarpa</i>	64
<i>Eucalyptus ovata</i>	21
<i>Eucalyptus obliqua</i>	8
<i>Eucalyptus radiata</i>	6
<i>Eucalyptus fulgens</i>	4
<i>Eucalyptus macrorhyncha</i>	3
<i>Acacia melanoxylon</i>	1

The following retention values were assigned to the trees in this group.

Retention value	No. of trees
High	4
Moderate	52
Low	47
None	4

- 6.10 The neighbouring trees and street trees examined as part of the assessment included mostly exotic and introduced native trees and shrubs. The retention value of the majority of these plants was 'Low'. There are some large indigenous trees located on the neighbouring land to the west of the site that would need to be considered in the design response, where site changes are proposed near them.
- 6.11 The most recent site inspection revealed some neighbouring trees and street trees have been removed.
- 6.11.1 Neighbouring tree 140, 145, 154 & 156 have been removed.
- 6.11.2 Street tree 165 & 166 have been removed.

## 7 Discussion

The Australian Standard (AS4970-2009) – 'Protection of trees on development sites' puts forward a process for undertaking tree inspections and reports on property where development is being considered. It recommends a preliminary assessment be undertaken to help guide planners and property owners with regard to the preservation of existing trees; that is trees on the site or adjoining land that might contribute to the completed proposal. The standard points out that the preliminary report 'information is to be used by planners, architects and designers, in conjunction with any

planning controls and other legislation, to develop the design layout in such a way that trees selected for retention are provided with enough space'.

These assessments often reveal a range of trees with varying attributes for health, structure and overall value. Some trees may be considered insignificant for their size, age, species type or condition, but they might still be considered for retention because they are situated conveniently on the site. Conversely, some trees may be exceptional for various reasons but there may be no scope for their retention because of their location or other site constraints. An objective of the tree assessment is to determine the trees that may be preferable, in terms of preservation, and to identify poor or insignificant trees that might be easily replaced or replaced with better species. Trees on neighbouring land are considered during this assessment phase.

The arborist must exercise judgement and expertise with respect to the types of trees that are deemed suitable for retention, and they should also consider what stage the tree is at in its overall lifecycle.

The subject site contained a large number of significant trees towards the northern quarter of the property. The northern section of the site contains intact remnant forest, which continues northwards to the Blind Creek Reserve.

The subdivision plans provided indicate the major site changes will occur within the vacant and unencumbered land to the south of the remnant forest. A very small number of trees are influenced by the proposed subdivision layout. Trees 1-4 are located adjacent to proposed site changes.

Tree 1 - *Eucalyptus cephalocarpa* (Mealy Stringybark) is not exposed to any Tree Protection Zone encroachment from the building footprint for the dwelling on Lot 140.

Tree 2 - *Eucalyptus cephalocarpa* (Mealy Stringybark) is not exposed to any Tree Protection Zone encroachment from the building footprint for the dwelling on Lot 140.

Tree 3 - *Eucalyptus cephalocarpa* (Mealy Stringybark) is exposed to Tree Protection Zone encroachment of less than 10% of the TPZ area from the building footprint for the dwelling on Lot 140. This is considered minor encroachment.

Tree 4 - *Eucalyptus cephalocarpa* (Mealy Stringybark) is exposed to Tree Protection Zone encroachment of approximately 10% of the TPZ area from the roadway in front of Lot 140 and the building footprint for the dwelling. This is considered minor encroachment.

A large proportion of the remnant forest trees were assigned arboricultural retention values of 'Moderate' and this collection of trees would have broader environmental values, as reported by any ecological assessments conducted on the site.

A further factor that may influence the proposed development of the subject site will be the design in the vicinity of the neighbouring trees and street trees.

All of the assessed trees on neighbouring land have been indicated at Appendix 3 with their respective Tree Protection Zone and Structural Root Zone. This plan has also been issued to the client in electronic format and these layers have been added to the proposed plans.

Street tree 164 - *Eucalyptus nicholii* (Narrow-leaved Peppermint) is proposed to be removed to allow the installation of crossovers for Lot 1 & Lot 32. Street trees 165 & 166 - *Lagerstroemia indica* (Crape Myrtle) have already been removed.

Street trees 167 & 169 are proposed to be removed to allow the installation of crossovers for Lot 66 & 65.

Street trees 168, 170 & 171 have been provided adequate clearance and no harm is predicted to them from the design, or the proposed crossovers near them.

There is a low risk of Tree Protection Zone encroachment towards any neighbouring trees from building envelopes associated with the subdivision. The neighbouring trees are distant from the

proposed building footprints. The greatest risk towards trees on neighbouring land would be the provision of sewer and drainage services that might be located in easements near the site boundary. The impact of these services towards neighbouring trees would need to be examined on a case by case basis.

A pedestrian / bike path is proposed in the easement to the west of the site. One low value tree is proposed to be removed to allow the path/track to be installed (Tree 141). Tree 140 has already been removed. The pedestrian / bike path also passes through the Tree Protection Zone of multiple trees along this alignment. The proposed design and method of construction for this path will have a significant bearing on the likely impact towards adjacent trees.

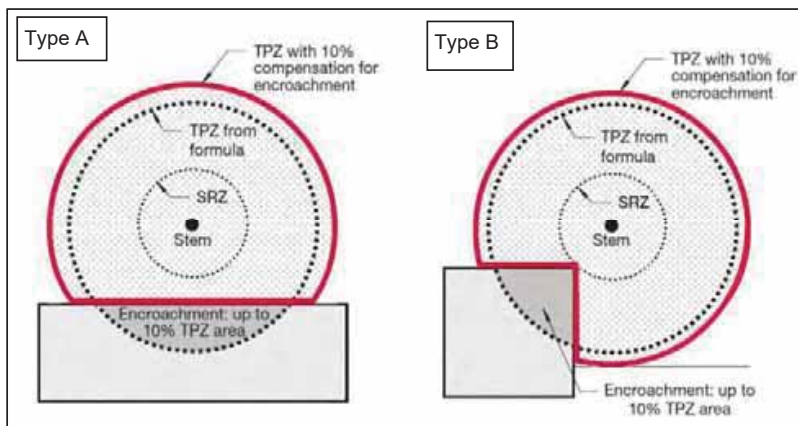
There are no other significant Tree Protection issues relating to trees on adjoining land.

**7.1 Tree protection zones on development sites**

The level of encroachment and the impact to specific trees can be estimated by comparing standard or modified tree protection clearances with those clearances provided to trees in the development design (as discussed above). The overall impact towards a specific tree will be based on the severity of encroachment into the respective tree protection zones. The degree of root activity in the tree protection zone can vary significantly because of existing conditions, which can result in more or less severe impacts to trees. The most accurate means of determining root activity in these zones is to undertake subsurface root investigations. The alternative to undertaking root investigations is to assign appropriate tree protection zones.

This report adopts AS4970-2009, Australian Standard – Protection of trees on development sites as the preferred tree protection method. The method provides a tree protection zone and a tree protection fencing distance (radial measurement from trunk centre) by using the width of the trunk at 1.4m above ground multiplied by 12. The prescribed TPZ distances are provided for each tree in Appendix 1 and tree protection zones are indicated for specific trees at Appendix 3 & 3a.

There is scope to reduce the tree protection zone by an area of 10% without further investigations. The rationale for any reduced tree protection distance is detailed in AS4970-2009 (*Australian Standard – Protection of trees on development sites*). Under encroachment Type A, it is acceptable to reduce the Tree Protection Zone (TPZ) area by 10%. This translates to a reduction in radial clearance distance of approximately 33% on one side of the tree only. This can be applied if there is contiguous space around the tree for root development to occur. The following diagram, from AS4970-2009, is provided to illustrate the approach.



There are vegetation controls that apply to the subject site, and there are more than 100 trees that need consideration under the ESO2 vegetation control.

There are 6 street trees and 48 neighbouring trees that require consideration in the design response.

## 8 Recommendations

- 8.1 The most recent site inspection revealed some neighbouring trees and street trees have been removed.
- 8.1.1 Neighbouring tree 140, 145, 154 & 156 have been removed.
- 8.1.2 Street tree 165 & 166 have been removed.
- 8.2 Of the 110 trees recorded on the site, there are 107 trees that are located within the footprint of Schedule 2 to the Environmental Significance Overlay (ESO2). The decision guidelines of this planning control would apply to a large proportion of trees.
- 8.2.1 Tree 1 - *Eucalyptus cephalocarpa* (Mealy Stringybark) is not exposed to any Tree Protection Zone encroachment from the building footprint for the dwelling on Lot 140.
- 8.2.2 Tree 2 - *Eucalyptus cephalocarpa* (Mealy Stringybark) is not exposed to any Tree Protection Zone encroachment from the building footprint for the dwelling on Lot 140.
- 8.2.3 Tree 3 - *Eucalyptus cephalocarpa* (Mealy Stringybark) is exposed to Tree Protection Zone encroachment of less than 10% of the TPZ area from the building footprint for the dwelling on Lot 140. This is considered minor encroachment.
- 8.2.4 Tree 4 - *Eucalyptus cephalocarpa* (Mealy Stringybark) is exposed to Tree Protection Zone encroachment of approximately 10% of the TPZ area from the roadway in front of Lot 140 and the building footprint for the dwelling. This is considered minor encroachment.
- 8.3 Tree 124 & 125 are environmental weeds recorded along the eastern boundary of the site and they are recommended for removal. A permit is not required to remove these weeds.
- 8.4 Street trees 164, 167 & 169 are proposed to be removed to allow the installation of crossovers.
- 8.5 Summary of proposed tree removals (4 trees)
- | Type of tree      | Tree no.       | Permit or permission required |
|-------------------|----------------|-------------------------------|
| Reserve tree (1)  | 141            | Yes - council                 |
| Street tree (3)   | 164, 167 & 169 | Yes - council                 |
| Neighbouring tree | None           |                               |
- 8.6 One hundred and seven trees (107) are retained.
- 8.7 Street trees 168, 170 & 171 have been provided adequate clearance and no harm is predicted to them from the design, or the proposed crossovers near them.
- 8.8 There is a low risk of Tree Protection Zone encroachment towards any neighbouring trees from building envelopes associated with the subdivision. The neighbouring trees are distant from the proposed building footprints. The greatest risk towards trees on neighbouring land would be the provision of sewer and drainage services that might be located in easements near the site boundary. The impact of these services towards neighbouring trees would need to be examined on a case-by-case basis.
- 8.9 A pedestrian / bike path is proposed in the easement to the west of the site. One low value tree is proposed to be removed to allow the path/track to be installed (Tree 141). Tree 140 has already



been removed. The pedestrian / bike path also passes through the Tree Protection Zone of multiple trees along this alignment. The proposed design and method of construction for this path will have a significant bearing on the likely impact towards adjacent trees.

- 8.10 Any vegetation in the study area that was not assessed as part of this report was considered insignificant, generally undesirable or sufficiently clear of any expected works.
- 8.11 Any proposed development on the site should make provision for landscaping and the planting of new trees.



Dean Simonsen (BAppSc *Melb.*)  
Consultant Arborist

## 9 References

Australian Standard AS 4970, 2009. *Protection of trees on development sites*. Standards Australia

## 10 Definitions

The TPZ and SRZ are defined in AS4970-2009, Australian Standard – Protection of trees on development sites as:

**Tree protection zone (TPZ)**

*A specified area above and below ground and at a given distance from the trunk set aside for the protection of a tree's roots and crown to provide for the viability and stability of a tree to be retained where it is potentially subject to damage by development.*

**Structural root zone (SRZ)**

*The area around the base of a tree required for the tree's stability in the ground. The woody root growth and soil cohesion in this area are necessary to hold the tree upright. The SRZ is nominally circular with the trunk at its centre and is expressed by its radius in metres. This zone considers a tree's structural stability only, not the root zone required for a tree's vigour and long-term viability, which will usually be a much larger area.*

Tree Assessment Detail for Norvel Estate, Ferntree Gully

Appendix 1

No	SPECIES	COMMON NAME	DBH (cm)	TPZ AS4970 (m)	SRZ AS4970 (m)	HxW (m)	AGE	HEALTH	STRUCTURE	FORM	ULE	COMMENT	TREE TYPE	RETENTION VALUE	RECOMMEND	X coordinate	Y coordinate
1	<i>Eucalyptus cephalocarpa</i>	Mealy Stringybark	42	5.04	2.39	9x8	Maturing	Fair	Poor	Major asymmetry	15 to 30 years	Major limbfall evidence	Indigenous	Low	Could be retained	348299.463	5807221.318
2	<i>Eucalyptus cephalocarpa</i>	Mealy Stringybark	55	6.60	2.67	14x11	Maturing	Fair	Fair to Poor	Minor asymmetry	15 to 30 years	Major limbfall evidence	Indigenous	Low	Could be retained	348298.664	5807219.798
3	<i>Eucalyptus cephalocarpa</i>	Mealy Stringybark	81	9.72	3.15	17x15	Maturing	Fair	Fair to Poor	Minor asymmetry	30 to 50 years	Major limbfall evidence	Indigenous	Moderate	Could be retained	348295.364	5807211.655
4	<i>Eucalyptus cephalocarpa</i>	Mealy Stringybark	69	8.28	2.94	14x11	Maturing	Fair	Fair to Poor	Minor asymmetry	30 to 50 years	Limbfall evidence	Indigenous	Moderate	Could be retained	348272.721	5807208.021
5	<i>Eucalyptus cephalocarpa</i>	Mealy Stringybark	58.55 (79.9)	9.59	3.13	14x15	Maturing	Fair	Fair	Minor asymmetry	30 to 50 years		Indigenous	Moderate	Could be retained	348266.702	5807212.6
6	<i>Eucalyptus radiata</i>	Narrow-leaved Peppermint	29.23 (37)	4.44	2.26	7x9	Semi-mature	Fair	Fair to Poor	Minor asymmetry	15 to 30 years	Suppressed	Indigenous	Low	Could be retained	348266.372	5807211.51
7	<i>Eucalyptus cephalocarpa</i>	Mealy Stringybark	56	6.72	2.70	14x11	Maturing	Fair	Fair to Poor	Asymmetric	30 to 50 years	Limbfall evidence	Indigenous	Moderate	Could be retained	348265.747	5807219.968
8	<i>Eucalyptus cephalocarpa</i>	Mealy Stringybark	59	7.08	2.75	15x14	Maturing	Fair	Fair to Poor	Minor asymmetry	30 to 50 years	Limbfall evidence	Indigenous	Moderate	Could be retained	348254.931	5807232.395
9	<i>Eucalyptus cephalocarpa</i>	Mealy Stringybark	59	7.08	2.75	13x16	Maturing	Fair to Poor	Fair to Poor	Asymmetric	30 to 50 years	Dieback, Limbfall evidence	Indigenous	Moderate	Could be retained	348282.592	5807230.626
10	<i>Eucalyptus cephalocarpa</i>	Mealy Stringybark	34	4.08	2.18	9x11	Semi-mature	Fair to Poor	Poor	Major asymmetry	15 to 30 years	Suppressed	Indigenous	Low	Could be retained	348281.511	5807231.726
11	<i>Eucalyptus cephalocarpa</i>	Mealy Stringybark	29	3.48	2.04	10x5	Semi-mature	Fair	Fair	Minor asymmetry	30 to 50 years		Indigenous	Low	Could be retained	348275.228	5807236.765
12	<i>Eucalyptus ovata</i>	Swamp Gum	55	6.60	2.67	18x14	Semi-mature	Fair	Fair to Poor	Minor asymmetry	15 to 30 years		Indigenous	Moderate	Could be retained	348270.619	5807240.034
13	<i>Eucalyptus radiata</i>	Narrow-leaved Peppermint	28	3.36	2.01	12x6	Semi-mature	Fair	Fair	Asymmetric	30 to 50 years		Indigenous	Moderate	Could be retained	348260.938	5807230.186
14	<i>Eucalyptus cephalocarpa</i>	Mealy Stringybark	25	3.00	1.92	12x5	Semi-mature	Fair	Fair	Asymmetric	30 to 50 years		Indigenous	Moderate	Could be retained	348259.388	5807229.226
15	<i>Eucalyptus cephalocarpa</i>	Mealy Stringybark	30	3.60	2.07	12x8	Semi-mature	Fair	Fair	Minor asymmetry	30 to 50 years		Indigenous	Moderate	Could be retained	348257.945	5807229.576
16	<i>Eucalyptus cephalocarpa</i>	Mealy Stringybark	23	2.76	1.85	11x4	Semi-mature	Fair	Poor	Minor asymmetry	15 to 30 years		Indigenous	Low	Could be retained	348256.687	5807231.196
17	<i>Eucalyptus radiata</i>	Narrow-leaved Peppermint	20	2.40	1.75	10x5	Semi-mature	Fair	Fair	Minor asymmetry	30 to 50 years		Indigenous	Moderate	Could be retained	348258.035	5807227.267
18	<i>Eucalyptus radiata</i>	Narrow-leaved Peppermint	26	3.12	1.95	14x7	Semi-mature	Fair	Fair	Minor asymmetry	30 to 50 years		Indigenous	Moderate	Could be retained	348258.538	5807225.737
19	<i>Eucalyptus radiata</i>	Narrow-leaved Peppermint	31	3.72	2.10	13x6	Semi-mature	Fair	Fair	Minor asymmetry	30 to 50 years		Indigenous	Moderate	Could be retained	348257.318	5807224.287
20	<i>Eucalyptus cephalocarpa</i>	Mealy Stringybark	33	3.96	2.16	13x5	Semi-mature	Fair	Fair	Minor asymmetry	30 to 50 years		Indigenous	Moderate	Could be retained	348255.149	5807225.277
21	<i>Eucalyptus radiata</i>	Narrow-leaved Peppermint	20	2.40	1.75	8x8	Semi-mature	Fair	Fair	Major asymmetry	30 to 50 years		Indigenous	Moderate	Could be retained	348257.046	5807232.516
22	<i>Eucalyptus cephalocarpa</i>	Mealy Stringybark	23	2.76	1.85	11x5	Semi-mature	Fair to Poor	Fair	Asymmetric	15 to 30 years		Indigenous	Low	Could be retained	348254.02	5807230.916
23	<i>Eucalyptus cephalocarpa</i>	Mealy Stringybark	36	4.32	2.24	15x9	Semi-mature	Fair to Poor	Fair	Asymmetric	15 to 30 years		Indigenous	Moderate	Could be retained	348251.249	5807232.826
24	<i>Eucalyptus ovata</i>	Swamp Gum	43	5.16	2.41	19x8	Semi-mature	Fair	Fair to Poor	Minor asymmetry	15 to 30 years		Indigenous	Moderate	Could be retained	348247.481	5807232.556
25	<i>Eucalyptus ovata</i>	Swamp Gum	39	4.68	2.31	16x8	Semi-mature	Fair to Poor	Fair	Asymmetric	15 to 30 years		Indigenous	Moderate	Could be retained	348246.805	5807234.775
26	<i>Eucalyptus cephalocarpa</i>	Mealy Stringybark	31.21 (37.4)	4.49	2.27	9x8	Semi-mature	Fair to Poor	Poor	Asymmetric	15 to 30 years	Bifurcation with included bark	Indigenous	Low	Could be retained	348254.226	5807243.693
27	<i>Eucalyptus ovata</i>	Swamp Gum	57	6.84	2.72	19x14	Maturing	Fair to Poor	Fair	Asymmetric	15 to 30 years		Indigenous	Moderate	Could be retained	348259.116	5807246.463
28	<i>Eucalyptus cephalocarpa</i>	Mealy Stringybark	20	2.40	1.75	7x4	Semi-mature	Fair	Fair	Minor asymmetry	30 to 50 years		Indigenous	Moderate	Could be retained	348246.879	5807229.526
29	<i>Eucalyptus cephalocarpa</i>	Mealy Stringybark	70	8.40	2.87	19x18	Maturing	Fair to Poor	Fair	Asymmetric	15 to 15 years		Indigenous	Moderate	Could be retained	348242.468	5807232.648
30	<i>Eucalyptus cephalocarpa</i>	Mealy Stringybark	57	6.84	2.72	15x11	Maturing	Fair	Fair to Poor	Asymmetric	30 to 50 years		Indigenous	Moderate	Could be retained	348263.863	5807211.91
31	<i>Eucalyptus cephalocarpa</i>	Mealy Stringybark	34	4.08	2.18	9x7	Semi-mature	Fair	Fair to Poor	Major asymmetry	30 to 50 years		Indigenous	Moderate	Could be retained	348250.128	5807208.111
32	<i>Eucalyptus cephalocarpa</i>	Mealy Stringybark	35	4.20	2.21	12x7	Semi-mature	Fair	Poor	Asymmetric	5 to 15 years	Bifurcation with included bark	Indigenous	Low	Could be retained	348247.596	5807208.85
33	<i>Eucalyptus cephalocarpa</i>	Mealy Stringybark	21	2.52	1.78	9x3	Semi-mature	Fair	Fair to Poor	Minor asymmetry	5 to 15 years		Indigenous	Low	Could be retained	348246.928	5807212.86
34	<i>Eucalyptus cephalocarpa</i>	Mealy Stringybark	30.27 (40.4)	4.85	2.35	10x8	Semi-mature	Fair	Fair to Poor	Asymmetric	15 to 30 years	Multi-stemmed from base	Indigenous	Low	Could be retained	348240.431	5807215.869
35	<i>Eucalyptus cephalocarpa</i>	Mealy Stringybark	57	6.84	2.72	16x16	Maturing	Fair	Fair	Symmetric	30 to 50 years		Indigenous	Moderate	Could be retained	348237.578	5807212.15
36	<i>Eucalyptus cephalocarpa</i>	Mealy Stringybark	23	2.76	1.85	9x4	Semi-mature	Fair to Poor	Fair to Poor	Minor asymmetry	15 to 15 years		Indigenous	Low	Could be retained	348238.478	5807213.628
37	<i>Eucalyptus cephalocarpa</i>	Mealy Stringybark	38	4.56	2.29	10x9	Semi-mature	Fair to Poor	Fair to Poor	Major asymmetry	5 to 15 years	Basal decay	Indigenous	Low	Could be retained	348232.333	5807212.96
38	<i>Eucalyptus obliqua</i>	Messmate Stringybark	59.33 (67.6)	8.11	2.92	17x15	Maturing	Fair	Fair to Poor	Minor asymmetry	30 to 50 years	Limbfall evidence, Bifurcation with included bark	Indigenous	Moderate	Could be retained	348231.146	5807219.658
39	<i>Eucalyptus cephalocarpa</i>	Mealy Stringybark	42	5.04	2.39	12x8	Maturing	Fair	Fair to Poor	Asymmetric	15 to 30 years		Indigenous	Moderate	Could be retained	348229.299	5807221.248
40	<i>Acacia melanoxylon</i>	Blackwood	18	2.16	1.67	7x4	Semi-mature	Poor	Fair to Poor	Asymmetric	1 to 5 years	Dead leader	Indigenous	Low	Remove	348226.635	5807215.449
41	<i>Eucalyptus obliqua</i>	Messmate Stringybark	32.25.15 (43.3)	5.20	2.42	14x9	Semi-mature	Fair	Poor	Minor asymmetry	5 to 15 years	Multi-stemmed from base	Indigenous	Low	Could be retained	348221.77	5807218.319
42	<i>Eucalyptus ovata</i>	Swamp Gum	43.40 (58.7)	7.04	2.75	15x11	Maturing	Fair to Poor	Fair to Poor	Minor asymmetry	15 to 30 years	Crossing rubbing branches, Dieback	Indigenous	Moderate	Could be retained	348217.524	5807217.029
43	<i>Eucalyptus ovata</i>	Swamp Gum	24	2.88	1.89	11x7	Maturing	Fair	Fair to Poor	Asymmetric	15 to 30 years		Indigenous	Moderate	Could be retained	348218.521	5807220.088
44	<i>Eucalyptus obliqua</i>	Messmate Stringybark	66	7.92	2.89	18x15	Maturing	Fair	Fair	Asymmetric	30 to 50 years		Indigenous	Moderate	Could be retained	348219.618	5807228.057
45	<i>Eucalyptus ovata</i>	Swamp Gum	33	3.96	2.16	16x9	Semi-mature	Poor	Fair to Poor	Asymmetric	15 to 30 years	Sparse crown	Indigenous	Low	Could be retained	348224.97	5807228.646
46	<i>Eucalyptus cephalocarpa</i>	Mealy Stringybark	33	3.96	2.16	15x8	Semi-mature	Fair	Fair to Poor	Asymmetric	30 to 50 years		Indigenous	Moderate	Could be retained	348232.292	5807230.446
47	<i>Eucalyptus cephalocarpa</i>	Mealy Stringybark	28	3.36	2.01	13x5	Semi-mature	Fair	Fair to Poor	Minor asymmetry	30 to 50 years		Indigenous	Moderate	Could be retained	348236.143	5807231.536
48	<i>Eucalyptus cephalocarpa</i>	Mealy Stringybark	62.43 (75.5)	9.06	3.06	18x17	Maturing	Poor	Fair to Poor	Asymmetric	15 to 30 years	Dieback	Indigenous	Moderate	Could be retained	348238.468	5807241.674
49	<i>Eucalyptus ovata</i>	Swamp Gum	57	6.84	2.72	12x19	Maturing	Fair to Poor	Poor	Major asymmetry	15 to 30 years	On lean	Indigenous	Low	Could be retained	348240.01	5807230.202
50	<i>Eucalyptus cephalocarpa</i>	Mealy Stringybark	47	5.64	2.50	14x8	Maturing	Poor	Poor	Asymmetric	5 to 15 years	In severe decline	Indigenous	Low	Could be retained	348231.302	5807249.402
51	<i>Eucalyptus cephalocarpa</i>	Mealy Stringybark	45	5.40	2.46	13x10	Maturing	Fair	Fair	Asymmetric	30 to 50 years		Indigenous	Moderate	Could be retained	348224.483	5807248.582
52	<i>Eucalyptus cephalocarpa</i>	Mealy Stringybark	47	5.64	2.50	17x12	Maturing	Fair	Fair	Asymmetric	30 to 50 years		Indigenous	Moderate	Could be retained	348220.476	5807248.412
53	<i>Eucalyptus cephalocarpa</i>	Mealy Stringybark	80	9.60	3.13	17x18	Maturing	Dead	Poor	Minor asymmetry	0 years		Indigenous	None	Remove	348217.392	5807257.811
54	<i>Eucalyptus ovata</i>	Swamp Gum	21	2.52	1.78	8x5	Semi-mature	Fair to Poor	Fair	Minor asymmetry	15 to 30 years		Indigenous	Low	Could be retained	348206.557	5807256.071
55	<i>Eucalyptus cephalocarpa</i>	Mealy Stringybark	49	5.16	2.41	16x12	Maturing	Fair to Poor	Fair to Poor	Asymmetric	15 to 30 years	Upper canopy defect bifurcation	Indigenous	Low	Could be retained	348215.668	5807246.263
56	<i>Eucalyptus cephalocarpa</i>	Mealy Stringybark	51.24 (56.4)	6.77	2.70	15x14	Maturing	Fair to Poor	Fair	Asymmetric	30 to 50 years		Indigenous	Moderate	Could be retained	348213.096	5807244.293
57	<i>Eucalyptus obliqua</i>	Messmate Stringybark	75	9.00	3.05	19x11	Maturing	Fair to Poor	Poor	Asymmetric	15 to 30 years	Acute primary scaffold attachment, Major limbfall evidence	Indigenous	Low	Could be retained	348207.744	5807242.374
58	<i>Eucalyptus cephalocarpa</i>	Mealy Stringybark	55	6.60	2.67	16x11	Maturing	Fair	Poor	Asymmetric	15 to 30 years	Major limbfall evidence	Indigenous	Low	Could be retained	348204.231	5807248.352
59	<i>Eucalyptus cephalocarpa</i>	Mealy Stringybark	44	5.28	2.43	14x12	Maturing	Fair to Poor	Fair	Minor asymmetry	15 to 30 years		Indigenous	Moderate	Could be retained	348199.919	5807246.483
60	<i>Eucalyptus cephalocarpa</i>	Mealy Stringybark	56	6.72	2.70	17x15	Maturing	Fair	Fair	Minor asymmetry	30 to 50 years		Indigenous	Moderate	Could be retained	348185.695	5807247.343
61	<i>Eucalyptus cephalocarpa</i>	Mealy Stringybark	84	10.08	3.20	22x17	Maturing	Fair to Poor	Fair	Asymmetric	30 to 50 years	Mistletoe, Dieback, Fungal bracket mid trunk	Indigenous	Low	Could be retained	348176.665	5807243.543
62	<i>Eucalyptus ovata</i>	Swamp Gum	51	6.12	2.59	14x7	Maturing	Poor	Poor	Asymmetric	5 to 15 years	Dieback leader, cross ovata?	Indigenous	Low	Remove	348188.366	5807238.365
63	<i>Eucalyptus cephalocarpa</i>	Mealy Stringybark	38	4.56	2.29	14x8	Maturing	Fair	Poor	Asymmetric	5 to 15 years	Bifurcation with included bark	Indigenous	Low	Remove	348190.848	5807239.084
64	<i>Eucalyptus cephalocarpa</i>	Mealy Stringybark	52	6.24	2.61	14x11	Maturing	Fair to Poor	Fair	Asymmetric	15 to 30 years	Dieback	Indigenous	Low	Could be retained	348189.026	5807229.966
65	<i>Eucalyptus cephalocarpa</i>	Mealy Stringybark	34	4.08	2.18	14x7	Semi-mature	Fair	Fair	Minor asymmetry	30 to 50 years		Indigenous	Moderate	Could be retained	348192.052	5807235.415
66	<i>Eucalyptus cephalocarpa</i>	Mealy Stringybark	20	2.40	1.75	6x4	Semi-mature	Fair	Poor	Asymmetric	15 to 30 years		Indigenous	Low	Could be retained	348192.704	5807236.865
67	<i>Eucalyptus cephalocarpa</i>	Mealy Stringybark	32	3.84	2.13	11x6	Semi-mature	Fair	Poor	Minor asymmetry	30 to 50 years		Indigenous	Moderate	Could be retained	348195.451	5807229.477
68	<i>Eucalyptus cephalocarpa</i>	Mealy Stringybark	22	2.64	1.82	7x6	Semi-mature	Fair	Fair	Major asymmetry	30 to 50 years		Indigenous	Low	Could be retained	348190.065	5807236.705
69	<i>Eucalyptus cephalocarpa</i>	Mealy Stringybark	54	6.48	2.65	16x14	Maturing	Fair to Poor	Fair to Poor	Major asymmetry	15 to 30 years	In decline	Indigenous	Low	Could be retained	348198.954	5807223.498
70	<i>Eucalyptus cephalocarpa</i>	Mealy Stringybark	50	6.00	2.57	17x13	Maturing	Fair	Fair	Minor asymmetry	30 to 5						

Tree Assessment Detail for Norvel Estate, Ferntree Gully

Appendix 1

No	SPECIES	COMMON NAME	DBH (cm)	TPZ AS4970 (m)	SRZ AS4970 (m)	HxW (m)	AGE	HEALTH	STRUCTURE	FORM	ULE	COMMENT	TREE TYPE	RETENTION VALUE	RECOMMEND	X coordinate	Y coordinate
79	<i>Eucalyptus cephalocarpa</i>	Mealy Stringybark	36	4.32	2.24	15x8	Semi-mature	Fair to Poor	Fair to Poor	Asymmetric	15 to 30 years		Indigenous	Low	Could be retained	348210.036	5807235.915
80	<i>Eucalyptus cephalocarpa</i>	Mealy Stringybark	40	4.80	2.34	16x11	Semi-mature	Fair to Poor	Fair	Minor asymmetry	30 to 50 years		Indigenous	Moderate	Could be retained	348209.97	5807239.134
81	<i>Eucalyptus cephalocarpa</i>	Mealy Stringybark	45	5.40	2.46	16x11	Semi-mature	Fair to Poor	Fair	Asymmetric	30 to 50 years		Indigenous	Moderate	Could be retained	348207.736	5807238.015
82	<i>Eucalyptus cephalocarpa</i>	Mealy Stringybark	80	9.60	3.13	22x19	Maturing	Fair	Fair	Symmetric	30 to 50 years		Indigenous	High	Could be retained	348202.953	5807268.218
83	<i>Eucalyptus cephalocarpa</i>	Mealy Stringybark	84	10.08	3.20	20x16	Maturing	Fair	Fair	Symmetric	30 to 50 years	Bifurcation-minor	Indigenous	High	Could be retained	348189.298	5807257.911
84	<i>Eucalyptus fulgens</i>	Green Scentbark	53	6.36	2.63	19x12	Semi-mature	Good	Good	Symmetric	50+ years		Indigenous	High	Could be retained	348183.724	5807271.338
85	<i>Eucalyptus cephalocarpa</i>	Mealy Stringybark	39	4.68	2.31	16x11	Semi-mature	Fair	Fair to Poor	Minor asymmetry	30 to 50 years		Indigenous	Moderate	Could be retained	348184.219	5807268.718
86	<i>Eucalyptus cephalocarpa</i>	Mealy Stringybark	21	2.52	1.78	11x4	Semi-mature	Fair	Fair	Minor asymmetry	30 to 50 years		Indigenous	Low	Could be retained	348181.514	5807268.398
87	<i>Eucalyptus cephalocarpa</i>	Mealy Stringybark	40	4.80	2.34	13x9	Semi-mature	Fair	Fair	Minor asymmetry	30 to 50 years		Indigenous	Moderate	Could be retained	348179.634	5807284.759
88	<i>Eucalyptus ovata</i>	Swamp Gum	56	6.72	2.70	17x15	Maturing	Very Poor	Poor	Asymmetric	0 years	Near dead	Indigenous	None	Remove	348170.728	5807259.57
89	<i>Eucalyptus ovata</i>	Swamp Gum	20	2.40	1.75	10x5	Semi-mature	Fair to Poor	Poor	Asymmetric	5 to 15 years	Trunk decay cankers	Indigenous	Low	Remove	348169.516	5807259.48
90	<i>Eucalyptus ovata</i>	Swamp Gum	22	2.64	1.82	10x5	Semi-mature	Poor	Fair to Poor	Asymmetric	5 to 15 years	In decline	Indigenous	Low	Could be retained	348167.686	5807262.85
91	<i>Eucalyptus ovata</i>	Swamp Gum	61.56 (82.8)	9.94	3.18	20x18	Maturing	Dead	Poor	Asymmetric	0 years		Indigenous	None	Remove	348166.721	5807266.489
92	<i>Eucalyptus fulgens</i>	Green Scentbark	32	3.84	2.13	15x6	Semi-mature	Fair to Poor	Fair	Asymmetric	15 to 30 years		Indigenous	Low	Could be retained	348162.623	5807269.158
93	<i>Eucalyptus fulgens</i>	Green Scentbark	24	2.88	1.89	13x4	Semi-mature	Fair	Fair	Minor asymmetry	15 to 30 years		Indigenous	Low	Could be retained	348165.855	5807270.618
94	<i>Eucalyptus ovata</i>	Swamp Gum	40	4.80	2.34	19x11	Semi-mature	Fair	Fair to Poor	Asymmetric	15 to 30 years	Borer damage, Decay seam	Indigenous	Moderate	Could be retained	348168.131	5807274.617
95	<i>Eucalyptus fulgens</i>	Green Scentbark	59	7.08	2.75	19x12	Semi-mature	Good	Fair to Poor	Symmetric	30 to 50 years		Indigenous	High	Could be retained	348171.429	5807271.958
96	<i>Eucalyptus ovata</i>	Swamp Gum	38	4.56	2.29	18x11	Semi-mature	Fair to Poor	Fair	Asymmetric	15 to 30 years		Indigenous	Moderate	Could be retained	348175.808	5807267.139
97	<i>Eucalyptus cephalocarpa</i>	Mealy Stringybark	20	2.40	1.75	8x6	Semi-mature	Fair	Fair to Poor	Asymmetric	15 to 30 years		Indigenous	Low	Could be retained	348175.717	5807269.328
98	<i>Eucalyptus ovata</i>	Swamp Gum	21	2.52	1.78	11x3	Semi-mature	Fair	Fair to Poor	Asymmetric	15 to 30 years		Indigenous	Low	Could be retained	348175.552	5807269.148
99	<i>Eucalyptus ovata</i>	Swamp Gum	94	11.28	3.35	20x20	Maturing	Fair	Fair	Symmetric	15 to 30 years		Indigenous	Moderate	Could be retained	348162.458	5807286.335
100	<i>Eucalyptus ovata</i>	Swamp Gum	64	7.68	2.85	23x15	Maturing	Fair	Poor	Asymmetric	5 to 15 years	Major limbfall evidence and associated wound	Indigenous	Low	Could be retained	348159.926	5807273.717
101	<i>Eucalyptus cephalocarpa</i>	Mealy Stringybark	76	9.12	3.06	15x16	Maturing	Fair to Poor	Fair	Symmetric	30 to 50 years	Dieback	Indigenous	Moderate	Could be retained	348159.926	5807253.461
102	<i>Eucalyptus macrochyra</i>	Red Stringybark	25	3.00	1.92	11x6	Semi-mature	Fair to Poor	Fair	Minor asymmetry	15 to 30 years		Indigenous	Low	Could be retained	348150.543	5807282.136
103	<i>Eucalyptus macrochyra</i>	Red Stringybark	24	2.88	1.89	10x5	Semi-mature	Very Poor	Fair	Minor asymmetry	5 to 15 years	In decline	Indigenous	Low	Remove	348151.029	5807285.495
104	<i>Eucalyptus macrochyra</i>	Red Stringybark	51.42 (66.1)	7.93	2.89	12x12	Maturing	Dead	Poor	Asymmetric	0 years		Indigenous	None	Remove	348142.132	5807287.904
106	<i>Eucalyptus cephalocarpa</i>	Mealy Stringybark	23	2.76	1.85	8x5	Semi-mature	Fair	Fair to Poor	Asymmetric	15 to 30 years		Indigenous	Low	Could be retained	348122.589	5807290.684
107	<i>Eucalyptus ovata</i>	Swamp Gum	43	5.16	2.41	16x12	Maturing	Fair	Poor	Asymmetric	15 to 15 years		Indigenous	Low	Remove	348125.921	5807294.043
108	<i>Eucalyptus ovata</i>	Swamp Gum	37	4.44	2.26	15x9	Semi-mature	Fair	Fair	Symmetric	15 to 30 years		Indigenous	Low	Could be retained	348126.564	5807293.743
109	<i>Pittosporum eugenioides</i> 'Variegatum'	Variegated Tarata	40	4.80	2.34	8x7	Maturing	Dead	Fair	Symmetric	0 years		Exotic evergreen	None	Neighbour's tree	348314.033	5807218.828
110	<i>Jacaranda mimosifolia</i>	Jacaranda	15	2.00	1.55	6x5	Semi-mature	Fair	Fair to Poor	Asymmetric	15 to 30 years		Exotic deciduous	Low	Neighbour's tree	348310.397	5807207.521
111	<i>Arbutus unedo</i>	Irish Strawberry Tree	30	3.60	2.07	7x7	Maturing	Fair	Fair to Poor	Symmetric	30 to 50 years		Exotic evergreen	Low	Neighbour's tree	348304.303	5807193.994
112	<i>Melaleuca bracteata</i>	Black Tea-tree	26	3.12	1.95	8x7	Maturing	Fair	Fair	Symmetric	30 to 50 years		Exotic evergreen	Low	Neighbour's tree	348283.334	5807143.934
113	<i>Hebe distans</i>	Hebe	15.14 (20.5)	2.46	1.77	5x5	Maturing	Fair	Fair to Poor	Symmetric	15 to 30 years		Exotic evergreen	Low	Neighbour's tree	348282.74	5807140.874
114	<i>Paraserithes lophantha</i> subsp. <i>lophantha</i>	Crested Wattle	15	2.00	1.55	5x5	Maturing	Fair	Fair to Poor	Symmetric	0 years		Australian native	None	Neighbour's tree	348280.415	5807134.556
115	<i>Corymbia ficifolia</i>	Red-flowering Gum	17	2.04	1.63	6x5	Maturing	Fair	Fair	Symmetric	30 to 50 years		Australian native	Low	Neighbour's tree	348279.178	5807129.127
116	<i>Banksia sp.</i>	Banksia	10	2.00	1.50	4x2	Semi-mature	Fair	Fair	Symmetric	15 to 30 years		Australian native	Low	Neighbour's tree	348275.871	5807126.177
117	<i>Prunus sp.</i>	Almond, Cherry, Peach, Plum	15	2.00	1.55	6x3	Semi-mature	Fair	Fair	Symmetric	15 to 30 years		Exotic deciduous	Low	Neighbour's tree	348275.005	5807124.358
118	<i>Genista monspessulana</i>	Cape Broom	15	2.00	1.55	4x4	Semi-mature	Fair	Poor	Symmetric	1 to 5 years		Exotic evergreen	None	Neighbour's tree	348273.76	5807120.798
119	<i>Erinobrya japonica</i>	Loquat	15.15 (23.5)	2.62	1.87	8x6	Maturing	Fair	Poor	Symmetric	5 to 15 years		Exotic evergreen	None	Neighbour's tree	348266.953	5807108.001
120	<i>Acer negundo</i>	Box Elder	30	3.60	2.07	5x5	Semi-mature	Fair	Poor	Symmetric	15 to 15 years		Exotic deciduous	None	Neighbour's tree	348255.833	5807098.430
121	<i>Acer negundo</i>	Box Elder	30	3.60	2.07	9x10	Semi-mature	Fair	Poor	Symmetric	5 to 15 years	Multi-stemmed from base	Exotic deciduous	None	Neighbour's tree	348257.854	5807078.127
122	<i>Brachychiton sp.</i>	Bottle Tree	15	2.00	1.55	5x3	Semi-mature	Fair	Fair	Symmetric	15 to 30 years		Australian native	Low	Neighbour's tree	348256.18	5807069.769
123	<i>Brachychiton sp.</i>	Bottle Tree	15	2.00	1.55	5x3	Semi-mature	Fair	Fair	Symmetric	15 to 30 years		Australian native	Low	Neighbour's tree	348254.284	5807066.35
124	<i>Prunus cerasifera</i>	Cherry-plum	15	2.00	1.55	5x4	Semi-mature	Fair	Poor	Symmetric	0 years		Exotic deciduous	None	Remove	348242.962	5807041.615
125	<i>Fraxinus angustifolia</i> subsp. <i>angustifolia</i>	Desert Ash	20	2.40	1.75	6x4	Semi-mature	Fair	Fair	Symmetric	0 years		Exotic deciduous	None	Remove	348230.585	5807010.291
126	<i>Lophostemon confertus</i>	Brush Box	50	6.00	2.57	12x7	Maturing	Fair	Fair	Symmetric	30 to 50 years		Australian native	Low	Neighbour's tree	348215.371	5806954.182
127	<i>Syzygium paniculatum</i>	Magenta Cherry	45	5.40	2.46	9x5	Maturing	Fair	Poor	Symmetric	15 to 30 years	Bifurcation with included bark	Australian native	Low	Neighbour's tree	348214.168	5806950.253
128	<i>Grevillea robusta</i>	Silky Oak	45	5.40	2.46	16x8	Maturing	Fair	Fair	Symmetric	15 to 30 years		Australian native	Low	Neighbour's tree	348201.543	5806920.419
129	<i>Eucalyptus melliodora</i>	Yellow Box	55	6.60	2.67	18x12	Maturing	Fair	Fair	Symmetric	30 to 50 years		Indigenous	Moderate	Neighbour's tree	348196.171	5806913.981
130	<i>Prunus cerasifera</i>	Cherry-plum	25	3.00	1.92	7x7	Maturing	Fair	Fair	Symmetric	1 to 5 years		Exotic deciduous	None	Neighbour's tree	348188.127	5806895.164
131	<i>Pittosporum eugenioides</i> 'Variegatum'	Variegated Tarata	45	5.40	2.46	6x7	Maturing	Fair	Fair	Symmetric	15 to 30 years		Exotic evergreen	Low	Neighbour's tree	348178.249	5806864.651
132	<i>Eucalyptus ovata</i>	Swamp Gum	48	5.76	2.53	16x12	Maturing	Fair	Fair	Minor asymmetry	15 to 30 years		Indigenous	Moderate	Could be retained	348151.532	5807378.216
133	<i>Eucalyptus ovata</i>	Swamp Gum	90	10.80	3.29	16x11	Maturing	Fair to Poor	Fair to Poor	Minor asymmetry	15 to 30 years	Dieback	Indigenous	Moderate	Neighbour's tree	348137.522	5807365.639
134	<i>Eucalyptus melliodora</i>	Yellow Box	56	6.72	2.70	17x9	Semi-mature	Fair	Fair to Poor	Minor asymmetry	30 to 50 years		Indigenous	Moderate	Neighbour's tree	348132.435	5807337.214
135	<i>X Cupressocyparis leylandii</i>	Leyland Cypress	45	5.40	2.46	10x7	Semi-mature	Fair	Fair	Symmetric	30 to 50 years		Exotic conifer	Low	Neighbour's tree	348126.044	5807340.604
136	<i>Prunus armeniaca</i>	Apricot	25	3.00	1.92	5x5	Maturing	Fair	Fair	Minor asymmetry	30 to 50 years		Exotic deciduous	Low	Neighbour's tree	348120.775	5807327.456
137	<i>Paulownia tomentosa</i>	Royal Paulownia	17	2.04	1.63	5x6	Semi-mature	Fair	Fair	Minor asymmetry	30 to 50 years		Exotic deciduous	Low	Neighbour's tree	348120.214	5807325.687
138	Removed	Silver Birch	10.10 (14.1)	2.00	1.51	6x4	Semi-mature	Fair	Fair to Poor	Minor asymmetry	30 to 50 years		Exotic deciduous	Low	Neighbour's tree	348118.541	5807320.938
140	<i>Eucalyptus ovata</i>	Swamp Gum	73	8.76	3.01	16x11	Maturing	Fair	Poor	Minor asymmetry	15 to 30 years		Indigenous	Moderate	Neighbour's tree	348125.657	5807318.268
140	<i>Eucalyptus ovata</i>	Swamp Gum	17.12 (20.8)	2.50	1.78	10x7	Semi-mature	Fair	Very poor	Minor asymmetry	0 years	Stump re-sprout	Indigenous	None	Neighbour's tree	348121.237	5807316.939
141	<i>Casuarina cunningghamiana</i>	River She-oak	16	2.00	1.59	8x4	Semi-mature	Fair	Fair to Poor	Asymmetric	15 to 30 years	Suppressed	Australian native	Low	Neighbour's tree	348115.003	5807302.501
142	<i>Eucalyptus cephalocarpa</i>	Mealy Stringybark	39	4.68	2.31	10x9	Semi-mature	Fair	Poor	Asymmetric	15 to 30 years	Upper trunk defect	Indigenous	Low	Neighbour's tree	348118.483	5807300.202
143	<i>Pittosporum tenuifolium</i>	Kohuhu	20	2.40	1.75	7x4	Semi-mature	Fair	Poor	Minor asymmetry	15 to 30 years	11 trees	Exotic				

Tree Assessment Detail for Norvel Estate, Ferntree Gully

Appendix 1

No	SPECIES	COMMON NAME	DBH (cm)	TPZ AS4970 (m)	SRZ AS4970 (m)	HxW (m)	AGE	HEALTH	STRUCTURE	FORM	ULE	COMMENT	TREE TYPE	RETENTION VALUE	RECOMMEND	X coordinate	Y coordinate
156	Removed	Gossamer Wattle	30	3.60	2.07	5x8	Maturing	Fair to Poor	Poor	Minor asymmetry	0 years		Victorian native	None	Neighbour's tree	348052.566	5807152.612
157	<i>Acer.pseudoplatanus</i>	Sycamore	13	2.00	1.50	4x3	Semi-mature	Fair	Fair to Poor	Minor asymmetry	15 to 30 years		Exotic deciduous	Low	Neighbour's tree	348050.521	5807146.393
158	<i>Acer.negundo</i>	Box Elder	25	3.00	1.92	7x8	Semi-mature	Fair	Fair to Poor	Minor asymmetry	15 to 30 years		Exotic deciduous	None	Neighbour's tree	348048.385	5807142.634
159	<i>Pyrus communis</i>	Common Pear	15	2.00	1.55	4x4	Semi-mature	Fair	Fair to Poor	Minor asymmetry	15 to 30 years		Exotic deciduous	Low	Neighbour's tree	348046.612	5807136.795
160	<i>Juniperus.sp.</i>	Juniper	15	2.00	1.55	5x1	Semi-mature	Fair	Fair to Poor	Minor asymmetry	15 to 30 years		Exotic conifer	Low	Neighbour's tree	348044.344	5807129.747
161	<i>Juniperus.sp.</i>	Juniper	15	2.00	1.55	5x1	Semi-mature	Fair	Fair to Poor	Minor asymmetry	15 to 30 years		Exotic conifer	Low	Neighbour's tree	348043.982	5807128.717
162	<i>Melaleuca.ericifolia</i>	Swamp Paperbark	15	2.00	1.55	4x4	Semi-mature	Fair to Poor	Poor	Minor asymmetry	5 to 15 years		Victorian native	Low	Neighbour's tree	348042.316	5807111.78
163	<i>Eucalyptus.sp.</i>	Gum Tree	15	2.00	1.55	4x2	Maturing	Dead	Poor	Minor asymmetry	0 years		Australian native	None	Neighbour's tree	348040.329	5807105.841
164	<i>Eucalyptus.nicholii</i>	Narrow-leaved Peppermint	95	11.40	3.37	12x12	Maturing	Fair	Fair to Poor	Minor asymmetry	5 to 15 years	Fungal bracket on lower trunk	Australian native	Low	Street tree	347994.919	5806923.369
165	Removed	Crape Myrtle	2	2.00	1.50	2x1	Young	Fair	Fair to Poor	Minor asymmetry	15 to 30 years		Exotic deciduous	Low	Street tree	348024.991	5806912.371
166	Removed	Crape Myrtle	1	2.00	1.50	1x1	Young	Fair	Poor	Stump re-sprout	15 to 30 years		Exotic deciduous	Low	Street tree	348062.881	5806897.744
167	<i>Lagerstroemia.indica</i>	Crape Myrtle	2	2.00	1.50	2x1	Young	Fair	Fair to Poor	Minor asymmetry	15 to 30 years		Exotic deciduous	Low	Street tree	348080.008	5806892.135
168	<i>Acer.X.freemanii</i> 'Scarlet Sentinel'	Freeman Maple	9	2.00	1.50	3x2	Semi-mature	Fair	Fair	Symmetric	15 to 30 years		Exotic deciduous	Low	Street tree	348087.132	5806888.686
169	<i>Acer.X.freemanii</i> 'Scarlet Sentinel'	Freeman Maple	10	2.00	1.50	3x2	Semi-mature	Fair	Fair	Symmetric	15 to 30 years		Exotic deciduous	Low	Street tree	348100.705	5806883.387
170	<i>Acer.X.freemanii</i> 'Scarlet Sentinel'	Freeman Maple	10	2.00	1.50	2x1	Semi-mature	Fair	Fair	Symmetric	15 to 30 years		Exotic deciduous	Low	Street tree	348112.059	5806879.198
171	<i>Acer.X.freemanii</i> 'Scarlet Sentinel'	Freeman Maple	11	2.00	1.50	3x2	Semi-mature	Fair	Fair	Symmetric	15 to 30 years		Exotic deciduous	Low	Street tree	348124.049	5806874.359

## Appendix 2

### Descriptors (Version C - 2013)

Field name	Description
<b>No.</b>	Tree identification number. Unique numbers are assigned to each assessed individual tree or tree group.
<b>Species</b>	Identifies the tree using the international taxonomic classification system of binomial (or trinomial) nomenclature (genus, species, variety and cultivar).
<b>Common Name</b>	Provides the common name as occurs in current Australian horticultural literature. More than one common name can exist for a single tree species, or several species can share the same common name.
<b>DBH</b> (Diameter at breast height)	Indicates the trunk diameter (expressed in centimetres) of an individual tree usually measured at 1.4m above the existing ground level. Multiple stemmed trees are calculated using a formula to combine the stems into a single stem for tree protection zone calculations.
<b>TPZ</b> (Tree protection zone)	Tree protection zone expressed as a radial distance in metres, measured from trunk centre. Based on AS 4970
<b>TPZr</b> (Tree protection zone reduced)	Reduced tree protection zone expressed as a radial distance in metres measured from trunk centre and justified according to a standard (Usually AS4970) or other method.
<b>SRZ</b> (Structural Root Zone)	Structural Root Zone expressed as a radial distance in metres, measured from trunk centre. Based on AS 4970
<b>HxW</b> (Height x Width)	Indicates height and width of single tree and measurement generally expressed in whole metres

Age	Description
<i>Young</i>	Sapling tree and/or recently planted
<i>Semi-mature</i>	Tree rapidly increasing in size and yet to achieve expected size in situation
<i>Maturing</i>	Specimen approaching expected size in situation, with reduced incremental growth
<i>Over-mature</i>	Tree is senescent and in decline

Health	Term assigned that provides a broad description of the health and vigour of the tree.					
<u>Ratings</u>	<i>Good</i>	<i>Fair</i>	<i>Fair to Poor</i>	<i>Poor</i>	<i>Very poor</i>	<i>Dead</i>

Structure	Term assigned that provides a broad description of the structure and stability of the tree.					
<u>Ratings</u>	<i>Good</i>	<i>Fair</i>	<i>Fair to Poor</i>	<i>Poor</i>	<i>Very poor</i>	<i>Failed</i>

Form	Description
<i>Symmetric</i>	Evenly balanced crown
<i>Asymmetric</i>	Crown biased in one direction; can be minor or major
<i>Stump re-sprout</i>	Adventitious shoots originating from stump or trunk
<i>Manipulated</i>	Hedge, pollard, topiary, windrow; managed for specific landscape use or aesthetic outcome

Comment	Additional comments that provide specific detail on the condition of the tree or management requirements

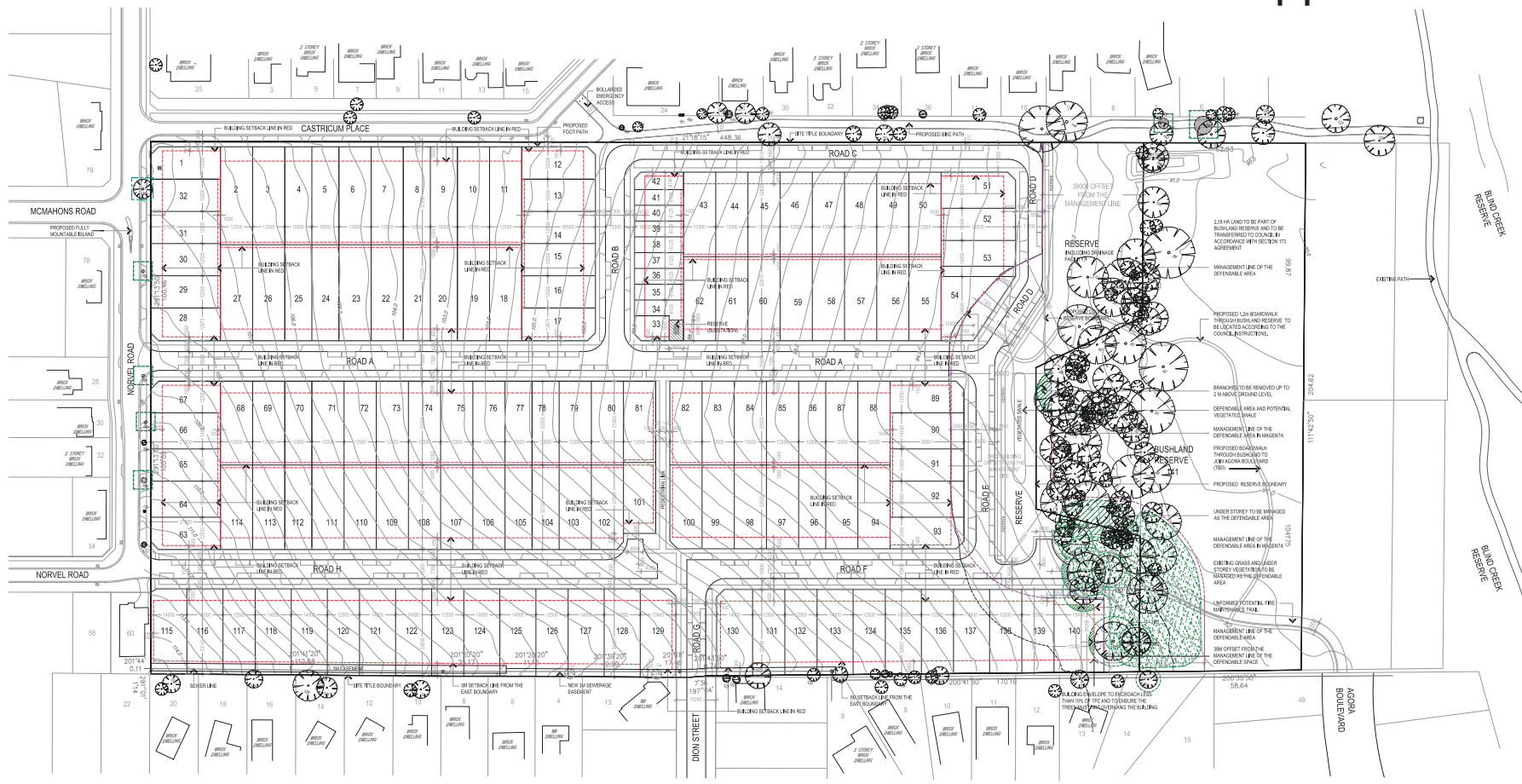
Tree type	Description
<i>Indigenous</i>	Occurs naturally in the area or region of the subject site
<i>Victorian native</i>	Occurs naturally within some part of Victoria (not exclusively) but is not indigenous
<i>Australian native</i>	Occurs naturally within Australia but is not a Victorian native or indigenous
<i>Exotic deciduous</i>	Occurs outside of Australia and typically sheds its leaves during winter
<i>Exotic evergreen</i>	Occurs outside of Australia and typically holds its leaves all year round
<i>Exotic conifer</i>	Occurs outside of Australia and is classified as a gymnosperm
<i>Native conifer</i>	Occurs naturally within Australia and is classified as a gymnosperm
<i>Palm</i>	Woody monocotyledon
<i>Other</i>	Other descriptions as indicated

Retention value	Qualitative rating provided on tree based on assessment factors. Provided as a guide for management decisions.			
<u>Ratings</u>	<i>High</i>	<i>Moderate</i>	<i>Low</i>	<i>None</i>

Recommend	Recommended action based on condition of the tree with reference to proposed site changes							
<u>Responses</u>	<i>Retain</i>	<i>Could be retained</i>	<i>Consider removal</i>	<i>Remove</i>	<i>Street tree</i>	<i>Neighbour's Tree</i>	<i>Already removed</i>	<i>Transplant</i>

Descriptors reviewed annually and subject to change

# Appendix 3a



**AREA ANALYSIS**

LAND AREA: 24,486sqm  
 NUMBER OF LOTS: 141  
 RESERVES INCLUDING ROADS: 22,202sqm  
 BUSHLAND RESERVE (LOT 141): 15,738sqm



TREES TO BE REMOVED



TREES TO BE RETAINED

**TREE ANALYSIS**

TREES 105, 106, 107, 108 ARE TO BE REMOVED.  
 THE TREES ARE CONTAINED OUTSIDE OF THE SITE BOUNDARY.  
 THE TREES 140, 141 ARE TO BE REMOVED AS THEY OBSTRUCT  
 THE PROPOSED RESERVE BIKE PATH.  
 FOR FURTHER DETAILS REFER TO ARBORIST REPORT.

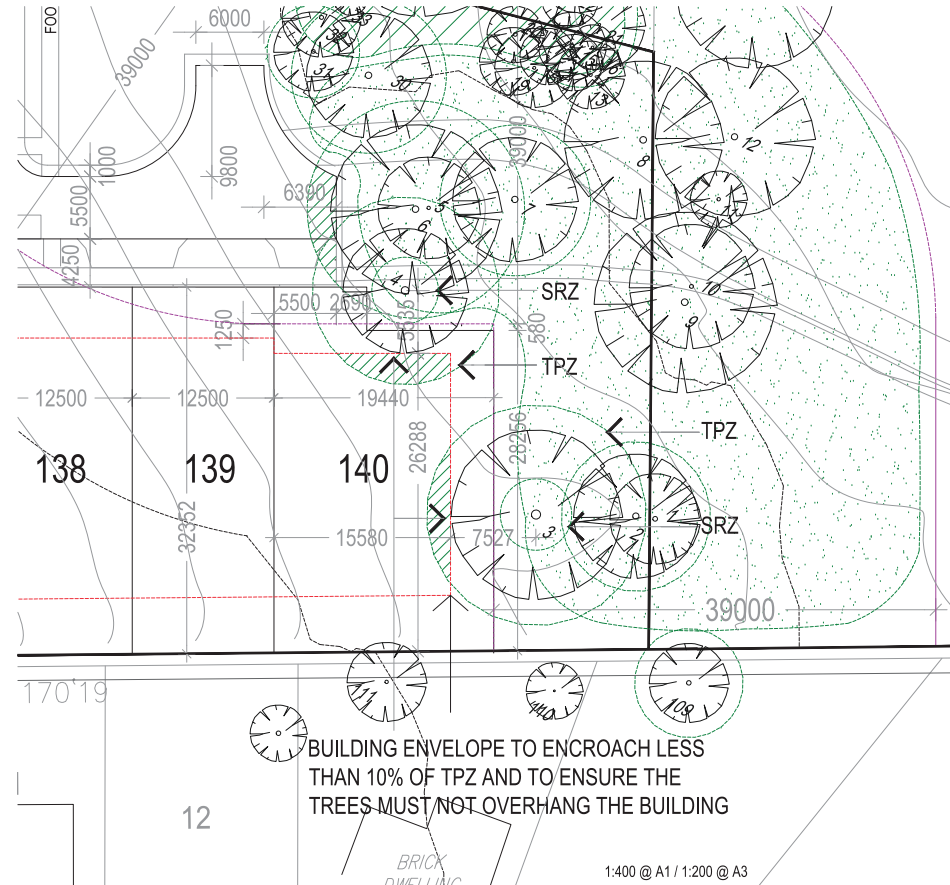


TREES PROTECTION ZONE (TPZ)

STRUCTURAL ROOT ZONE (SRZ)



# Appendix 3a



FROM ZONE (TPZ)

**AREA ANALYSIS**

LAND AREA: 82,486sqm  
 NUMBER OF LOT: 141  
 RESERVES INCLUDING ROADS: 22,202sqm  
 BUSHLAND RESERVE (LOT 141): 15,738sqm



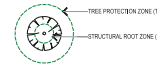
TRES TO BE REMOVED



TRES TO BE RETAINED

**TREE ANALYSIS**

TRES 105, 106, 107, 108 ARE TO BE REMOVED.  
 THE TRES ARE CONTAINED OUTSIDE OF THE SITE BOUNDARY.  
 THE TRES 140, 141 ARE TO BE REMOVED AS THEY OBSTRUCT  
 THE PROPOSED RESERVE BIKE PATH.  
 FOR FURTHER DETAILS REFER TO ARBORIST REPORT.



—TREE PROTECTION ZONE (TPZ)

—STRUCTURAL ROOT ZONE (SRZ)



**RESIDENTIAL SUBDIVISION OF 29Q, 41Q NORVEL ROAD AND 18Q DION STREET FERNTREE GULLY**  
 36-0125

TREE REMOVAL AND RETENTION DETAIL LOT 140  
 26/11/2020 | REV E | AS NOTED

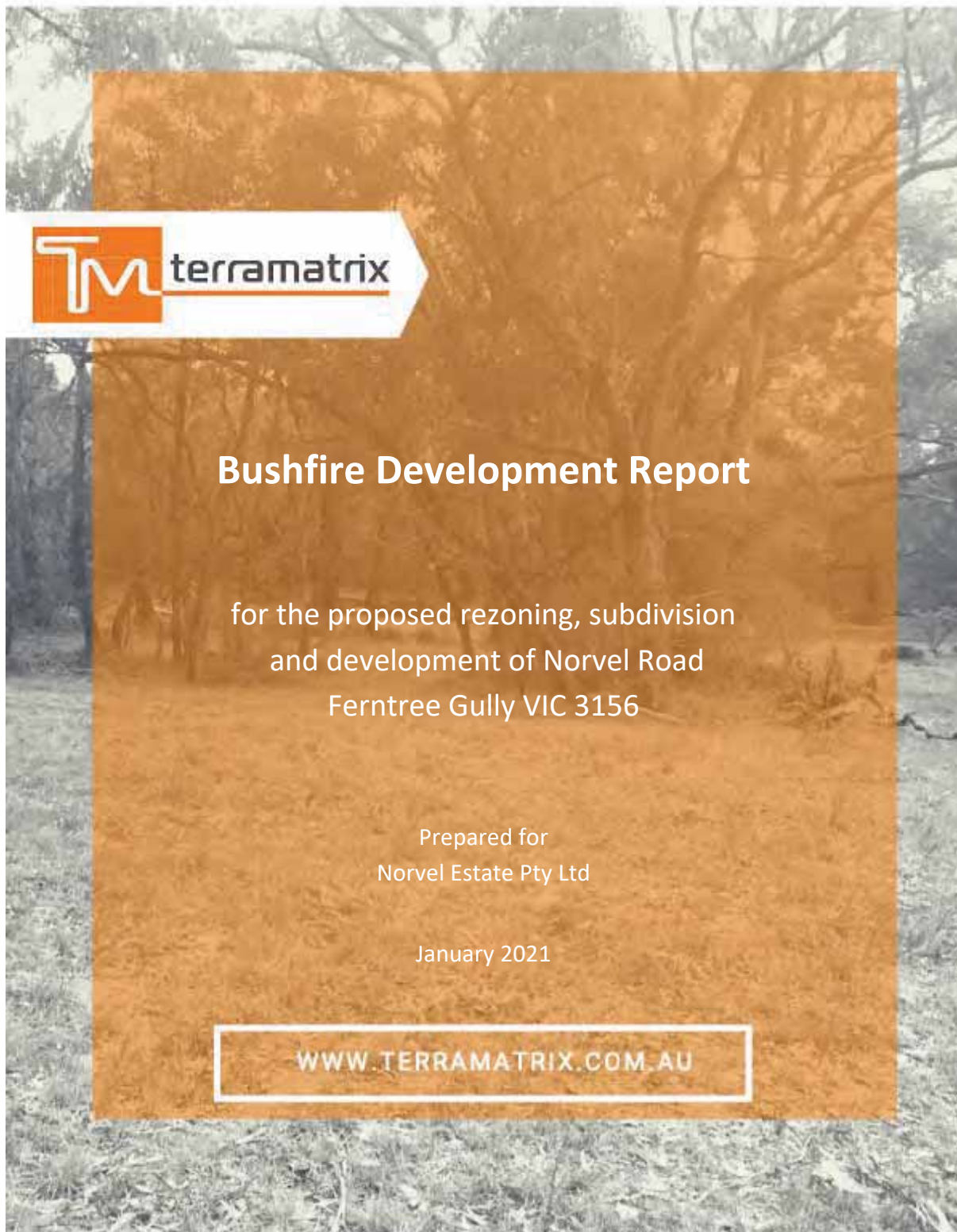


**SK059**  
 322

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12. To the writer's knowledge all facts, matter and all assumptions upon which the report proceeds have been stated within the body of the report and all opinion contained within the report have been fully researched and referenced and any such opinion not duly researched is based upon the writers experience and observations.







Terramatrix project: Yong Ning Pty Ltd-2018-01 BAL-Ferntree Gully

Cover image: Bushland reserve to the north of development area

#### Accountability

Stage	Date completed	Name	Title
Analysis & report preparation	13 October 2020	John Eastwood	Senior Analyst
Peer review	13 October 2020	Jon Boura	Managing Director

#### Version Control

Version	Date issued	Comments	Issued by
1.0	14 October 2020	Bushfire Development Report (BDR) to client	John Eastwood
1.1	09 February 2021	Updated with council and CFA agreement details and landscaping content	John Eastwood

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## 1 Introduction

This Bushfire Development Report (BDR) has been prepared on behalf of Norvel Estate Pty Ltd, to show how the proposed subdivision and associated planning scheme amendment and subsequent development of 29Q Norvel Road, 41Q Norvel Road and 18Q Dion Street ('the site'), can comply with the applicable planning and building controls that relate to bushfire, specifically the requirements of Clause 13.02-1S *Bushfire Planning*, in the Knox Planning Scheme.

The proposal is to subdivide the land for subsequent residential development. The site will comprise approximately 138 townhouse lots with associated open space and residential road network. The site comprises 9.2ha of land comprising a former quarry with an area of remnant bushland in the northern part. The southern section of the site will be developed for residential purposes (the 'development area'), with the balance of the site remaining as bushland ('the bushland area') and vested with the City of Knox to form an adjunct bushland area to the Blind Creek Trail.

This report assesses the bushfire risk and demonstrates how the development can respond to the objectives and strategies for bushfire safety at Clause 13.02-1S in the Planning Policy Framework (PPF) (Knox Planning Scheme, 2018a).

The site is partially within a designated Bushfire Prone Area (BPA). BPAs are those areas subject to or likely to be subject to bushfires, as determined by the Minister for Planning. Developed land around the site has been largely removed from the BPA, with the areas remaining arising from the presence of the bushland area within the site and the Blind Creek Trail to the north. Where BPA coverage reflects the presence of vegetation that has now been removed (such as along the western boundary of the site), an application to excise those areas from the BPA will be made during development, and from any further areas of the site that will become eligible for excision as development occurs.

Higher hazard land within a BPA that may be subject to extreme bushfire behaviour is covered by the Bushfire Management Overlay (BMO); however, no part of the site is affected by the BMO and the closest BMO areas are approximately 2km to the east toward the western face of the Dandenong Ranges in the Boronia/The Basin area.

This report assesses the bushfire hazard and identifies how development of the site can appropriately mitigate the bushfire risk and respond to, and comply with, the applicable bushfire planning and building controls. It has been prepared in accordance with applicable guidance for the assessment of, and response to bushfire risk, provided in:

- *Bushfire State Planning Policy Amendment VC140*, Planning Advisory Note 68 (DELWP, 2018);
- *AS 3959-2018 Construction of buildings in bushfire prone areas* (Standards Australia, 2019) and;



- Local planning for bushfire protection, Planning Practice Note 64 (DELWP, 2015a);
- *Planning Permit Applications Bushfire Management Overlay* Technical Guide (DELWP, 2017).
- *Design guidelines for settlement planning at the bushfire interface* (DELWP, 2020).



Figure 1 – Site and surrounds with bushland area and Blind Creek Trail at the northern end (Google Earth imagery 01/12/2018).



## 1.1 Site summary

<b>Address:</b>	29Q Norvel Road, 41Q Norvel Road and 18Q Dion Street
<b>Property size:</b>	9.2ha
<b>Local Government Area:</b>	Knox City Council
<b>Zone/s</b>	Special Use Zone and Schedule 2 (SUZ2)
<b>Overlay/s</b>	Environmental Significance Overlay and Schedule 2 (ESO2)
<b>Directory reference:</b>	Melway 64 G12, H11
<b>Site assessment date:</b>	25/07/2018 and 12/05/2020
<b>Assessed by:</b>	John Eastwood

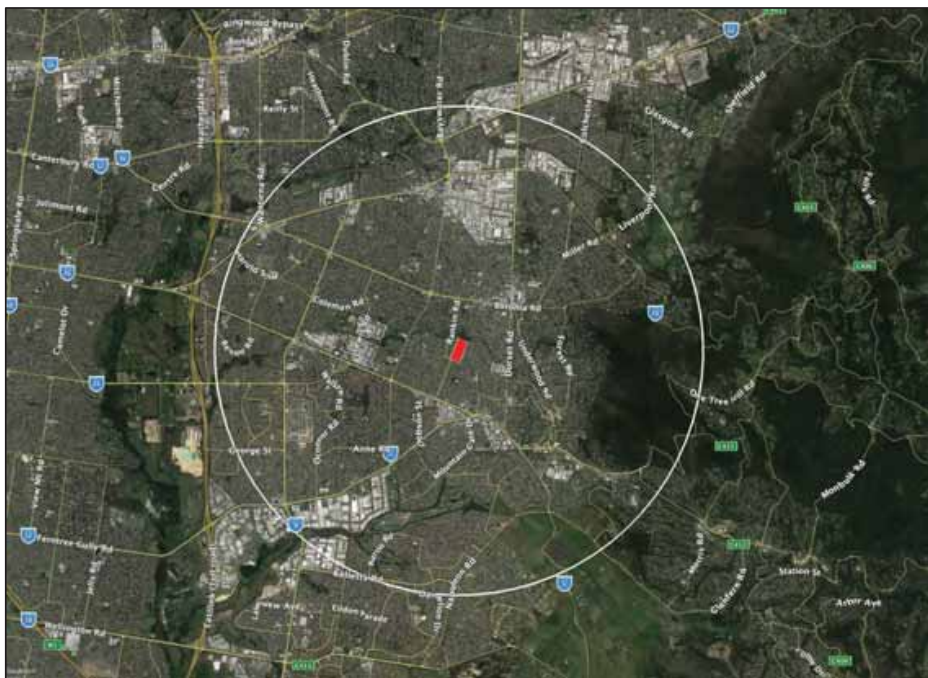


Figure 2 - Site location (site shown in red fill, 5km buffer of site in white outline; Google Earth imagery 01/12/2018).



## 2 Bushfire planning and building controls

This section summarises the applicable planning and building controls that relate to bushfire.

### 2.1 Clause 13 Environmental Risks and Amenity

This clause in the Planning Policy Framework (PPF) has three provisions pertinent to bushfire.

#### 2.1.1 Clause 13.01-1S Natural Hazards and Climate Change

The objective of this Clause is to minimise the impacts of natural hazards and adapt to the impacts of climate change through risk-based planning. Specified strategies to achieve the objective are:

- *‘Consider the risks associated with climate change in planning and management decision making processes.*
- *Identify at risk areas using the best available data and climate change science.*
- *Integrate strategic land use planning with emergency management decision making.*
- *Direct population growth and development to low risk locations.*
- *Develop adaptation response strategies for existing settlements in risk areas to accommodate change over time.*
- *Ensure planning controls allow for risk mitigation or risk adaptation strategies to be implemented.*
- *Site and design development to minimise risk to life, property, the natural environment and community infrastructure from natural hazards’ (Knox Planning Scheme, 2018b).*

#### 2.1.2 Clause 13.02-1S Bushfire Planning

Clause 13.02-1S has the objective *‘To strengthen the resilience of settlements and communities to bushfire through risk based planning that prioritises the protection of human life’* (Knox Planning Scheme, 2018a). The policy must be applied to all planning and decision making under the Planning and Environment Act 1987, relating to land which is:

- Within a designated Bushfire Prone Area;
- Subject to a Bushfire Management Overlay; or
- Proposed to be used or developed in a way that may create a bushfire hazard.

Priority must be given to the protection of human life by:

- *‘Prioritising the protection of human life over all other policy considerations.*
- *Directing population growth and development to low risk locations and ensuring the availability of, and safe access to, areas where human life can be better protected from the effects of bushfire.*





- *Reducing the vulnerability of communities to bushfire through consideration of bushfire risk in decision-making at all stages of the planning process* (Knox Planning Scheme, 2018a).

Key strategies are stipulated that require strategic planning documents, planning scheme amendments and development plan approvals to properly assess bushfire risk and include appropriate bushfire protection measures. This also applies to planning permit applications for:

- Subdivisions of more than 10 lots;
- Accommodation;
- Child care centres;
- Education centres;
- Emergency services facilities;
- Hospitals;
- Indoor recreation facilities;
- Major sports and recreation facilities;
- Places of assembly; and
- Any application for development that will result in people congregating in large numbers.

Development should not be approved where *'...a landowner or proponent has not satisfactorily demonstrated that the relevant policies have been addressed, performance measures satisfied or bushfire protection measures can be adequately implemented'* (Knox Planning Scheme, 2018a).

This report assesses the hazard and identifies the bushfire protection measures that will be required for future development on the site. It is considered that development can appropriately prioritise the protection of human life, and meet the objectives of Clause 13.02-1S, largely by ensuring future dwellings will not be exposed to RHF above 12.5kW/m<sup>2</sup>, which is commensurate with a BAL-12.5 construction standard.

The maximum 12.5kW/m<sup>2</sup> safety threshold is required in settlement planning as the upper limit for acceptable risk. Responsible authorities must *'Not approve any strategic planning document, local planning policy, or planning scheme amendment that will result in the introduction or intensification of development in an area that has, or will on completion have, more than a BAL-12.5 rating under AS 3959-2009'*<sup>1</sup> (Knox Planning Scheme, 2018a).

Consultation with CFA has determined development must provide for a BAL-12.5 construction standard across the entire site. Analysis of how the development can respond to the strategies in Clause 13.02-1S is provided in Section 6.

---

<sup>1</sup> AS 3959-2009 has been superseded by AS 3959-2018, which was invoked in the National Construction Code (NCC) in May 2019, therefore all references to AS 3959-2009 should be read as the most recent version of the standard.



## 2.2 Clause 21 Municipal Strategic Statement

### 2.2.1 Clause 21.04-1 Bushfire

Clause 21.02-4 provides an overview acknowledging the risk of bushfire in the Knox LGA, with the main focus on the Dandenong Foothills and the Lysterfield area. The clause lists the key issues with regard to bushfire:

- *Identifying areas prone to bushfire.*
- *Managing development to minimise risk to life, property and the environment.*
- *Limiting new development in the Dandenong Foothills and Lysterfield where vegetation removal for bushfire management would affect significant vegetation (Knox Planning Scheme, 2017a).*

The clause has the objectives:

#### Objective 1

- *To ensure that new development responds to bushfire risk to life and property (Knox Planning Scheme, 2017a).*

#### Objective 2

- *Limit development in areas at high risk from bushfire where there is also significant vegetation of high biological and/or landscape value and where planned bushfire protection measures may be incompatible with the natural environment, landscape and biodiversity values (Knox Planning Scheme, 2017a).*

It provides several strategies; however, they address only those areas covered by the BMO. No part of the Norvel Road site is covered by the BMO.

The measures addressed in this report in response to Clause 13.02 (see Section 2.1.2) and the BPA (see Section 2.4) are considered to meet Objective 1. Objective 2 is unlikely to apply as the site is not in an area at high risk of bushfire and the development areas are largely constrained to those parts of the site affected by previous extractive industry that have limited residual biodiversity value.

### 2.2.2 Clause 21.06 Housing

Clause 21.06 complements multiple clauses of the State Planning Policy Framework with additional content to support implementation of the State and Local Planning Policy Frameworks (Knox Planning Scheme, 2019).

Clause 21.06 addresses bushfire at 21.06-4 *Areas with significant landscape and environmental*



values. As with Clause 21.04-4 *Bushfire*, Clause 21.06-4 identifies the Dandenong Foothills and Lysterfield as the main areas of bushfire risk in Knox, and lists two key issues:

- *Protecting Bush Suburban areas (the Dandenong Foothills and Sites of Biological Significance) from overdevelopment.*
- *Ensuring new residential development responds to bushfire issues (Knox Planning Scheme, 2019).*

The clause has the objectives:

**Objective 5**

- *To protect and enhance the landscape and environmental values of natural areas of significance within the municipality (Knox Planning Scheme, 2019).*

**Objective 6**

- *To reduce the risk and impacts of bushfire in the high risk areas of the Foothills of the Dandenong Ranges and Lysterfield (Knox Planning Scheme, 2019).*

It provides strategies largely focussed on the Dandenong Foothills and Lysterfield, two of which are:

- *5.2 – Direct significant growth in housing stock to locations outside of the Bush Suburban areas.*
- *6.2 – Site, design, construct and manage development to meet the requirements of the relevant fire authority to minimise the impact of ember attack, radiant heat and direct flame contact from a bushfire (Knox Planning Scheme, 2019).*

The development of the Norvel Road site supports strategy 5.2 by providing a large development area, outside of the Bush Suburban areas (identified at Figure 1 of the Clause), in a location with a lower bushfire threat. It is also compliant with strategy 6.2 through the measures detailed in this report.

## 2.3 Clause 71.02-3 Integrated Decision Making

Clause 71.02-3 states that planning and responsible authorities should endeavour to integrate policies and balance conflicting objectives in favour of net community benefit and sustainable development. However, in bushfire affected areas, the protection of human life must be prioritised over all other policy considerations (Knox Planning Scheme, 2018c).

## 2.4 Bushfire Prone Area (BPA)

Bushfire Prone Areas (BPA) are those areas subject to or likely to be subject to bushfire, as determined by the Minister for Planning. The site is partially in a designated BPA (see Figure 3); the extent of BPA coverage over the site will change as the BPA mapping excision process is applied. Part of the site is subject to an excision review application at the time of preparation of



this report.



**Figure 3 – BPA coverage (brown shading) of site (in blue outline).**

Those areas of highest bushfire risk within the BPA are designated as BMO areas.

In a BPA, the Building Act 1993 and associated Building Regulations 2018, through application of the National Construction Code (NCC), require bushfire protection standards for class 1, 2 and 3<sup>2</sup> buildings, 'Specific Use Bushfire Protected Buildings'<sup>3</sup> and associated class 10A buildings<sup>4</sup> or decks. The applicable performance requirement in the NCC is:

*'A building that is constructed in a designated bushfire prone area must, to the degree necessary, be designed and constructed to reduce the risk of ignition from a bushfire, appropriate to the —*

- (a) *potential for ignition caused by burning embers, radiant heat or flame generated by a bushfire; and*
- (b) *intensity of the bushfire attack on the building'* (ABCB, 2019).

Compliance with AS 3959-2018 *Construction of buildings in bushfire prone areas* (Standards Australia, 2019) is 'deemed-to-satisfy' the performance requirement<sup>5</sup>.

<sup>2</sup> Class 1, 2 and 3 buildings are defined in the NCC and are generally those used for residential accommodation, including houses and other dwellings, apartments, hotels and other buildings with a similar function or use.

<sup>3</sup> Specific Use Bushfire Protected Buildings are defined in the Victorian *Building Regulations 2018*, they generally comprise 'vulnerable' uses and include schools, kindergartens, childcare facilities, aged care facilities and hospitals.

<sup>4</sup> Class 10a buildings are defined in the NCC as non-habitable buildings including sheds, carports, and private garages.

<sup>5</sup> For Class 1 and associated Class 10a buildings, the *NASH Standard for Steel Framed Construction in Bushfire Areas* is also deemed to satisfy the performance requirement.



Applicable buildings must be constructed to a minimum Bushfire Attack Level (BAL)-12.5, or higher, as determined by a site assessment or planning scheme requirement.

A BAL is a means of measuring the severity of a building's potential exposure to ember attack, radiant heat and direct flame contact. There are six BALs defined in AS 3959-2018, which range from BAL-LOW, which has no bushfire construction requirements to BAL-FZ (Flame Zone) where flame contact with a building is expected.

Larger developments and certain vulnerable uses in a BPA (see Section 2.1.2) are also required by Clause 13.02-1S *Bushfire Planning* to:

- *'Consider the risk of bushfire to people, property and community infrastructure.*
- *Require the implementation of appropriate bushfire protection measures to address the identified bushfire risk.*
- *Ensure new development can implement bushfire protection measures without unacceptable biodiversity impacts' (Knox Planning Scheme, 2018a).*

There are no significant obstacles to future development of the site complying with the applicable strategies at Clause 13.02-1S and the building regulations invoked by the BPA coverage (see Section 6).

DELWP review and excise areas from the BPA approximately every 6 months. Land becomes eligible for excision if it satisfies state-wide hazard mapping criteria, including that the land needs to be:

- At least 300m from areas of classified vegetation (except grassland) larger than 4ha in size; and
- At least 150m from areas of classified vegetation (except grassland) 2 to 4ha in size; and
- At least 60m from areas of unmanaged grassland more than 2ha in size (DELWP, 2015b).

For isolated areas of vegetation greater than 1ha but less than 2ha, the shape of the area and connectivity to any other hazardous vegetation is a further consideration (DELWP, 2015b). Land around the site that is not in the BPA (i.e. BAL-LOW areas) is shown in Figure 3 and Map 3.

Part of the western side of the development site is eligible for excision from the BPA as the vegetation along the western boundary has already been removed. This area will be subject to a BPA review application prior to development, with alterations to the BPA expected to be gazetted around six months after the review. Reviews occur on an approximate six-month basis, with gazettal of changes approximately six months after review.



## 2.5 Other development controls

### 2.5.1 Zoning

The site is currently in a Special Use Zone – Schedule 2 (SUZ2). The development area of site will be rezoned to General Residential Zone (GRZ) prior to subdivision and development. Neither zone has implications for the development with regard to bushfire.

The balance of the site, forming those areas to be vested with Knox City Council to form an adjunct area to the Blind Creek Trail, will be retained as a bushland reserve. The bushfire implications of this bushland reserve are the subject of this report.

### 2.5.2 Overlays

The purpose of the Environmental Significance Overlay (ESO) at Clause 42.01 is to identify areas where the development of land may be affected by environmental constraints and to ensure that development is compatible with identified environmental values (Knox Planning Scheme, 2018e). It provides exemptions from requirements for a permit for vegetation removal for the purposes of fire protection for existing buildings. The purpose of ESO Schedule 2 (ESO2) is to protect sites of biological significance from a range of adverse impacts including removal of indigenous vegetation, habitat fragmentation, weed invasion, alteration to stream flows and changes to topography that may impact negatively on vegetation or cause erosion or landslip (Knox Planning Scheme, 2017b).

It also includes:

*‘To provide for adequate bushfire protection measures that minimise adverse environmental impacts’ (Knox Planning Scheme, 2017b).*

Decision guidelines specific to bushfire protection are:

- Whether any bushfire protection measures are required.
- Whether the proposal, including proposed replanting, will result in an increase in bushfire risk to life and property and if so, whether there are more suitable alternatives.
- Whether the proposal has been appropriately sited so as to reduce the bushfire risk.
- Whether the bushfire protection measures are designed so as to minimise ecological damage while still achieving the fire safety objective.
- Whether the development and/or vegetation outcomes on the site are compatible with the ongoing bushfire protection management measures (Knox Planning Scheme, 2017b).

This report demonstrates that the development of the Norvel Road site is in accordance with these decision guidelines.



### 3 Bushfire hazard site assessment

#### 3.1 Classified vegetation

Vegetation within the 100m assessment zone around the development area boundary has been classified in accordance with the AS 3959 methodology. Classified vegetation is vegetation that is deemed hazardous from a bushfire perspective.

The classification system is not directly analogous to Ecological Vegetation Classes (EVCs) but uses a generalised description of vegetation based on the AUSLIG (Australian Natural Resources Atlas: No. 7 – Native Vegetation) classification system. The classification is based on the mature state of the vegetation and the likely fire behaviour that it will generate.

The site was assessed in its current condition as detailed in this report. This assessment informed the development layout following consultation with the Knox City Council and CFA.

Part of the development area is outside of the BPA (see green dashed line on Map 1). For the purposes of this report, the 100m site assessment zone has been applied around that part of the development area within the BPA.

##### 3.1.1 Forest

Treed vegetation in the bushland reserve within and adjacent to the northern part of the site best accords with the Forest group of AS 3959-2018. Forest vegetation comprises areas with trees up to 30m high or taller at maturity, typically dominated by eucalypts, with 30–70% foliage cover (may include understorey ranging from rainforest species and tree ferns to sclerophyllous low trees or shrubs). Includes pine and eucalypt plantations (Standards Australia, 2020).

DELWP biodiversity mapping indicates that the treed vegetation on the northern end of the site comprises the ecological vegetation class EVC 127 Valley Heathy Forest. In its presumed natural state it has a benchmark tree canopy cover of 30% and shrubby understorey (DSE, 2004), which is consistent with a Forest classification.

Vegetation density varies across the bushland reserve, with the western side generally being denser. As a precautionary approach, and in the absence of assurance regarding the future management of the reserve, the whole of the bushland reserve has been classified as Forest.

#### 3.2 Excluded vegetation and non-vegetated areas

Areas of low threat vegetation and non-vegetated areas can be excluded from classification in accordance with Section 2.2.3.2 of AS 3959-2018, if they meet one or more of the following criteria:



- (a) *'Vegetation of any type that is more than 100m from the site.*
- (b) *Single areas of vegetation less than 1 ha in area and not within 100m of other areas of vegetation being classified vegetation.*
- (c) *Multiple areas of vegetation less than 0.25ha in area and not within 20m of the site, or each other, or of other areas of vegetation being classified vegetation.*
- (d) *Strips of vegetation less than 20m in width (measured perpendicular to the elevation exposed to the strip of vegetation) regardless of length and not within 20m of the site or each other, or other areas of vegetation being classified vegetation.*
- (e) *Non-vegetated areas, that is, areas permanently cleared of vegetation, including waterways, exposed beaches, roads, footpaths, buildings and rocky outcrops.*
- (f) *Vegetation regarded as low threat due to factors such as flammability, moisture content or fuel load. This includes grassland managed in a minimal fuel condition, mangroves and other saline wetlands, maintained lawns, golf courses (such as playing areas and fairways), maintained public reserves and parklands, sporting fields, vineyards, orchards, banana plantations, market gardens (and other non-curing crops), cultivated gardens, commercial nurseries, nature strips and windbreaks' (Standards Australia, 2020).*

For the purposes of this report, it is assumed that all vegetation within the development area will become low threat and excludable from classification as the development is completed, therefore Map 1 does not show any classified vegetation within the development area boundary.

Low-threat areas excluded from classification also include the managed gardens and building surrounds of some nearby properties and minor areas of roadside vegetation. Non-vegetated areas include the roads, driveways and structures within the 100m site assessment zone (see Map 1).

### 3.3 Topography

The AS 3959 methodology requires that the 'effective slope' be identified to determine the BAL and applicable defendable space or vegetation setback distances. This is the slope of land under the classified vegetation that will most significantly influence the bushfire attack on a building. Two broad types apply:

- Flat and/or Upslope – land that is flat or on which a bushfire will be burning downhill in relation to the development. Fires burning downhill (i.e. on an upslope) will generally be moving more slowly with a reduced intensity.
- Downslope – land under the classified vegetation on which a bushfire will be burning uphill in relation to the development. As the rate of spread of a bushfire burning on a downslope (i.e. burning uphill towards a development) is significantly influenced by increases in slope, downslopes are grouped into five classes in 5° increments from 0° up to 20°.

The topography on and around the site within the 100m assessment zone is relatively benign,

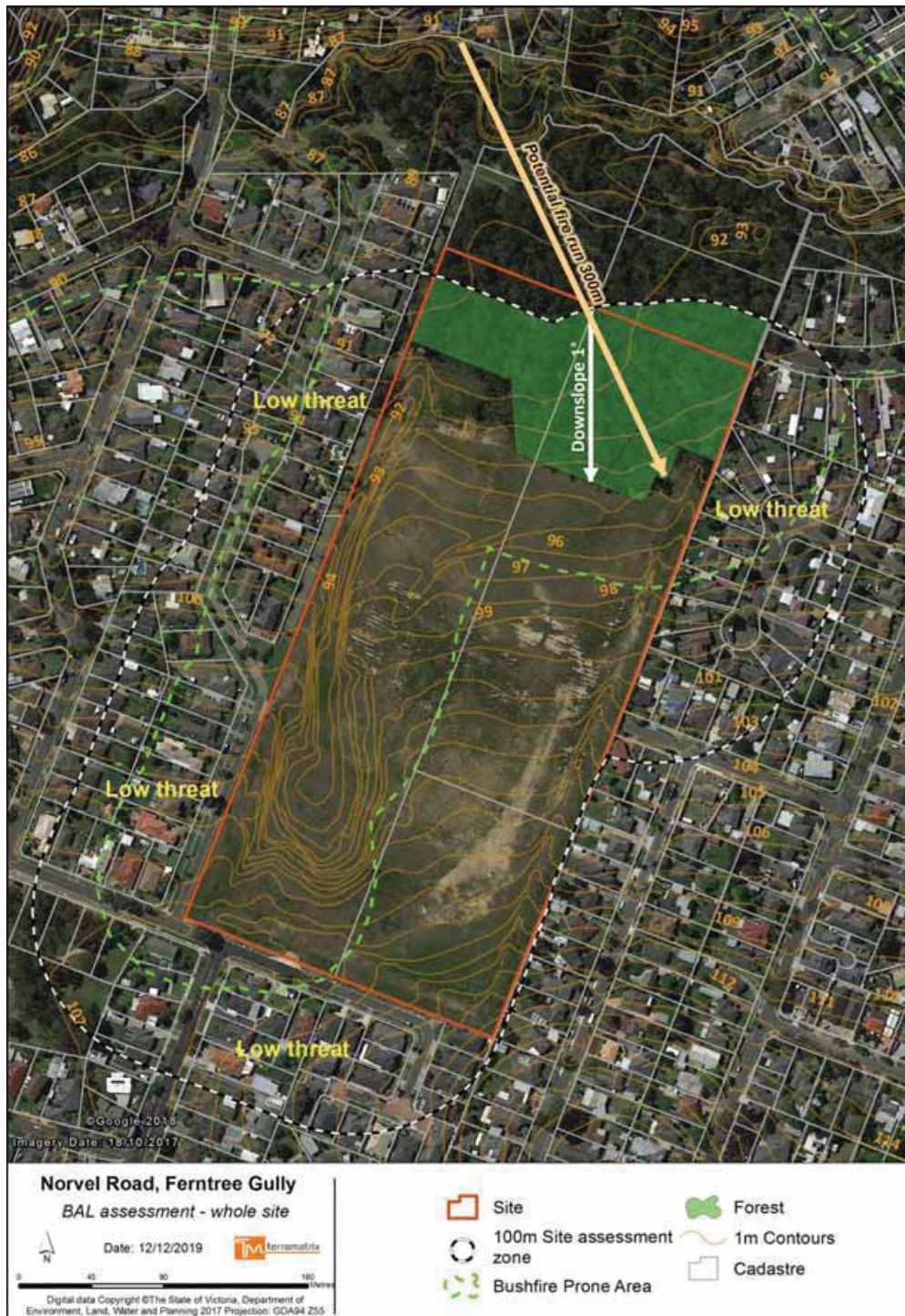




with no significant changes in elevation that would exacerbate the bushfire attack (see Map 1). The land slopes up towards the development area at 1°, placing it in the 'Downslope >0° to 5°' slope category. This is modelled as 1° in the Method 2 modelling shown at Section 5.2.



Bushfire Development Report for Norvel Road, Ferntree Gully



Map 1 – Bushfire hazard site assessment plan.



**Figure 4 – Higher density Forest on the western side of the bushland reserve.**



**Figure 5 – More open Forest on the eastern side of the bushland reserve which will be managed by the City of Knox to provided setbacks for a BAL-12.5 construction standard.**



**Figure 6 – Looking south-west from the bushland reserve, up the gentle slope into the proposed development area.**



**Figure 7 – Forest in the middle section of the bushland reserve including areas to be managed in a low threat state to provide setbacks.**



### 3.4 Fire weather

The Forest Fire Danger Index (FFDI) and the Grassland Fire Danger Index (GFDI) represent the level of bushfire threat based on weather (and fuel) conditions. An FFDI 100/GFDI 130 is applied in non-alpine areas of Victoria by the building system, to establish building setback distances from classified vegetation in accordance with AS 3959-2018.

The indices are also used for predicting fire behaviour including the difficulty of suppression, forecasting Fire Danger Ratings (FDRs) and determining an appropriate level of preparedness for emergency services. Table 1 displays the FDRs, their FFDI range<sup>6</sup> and the description of conditions for each FDR.

Note that the benchmark of an FFDI 100 represents a 'one size fits all' model of extreme fire weather conditions for the state, but which has been exceeded during some significant fire events, including at some locations in Victoria on 'Black Saturday' 2009. Therefore, it is important to note that this is not necessarily the *worst-case* conditions for any particular location, including the development site.

It should be noted that, especially in eastern and southern Australia, since the 1950s there has been an increase in the length of the fire weather season and a greater number of higher risk days (CSIRO/BOM, 2018). There is a 'high confidence' that climate change will result in a harsher fire weather climate for the Southern Slopes Victoria West sub-region that the study area is in; with a 'low confidence' in the magnitude of the expected change (CSIRO/BOM, 2019).

However, currently the CFA and DELWP have no published policy on FFDI recurrence intervals. There is, therefore, no compelling rationale for applying a different FFDI/GFDI from the 'default' FFDI 100/GFDI 130 threshold used throughout non-Alpine areas of Victoria in the planning and building system<sup>7</sup>.

<sup>6</sup> The GFDI ranges for each FDR in Table 1 may vary in some jurisdictions.

<sup>7</sup> In alpine areas of Victoria an FFDI 50 applies for determining BALs using Method 1 of AS 3959-2018.



Table 1 – Fire Danger Ratings (Source: AFAC, 2017; CFA 2017b).

Forest Fire Danger Index	Grassland Fire Danger Index	Fire Danger Rating (FDR)	Description of conditions
100+	150+	Code Red	The worst conditions for a bush or grass fire. Homes are not designed or constructed to withstand fires in these conditions. The safest place to be is away from high risk bushfire areas.
75-99	100-149	Extreme	Expect extremely hot, dry and windy conditions. Fires will be uncontrollable, unpredictable and fast moving. Spot fires will start, move quickly and will come from many directions. Homes that are situated and constructed or modified to withstand a bushfire, that are well prepared and actively defended, may provide safety. You must be physically and mentally prepared to defend in these conditions.
50-74	50-99	Severe	Expect hot, dry and possibly windy conditions. If a fire starts and takes hold, it may be uncontrollable. Well prepared homes that are actively defended can provide safety. You must be physically and mentally prepared to defend in these conditions.
	25-49	Very High	If a fire starts, it can most likely be controlled in these conditions and homes can provide safety. Be aware of how fires can start and minimise the risk. Controlled burning off may occur in these conditions if it is safe – check to see if permits apply.
	12-24	High	
	0-11	Low – Moderate	



## 4 Bushfire hazard landscape assessment

One of the bushfire hazard identification and assessment strategies in Clause 13.02-1S is to use the best available science to identify the hazard posed by vegetation, topographic and climatic conditions. The basis for the hazard assessment should be:

- *'Landscape conditions – meaning the conditions in the landscape within 20 kilometres and potentially up to 75 kilometres from a site;*
- *Local conditions – meaning conditions in the area within approximately 1 kilometre from a site;*
- *Neighbourhood conditions – meaning conditions in the area within 400 metres of a site; and*
- *The site for the development'* (Knox Planning Scheme, 2018a).

This section considers the hazard beyond the site level.

### 4.1.1 Landscape – to 20km

The development site at Norvel Road, Ferntree Gully is in the Dandenong Creek valley, located in the eastern part of the Knox City Council LGA, approximately 28 kilometres south-east of the Melbourne CBD.

The site is between the Dandenong Valley Parklands to the west and the foothills of the Dandenong Ranges to the east. The site is to the north of Ferntree Gully Road and south of Boronia Road (see Figure 1, Figure 2 and Map 2).

To the west, between the site and the Eastlink M3 Freeway and further beyond Dandenong Creek, the low threat suburban areas of greater Melbourne extend to the CBD and beyond. To the east, the balance of Ferntree Gully separates the site from the higher threat bushland areas of the Dandenong Ranges, approximately 2.3km to the east and south-east

The landscape is characterised by three main land types:

- Around the site, the low threat heavily urbanised areas of greater Melbourne extend west to the CBD and beyond, and east to the Dandenong Ranges, north to Ringwood and south to Dandenong South. Urban areas comprise the great majority of the 20km landscape assessment zone.
- Approximately 2.3km to the east and south-east, the urban areas give way to the bushland of the Dandenong Ranges and Lysterfield, identified in the Knox Planning Scheme as higher bushfire areas and covered by the BMO. In these areas, hilly terrain and dense forest extend north-to-south through the eastern part of the 20km landscape assessment zone. There is no credible scenario, however, in which a fire in these areas could affect the site other than by smoke.



- To the north of the site, beyond Maroondah LGA, the landscape is a complex mosaic of urban development of varying density, patches of pastoral land and further north, densely forested areas over an undulating and sometimes steep landscape through the Warrandyte and North Warrandyte areas. The 20km landscape assessment zone to the north includes the forested areas of the foothills of the Christmas Hills range leading north to Kinglake and beyond. Again, it is very unlikely that a fire in these areas could affect the site other than by smoke.

The designated BPA covers the eastern and northern sectors of the 20km landscape assessment zone, with minor coverage in the urban areas around parks and bushland reserves, including the Dandenong Valley Parklands to the west of the site. The BMO covers large areas of treed vegetation and is restricted to the east and north of the site, with the closest BMO area being approximately 2km to the east. The BPA affecting the site is part of a small and isolated area of coverage associated with the Blind Creek Trail (see Figure 3). The vegetation affecting the site is not contiguous to any large area of vegetation on a landscape scale.

There is an extensive fire history within 20km, restricted to the larger forested areas to the north and east (see Map 2). The distinctly localised nature of the fire history to the north and east and the absence of fire in the urban areas of Ferntree Gully and the Dandenong Valley Parklands further affirms the low threat nature of the site and surrounds.

The landscape scale bushfire threat from all directions is low, with the site separated from the bushfire threat in the wider landscape by the extensive low threat urban areas. The site could be affected by smoke from the forested areas to the north and east, with some small possibility of ember attack from the north but any immediate approach by a bushfire from these areas is not credible.

The Norvel Road site has good access to the comprehensive local road network. There is ready access to lower threat areas around the site, including areas not in the BPA.

#### **4.1.2 Local – to 1km**

Within the 1km local assessment zone, other than around the site and the Blind Creek Trail, the land in all directions around the site is not in the BPA (see Map 3) and consists of established urban areas. Patches of vegetation are largely confined to reserves, parks, roadsides, private gardens and the Blind Creek corridor. The surrounding area (see Map 3) is characterised by small areas of fragmented remnant and planted vegetation in managed gardens on private properties and managed roadsides.

As part of greater Melbourne, there is a significant emergency service capability to respond to bushfire.





Consequently, although areas of the BPA coverage within the 1km local assessment zone could potentially be affected by bushfire, a large-scale bushfire as envisioned by the AS 3959 model is unable to occur in the Blind Creek corridor or the bushland reserve forming the northern part of the site. Any bushfire in this area would be responded to with considerable resources.

The arrangement and distribution of vegetation within the Blind Creek corridor and the bushland reserve is unlikely to change significantly into the future.

#### **4.1.3 Neighbourhood – to 400m**

Within 400m, the neighbourhood scale bushfire risk to the site is largely consistent with that for 1km, although there is a greater proportion of land in the BPA. This is reflected in the Bushfire Hazard Site Assessment (see Map 1).

The localised bushfire hazard of the bushland reserve is more evident, comprising the only area of unmanaged vegetation within the neighbourhood and emphasising the absence of any potential for a large-scale, fully developed bushfire as envisioned by the AS 3959 model. A smaller, locally ignited fire is possible, with short fire runs and fire intensity likely to be moderated by the presence of the managed or non-vegetated areas of the Blind Creek Trail (see Figure 8 and Figure 9).



**Figure 8 – Blind Creek Trail junction to the north of the site.**



Figure 9 – Open managed area on Blind Creek Trail near the north-western corner of the bushland reserve.

## 4.2 Landscape risk

To assist in defining the risk beyond the site scale, four ‘broader landscape types’, representing different landscape risk levels, are described in the DELWP technical guide *Planning Applications Bushfire Management Overlay*. These are intended to streamline decision-making and support more consistent decisions based on the landscape risk (DELWP, 2017).

The four types range from low risk landscapes where there is little hazardous vegetation beyond 150m of the site and extreme bushfire behaviour is not credible, to extreme risk landscapes with limited or no evacuation options, where fire behaviour could exceed AS 3959-2018 presumptions (see Table 1).

The development site and immediately surrounding landscape accords with Broader Landscape Type 1, with elements of Broader Landscape Type 2, in that whilst the vegetation is not restricted to grassland, bushfire can only approach from one direction and there is immediate egress to the adjacent urban area that provides shelter from bushfire (see Table 2).



Table 2 – Landscape risk typologies (from DELWP, 2017).

Broader Landscape Type 1	Broader Landscape Type 2	Broader Landscape Type 3	Broader Landscape Type 4
<ul style="list-style-type: none"> <li>• There is little vegetation beyond 150 metres of the site (except grasslands and low-threat vegetation).</li> <li>• Extreme bushfire behaviour is not possible.</li> <li>• The type and extent of vegetation is unlikely to result in neighbourhood-scale destruction of property.</li> <li>• Immediate access is available to a place that provides shelter from bushfire.</li> </ul>	<ul style="list-style-type: none"> <li>• The type and extent of vegetation located more than 150 metres from the site may result in neighbourhood-scale destruction as it interacts with the bushfire hazard on and close to a site.</li> <li>• Bushfire can only approach from one aspect and the site is located in a suburban, township or urban area managed in a minimum fuel condition.</li> <li>• Access is readily available to a place that provides shelter from bushfire. This will often be the surrounding developed area.</li> </ul>	<ul style="list-style-type: none"> <li>• The type and extent of vegetation located more than 150 metres from the site may result in neighbourhood-scale destruction as it interacts with the bushfire hazard on and close to a site.</li> <li>• Bushfire can approach from more than one aspect.</li> <li>• The site is located in an area that is not managed in a minimum fuel condition.</li> <li>• Access to an appropriate place that provides shelter from bushfire is not certain.</li> </ul>	<ul style="list-style-type: none"> <li>• The broader landscape presents an extreme risk.</li> <li>• Fires have hours or days to grow and develop before impacting</li> <li>• Evacuation options are limited or not available.</li> </ul>

### 4.3 Regional Bushfire Planning Assessment

As part of the response to the 2009 Victorian Bushfires Royal Commission, Regional Bushfire Planning Assessments (RBPAs) were undertaken across six regions that covered the whole of Victoria. The RBPAs provide information about ‘identified areas’ where a range of land use planning matters intersect with a bushfire hazard to influence the level of risk to life and property from bushfire. The RBPAs state that ‘This information should be addressed as part of strategic land use and settlement planning at the regional, municipal and local levels’ (DPCD, 2012).

The *Regional Bushfire Planning Assessment – Melbourne-Metropolitan Region* covers the Knox City Council area. Ferntree Gully is not noted as an area of interest with regard to bushfire. The more significant bushfire threat of the Dandenong Ranges and Lysterfield area to the east is



highlighted (DPCD, 2012), however this has limited relevance to the site.

#### **4.4 Credible bushfire scenarios**

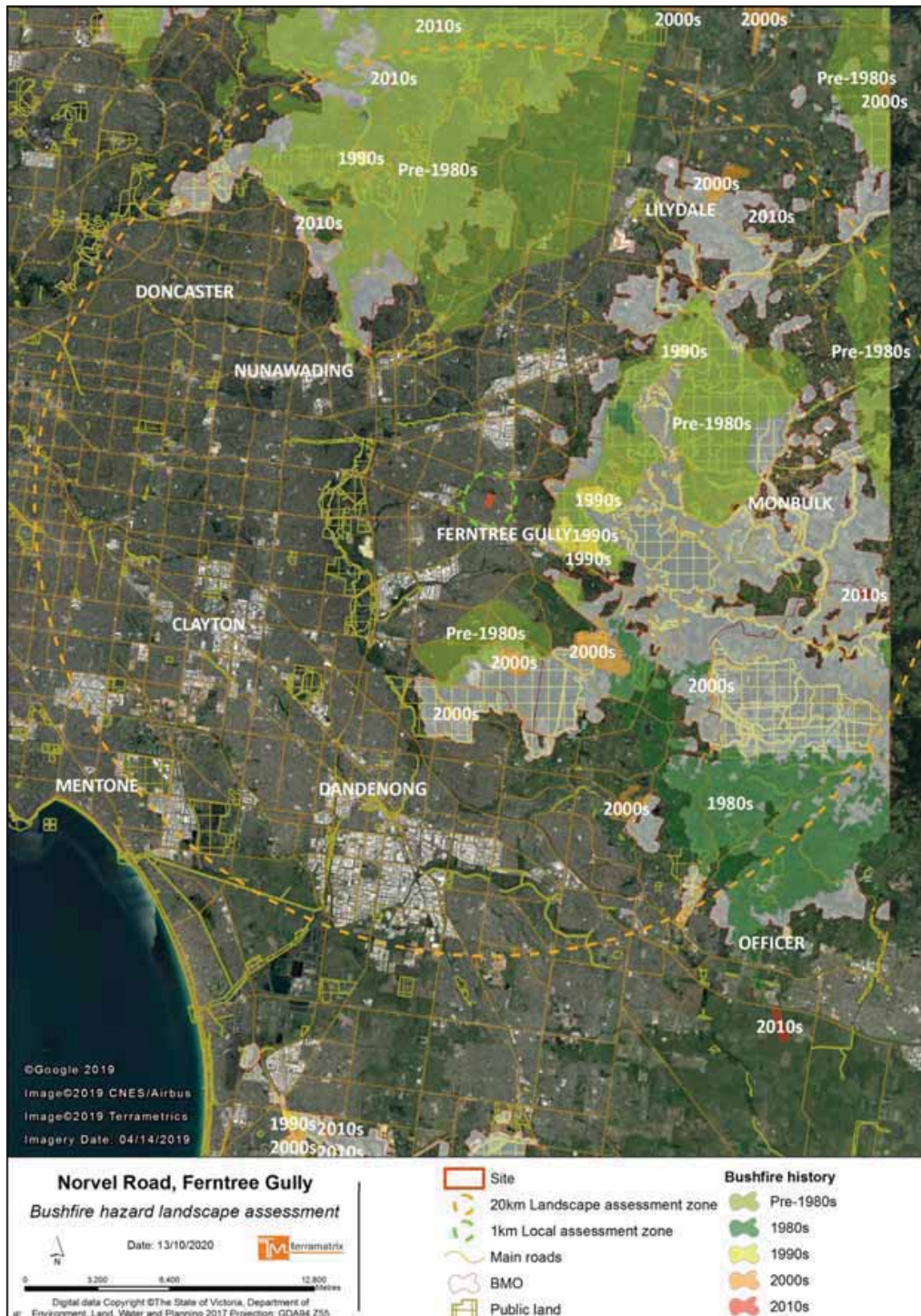
The most likely bushfire scenarios for a large landscape fire in Victoria, are an approach from those directions typically associated with the direction of the wind on severe or higher, fire danger days i.e. from the north, north-west, west or south-west (Long, 2006).

There is no credible scenario in which the site can be approached by a large landscape scale bushfire due to the developed nature of the land in all directions except for the small area of the bushland reserve to the north. A fire in the Blind Creek corridor could approach the site from the north and burn into the bushland reserve and through the treed vegetation of the Reserve. Due to the narrowness of the corridor, the fragmented nature of the vegetation and benign terrain, there is little opportunity for a fire of the scale envisioned by AS 3959 to develop.

Any such fire would be an accelerating fire with the forward rate of spread and fire intensity moderated by the presence of the managed and non-vegetated areas of the Blind Creek corridor (see Figure 8 and Figure 9). Residents near the bushland reserve will be able to readily move to the low threat urban areas within and beyond the Norvel Road site to the south. The emergency resources of the Greater Melbourne area would be available for fire suppression and evacuation.



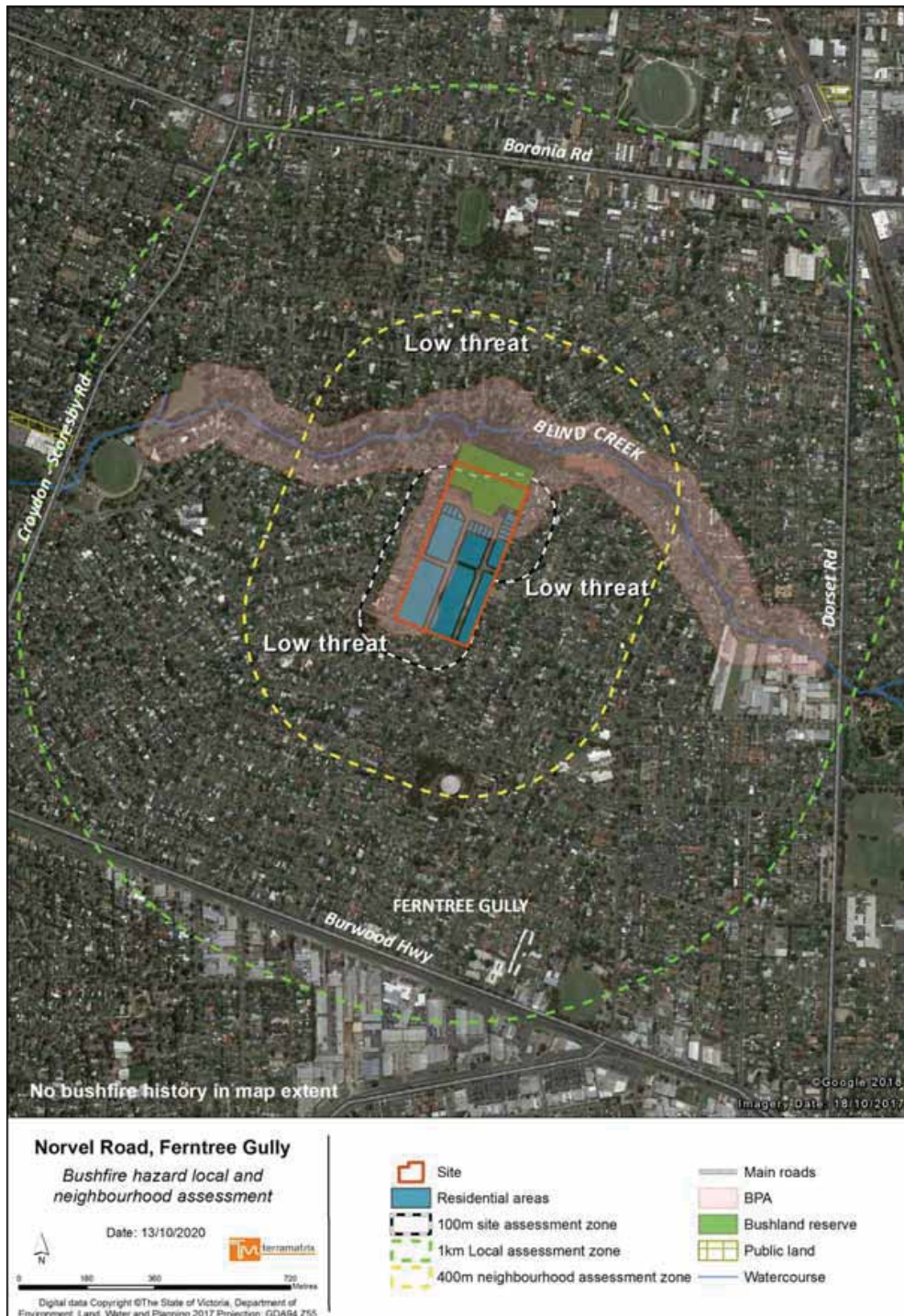
Bushfire Development Report for Norvel Road, Ferntree Gully



Map 2 – Bushfire hazard landscape assessment plan.



Bushfire Development Report for Norvel Road, Ferntree Gully



Map 3 – Bushfire hazard local and neighbourhood landscape assessment.



## 5 Planning and design response

This section identifies how future development can respond to the bushfire risk, including the requirements of Clause 13.02-1S, published CFA guidance and the building regulations applicable to construction in a BPA.

### 5.1 BAL construction standards

To satisfy key settlement planning strategies of Clause 13.02-1S, the future dwellings and other buildings on the site requiring a BAL (see Section 2.4), should be sufficiently setback from classified vegetation to enable a BAL-12.5 construction standard.

Building setbacks are measured from the edge of the classified vegetation to the external wall of a building, excluding eaves, roof overhangs and some other building appurtenances<sup>8</sup> (Standards Australia, 2019) (see Figure 10).

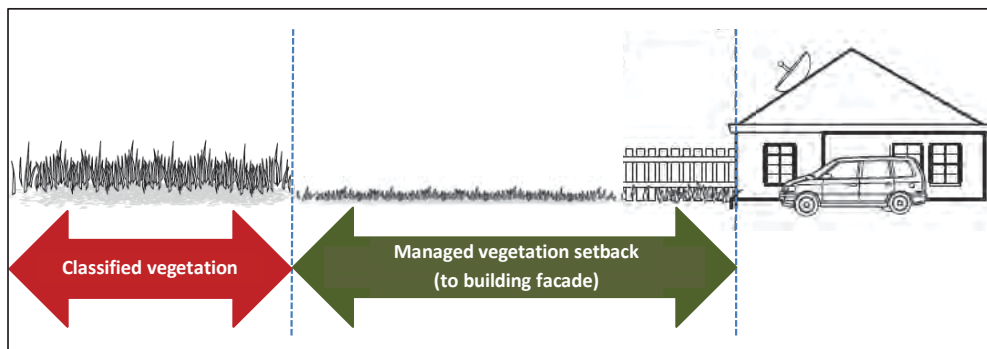


Figure 10 – Example of building-classified vegetation setback (adapted from CFA, 2013).

The setbacks required in response to the identified classified vegetation, based on the hazard assessment in Section 3 and determined using the complex Method 2 procedure of AS 3959-2018, are shown in Table 3 below. The landscaping to be applied to the balance of the site will be created in accordance with the setback distances specified in Table 3. Where required, dwellings on lots adjacent to the bushland reserve will be setback the commensurate distance from classified vegetation in the bushland reserve.

<sup>8</sup> The setback distance is measured from the edge of the classified vegetation to the external wall of the building, or for parts of the building that do not have external walls (including carports, verandas, decks, landings, steps and ramps), to the supporting posts or columns. The following parts of a building are excluded:

- a) Eaves and roof overhangs.
- b) Rainwater and domestic fuel tanks.
- c) Chimneys, pipes, cooling or heating appliances or other services.
- d) Unroofed pergolas.
- e) Sun blinds (Standards Australia, 2019).



## 5.2 Method 2 modelling

The site assessment at Section 3 determined that the Forest within the bushland reserve is on an effective slope of 1°, a slope that is in the AS 3959-2018 and Table 2 to Clause 53.02 slope category of 'Downslope >0° to 5°'. The default values of Table 2 to Clause 53.02 are calculated using the highest slope value of the category (i.e. 5°), which overstates the bushfire behaviour likely to affect the site as a result of the very slight rise of the land from the Blind Creek.

Consequently, the required extent of defendable space for the proposed dwellings with a BAL-12.5 construction standard was determined using the detailed method for determining the bushfire attack level (BAL) - Method 2 of AS 3959-2018.

The bushland reserve to the north of the development area and the classified vegetation contiguous to it outside of the site extends for approximately 260m – 300m to the north and north-west of the proposed dwellings. A fire that ignites on the northern fringe of this area and burns into the site is unlikely to reach a quasi-steady state rate of spread and intensity as assumed by the AS 3959-2018 test fire before it reached the proposed dwellings.

Consequently, the potential fire behaviour of credible bushfire scenarios in the bushland reserve was modelled using a combination of site-specific inputs (slope and run length) and default inputs (Forest fuel load, fire front width and weather) from the AS 3959-2018 methodology.

These inputs were combined to determine potential fire behaviour in terms of forward rate of spread, fireline intensity, flame length and radiant heat flux for an accelerating fire over a distance of 300m on a 1° downslope. The results of the modelling were then used to determine the low threat setback distances required for a BAL-12.5 construction standard.

**Table 3 - Summary of Method 2 setback distance and construction standard determination.**

Attribute	Value
<b>Inputs</b>	
Vegetation	Forest
FFDI	100
Flame temp (K)	1090
Flame emissivity	0.95
Flame width (m)	100
Heat of combustion (kJ/kg)	18,600
Rate of spread model	Accelerating
Fire run distance (m)	300
Surface fuel load (t/ha)	25
Overall fuel load (t/ha)	35
Effective slope (°)	1
Site slope (°)	3





<b>Outputs</b>	
Rate of spread (km/h)	3.2
Calculated elevation of receiver (m)	9.2
Flame length (m)	18.4
View factor	1.0000
Flame angle (°)	90.0
<b>Radiant heat</b>	
Distance to reach 12.5 kW/m <sup>2</sup> (m)	39.1

Map 4 shows the low threat setback distance required to enable a BAL-12.5 construction standard. A setback distance of 39m has been applied, beyond which all dwellings can be built to a BAL-12.5 construction standard. The site management, setbacks and modelling detailed here have been discussed with the CFA and gained in-principle support.

**Table 4 – Building setbacks for BAL-12.5 construction standard.**

Vegetation type	Effective slope	BAL construction standard	Low threat setback distance (m)
Forest	Downslope 1°	BAL-12.5	39

Map 4 shows the required BAL-12.5 setbacks for the dwellings within the development area. It is not anticipated that the overall development area will change significantly, but if the lot layout changes as the design is finalised, the setback distance of 39m will be applied and all dwellings will be setback the required distance as per the criteria listed at Section 5.1.. The setback is shown as orange shading extending from the bushland reserve and must comprise managed low threat vegetation or non-vegetated areas.

The application of the 39m setback will enable all proposed dwellings to achieve a BAL-12.5 construction standard. Where the 39m setback extends over the nearby lots, dwellings on those lots must be located beyond the full extent of the setback.

### 5.3 Vegetation management

In the north-east of the site, part of the 39m setback required to enable a BAL-12.5 construction standard for dwellings close to the bushland reserve extends over areas of the reserve.

The bushland reserve will be vested with the Knox City Council to form an adjunct bushland area to the Blind Creek Trail and managed as a Council park. Following extensive consultation, informed by preliminary reports by Terramatrix and vegetation assessments by Ecolink Consulting (22/06/2020, unpublished), the Knox City Council has agreed to manage part of the reserve for the purpose of providing bushfire protection for the proposed dwellings.



Management will be in accordance with guidelines published in *'Fire preparedness for Sites of Biological Significance in Knox – 2015/2016'* (Knox City Council, 2015) and adapted to the site in consultation with the CFA.

The vegetation management will create a regularly managed low threat setback in which vegetation is at, or close to, the defensible space standards at Clause 53.02 (Knox Planning Scheme, 2018d).

The Knox City Council Bushland Management Team has indicated that the site will be visited monthly during the declared fire danger period (James Rose, Knox City Council Bushland Management Team Leader, *email communication 12/08/2020*) and works undertaken as required. The line to which vegetation is to be managed will be mapped and followed by GPS to ensure consistent delivery of the required 39m low threat area.

The agreed upon fire management regimen for the bushland is as follows:

**Trees must not overhang or touch any elements of the building.**

- From a site inspection on 10 November, Council officers can confirm that the shape of the canopies of tree #3 and #4 will not overhang or touch the proposed future building at Lot 138.
- Council proposed nevertheless to do a general maintenance and pruning of tree #3 and #4 to prune dead branches and reduce canopy extending towards Lot 138.

**Within 10 metres of the building at Lot 138, flammable objects must not be located close to the vulnerable parts of the building.**

- Council will not put flammable public furniture within 10m of the building envelope of Lot 138.

**Council will maintain clumps of canopy trees, each clump will have canopy separated from another clump by at least 5 metres. These will consist of the nine clumps marked 1-9 and highlighted in yellow on the above plans.**

- Preliminary pruning and thinning work will be undertaken, under the supervision of Council to achieve the above outcome, prior to Statement of Compliance being issued for the stage of the subdivision plan creating Lot 138.
- Pruning of trees in each clump will be undertaken to create separation between clumps. Council officer will be on-site supervising works to achieve this outcome by identifying best trees/branches to be removed between each clump and retain the biodiversity significance/health of the bushland.
- Ongoing maintenance of each clump will be undertaken to remove any dead or diseased branches/vegetation.
- All smaller Wattle trees growing within each clump or between clumps will be removed to thin the population within each of the clumps.



- Thinning of Clumps #5 and #6 by removal of Wattle and diseased/dead trees.
- Canopy separation pruning between clumps within the defendable space and trees outside the defendable will be also applied.
- Under pruning to establish and maintain a clearance of at least 2 metres between the lowest tree branches and ground level will be implemented.
- All area within the clumps will be mowed and no shrubs will be kept or allowed to grow under the trees comprising each clump.

**Grass must be short cropped and maintained during the declared fire danger period.**

**All leaves and vegetation debris must be removed at regular intervals during the declared fire danger period.**

**There must be a clearance of at least 2 metres between the lowest tree branches and ground level.**

- During the Fire Season, the area will be mowed monthly or on an as-needed basis
- Outside the Fire Season, the area will be mowed on an as-needed basis.
- The understorey/grass beneath each clumps of canopy trees will be mowed to be cleared of debris and vegetation.
- Dead/fallen timber will be removed from the defendable area.
- The mowing will extend further the defendable area towards Agora Blvd (as depicted by the blue dashed line)
- Low lying branches which intrude into the 2m under pruned space will be removed.

**Individual and clumps of shrubs must not exceed 5 sq. metres in area and must be separated by at least 5 metres.**

**Shrubs must not be located under the canopy of trees.**

- Shrubs will be removed from under the canopy of the trees in the defendable area.

**Maintenance and fire track access (marked in purple as an unformed track) will have a minimum trafficable width of 3.5m and be clear of encroachments for at least 0.5m on each side and 4m above the accessway.**

- The track will remain constantly mowed and freed of encroachment.
- Access to the track will comprise removable bollard at Agora Blvd and Road F.
- Trees will be removed nearing Agora Blvd to allow for trafficable radius.
- Final fire emergency track will need to be confirmed between Trees #7, #8 and #9, and will meet radius requirement for emergency vehicles.
- Low lying branches will be removed along the fire emergency track.
- The track will share the axis of the pedestrian access path past clumps 1 and 7 to Agora Blvd.

**Maintaining the setback distances**

- Clearly identify the management area edge for the purposes of maintaining separation from dwellings

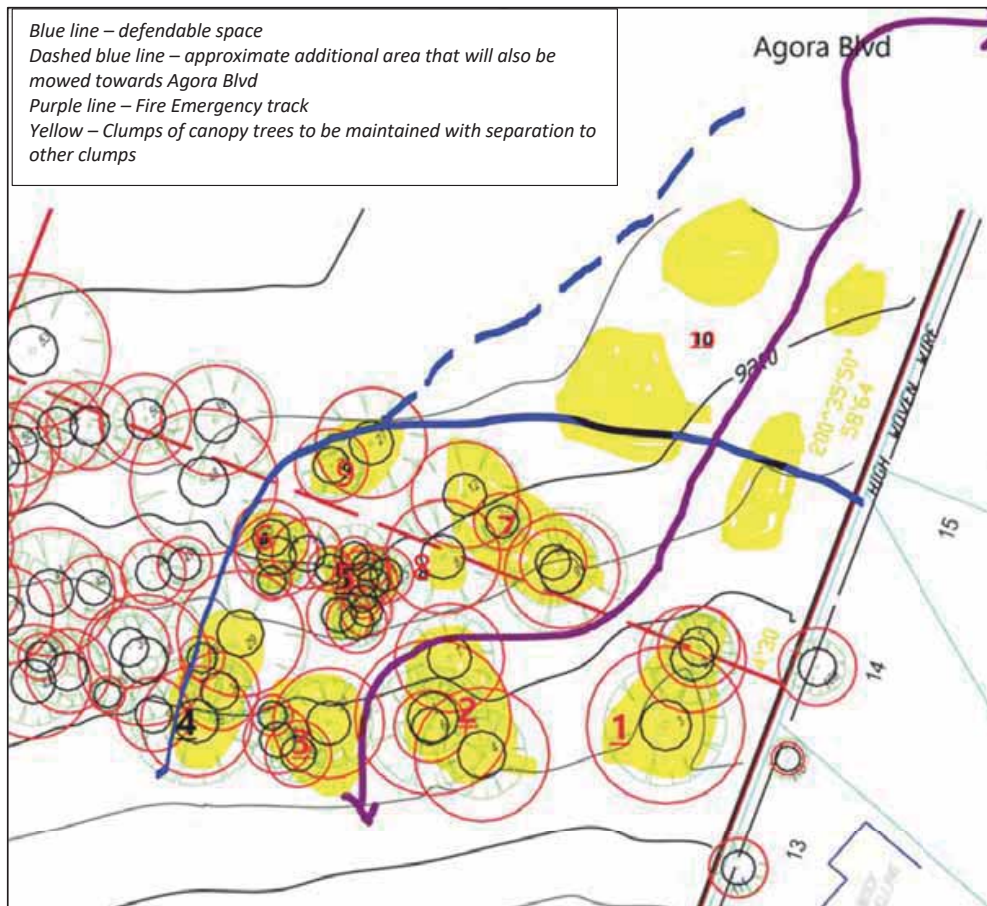


Figure 11 – Sketch of area of management to which the vegetation management plan applies.

#### 5.4 North-easternmost lot (Lot 138)

Lot 138 is located in the north-easternmost corner of the development area closest to the bushland reserve and will contain the dwelling most exposed to the effects of bushfire. The bushland reserve will be managed in a low threat state for a distance of 39m from the dwelling to support the BAL-12.5 construction standard in Lot 138 and all lots facing the Bushland Reserve.

#### 5.5 Landscaping and drainage reserve

The drainage reserve on the western side of the site adjacent to the bushland reserve will incorporate landscaping in accordance with the Norvel Estate, Ferntree Gully Landscape Report (Urbis, 2021). The landscape report provides details of the proposed vegetation throughout the development site; the development area will be provided with street trees as recommended by



Knox City Council, nature strips and plantings. This vegetation will form part of the low threat urban area of the subdivision, largely outside of the BPA and is not discussed here.

The landscape report also addresses the Bushland Reserve across the northern part of the site, and the drainage reserve on the western boundary. A vegetated swale (see Figure 12) running between the development area and much of the Bushland Reserve will drain into the drainage reserve, which will discharge onto the Bushland Reserve and Blind Creek. The landscape plan has been prepared with reference to the proposed Knox City Council vegetation management regime (see Section 5.3), the CFA publication 'Landscaping for Bushfire' and the need to provide a low threat zone between the residential dwellings and the Bushland Reserve (see Figure 13).



**Figure 12 – Example of the vegetated swale to be created adjacent to the Bushland Reserve (Urbis, 2021).**

With regard to bushfire safety, the landscape report states *'The proposed design takes this into account and seeks to minimise dangers to life and property through the positioning of a road as a buffer, providing appropriate building setbacks, and by selecting appropriate plant species and positioning of plants'* (Urbis, 2021).

Additionally, the report points out that linear reserve adjacent to the Bushland Reserve will comprise *'of low grass and hardscape, with clean-trunked trees that are loosely positioned so they do not form a continuous canopy'* and that *'The tree species proposed here are "firewise" according to the criteria set out in the Country Fire Association's (CFA's) resource "Landscaping for Bushfire - Garden Design and Plant Selection"'* (Urbis, 2021).

Figure 13 shows the arrangement of vegetation within the 39m setback to be managed in a low threat state. These areas will be subject to management by Knox City Council as discussed at Section 5.3).





## 5.6 Dwellings outside of the BPA

The green dashed line on Map 1 shows the extent of non-BPA land within the site, largely reflecting the prior land use and previously cleared areas that were devoid of vegetation. Re-growth vegetation in these areas will be removed by the development of the site and further areas will be excised from the BPA.

Some of the land in the east of the site that is currently in the BPA satisfies the DELWP criteria for excision from the BPA (see Section 2.4) and will be the subject of a future application for review of BPA mapping over the site (see Map 1 and Map 4). The areas within the site eligible for excision are anticipated to be excised from the BPA prior to development. Buildings not in the BPA will not need to be built to a BAL construction standard or provided with low threat setbacks.

## 5.7 Access and perimeter road

The development areas will access the wider road network via two points to Norvel Road to the south and via an extension to Dion Street to the east (see Map 4 for location of permanent accessways). This is consistent with DELWP guidance (DELWP, 2020) that recommends multiple egress routes away from a bushfire hazard and will enhance bushfire safety and support more effective fire fighting.

Perimeter roads are a desirable subdivision design feature (DELWP, 2020); to achieve, or contribute to, BAL setbacks, separate future development from hazardous vegetation with a 'hard' non-vegetated edge, facilitate property protection and firefighting (see Figure 14). The majority of the development area at Norvell Road will be separated from the bushfire hazard to the north by a perimeter road that forms part of the required 39m setback.

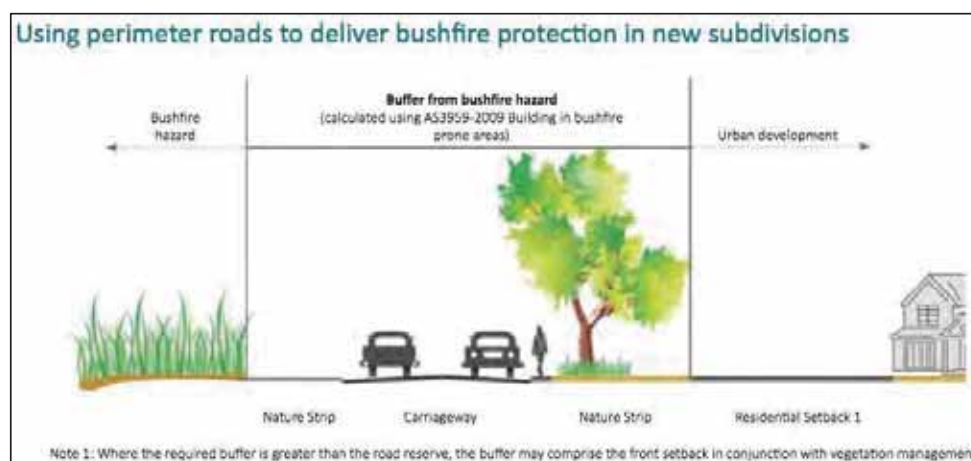


Figure 14 - Illustration of a perimeter road to provide required development setbacks (DELWP, 2015a).



Adequate access and egress for emergency management vehicles can be provided via a residential road network as per Clause 56.06-4 of the Knox Planning Scheme (Knox Planning Scheme, 2010) and incorporating a perimeter road between the development area and the bushfire hazard. CFA commentary during the consultation process has also addressed the road layout and conditions.

### **5.8 Water supply for fire fighting**

The residential area will be provided with a reliable water supply for fire fighting, via a conventional reticulated hydrant system, in accordance with the hydrant objective for residential subdivision at Clause 56.09-3 (Knox Planning Scheme, 2014).





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Figure 15 – Proposed development layout.



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Map 4 – Setback and management zone that allow for a BAL-12.5 construction standard on affected lots.



## 6 Response to Clause 13.02-1S Bushfire Planning

The applicable strategies at Clause 13.02-1S are detailed in the following sub-sections, and a summary is provided about how the proposed development responds to the strategies.

### 6.1.1 Protection of human life strategies

Priority must be given to the protection of human life.

#### ***Prioritising the protection of human life over all other policy considerations***

As identified in Section 4, the site is in a low bushfire risk location. Accordingly, the protection of human life can be prioritised by adopting the measures recommended in this report and through application of the existing planning and building regulations for construction in a BPA, including ensuring future dwellings and other buildings are located where a BAL-12.5 construction standard can be achieved (i.e. achieving setbacks for future buildings from unmanaged vegetation, such that radiant heat can be expected to be below 12.5kW/m<sup>2</sup>).

#### ***Directing population growth and development to low risk locations and ensuring the availability of, and safe access to, areas where human life can be better protected from the effects of bushfire.***

The site is in a low risk location and has ready access to lower threat urban locations to the south and east (see Map 3).

The nearest *lowest* risk location is the south-eastern part of the development area, within the site itself, that is not in the BPA and is a BAL-LOW area (see Map 3). This non-BPA land will be developed along with the balance of the development area. This area is immediately adjacent to and accessible from the lots closer to the bushland reserve and provides access to the wider urban areas of Ferntree Gully.

As development progresses, reliably low threat urban areas within the site will become eligible for excision from the BPA if they satisfy the exclusion criteria (see Section 2.4). Some of the land within the development areas already satisfies these criteria and will be the subject of an application for review of BPA mapping over the site.

#### ***Reducing the vulnerability of communities to bushfire through consideration of bushfire risk in decision-making at all stages of the planning process***

This report provides the basis for incorporating bushfire risk into decision-making associated with development of the site.

The CFA consider that community resilience to bushfire will be strengthened (and hence, presumably, vulnerability to bushfire will be reduced) when a strategic planning proposal



demonstrates that Clause 13.02-1S strategies have been applied, and where a proposal takes advantage of existing settlement patterns so that new development will not expose the community to increased risk from bushfire.

The CFA provide principles to respond to Clause 13.02-1S including that settlement planning decisions should:

- *'Direct development to locations of lower bushfire risk.*
- *Carefully consider development in locations where there is significant bushfire risk that cannot be avoided.*
- *Avoid development in locations of extreme bushfire risk.*
- *Avoid development in areas where planned bushfire protection measures may be incompatible with other environmental objectives' (CFA, 2015).*

It is considered that the development can appropriately implement the strategies in Clause 13.02-1S that aim to prioritise protection of human life and will, therefore, meet the CFA strategic planning principles for bushfire. The site is in a low bushfire risk location, is not affected by the BMO and is adjacent to an existing low threat urban area outside of the BPA. More of the site will become eligible for excision from the BPA when development occurs.

### **6.1.2 Bushfire hazard identification and assessment strategies**

The bushfire hazard must be identified, and an appropriate risk assessment be undertaken.

#### ***Applying the best available science to identify vegetation, topographic and climatic conditions that create a bushfire hazard.***

This report identifies the hazard in accordance with the commonly accepted methodologies of AS 3959-2018 and, as appropriate, additional guidance provided in and *Planning Advisory Note 68 Bushfire State Planning Policy Amendment VC140* (DEWLP, 2018).

The type and extent of (hazardous) vegetation within, and up to 100m around the site, has been identified and classified into the AS 3959 vegetation groups. Classification was based on the anticipated long-term state of the vegetation, EVC mapping, aerial imagery, site assessment, published guidance on vegetation assessment for bushfire purposes and experience with the fuel hazard posed by the vegetation types that occur within the region.

Geographic Information System analysis of publicly available contour data for the area was undertaken and effective slopes determined.

In relation to climatic conditions and fire weather, the AS 3959 default FFDI 100/GFDI 130



benchmark used in the Victorian planning and building system, has been applied as discussed in Section 3.4.

***Considering the best available information about bushfire hazard including the map of designated bushfire prone areas prepared under the Building Act 1993 or regulations made under that Act.***

The extent of BPA coverage has been considered and the nearby BPA land is shown in Map 3. This is based on the most recent BPA mapping for the area, which was published 7<sup>th</sup> September 2020. This mapping is anticipated to change prior to the commencement of development, subject to the results of the application for review of the BPA that will be submitted.

***Applying the Bushfire Management Overlay in planning schemes to areas where the extent of vegetation can create an extreme bushfire hazard.***

None of the site is covered by the BMO (see Map 2 and Map 3), with the nearest coverage approximately 2km to the east. This is considered appropriate and reflects state-wide BMO mapping introduced into the Knox Planning Scheme on 3<sup>rd</sup> October 2017.

***Considering and assessing the bushfire hazard on the basis of:***

- ***Landscape conditions – meaning the conditions in the landscape within 20 kilometres and potentially up to 75 kilometres from a site;***
- ***Local conditions – meaning conditions in the area within approximately 1 kilometre from a site;***
- ***Neighbourhood conditions – meaning conditions in the area within 400 metres of a site; and***
- ***The site for the development.***

The hazard has been assessed and described at a range of scales (see Sections 3 and 4 and Maps 1-3).

At the site scale, the assessment follows the AS 3959-2018 methodology of classifying vegetation and topography within 100m of the site.

At the neighbourhood, local and broader landscape scale, the risk has been considered within 400m and 1km of the site and extending out beyond 20km in accordance with guidance provided in Planning Advisory Note 68 (DELWP, 2018) and the BMO Technical Guide (DELWP, 2017).

***Consulting with emergency management agencies and the relevant fire authority early in the process to receive their recommendations and implement appropriate bushfire protection measures.***

The CFA has been extensively consulted during the preliminary planning for this site and,



having arrived at agreement with the City of Knox with regard to the extent and type of vegetation management within the bushland reserve have had input to the development layout and response to the bushfire planning requirements. This report forms part of the further consultation process that will occur prior to development.

***Ensuring that strategic planning documents, planning scheme amendments, planning permit applications and development plan approvals properly assess bushfire risk and include appropriate bushfire protection measures.***

DELWP advisory and practice notes, Clause 13.02-1S, and the building regulations invoked by the BPA coverage, specify the general requirements and standards for assessing the risk. These have been used in this report as appropriate and bushfire protection measures have been identified commensurate with the risk.

***Not approving development where a landowner or proponent has not satisfactorily demonstrated that the relevant policies have been addressed, performance measures satisfied, or bushfire protection measures can be adequately implemented.***

It is considered that if the provisions of the Building Act 1993 and associated Building Regulations 2018, through application of the National Construction Code (NCC), are complied with and the objectives and strategies of Clause 13.02-1S are successfully implemented, as discussed in this report, then the risk can be deemed to be acceptably mitigated such that development can proceed.

The CFA specify that areas where development should not proceed could include:

- *'Isolated settlements where the size and/or configuration of the settlements will be insufficient to modify fire behaviour and provide protection from a bushfire.*
- *Where bushfire protection measures will not reduce the risk to an acceptable level.*
- *Where evacuation (access) is severely restricted.*
- *Where the extent and potential impact of required bushfire protection measures may be incompatible with other environmental objectives or issues, e.g. vegetation protection, land subject to erosion or landslide' (CFA, 2015).*

These characteristics are not applicable to the site.

### **6.1.3 Settlement planning strategies**

Settlement planning must strengthen the resilience of settlements and communities and prioritise protection of human life.



***Directing population growth and development to low risk locations, being those locations assessed as having a radiant heat flux of less than 12.5 kilowatts/square metre under AS 3959-2009 Construction of Buildings in Bushfire-prone Areas (Standards Australia, 2009).***

The applicable distances for dwellings or other buildings to be setback from classifiable vegetation, such that RHF is calculated to not exceed 12.5kW/m<sup>2</sup> and BAL 12.5 dwellings could potentially be sited, have been determined (see Section 5). The lot layout and proposed landscaping will be designed to provide these setbacks to achieve a BAL-12.5 construction standard.

***Ensuring the availability of, and safe access to, areas assessed as a BAL-LOW rating under AS 3959-2009 Construction of Buildings in Bushfire-prone Areas (Standards Australia, 2009) where human life can be better protected from the effects of bushfire.***

The nearest *lowest* risk locations are considered to be those areas in the surrounding urban areas which are not in a designated Bushfire Prone Area (BPA). These comprise the urban areas of Ferntree Gully (see Map 2 and Map 3), immediately beyond the site boundaries. In addition, part of the proposed development area is already outside of the BPA and is in a low threat state. This area will expand as development commences and further areas are excised from the BPA.

***Ensuring the bushfire risk to existing and future residents, property and community infrastructure will not increase as a result of future land use and development.***

***Achieving no net increase in risk to existing and future residents, property and community infrastructure, through the implementation of bushfire protection measures and where possible reduce bushfire risk overall.***

There will be no increase in risk to existing residents or community infrastructure if development achieves vegetation setbacks from hazardous vegetation to enable BAL-12.5 construction, provides an appropriate water supply for fire fighting via a conventional reticulated hydrant system and appropriate access/egress for emergency vehicles and residents via a conventional residential road network.

The risk to existing residents of nearby urban areas will be reduced by the development of additional urban residential areas and associated low threat or non-vegetated land. As identified above, this will eventually create BAL-LOW areas with the potential to be excised from the BPA.

Areas of proposed landscaping are well separated from existing urban areas and will not increase the bushfire risk for existing residents. The maintenance of the 39m setback, including management of part of the new bushland reserve, will also act to reduce the bushfire threat to the existing dwellings adjacent to the north-east of the site.



***Assessing and addressing the bushfire hazard posed to the settlement and the likely bushfire behaviour it will produce at a landscape, settlement, local, neighbourhood and site scale, including the potential for neighbourhood-scale destruction.***

This report appropriately assesses and addresses the risk at a range of scales.

***Assessing alternative low risk locations for settlement growth on a regional, municipal, settlement, local and neighbourhood basis.***

No alternative low risk development locations have been identified or assessed as part of this study.

***Not approving any strategic planning document, local planning policy, or planning scheme amendment that will result in the introduction or intensification of development in an area that has, or will on completion have, more than a BAL-12.5 rating under AS 3959-2009'.***

If the setback distances from any hazardous vegetation as identified in this report are implemented as proposed, then construction can achieve a BAL not exceeding BAL-12.5. Excision from the BPA of some parts of the site would enable BAL-LOW construction in those areas.

#### **6.1.4 Areas of high biodiversity conservation value**

***Ensure settlement growth and development approvals can implement bushfire protection measures without unacceptable biodiversity impacts by discouraging settlement growth and development in bushfire affected areas that are of high biodiversity conservation value.***

The proposed management of that part of the 39m setback over the eastern part of the bushland reserve will be carried out by Knox City Council in accordance with published guidelines expressed in 'Fire preparedness for Sites of Biological Significance in Knox – 2015/2016 (Knox, 2015) and agreed management practices. The management of vegetation within the bushland reserve was agreed to following extensive discussions and site assessments and is detailed at Section 5.3. Biodiversity impacts have been minimised through this process.

Terramatrix is not aware of any biodiversity impacts associated with the development of the majority of the site that is outside of the bushland reserve.

#### **6.1.5 Use and development control in a Bushfire Prone Area**

Clause 13.02 requires that 'In a bushfire prone area designated in accordance with regulations made under the Building Act 1993, bushfire risk should be considered when assessing planning applications for the following uses and development:

- Subdivisions of more than 10 lots.
- Accommodation.





- *Child care centres.*
- *Education centres.*
- *Emergency services facilities.*
- *Hospitals.*
- *Indoor recreation facilities.*
- *Major sports and recreation facilities.*
- *Places of assembly.*
- *Any application for development that will result in people congregating in large numbers' (Knox Planning Scheme, 2018a).*

It further states that:

*'When assessing a planning permit application for the above uses and development:*

- *Consider the risk of bushfire to people, property and community infrastructure.*
- *Require the implementation of appropriate bushfire protection measures to address the identified bushfire risk.*
- *Ensure new development can implement bushfire protection measures without unacceptable biodiversity impacts' (Knox Planning Scheme, 2018a).*

The development of the Norvel Road site should be able to achieve acceptable safety if:

- Appropriate setbacks for future development from classified vegetation are achieved to enable BAL-12.5 construction in the BPA;
- Management of vegetation within the bushland reserve occurs so as to provide the requisite setback distances;
- Adequate access and egress for emergency management vehicles is provided by a residential road network to assist property defence and fire fighting; and
- A reliable water supply for fire fighting is provided, via a conventional reticulated hydrant system, in accordance with the hydrant objective for residential subdivision at Clause 56.09-3.



## 7 Conclusion

The proposed Planning Scheme Amendment and future development of the Norvel Road site in Ferntree Gully was assessed for compliance with Clause 13.02-1S of the Knox Planning Scheme, the AS 3959-2018 methodology invoked by the Victorian building regulations and additional guidance provided in *Planning Practice Note 64 Local planning for bushfire protection* (DEWLP, 2015), *Planning Advisory Note 68 Bushfire State Planning Policy Amendment VC140* (DEWLP, 2018a) and, in relation to the landscape hazard assessment, the DELWP technical guide *Planning Permit Applications Bushfire Management Overlay* (DELWP, 2017).

Part of the site is currently a designated BPA; however, no part of the site or land within 2km around it is covered by the BMO. The type and extent of (hazardous) vegetation within, and up to 100m around the site, has been identified and classified into AS 3959-2018 vegetation groups, based on DELWP extant EVC mapping, aerial imagery and site investigation. The classification is based on the current state of the vegetation and identifies that the current hazard is Forest to the north of the site.

The terrain in the site and the surrounding landscape is benign from a bushfire perspective, being predominantly flat but with a slight rise toward the site from the Blind Creek. For the purposes of determining BALs and vegetation setback distances for future buildings, an accelerating fire on a slope of 1° was modelled using Method 2 of AS 3959-2018.

The landscape is one of low bushfire risk, which will decrease further as development on the site occurs. Bushfire behaviour can reasonably be expected to be well within AS 3959-2018 presumptions and design parameters as detailed in the Method 2 modelling applied. The hazard is largely restricted to the bushland reserve to the north of the site, where appropriate vegetation management can provide the required low threat setback.

Accordingly, it is considered that the risk can be mitigated to an acceptable level and the development can appropriately prioritise the protection of human life, if dwellings (and any other buildings that require a BAL) are separated from hazardous vegetation to allow BAL-12.5 construction, in accordance with the building regulations and key settlement planning strategies in Clause 13.02.

Good access and egress for emergency management vehicles and residents, in the event of a bushfire, can be achieved via a conventional urban-residential road network. A reliable water supply for fire fighting can be provided via a conventional reticulated hydrant system in accordance with the hydrant objective for residential subdivision.



## 8 Appendix – BALs explained

Bushfire Attack Level (BAL)	Risk Level	Construction elements are expected to be exposed to...	Comment
BAL-LOW	VERY LOW: There is insufficient risk to warrant any specific construction requirements but there is still some risk.	No specification.	At 4kW/m <sup>2</sup> pain to humans after 10 to 20 seconds exposure. Critical conditions at 10kW/m <sup>2</sup> and pain to humans after 3 seconds. Considered to be life threatening within 1 minute exposure in protective equipment.
BAL-12.5	LOW: There is risk of ember attack.	A radiant heat flux not greater than 12.5 kW/m <sup>2</sup>	At 12.5kW/m <sup>2</sup> standard float glass could fail and some timbers can ignite with prolonged exposure and piloted ignition.
BAL-19	MODERATE: There is a risk of ember attack and burning debris ignited by windborne embers and a likelihood of exposure to radiant heat.	A radiant heat flux not greater than 19 kW/m <sup>2</sup>	At 19kW/m <sup>2</sup> screened float glass could fail.
BAL-29	HIGH: There is an increased risk of ember attack and burning debris ignited by windborne embers and a likelihood of exposure to an increased level of radiant heat.	A radiant heat flux not greater than 29 kW/m <sup>2</sup>	At 29kW/m <sup>2</sup> ignition of most timbers without piloted ignition after 3 minutes exposure. Toughened glass could fail.
BAL-40	VERY HIGH: There is a much increased risk of ember attack and burning debris ignited by windborne embers, a likelihood of exposure to a high level of radiant heat and some likelihood of direct exposure to flames from the fire front.	A radiant heat flux not greater than 40 kW/m <sup>2</sup>	At 42kW/m <sup>2</sup> ignition of cotton fabric after 5 seconds exposure (without piloted ignition).
BAL- FZ (i.e. Flame Zone)	EXTREME: There is an extremely high risk of ember attack and a likelihood of exposure to an extreme level of radiant heat and direct exposure to flames from the fire front.	A radiant heat flux greater than 40 kW/m <sup>2</sup>	At 45kW/m <sup>2</sup> ignition of timber in 20 seconds (without piloted ignition).

Source: derived from AS 3959-2018 (Standards Australia, 2019).



## 9 References

ABCB (2019) *Building Code of Australia, Volumes 1 and 2 of the National Construction Code (NCC)*, Australian Building Codes Board (ABCB). Available at <<http://abcb.gov.au/ncc-online/>>.

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DELWP (2015b) *Bushfire Prone Area Mapping Criteria*. Department of Environment, Land, Water and Planning, Melbourne. Available at <<https://www.planning.vic.gov.au/policy-and-strategy/bushfire-protection/building-in-bushfire-prone-areas>>.

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# Utility Services Infrastructure Report

Proposed Residential Development,  
Norvel Road, Ferntree Gully

V161919



Prepared for  
Norvel Estate Pty Ltd

9 February 2021



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## 1 Introduction

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Norvel Estate Pty Ltd has engaged Cardno to investigate and report on the provision of utility services infrastructure to the proposed residential development of the site in Norvel Road, Ferntree Gully.

As a part of this investigation, we have inspected the site, reviewed existing services asset information and liaised with the relevant authorities regarding servicing strategies to cater for the development of the site. This report summarises the outcomes of this investigation.



## 2 Site Description

The Norvel Road site is located on the north side of Norvel Road and extends north to the Blind Creek reserve as shown in the figure below. The site is bounded to the west by existing residential development, and has frontage to Castricum Place for part of the eastern frontage, with the balance of the eastern boundary abutting a Council linear reserve at the rear of existing residential development. The site is approximately 9.2 ha in area.



**Figure 2-1 Site Locality Plan**

The northern end of the site is heavily vegetated. The balance of the site was formerly used as a quarry, with the quarry excavation being filled by the former owner and graded so that the site falls evenly from south to north.



### 3 Development Proposal

The subdivision masterplan for the site prepared by Peddle Thorp Architects is shown in the figure below. The masterplan retains the existing vegetation at the northern end of the site as a Council reserve. Residential subdivision of the balance of the site is proposed with a yield of 138 residential lots.

The road reserves to be created within the development generally accord with Councils standard requirements with verges of suitable width to accommodate underground reticulated utility services, typically in shared trenches in accordance with standard industry practice.



Figure 3-1 Subdivision Masterplan

## 4 Utility Services Infrastructure

### 4.1 Sewerage Reticulation

South East Water is the authority responsible for the provision of sewerage facilities within this area.

#### 4.1.1 Existing Infrastructure

The existing 600 mm diameter Blind Creek Main Branch Sewer is located in the Blind Creek Reserve to the north of the site, as shown in red on the Sewer Asset Plan below.

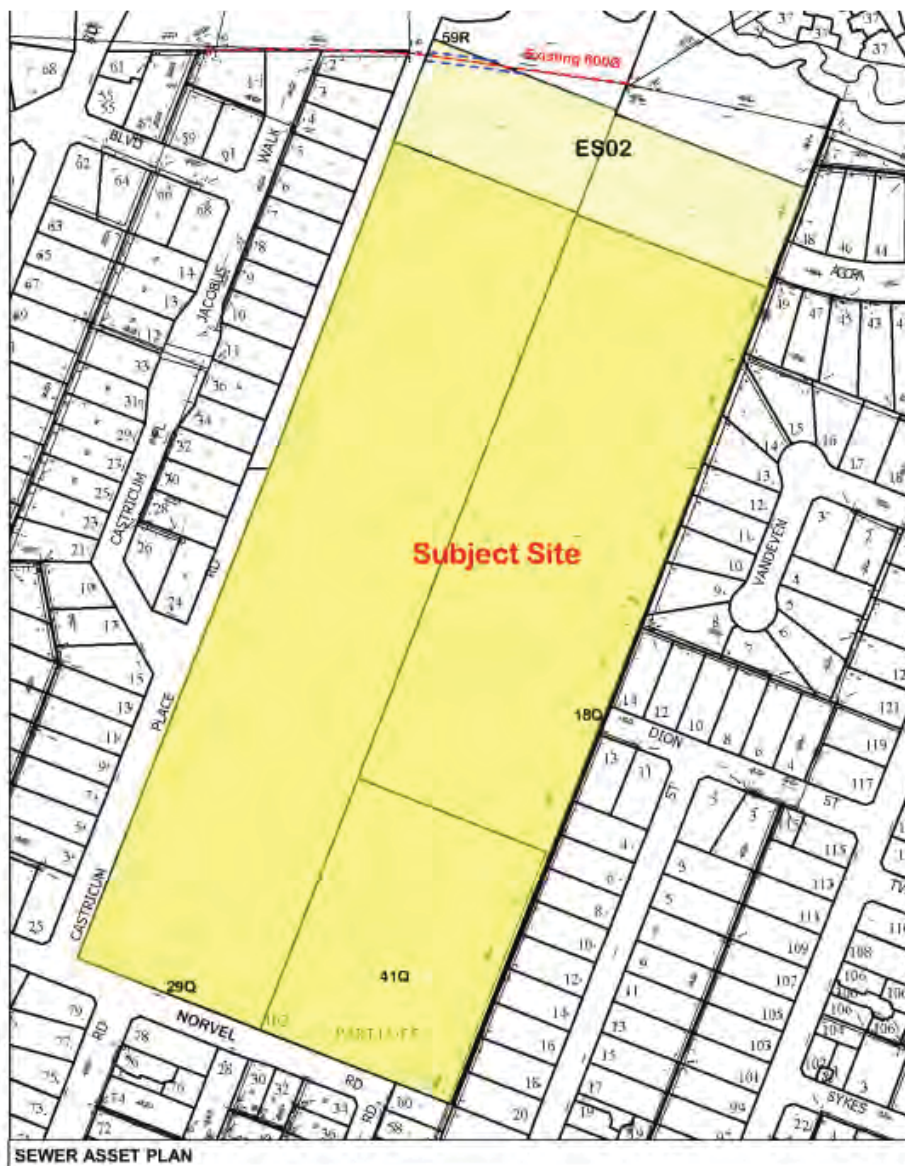


Figure 4-1 Sewer Asset Plan

Smaller reticulation sewers are located along the eastern boundary of the site.



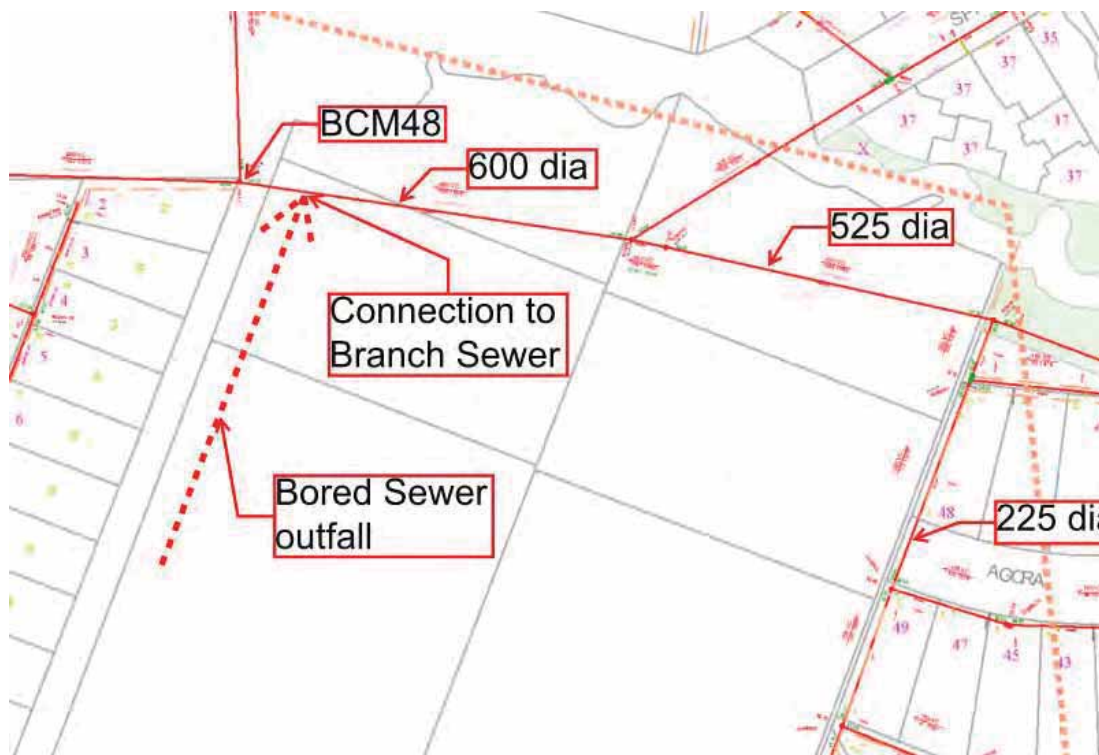
**4.1.2 Development Infrastructure**

South East Water has advised that the Blind Creek Main Branch Sewer is capable of servicing the development of the site and have noted existing manhole no. BCM48 to the north west of the site as the logical point of connection for sewer reticulation from the development.

Connection to this manhole would require extension of a new sewer south along the Council linear reserve to the site. Council has advised that this is not desirable as this would affect their future plans for works in the reserve to complement the development of the site.

Council has suggested that connection be made to the existing sewer on the western boundary of the site. An existing 225 dia sewer abuts the sites north east corner in Agora Blvd. South East Water has advised that this sewer may be able to accept some flows from the site subject to detailed review of their network however the capacity of this sewer is limited.

Connection to the Blind Creek Main Branch Sewer is required to cater for full development of the site. It is envisaged that the sewer outfall for the development will be bored under the existing vegetation between the development area and the existing sewer that is to be retained and protected, as shown conceptually on the plan below. The exact alignment and point of connection to the existing sewer will be determined as part of detailed design.



**Figure 4-2 Sewer Outfall**



## 4.2 Water Supply

South East Water is the authority responsible for the provision of water supply facilities within this area.

### 4.2.1 Existing Infrastructure

An existing 150 mm dia potable water main is located in Norvel Road at the south west corner of the site, as shown in light blue in the Water Asset Plan below. Existing 100 mm dia potable water mains are located on the south side of Norvel Road and on the west side of Castricum Place across the sites frontage to these roads, and in Dion Street.

There is no recycled water supply infrastructure in the vicinity of the site.

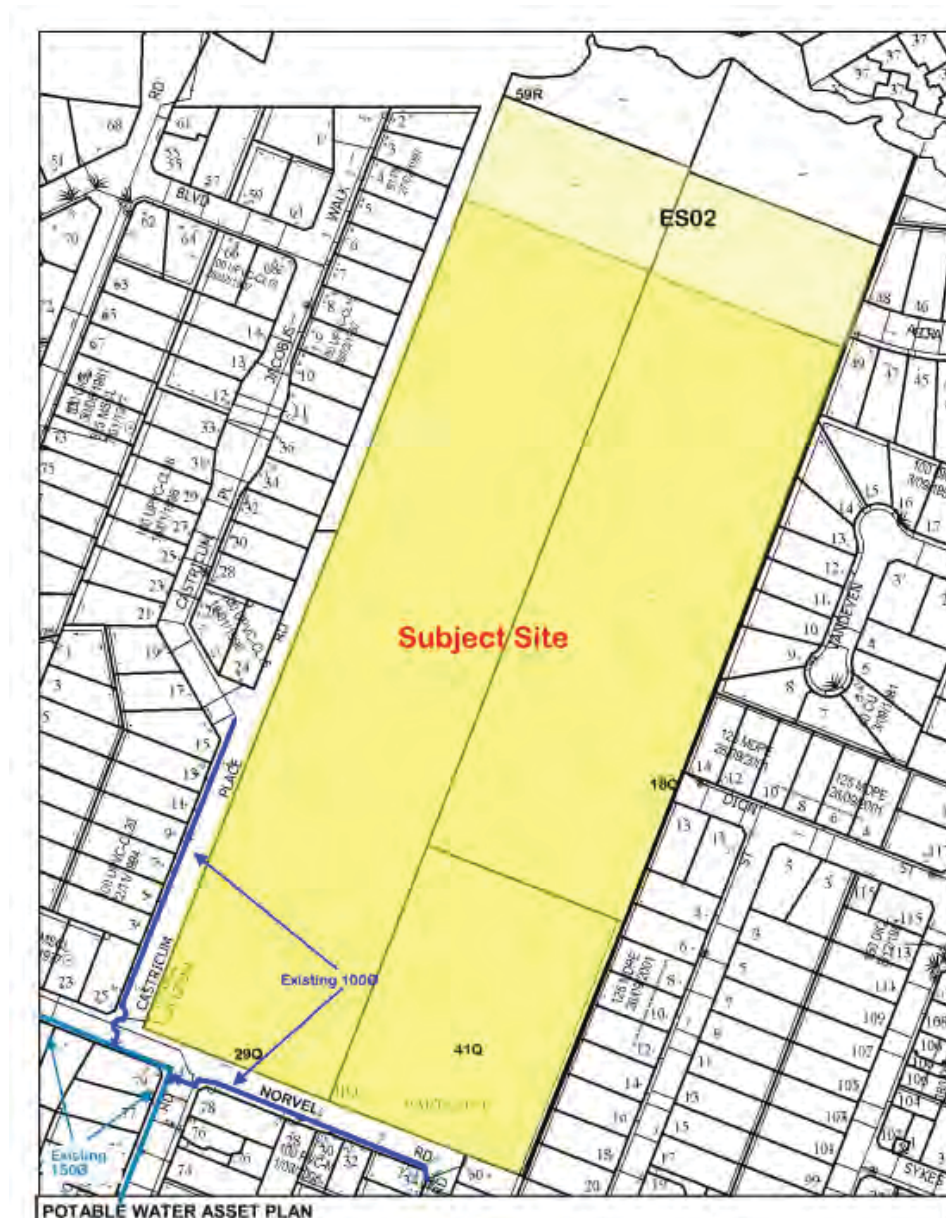


Figure 4-3 Water Asset Plan



#### 4.2.2 Development Infrastructure

South East Water has advised that the proposed development can be serviced from the existing 150 mm dia water main in Norvel Road. Upsizing of the existing 100 mm dia water main in Norvel Road to 150 mm dia to the new entrance road to the development will be required, so that a new 150 mm dia water main can extend into the development as the primary source of water supply. Connection to the existing mains in Castricum Place and Dion Street will be required. Upsizing of these mains to 150 mm dia may be required subject to development staging.

South East Water do not require the reticulation of recycled water within the development.

#### 4.3 Electricity Supply

Ausnet is the authority responsible for the provision of electricity supply facilities within this area.

##### 4.3.1 Existing Infrastructure

Ausnet's existing high voltage electricity supply infrastructure in the vicinity of the site is shown in blue in the figure below. Existing overhead high voltage lines are located in McMahons Road immediately to the south of the site, Norvel Road to the west and Burke Road to the east.

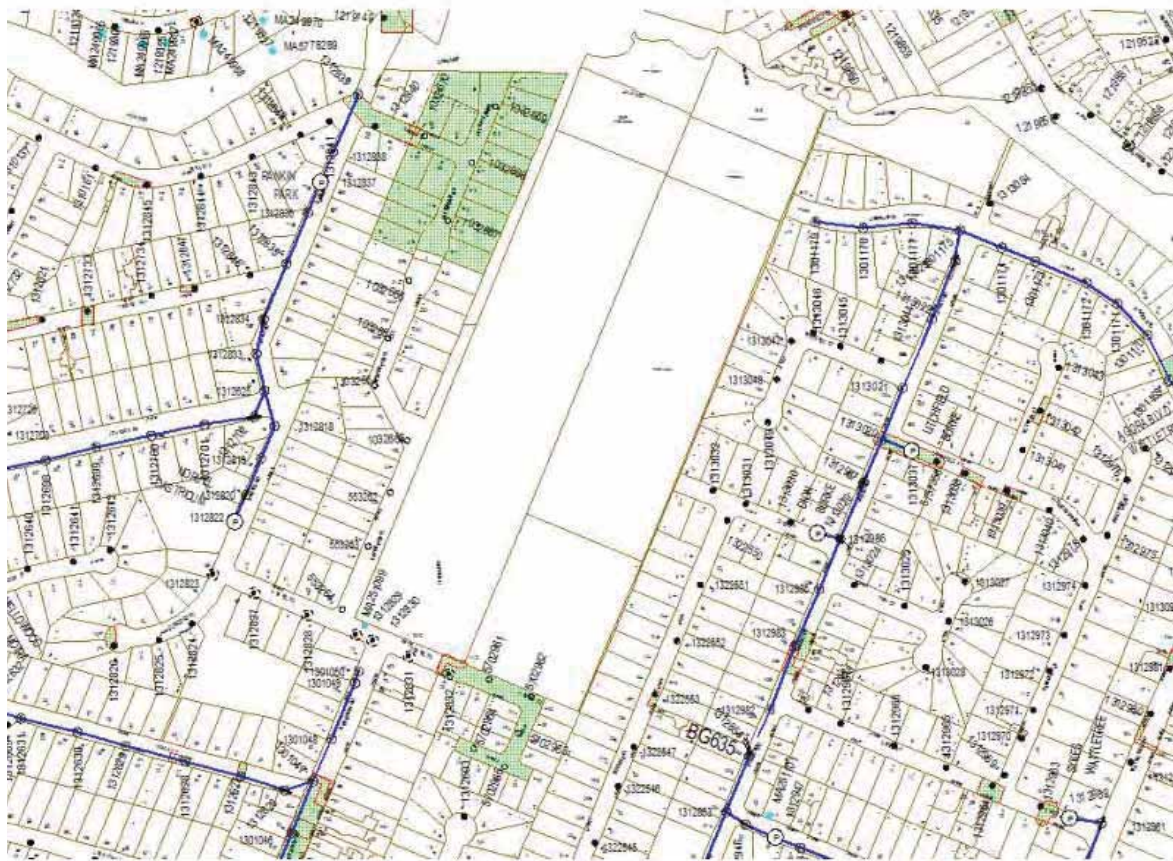


Figure 4-4 Electricity Asset Plan



**4.3.2 Development Infrastructure**

The provision of electricity supply to the development will require the extension of a new high voltage cable from the existing high voltage line in McMahons Road to the south to a new kiosk substation within the site as shown in blue in the figure below.



**Figure 4-5 Preliminary Electrical Cable Layout**

Low voltage electrical cables will extend from the substation to provide electricity supply to each lot in the development.





#### 4.4 Gas Supply

Multinet Gas is the authority responsible for the provision of gas supply facilities within the area.

##### 4.4.1 Existing Infrastructure

Existing 50 mm dia gas reticulation mains are located in Norvel Road and Castricum Place across the sites frontage, and in Dion Street as shown in blue in the figure below.

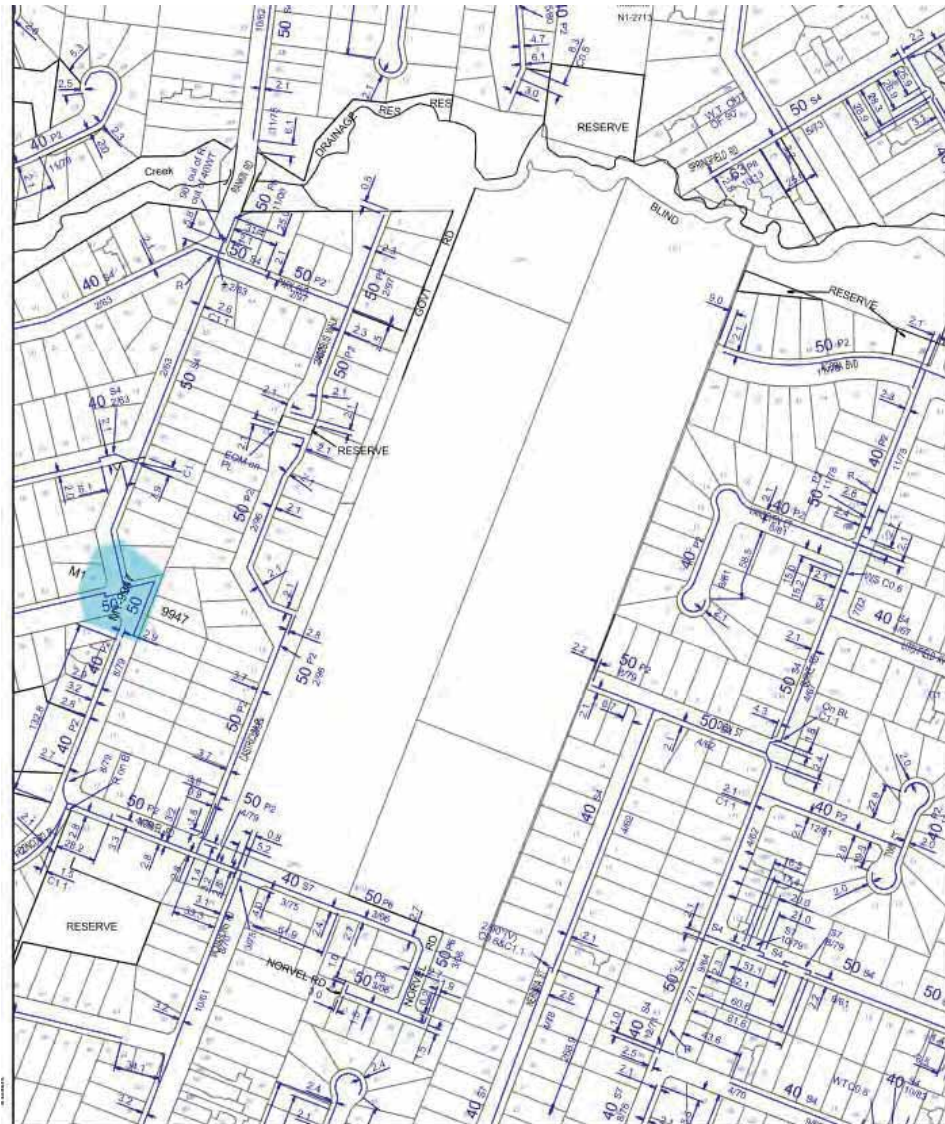


Figure 4-6 Gas Asset Plan

##### 4.4.2 Development Infrastructure

Comdain on behalf of Multinet Gas has advised that there is sufficient capacity in the existing gas reticulation network in the vicinity of the site to provide gas supply to the development.



#### **4.5 Telecommunications**

NBN Co. is the provider of last choice of telecommunication facilities to the development. The development will exceed the minimum service requirement for the provision of NBN infrastructure of 100 dwellings so it is envisaged that the NBN could provide the required infrastructure. NBN Co. does not release planning information except in response to specific development applications.

The developer will be required to install telecommunications pit and pipe infrastructure as part of their subdivisional works, with the installation of fibre optic cable to be carried out by NBN Co, including any backhaul works required to bring the service to the site.

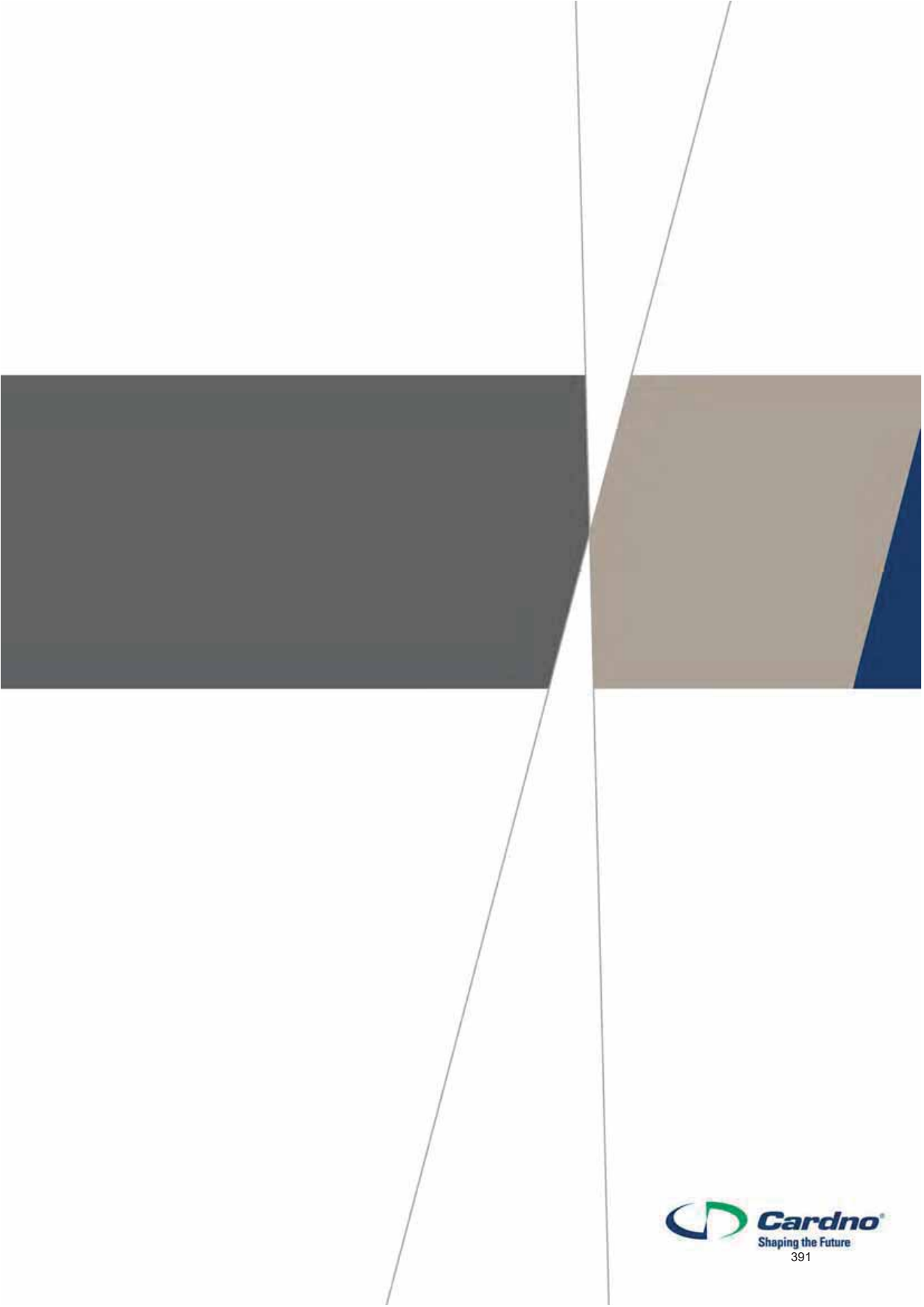
The developer also has the option of making alternative arrangements for the provision of fibre optic telecommunication systems to the development with other telecommunication providers.



## 5 Summary

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Our assessment has shown that the site is well suited for development from a servicing perspective, with ready access to existing utility services networks that have the capacity to cater for the level of development proposed. Minor external services extensions and augmentations will be required, however these can be readily undertaken using standard engineering practices.





## SOCIAL IMPACT ASSESSMENT

### NORVEL ESTATE

Prepared for Norvel Estate Pty Ltd

February 2021

[www.public-place.com.au](http://www.public-place.com.au)



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## 1 Introduction

Public Place was engaged by Norvel Estate Pty Ltd to prepare a Social Impact Assessment (SIA) relating to a proposal to rezone the old Norvel Road Quarry site to residential and for the subdivision of 140 residential lots on the site. This report presents the findings of the SIA.

### 1.1 The Requirement for an SIA

City of Knox has requested that a Social Impact Assessment be prepared that:

- Identifies social impacts that are likely to arise for individuals and the community as a result of the proposed development.
- Assesses the social impacts and determines the probability, scale and duration of the occurrence.
- Recommends measures to reduce negative impacts and enhance positive impacts.

### 1.2 Tasks

The following tasks were undertaken to support this SIA:

- Review of the plans for the proposed development.
- Review of relevant City of Knox policies and strategies.
- Demographic analysis of Ferntree Gully and Boronia.
- Mapping of community facilities in Ferntree Gully and Boronia.





## 2 The Proposal

### 2.1 The Site and Surrounds

The subject site comprises 9.24 hectares and is located in the suburb of Ferntree Gully, approximately 27 kilometres east from the Melbourne CBD. The subject site is a vacant, rehabilitated quarry generally bound by Blind Creek to the north, Norvel Road to the south, Castricum Place to the west and a row of residential properties to the east. The surrounding area is predominantly a low-density residential area, which provides a mix of single and double storey detached dwellings.

The suburb of Boronia is immediately to the north of the site, separated from the site by the Blind Creek open space corridor. Approximately 1 kilometre to the north of the site is the Boronia Activity Centre, including the Boronia Train Station.

### 2.2 The Proposal

The proposal is to rezone the site from SUZ2 to the Neighbourhood Residential Zone and subdivide the site for residential purposes. Specifically, the proposal is to subdivide 140 residential lots. The mix of dwellings that would ultimately be developed is not yet determined. However, for the purpose of the SIA it has been assumed that the lots will accommodate a mix of one and two storey townhouses, providing two to five bedrooms.

The proposal also includes a passive open space area (park/billabong), the preservation of 1.74 hectares of bushland (1.29 ha of which would be transferred into Council ownership), and the provision of a new informal path and boardwalk providing a connection between the site, the Blind Creek Trail and Agora Boulevard to the east (see Table 2-1).

Table 2-1: Schedule of Land Use and Development Outcomes

Land Use	Development Outcomes	
Residential Lots	2 to 5 Bedroom Town Houses	139
Open Space	Bushland Reserve Transfer	1.29ha
	Bushland Extension	0.45ha
	Park/Billabong Area	0.29ha

Source: Urbis 2021



---

## 3 Policy Context

### 3.1 Plan Melbourne

*Plan Melbourne* sets out the Victorian Government's vision for how Melbourne will grow to 2050. Plan Melbourne identifies a need to provide a diversity of housing in defined locations that caters for different households and is close to jobs and services. Urban renewal sites are identified as potentially making a major contribution to this objective.

*Plan Melbourne* also identifies community infrastructure as an important enabler of effective urban renewal. A particular focus of Plan Melbourne is to ensure that infill development is sequenced to encourage productive use of existing infrastructure.

### 3.2 Local Policies and Strategies

### 3.3 Knox Community and Council Plan (2017-2021)

The Plan sets a vision for the City of Knox and identifies eight community and council goals that will drive Council activities to 2021. Goals of particular relevance in the context of the SIA are:

- Goal 2: We have housing to meet our changing needs - This goal recognises that the housing needs of the Knox community are changing and more diverse and affordable housing will be required to meet community needs into the future.
- Goal 6: We are healthy, happy and well - This goal recognises that being active and participating in leisure, culture and sport can increase people sense of wellbeing and reduce anxiety, stress and the likelihood of illness. The plan seeks to mitigate lifestyle risks such lack of physical activity.

#### 3.3.1 Knox Affordable Housing Action Plan 2015-2020

The focus of the Action Plan is to increase the supply of social housing in Knox to meet the needs of the most vulnerable and disadvantaged households in the City. The Plan estimates that an additional 860 social housing dwellings will be needed in Knox by 2036 to meet minimum requirements, as well as more diverse and affordable housing options generally.

The Plan indicates that Council will negotiate with developers for a voluntary contribution to social housing of approximately 5% of dwellings on larger-scale development sites.



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### 3.3.2 Knox Open Space Plan 2012-2022

The Knox Open Space Plan outlines how City will Knox will manage open space in the City to ensure open space in Knox provides for a diversity of leisure activities, and enables people to enjoy nature, engage with others, learn and play. The Plan outlines a number of strategic directions, with Direction 1 being particularly relevant in the context of the SIA: *Create healthy creek corridors that people love.*

### 3.4 Summary

The policy context that applies to the Norvel Estate is one that encourages urban consolidation to meet the housing needs of the community in locations that are already provisioned with community infrastructure and open space. Development of urban renewal sites is to occur in a manner which respects and integrates with the existing physical and social environment, and leverages the opportunities created to improve social outcomes in the host area.

## 4 Social Conditions

### 4.1 Introduction

Demographic data are presented below for Ferntree Gully, Boronia and the City of Knox as a whole. The geographies used to report demographic data are consistent with those used by i.d. Consulting when preparing the Knox community profile. The proposed Norvel Estate is located in Ferntree Gully (see Figure 4.1).



Figure 4-1: Location of the Norvel Estate



## 4.2 Population Size and Growth

Table 4.1 shows existing and projected population levels for Ferntree Gully, Boronia and Knox as a whole. As can be seen, as at 2019 the population of Ferntree Gully was 27,626 people, a figure which is expected to grow incrementally to 30,842 people by 2039 (an average annual growth rate of 0.55%).

A slightly higher rate of growth (0.67% per annum) is projected for Boronia. However, growth in Ferntree Gully and Boronia is projected to occur at a lower rate than for the City of Knox as a whole.

Table 4-1: Existing and Project Population – Selected Areas

	2019	2029	2039	Change - 2019-2039	Annual Growth
Ferntree Gully	27,626	29,311	30,842	3,216	0.55%
Boronia	23,579	25,561	26,965	3,386	0.67%
City of Knox	164,889	177,779	190,414	25,525	0.72%

Source: *i.d. consulting (2019)*

Population forecasts prepared for Ferntree Gully on behalf of the City of Knox assume that the Norvel Road Quarry site will be developed for residential purposes between 2020-2027 and yield 197 dwellings. That is, Council's forecasts assume that the site would yield more dwellings than is proposed.

## 4.3 Age Profile

Table 4.2 shows 2016 Census data on age profile for the areas of interest. As the Table shows, at the time of the Census Ferntree Gully's age profile was similar to Boronia and Knox as a whole. However, in Ferntree Gully, Boronia and Knox there were fewer young adults aged 18 to 34 and more mature and older adults aged 50+ than observed across Greater Melbourne, resulting in a higher median age in Ferntree Gully (39 compared with 36 for Greater Melbourne).



Table 4-2: Age Profile

	Ferntree Gully	Boronia	Knox	Greater Melbourne
Babies and preschoolers (0 to 4)	6.2%	6.7%	5.8%	6.4%
Primary schoolers (5 to 11)	8.0%	7.5%	8.2%	8.5%
Secondary schoolers (12 to 17)	6.9%	5.8%	7.3%	6.7%
Tertiary student/independent (18 to 24)	8.4%	7.9%	9.3%	10.0%
Young workforce (25 to 34)	13.9%	16.0%	13.2%	16.3%
Parents and homebuilders (35 to 49)	21.5%	20.3%	20.6%	21.1%
Older workers/pre-retirees (50 to 59)	13.1%	12.1%	14.0%	11.9%
Empty nesters/retirees (60 to 69)	11.5%	11.8%	11.3%	9.3%
Seniors (70 to 84)	8.6%	9.7%	8.3%	7.7%
Elderly aged (85 and over)	1.8%	2.3%	2.0%	2.0%

Source: i.d. Consulting 2018

Population growth in Ferntree Gully will not be uniform across all age groups in coming years, with growth projected to be particularly strong in older cohorts (those aged 75+, see Figure 4-2). Notwithstanding, growth is projected in all age groups.

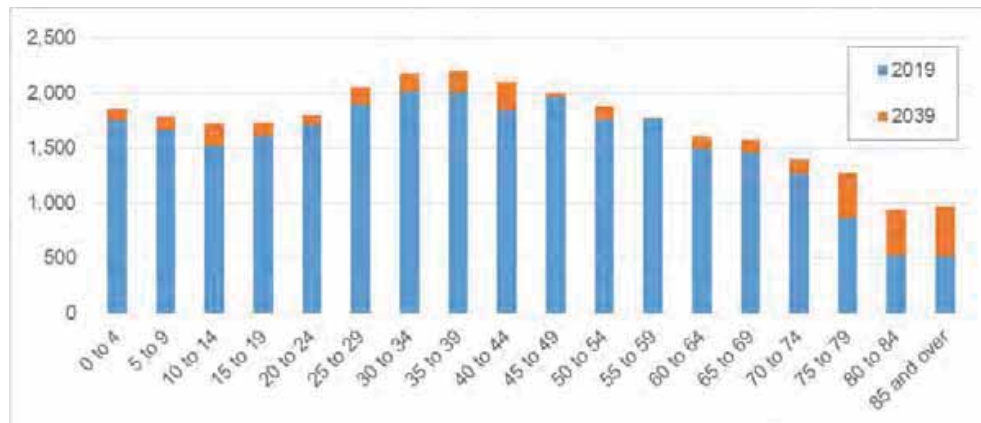


Figure 4-2: Population Growth by Age – Ferntree Gully (adapted from i.d Consulting 2019).



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#### 4.4 Other Demographic Characteristics

Table 4.3 shows a selection of demographic data for Ferntree Gully, Boronia and the City of Knox, as well as Greater Melbourne. The following observation can be made with respect to the data:

- Housing stock in Ferntree Gully consists primarily of larger detached houses. Relatively few dwellings offer 0 to 2 bedrooms and high-density housing forms are virtually absent from the market. In contrast, medium density dwellings comprise almost a quarter of dwellings in Boronia and two bedrooms dwellings are relatively common in Boronia.
- A large proportion of households living in Ferntree Gully and Boronia are family households. However, lone person and group households are more common in Boronia compared with Ferntree Gully, reflecting Boronia's greater housing diversity.
- Educational attainment is slightly lower in Ferntree Gully and Boronia when compared with Knox and Greater Melbourne. Consistent with this, fewer Ferntree Gully residents are employed in managerial or professional occupations ('white collar'), compared with Melbourne as a whole.
- Median weekly personal and household income in Ferntree Gully was similar to that observed for Greater Melbourne and slightly higher than that observed for Boronia. A lower (although not insignificant) proportion of households and individuals in Ferntree Gully were earning a low income compared with Melbourne as a whole.
- Home ownership is more common in Ferntree Gully compared with Greater Melbourne. In contrast, a relatively high proportion of households in Boronia rent their dwelling, consistent with the housing profile of this suburb.
- There is less ethnic diversity in Ferntree Gully compared with Knox and Greater Melbourne as a whole, with fewer residents speaking language other than English, and relatively few residents have poor English language skills.
- The Ferntree Gully population is very stable, with a large proportion of residents reporting they have lived at their current address for 5 or more years. This observation is consistent with the presence of a large proportion of owner occupier and/or family households in the area.



Table 4-3: Selected Demographic Indicators

		FTG	Boronia	Knox	Greater Melbourne
<b>DWELLINGS</b>	Separate house	89.1%	74.0%	84.5%	66.7%
	Semi-detached, townhouse	10.2%	24.6%	14.7%	23.1%
	Flat, unit or apartment:	0.7%	1.3%	0.8%	10.2%
	0 to 1 Bedroom	1.8%	2.1%	2.0%	6.4%
	2 Bedrooms	13.9%	22.5%	12.6%	20.9%
	3 Bedrooms	54.2%	52.6%	47.4%	42.9%
	4 + Bedrooms	30.1%	22.7%	38.0%	29.8%
<b>HOUSEHOLDS</b>	Household Size	2.6	2.4	2.7	2.7
	Lone Person Household	23.3%	27.4%	20.2%	23.2%
	Group Household	2.6%	3.4%	2.4%	5.0%
	Family Household	74.2%	69.2%	77.4%	71.7%
<b>FAMILIES</b>	Couple family with no children	25.4%	25.7%	25.6%	24.7%
	Couple family with children	35.1%	29.2%	39.2%	34.8%
	One parent family	12.7%	13.2%	11.6%	10.8%
	Other Family	0.9%	1.1%	1.0%	1.4%
<b>INCOME</b>	Median Personal Income	\$665	\$658	\$664	\$673
	Personal Income <\$400	31.2%	30.3%	32.6%	33.2%
	Median Household Income	\$1,455	\$1,318	\$1,561	\$1,542
	HH Income <\$650	17.6%	19.8%	16.2%	18.4%
<b>EMPLOYMENT AND TRAINING</b>	Unemployment Rate	5.6%	5.9%	5.6%	6.8%
	Labour Force Participation	64.8%	62.5%	64.5%	61.9%
	White Collar	30.0%	29.0%	33.4%	38.9%
	Completed Year 12	53.3%	54.3%	58.3%	64.2%
	Bachelor Degree or Higher	18.7%	18.6%	22.3%	27.5%
<b>TENURE</b>	Fully owned	33.5%	32.4%	34.9%	31.3%
	Being purchased	45.2%	40.2%	43.5%	37.0%
	Rented	20.5%	26.9%	20.2%	30.8%
	Public/Social Housing	3.1%	3.0%	2.1%	2.8%
	Other Tenure	0.9%	0.6%	1.5%	0.8%
<b>ETHNICITY</b>	Born Overseas	24.4%	25.3%	31.5%	36.2%
	Speaks other language	16.5%	17.5%	26.2%	34.3%
	Speak English Poorly	2.2%	2.9%	4.0%	5.9%
<b>CARS</b>	Household Owns a Car	95.8%	94.3%	96.2%	91.0%
<b>DISABILITY</b>	Needs Assistance	5.3%	5.3%	4.8%	4.9%
	Not Stated	4.3%	5.5%	4.4%	6.3%
<b>SAME ADDRESS</b>	1 Year Ago	89.7%	86.4%	88.4%	83.6%
	5 Years Ago	68.2%	62.0%	67.2%	57.2%





#### 4.5 SEIFA Index

Figure 4.4 below shows local variation in SEIFA Index of Disadvantage scores within the City of Knox. As can be seen, the proposal site is located within an area of considerable socio-economic advantage (Decile 7). Areas to east and west along the Maroondah Highway between Upper Ferntree Gully and Wantirna likewise score highly on the SEIFA Index. Immediately to the north of the site in Boronia (on the northern side of the Blind Creek) there is small area which ranks in Decile 3 on the SEIFA Index, reflecting a notable clustering of public housing in this location.

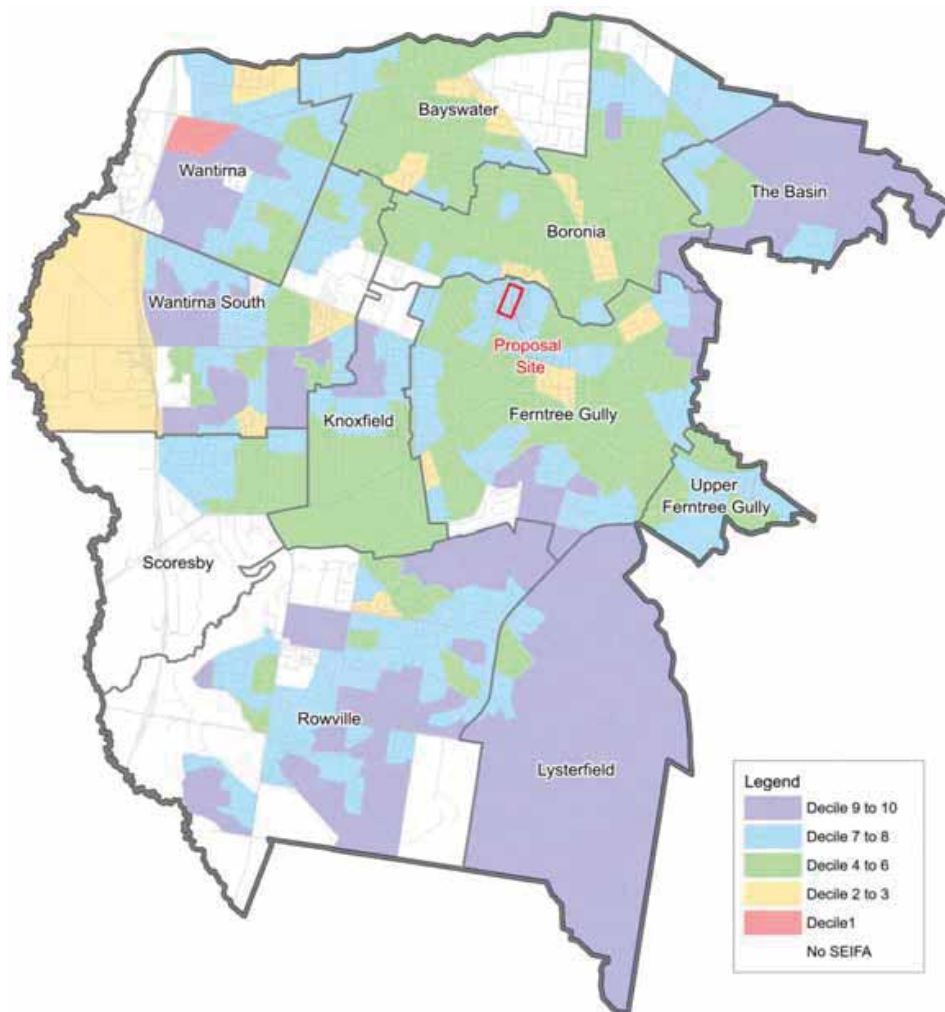


Figure 4-3: SEIFA Index of Disadvantage (Source Census 2016).



## 5 Community Facilities and Open Space

### 5.1 Introduction

This Section provides an assessment of community facilities and open space located in Ferntree Gully and Boronia (the Study Area).

### 5.2 Facilities

#### **Early Years Facilities**

There are numerous early years facilities located in close proximity to the proposed Norvel Estate (see Figure 5-1) and future residents would enjoy convenient access to these services. In the case of MCH and LDC, existing facilities have capacity to accommodate existing and projected growth in demand. With respect to sessional kindergarten, current supply is only just sufficient. However, projected growth in the four year old population is modest, and potential increases in demand will be offset by a trend of increasing utilisation of kindergarten programs imbedded within LDC programs.<sup>1</sup> Moreover, Council has recently/is currently developing Early Years Hubs in Bayswater and Wantirna South. These facilities will increase supply of sessional kindergarten programs in Knox and assist in meeting demand generated in Ferntree Gully and Boronia.

Table 5-1: Early Years Services– Supply and Demand in Ferntree Gully and Boronia

Demand			Supply
MCH (Nurse EFT)	2019	2.7	Two existing centers which can accommodate the required Nurse EFT for the foreseeable future
	2039	2.8	
Sessional Kindergarten (Enrollments)	2019	485	There are 10 kindergartens located in Ferntree Gully and Boronia which have a combined enrollment capacity of 484 (assumes group size are a multiple of 11 children to achieve optimal staffing ratios)
	2039	476	
LDC (Places)	2019	902	11 existing centers which provide LDC places at a rate of 228 per 1,000 children aged 0 to 5. As at 2016, the rate of provision of LDC places in Metropolitan Melbourne was 214 places per 1,000 children aged 0-5. Data from mchild.gov indicate that all centers have vacancies.
	2039	950	

Source: ACECQA 2019

<sup>1</sup> To illustrate, in 2006, 8.4% of children in Knox accessed kindergarten programs within a LDC setting, growing to 18.9% by 2015 (VCAMS 2019).





### 5.3 Schools

There is a well-developed network of primary and secondary schools in Ferntree Gully and Boronia (see Figure 5-2). Over the past two decades changes to the age profile of Boronia and Ferntree Gully have resulting in fewer primary and secondary school aged children living in these suburbs, despite overall population growth. In the past, schools in the area have accepted higher enrolment levels than those experienced currently, and have sufficient capacity to accommodate projected increases in demand.

Table 5-2: Schools– Supply and Demand in Ferntree Gully and Boronia

Demand			Supply
Gov. Primary (enrollments)	2019	3,471	10 primary schools and 2 secondary located in Ferntree Gully and Boronia. The network operates well below enrollment capacity and schools near the Norvel Estate have previously accommodated 100-150 additional students compared with 2018 enrolment levels.
	2039	3,602	
Secondary	2019	2,181	
	2039	2,330	

Source: DoT 2018; i.d. Consulting 2019; ABS Census 2016



Figure 5-2: Schools in Ferntree Gully and Boronia



## 5.4 Community Spaces

### **Meeting Spaces**

There is a well-developed network of community meeting spaces in Ferntree Gully and Boronia, including halls, sports pavilions, spaces within primary schools and the Ferntree Gully Community Arts Centre. Collectively, these venues provide approximately 2,850 square metres of community meeting space, a level of supply that is consistent with planning standards applied in Melbourne's growth areas.

Overtime demand for community meeting space in the Study Area may grow in association with population growth and existing supply may need to be augmented.

Table 5-3: Schools– Supply and Demand in Ferntree Gully and Boronia

Demand			Supply
Meeting spaces (floor space)	2019	2,720	16 venues offering 25 meeting spaces of varying size (approx. 2,850 sq.m)
	2039	3,071	

Source: City of Knox 2019; i.d. Consulting 2019; ASR 2008

### **Libraries**

There is an existing library in Boronia and in Ferntree Gully. These facilities have capacity to meet community needs for the foreseeable future.

Table 5-4: Demand for and Supply of Libraries in the Study Area

Demand			Supply
Libraries (1 per 30,000 to 60,000)	2019	0.8-1.7	2 existing libraries providing over 2,000 sq.m of floor space.
	2039	1-1.9	
Library Floor Space	2019	1,706	
	2039	1,926	

Source: i.d. Consulting 2019; People and Places 2012; ASR 2008



Figure 5-3: Community Spaces – Ferntree Gully and Boronia



## 5.5 Open Space

Figure 6.4 shows the distribution of open space in Ferntree Gully and Boronia. As the Figure shows there are numerous public open space areas in Ferntree Fully and Boronia, including parks, sports fields and natural and semi-natural areas.

The adequacy of an open space network can be judged in terms of its ability to ensure convenient access to a range of open spaces for the community. The City of Knox uses the benchmark of a maximum distance of 500 metres between a residential property and open space, when judging the adequacy of supply.<sup>2</sup> In this context it is noted that:

- All locations in Ferntree Gully and Boronia are within 500 metres of an open space.
- A number of existing open spaces are located within 500 metres of the proposal site's boundary, which provide for a variety of active and passive uses in close proximity to the subject site. These are:
  - Norvel Reserve: A local open space which includes a children's playground.
  - Unnamed - a small passive open space area on Norvel Road, which contains the FTG 8<sup>th</sup> Scout Hall.
  - Blind Creek Linear Open Space Corridor – a long linear open space corridor linking two municipal scale open spaces, Tim Neville Arboretum to the east and Lewis Park to the west. In close proximity to the proposal site, this corridor incorporates the Mountain Gate Tennis Club, the Blind Creek Billabong and Fair Park, all of which can be accessed using the Blind Creek shared trail.

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<sup>2</sup> See *Open Space Plan 2012-2022*





## 5.6 Active Recreation

ABS data on sports participation indicate a trend away from traditional club based sports such as cricket and tennis, and greater participation in casual activities such as fitness classes, gyms and jogging. As a result, even though the population of Ferntree Gully and Boronia is growing, the data suggest that there would be a similar or even lower number of participants in activities such as AFL and cricket living in the Study Area in 2039 compared with 2006, due to lower participation levels (notwithstanding, participation in particular sports can be subject to rapid change, as indicated by the recent increase in participation in AFL football among women and girls).

In relation to other sports such as netball, notable increases in the total number of participants may occur. However, the greatest uplift in total number of participants can be expected in relation to activities such as fitness classes, gyms and jogging (see Table 5-5).

Table 5-5: Participation in Active Recreation in Ferntree Gully and Boronia (persons aged 15 or over).

	Participation Rate				Participants		
	2006	2009	2011	2031 (trend)	2006	2031	
						2011 rate	trend
AFL	3.3%	2.7%	2.0%	1.6%	1,246	960	768
Cricket	2.8%	1.9%	2.0%	1.5%	1,057	960	720
Lawn bowls	1.7%	1.3%	1.4%	1.2%	642	672	576
Soccer	1.9%	1.1%	1.9%	1.2%	717	912	576
Tennis	4.8%	4.7%	4.2%	4.0%	1,812	2,017	1,921
Netball	3.2%	3.0%	3.5%	3.4%	1,208	1,680	1,632
Basketball	2.6%	3.0%	3.2%	3.6%	982	1,536	1,728
Fitness/Gym	11.8%	14.4%	17.6%	20.2%	4,455	8,450	9,699
Jogging	4.2%	7.5%	7.8%	10.5%	1,586	3,745	5,041

Source: ABS Participation in Sport and Physical Recreation, Victoria (2011-12).



Figure 5-4: Open Space in Ferntree Gully and Boronia



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## 6 Population of the Norvel Estate

The population of the Novel Estate is estimated below. In order to estimate the likely size and structure of the population of the development, Census data for 'Outer Melbourne' were used to establish trends. Specifically, the average household size and age profile of residents living in dwellings of different types and sizes was observed. These observations were then used to guide assumptions regarding the average household size and age profile of particular dwelling classes.

Based on the proposed dwelling mix and likely number of persons per dwelling by dwelling type, the population of the Norvel Estate would be approximately 599 persons once fully occupied (see Table 6-1). Due to the mix of proposed dwellings, when compared with the City of Knox age profile, the development would be home to:

- A larger proportion of children aged 0 to 9.
- A larger proportion adults aged 20 to 49.
- A lower proportion of older adults age 50+.

Notwithstanding the above, as the proposed mix of dwellings includes townhouses of varying size, the population of the Norvel Estate would consist of a broad range of households, including working singles and couples, families with children and empty nesters. It can also be expected that owner occupation would be common.

The Figures presented in Table 6.1 are an estimate only and the overall size of the population residing within the development at any particular time may differ. Notwithstanding, over time the population of the development can be expected to approximate that shown in 6-1.



Table 6-1: Likely Population Outcomes – Norvel Estate

	Population	Age Profile	
		Norvel	Knox
<b>Dwellings</b>	139	Norvel	Knox
<b>HH size</b>	2.77		
<b>Population</b>	386		
<b>0 to 4</b>	31	8.0%	6.3%
<b>5 to 9</b>	35	9.1%	8.2%
<b>10 to 14</b>	26	6.7%	6.8%
<b>15 to 19</b>	40	10.4%	8.5%
<b>20 to 29</b>	69	17.9%	14.1%
<b>30 to 49</b>	86	22.3%	21.1%
<b>50 to 69</b>	73	18.9%	23.4%
<b>70+</b>	25	6.7%	11.5%

Source: ABS Census 2016; Public Place 2020

As explained in Section 4, population forecasts prepared on behalf of the City of Knox assume that 197 dwellings would be developed within the Norvel Estate. That is, Council's forecasts assume that the site would yield more dwellings than is proposed, and as a result Council may need to adjust down its forecasts for the local area.



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## 7 Impact Assessment

### 7.1 Physical Integration

#### ***Interfaces***

The proposed Norvel Estate would be developed on a vacant, rehabilitated quarry site embedded within a well-established residential area. While land within the quarry site is not publicly accessible, it provides an existing green backdrop for residences located on its boundary.

Development of the quarry site for residential purposes has the potential to result in a perceived reduction in amenity, particularly for occupants of dwellings whose property is set on the site boundary (those to the east of the site). However, the low-density form of the proposed Norvel Estate would limit changes to residential amenity for existing dwellings and is consistent with the suburban character of the surrounding neighbourhood.

Moreover, the proposal would improve connections between surrounding residential areas and the Blind Creek open space corridor by connecting internal roads with existing streets such as Dion Street, the improvement of an existing shared path along the western site boundary and development of new boardwalks and connections to the bushland reserve. These improved connections would offset perceived reductions in amenity by enhancing and improving access to the Blind Creek corridor.

#### ***Access to Services and Amenities***

The Boronia Activity Centre is located approximately 1 kilometre to the north of the site and offers a wide range of retail, health and entertainment options, as well as the Boronia Train Station. Pedestrians and cyclists would enjoy direct access to the activity centre via the Blind Creek Trail and Springfield Street. While the activity centre is beyond the commonly applied 800 metre 'rule of thumb' for a 'longer walk', walking distance research from Australia and overseas shows that people will walk considerably further than 800 metres to access destinations such as train stations.<sup>3</sup> It can therefore be expected that the Boronia Activity Centre would be considered within walking range by many of the future residents of the Norvel Estate. For future residents wishing to access the Boronia Activity centre using public transport, bus route 753 can be accessed from Springfield Street approximately 250 metres from the Norvel Estate.

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<sup>3</sup> To illustrate, from the VISTA travel survey shows that a quarter of bus users in Melbourne walk more than 800 metres to their stop. The data also show that half of Melbourne's train travellers walk more than 800 metres and a quarter more than 1.3 kilometres to access a station.



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The Mountain Gate Shopping Centre is located approximately 1 kilometre to the south of the site, and therefore future residents of the Norvel Estate would have multiple retail and service centres located in close proximity.

The Norvel Estate would result in changes to an existing residential environment. While future development will be appropriately scaled and would increase pedestrian connectivity to the Blind Creek Trail, some adjoining neighbours may consider that the proposal reduces their existing amenity. However, concerns about amenity impacts would dissipate quickly given the relatively low-density development form which would be allowed by the proposed planning controls.

The Norvel Estate would be located in a well-established urban area, in close proximity to a range of range of retail, health and entertainment options, as well as fixed rail transport.



## 7.2 Demography

The Novel Estate would yield 140 lots which would be occupied by approximately 382 people, once developed. The mix of households and the age structure of the incoming residents would be slightly different to that which exists in the local area. However, as Figure 9.1 indicates, the Novel Estate would not fundamentally alter the demographic character of Ferntree Gully and the changes to the local demographic profile would occur over several years, meaning they would be barely perceptible.

Notwithstanding the above, as the Novell Estate incorporates a mix of medium density housing products, the estate may attract family households with children, and this would offset to a degree population ageing in Ferntree Gully, which is expected to be notable over the next two decades.

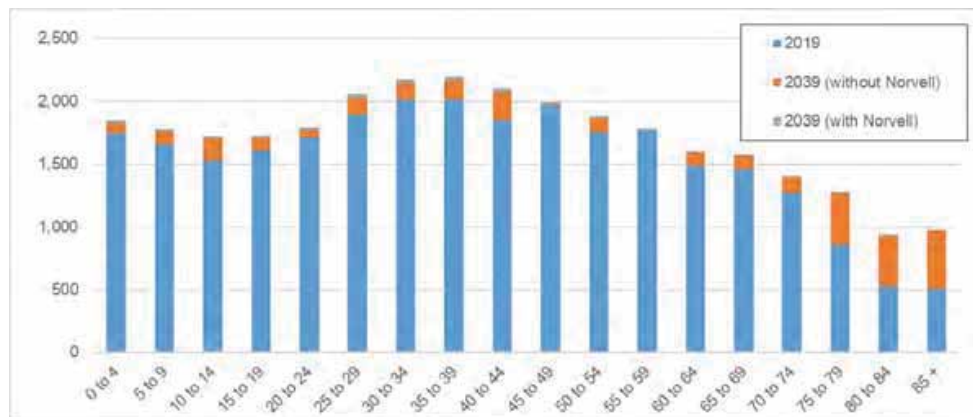


Figure 7-1: Age Profile of Ferntree Gully in 2019 and in 2039 with and without the Novell Estate.

The Novell Estate would offset the current trend of population ageing in Ferntree Gully, and therefore would have a minor positive impact on the demographic character of Ferntree Gully.



### 7.3 Community Facilities and Open Space

#### 7.3.1 Facilities

Population uplift associated with Norvel Estate has been accounted for in the population forecasts developed by City of Knox and the implications for future demand for facilities and services has been discussed in Section 5.

Table 7-1 shows demand for community facilities and services generated by the future population of the Norvel Estate. As the Table shows, the uplift in demand would be small and not sufficient to influence the service or facility planning decisions made by City of Knox, the State Government or the private sector.

Table 7-1: Demand for Community Facilities, Norvell Estate

	Benchmark	Norvel
MCH	1 Nurse EFT per 130 children aged 0	0.05
Sessional Kindergarten	75% of 4 year olds enroll	4.4
	1 licensed placed for every 2 enrollments	2.2
Childcare Places	220 licensed places per 1,000 children aged 0-5	9
Meeting Spaces	1 sq.m per 30 people	12
Primary	80% enrollments per 100 children aged 5-11	28
Secondary	65% enrollments per 100 children aged 12-17	17
Library	1 per 30,000 to 60,000 residents	0.01-0.02
	1 sq.m. per 30 residents	13

Demand for community facilities and services generated by the Norvel Estate would be small, and this additional demand can be accommodated by the existing network of facilities and services. The impact of the additional demand would be negligible.





### 7.3.2 Open Space

Section 5.6 the City of Knox's Open Space Strategy does not identify an open space deficit in the immediate surrounds of the Norvell Estate. This considered, future residents of the estate would enjoy convenient access to ample existing public open space in various forms.

The Knox Open Space Strategy includes the Strategic Direction to *create healthy creek corridors that people love*. Consistent with this direction, the proposed Norvell Estate includes a significant bushland buffer between the Blind Creek Corridor, comprising 1.29 hectares of bushland transferred into Council ownership, 0.45 of bushland within the Norvell Estate and a passive open space area comprising a park/billabong. A boardwalk would be constructed which traverses the bushland areas and which connects with the proposed park/billabong and Agora Boulevard. These open space areas combined comprise over 20% of the site and constitutes a significant extension to the public open space network in Knox. The proposed open spaces would create passive recreational opportunities for future residents of the Norvell Estate as well residents of adjoining areas and other users of the Blind Creek Corridor.

### 7.3.3 Active Recreation

Some of the people who live within the Norvell Estate would participate in organised sport and generate demand for infrastructure such as sporting fields and pavilions. Estimates of the total demand for a selection of activities are provided in Table 7-2 based on data from the ABS. As with estimates of demand relating to community facilities, all uplift in demand has been accounted for previously in Section 5.

Table 7-2: Norvell Estate, Participation in Active Recreation (persons aged 15 and over).

	Participation Rate		Norvell Participants	
	2011 rate	2031 (trend)	2011 rate	2031 (trend)
AFL	2.0%	1.6%	6	5
Cricket	2.0%	1.5%	6	5
Lawn bowls	1.4%	1.2%	4	4
Soccer	1.9%	1.2%	6	5
Tennis	4.2%	4.0%	13	12
Netball	3.5%	3.4%	11	10
Basketball	3.2%	3.6%	10	11
Fitness/Gym	17.6%	20.2%	54	62
Jogging	7.8%	10.5%	24	32

Source: ABS Participation in Sport and Physical Recreation, Victoria (2011-12).



The following observations are made with respect to Table 7-2:

- In relation to activities such as cricket and AFL football, the total number of participants who would live within the Norvel Estate would be modest and set against a trend of declining participation (see Section 5-6). As a result, increases in the total number of participants associated with the Norvell Estate would help local clubs and associations to sustain their membership levels over the longer term.
- Increases in the number of people living in Boronia and Ferntree Gully who would be involved in indoor sports such as netball and basketball will grow overtime, and the development of the Norvel Estate would add to this.
- Notable numbers of people living within the development would participate in activities such as jogging, fitness classes and gyms. However, in the context of the catchment size of a Council indoor aquatic centre/gym (approx. 40-60,000 people), the projected increase is small. Moreover, there is ample open space in the local area to support activities such as jogging and walking.

The Norvel Estate would be located to ensure future residents have access to abundant and diverse open space, with positive implications for their health and wellbeing. The Norvel Estate would also facilitate the expansion and enhancement of the Blind Creek Corridor, with positive implications for residents of surrounding areas and other users of this linear open space.

The Norvel Estate would generate some demand for active recreation. However, the demand generated would not be sufficient to influence the service or facility planning decisions made by City of Knox.



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## 7.4 Affordable Housing

### 7.4.1 Housing Diversity

The Council's Affordable Housing Action Plan identifies the need to provide a range of housing in Knox to respond to the needs of people from across the socio-economic spectrum. The Norvel Estate will likely be developed to include a mix of two to five-bedroom townhouses. Housing delivered in this medium density form is typically more affordable than housing delivered in lower density forms, such as detached dwellings. Moreover, housing diversity and choice is very limited in Ferntree Gully at present.

The proposed housing would increase housing choice, be relatively affordable and as such assist in maintaining socio-economic diversity in Knox, consistent with Council policy.

### 7.4.2 Social Housing

Notwithstanding the above, market forces will dictate the price of the townhouses (purchase and rent) and there can be no guarantee that the costs of the proposed housing will meet any particular standard of affordability. In order to guarantee that a particular affordability standard can be met, a component of the dwellings would need to be reserved for a registered housing provider (or prices would need to be controlled through some other mechanism).

To contribute to the supply of affordable housing in Knox it is proposed that approximately 10 of the lots be made available for social housing and provided to a registered housing provider/association, or approximately 7.2% of all lots. This approach is consistent with the Council's Affordable Housing Action Plan, and would contribute to ensuring a minimum supply of social/affordable housing in the City of Knox.

The Norvel Estate would increase housing diversity and the supply of housing units provided by a registered housing provider/association, consistent with Council Policy. In doing so the development would have a significant positive social impact.



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## 8 Conclusions

The proposed development would produce a number of important social benefits:

- The development of the land for residential and related purposes accords with the State Government's urban consolidation initiatives.
- The proposal site is located within a well-established suburban area and therefore would deliver housing in close proximity to established facilities and services. A variety of community facilities, open spaces and retail opportunities could be accessed within walking distance of the site and an existing bus services connects future residents with the Boronia Activity Centre and beyond.
- The proposed mix of housing would contribute to housing diversity and affordability in the local area. Moreover, consistent with Council's Affordable Housing Action Plan, approximately 7.2% of the proposed lots would be used to accommodate social housing provided by a registered housing provider/association.
- The Norvel Estate would be located to ensure future residents have access to abundant and diverse open space, with positive implications for their health and wellbeing. The Norvel Estate would also facilitate the expansion and enhancement of the Blind Creek Corridor, with positive implications for residents of surrounding areas and other users of this linear open space.

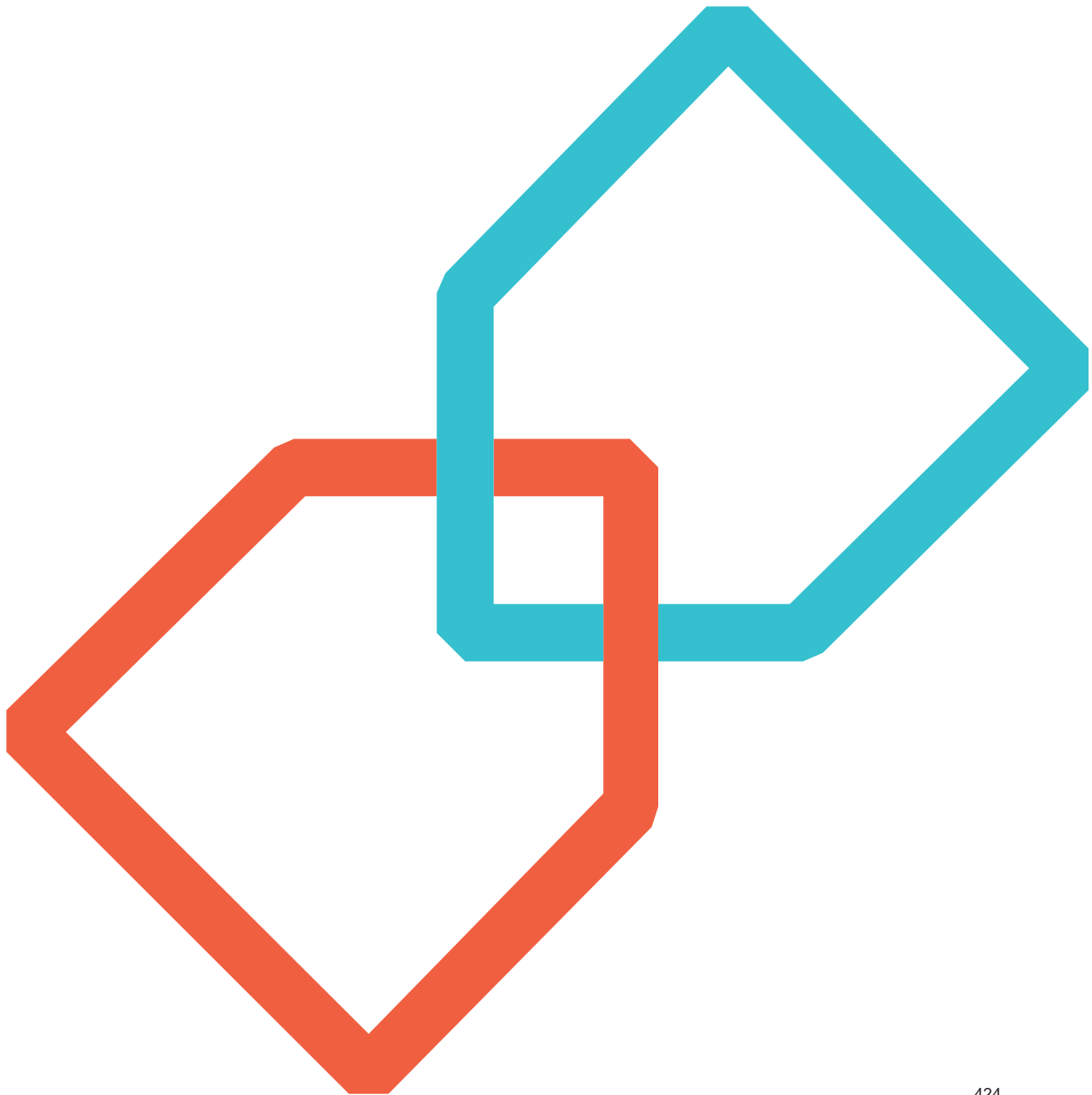
Potential negative impacts such as perceived reductions in amenity for surrounding residential properties would likely be minimal and short lived, given the low-density form of the proposed Norvel Estate.

Demand for community facilities and services associated with the future population of the Norvel Estate would be minimal. Moreover, the community infrastructure audit shows that the area surrounding the subject site is well supplied with a diverse range of community facilities and open space.



# Affordable Housing Strategy

## Norvel Estate, Ferntree Gully



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## Executive Summary

### Overview

This Affordable Housing Strategy has been prepared on behalf of Norvel Estate Pty Ltd ('the landowner') in relation to land owned at **18Q Dion Street, 29Q and 41Q Norvel Road, Ferntree Gully** ('the Site') and forms part of the application for rezoning and subdivision.

The Strategy responds to Knox City Council ('Council') *Affordable Housing Action Plan 2015 – 2020* ('the Plan') and policy objective that approximately five per cent of dwellings are to be negotiated to be provided as Affordable Housing in all significant rezonings.

In response to this objective and in line with the Victorian *Planning and Environment Act 1987* and State Government guidance concerning voluntary planning negotiations, the landowner proposes, subject to approval of the rezoning and sub-division for 138 lots, to facilitate the provision of at least 5 per cent of dwellings as Affordable Housing by the **gifting of serviced lots to a Registered Housing Agency for development and management as Affordable Housing**.

8 lots have been identified that are proposed to be gifted that once developed, will result in **5.8%** of the development being realised as Affordable Housing.

The titled and serviced land lots will be gifted to a Registered Housing Agency that is regulated by the Victorian Government to provide housing services to lower income Victorians. The title of the lots will be transferred to a Housing Agency within 90 days of the registration of the plan of subdivision and the Agency will be responsible for the design, planning, funding and construction of the dwellings, and their subsequent rental to very low to moderate income households.

The design of Affordable Housing lots will be in accordance the Design Guidelines. The Housing Agency is also expected to aim to achieve high standards of housing liveability and environmental performance, subject to design and feasibility. The dwellings are expected to be predominantly two and three-bedroom dwellings.

In addition to the gifting of the land, the landowner commits to meeting the reasonable costs of a Housing Agency appointed architect to be engaged to prepare plans suitable for planning lodgement.

A permit condition and Section 173 Agreement is proposed to set out the proposal and the specific requirements in relation to the transfer of the lots. A draft term sheet is set out at Attachment 1.

The proposal will result in a significant contribution to a Registered Housing Agency in terms of gifted land value, estimated to be worth between \$2.5 million to \$2.8 million.<sup>1</sup> Construction costs are expected to be met from a combination of Housing Agency equity, access to debt finance, and/or State Government funding under its \$5.3 billion 'Big Housing Program'.

The proposal exceeds Council's 5% Affordable Housing policy aspiration and reflects that the provision of Affordable Housing is a voluntary contribution under the planning scheme. The agreement will result in housing that is of a high quality and is appropriate in terms of size, amenity and cost for intended lower income households and achieves long-term, integrated and tenure-blind Affordable Housing outcomes in the City of Knox.

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<sup>1</sup> Subject to valuation



## Affordable Housing and Planning Negotiation Framework

Affordable Housing is defined by the *Planning and Environment Act 1987* (the Act) as “**housing, including Social Housing, that is appropriate for the housing needs of any of the following - very low, low, and/or moderate income households**” (Section 3AA(1)).

Eligibility for Affordable Housing delivered under the Act is set with reference to household income bands published annually by the State Government. A list of gazetted ‘matters’ provides a framework for assessing the appropriateness of a proposed built form for Affordable Housing (*see Part 1*).

The key criteria are that a dwelling should be:

- Appropriate in terms of tenure, dwelling type, size, amenity and location;
- Affordable in terms of rent or mortgage repayments, with the commonly accepted benchmark that lower income households should not pay more than 30 per cent of income on housing costs;
- Allocated to eligible households that earn below the government established income bands; and
- Managed as Affordable Housing for an appropriate period.

The inclusion of Affordable Housing is not a mandatory planning requirement in Victoria.

Knox Affordable Housing Action Plan encourages “*negotiation with developers for a voluntary contribution to social housing (of approximately 5%) on larger-scale development sites (on a case-by-case basis)*”. The Plan does not specify the form that the Affordable Housing is to be provided or the dwelling mix.

The State Government supports local governments to seek to negotiate and reach agreement with a landowner for the inclusion of Affordable Housing where appropriate and commercially viable. Each negotiation and agreed outcome is site-specific. The State has not set a percentage of delivery model that must be applied. VCAT precedent re-affirms that the details of agreement to include Affordable Housing must be voluntarily made and that approval of an amendment or a permit should not be withheld if an agreement to Affordable Housing cannot be reached.<sup>2</sup> An agreement with a landowner does not preclude Council seeking a different delivery arrangement on another site.

## Key Considerations

The development of the Affordable Housing offer took into consideration:

- Guidance established under the Act and by the State Government in relation to objectives and opportunities to facilitate Affordable Housing via the planning scheme;
- Council policy aspirations and pre-lodgement discussions with officers;
- Landowner requirements that the inclusion of Affordable Housing is reasonable, does not unduly impact on the project feasibility, and reflects that the landowner intends to sub-divide and sell lots (not develop built form).
- Evidence of Affordable Housing need in Knox and the dwelling typology estimated to be required to respond to demand and support affordability for priority groups over time;
- Housing Agency advice in relation to preferred lot typology and dwelling mix to respond to housing demand, objectives for any development to achieve Liveable Housing ‘Silver’ Standard, and capacity and experience to fund the construction;

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<sup>2</sup> Victoria Government Department of Environment, Land, Water and Planning (2020) <https://www.planning.vic.gov.au/policy-and-strategy/affordable-housing>, accessed February 2020





- Importance of ensuring integration of Affordable Housing in the neighbourhood, meeting the zoning, character, and design requirements and that housing for lower income and potentially vulnerable persons is not identified on plans or by design;
- Examples of Affordable Housing delivery arrangements in Victoria, particularly where land is provided to a Registered Housing Agency to develop; and
- State Government investment opportunities for Housing Agencies to access funding.

### Affordable Housing Proposal

Subject to approval of the rezoning and subdivision for 138 lots, the landowner proposes to enter an Affordable Housing agreement with Council to facilitate the provision of Affordable Housing by way of the gifting of land to accommodate at least 5 per cent of the site's total residential lots at nil consideration to a Registered Housing Agency for development and management by the Housing Agency as Affordable Housing.

The landowner also commits meet the reasonable costs of a Housing Agency appointed architect to prepare plans for the lots for planning lodgement.

Serviced lots will be transferred upon within 90 days of the registration of the plan of subdivision.

In accordance with the Act, the Affordable Housing agreement will be reflected within a Section 173 Agreement. Draft terms are set out at Attachment 1.

The proposal will:

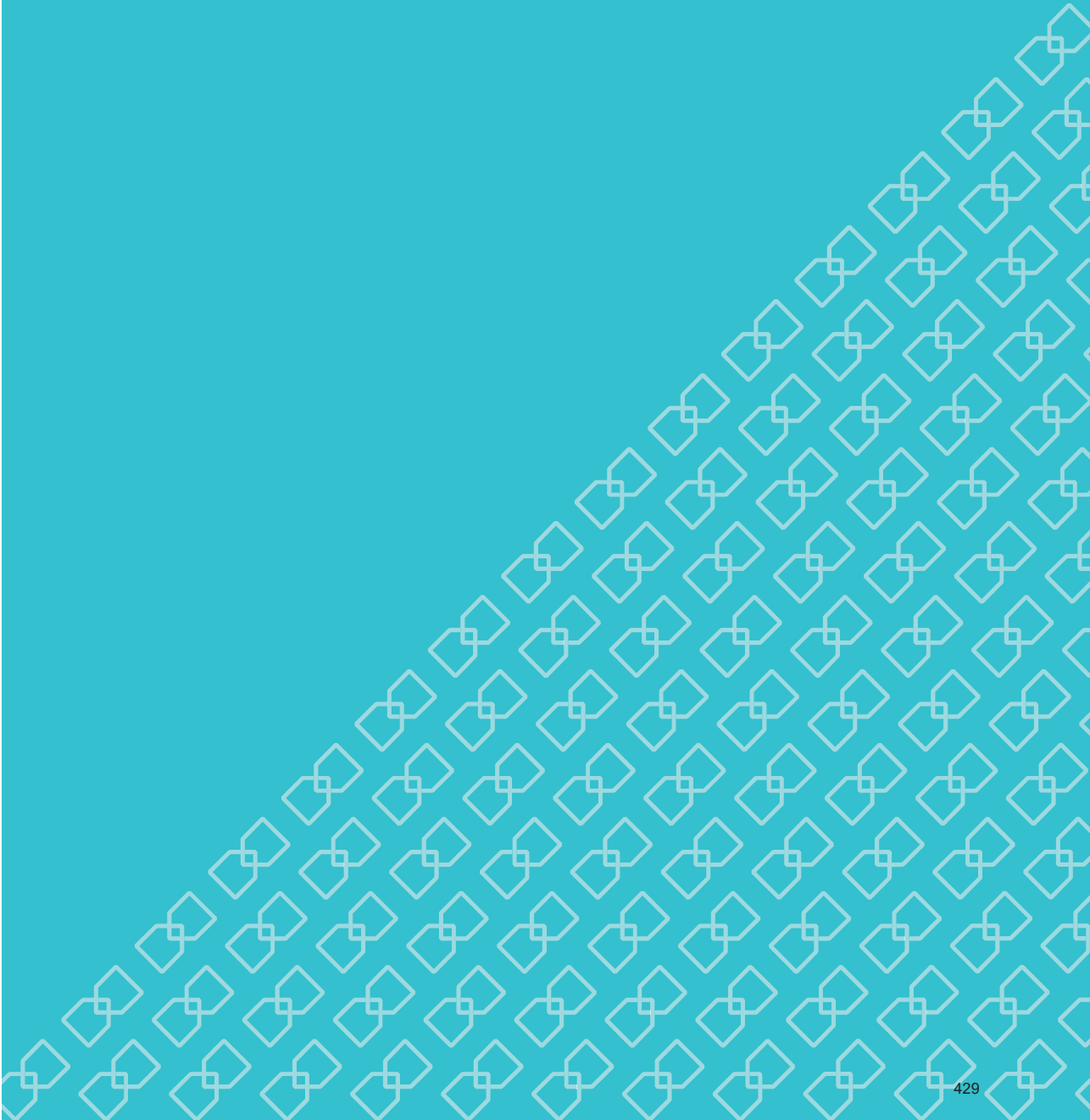
- Result in 5.8 per cent of the total residential development lots being realised as Affordable Housing;
- Meet the objective of Council that at least 5 per cent of significant developments is Affordable Housing and that these dwellings are *"non-profit housing owned and managed for the primary purpose of meeting social objectives such as affordable rents, responsible management, security of tenure and good location in relation to employment services;"*<sup>3</sup>
- Result in high quality, architecturally designed dwellings that will adhere to design guidelines, reflect the neighbourhood character and achieve a high standard of liveability and environmental performance;
- Support greater housing diversity in the City of Knox through the development of two-bedroom dwellings;
- Align to the land lot sub-division delivery approach for the development of the Site;
- Support realisation of a commercially viable development;
- Transfer significant value in the form of land to a not-for-profit Registered Housing Agency, which in turn supports attraction of funding and/or financing towards construction; and
- Result in high quality, integrated Affordable Housing suitable to address local need.

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<sup>3</sup> Knox Affordable Housing Action Plan 2015 – 2020



# Part 1: Background Context



### Affordable Housing Overview

The ‘facilitation’ of the provision of Affordable Housing is an objective of the *Planning and Environment Act 1987*, defined as:

**‘Affordable Housing is housing, including social housing, that is appropriate for the housing needs of any of the following - very low income households; low income households; moderate income households.’**

A range of programs fall within the Affordable Housing spectrum (Figure 1).



Figure 1: Housing Spectrum (Source: Affordable Development Outcomes)

Household income bands and a list of ‘matters that are required to be given regards to’ when determining the appropriateness of the intended built form and subsequent housing allocation are gazetted under the Act (Table 1 and Figure 2). Income bands are updated annually.

Household type	Very Low Income	Low Income	Moderate Income
One adult	<\$26,090	\$26,091 - \$41,750	\$41,751 - \$62,610
Couple	<\$39,130	\$39,131 - \$62,620	\$62,621 - \$93,920
Family	<\$54,780	\$54,781 - \$87,687	\$87,688 - \$131,500

Table 1: Affordable Housing Income Ranges, Greater Melbourne, 2020/2021



Figure 2: List of Matters required to be considered to determine appropriateness of built form for Affordable Housing



## Why is Affordable Housing Required

Access to an adequate standard of living, including housing, is foremost a human rights issue.<sup>4</sup> Without appropriate shelter, a person's ability to live and participate in their society to their full potential is significantly decreased. This is recognised in Council plans and Affordable Housing Action Plan.

Affordable Housing is required to accommodate diversity in a community, to maintain social cohesion and to support and sustain local economies with a range of services and businesses.<sup>5</sup>

Access to appropriate and Affordable Housing that is well located is critical to economic productivity and the efficient functioning of a city. Without local Affordable Housing it is difficult for key employment sectors to attract and retain employees or workers are face significant time and cost pressures to access employment. This has wider implications on family functioning and environmental impacts due to an increase in car usage.

A lack of Affordable Housing therefore has negative impacts from both a social and economic viewpoint and is critical economic and social infrastructure.

The provision of, and safeguards to protect sufficient appropriate and adequate Affordable Housing supply has significant social and economic benefits for individuals, families, the wider community and the economy, with established linkages with households':

- Health and wellbeing;
- Capacity to participate in education and the workforce;
- Rates of family violence;
- Level of reliance on social supports and high cost welfare services; and
- Participation in society.

## Who Requires Affordable Housing

People across all life stages can find themselves in need of Affordable Housing at any time due to limitations on their income generating capacity. This may be a long-term constraint (for example, persons who are aged, disabled, suffer from chronic ill health or are a primary carer and therefore unable to work), or a short-term issue, for example, because of loss of employment, family violence or family breakdown, short-term illness or disability.

There is also a range of low paying and increasing casual jobs that do not provide a significant income, particularly for single persons or sole parents.

Council has forecast that an additional 860 social housing dwellings are needed in Knox by 2036 to meet minimum requirements, as well as more diverse and affordable housing options generally.<sup>6</sup>

Very low and low-income households are traditionally the key target group for Affordable Housing. Social Housing is the primary program response to these housing needs. Social Housing is housing owned and/or managed by either the State Government or a Registered Housing Agency ('community housing organisation').

<sup>4</sup> ICESCR, Article 11 quoted in statement from <http://www.humanrights.gov.au/our-work/rights-and-freedoms/projects/housing-homelessness-and-human-rights>

<sup>5</sup> University of Melbourne, Melbourne School of Design - Transforming Housing (2016) Affordable Housing for All. Melbourne: Faculty of Architecture, Building and Planning, University of Melbourne; 2016.

<sup>6</sup> Knox Affordable Housing Action Plan 2015 – 2020



## Development, Planning and Policy Context

### Development Overview

The planning application is for the rezoning of the site from Special Use Zone 2 to Neighbourhood Zone and the subdivision of the land to accommodate a total 138 residential lots (Figure 3). A Schedule to the Zone and Design Guidelines are proposed to apply. 5 per cent of lots equates to 6.9 dwellings.



Figure 3: Proposed Subdivision Plan, Feb 2021

### State Government Legislation, Policy and Investment

The *Housing Act 1983* and the *Planning and Environment Act 1987* are the key legislative frameworks governing Affordable Housing delivery and management in Victoria. The focus of the *Housing Act* is on the delivery and management of Social Housing for very low income households including the regulatory system for not-for-profit housing agencies who own and/or manage Social Housing ('Registered Housing Agencies').

In November 2020, the State Government announced a \$5.3b investment package to renew public housing and invest in new Social and Affordable Housing. The program includes:

- Government spot-purchase of under construction or ready-to-construct dwellings from the private sector;
- \$1.38 billion in capital funding to Registered Housing Agencies to develop land or acquire an estimated 4,400 new properties, further supported by low-cost loans;
- Funding to support new Affordable Housing supply delivered in partnership with the private and not-for-profit sectors;
- New planning controls to facilitate the fast-tracking approval of Affordable Housing dwellings; and
- A commitment to develop a 10-year strategy and a compact with Local Government.



Funding will be allocated on a competitive tender process with the first funding rounds now open to Registered Housing Agencies to apply. The government has indicated that proposals from Housing Agencies where land is gifted are encouraged, noting they will reduce the funding requirements and provide high degree of certainty as to development progression.

### Planning Requirements for Affordable Housing

The facilitation of the provision of Affordable Housing is an objective rather than a mandatory requirement under the Victorian *Planning and Environment Act 1987*.

The objective is referenced with regards to a definition and objectives and strategies within the State Planning Policy to increase housing choice in terms of type, tenure and cost and encourage a proportion of new development to be affordable for households on very low to moderate incomes.

State Government supports councils to seek to negotiate and reach agreement with a landowner in relation to Affordable Housing inclusion where the planning and development circumstances are appropriate; there is established evidence of housing need; and the outcome is viable and accepted by the landowner.

State Government guidelines emphasise:

- *“The decision to enter into negotiations and conclude an agreement is voluntary. A planning condition in relation to Affordable Housing delivery must have the explicit written agreement of the landowner. Parties may elect to cease negotiations at any stage”<sup>7</sup>;*
- Council should establish a clear strategic justification for Affordable Housing with regards to local need;
- Council should be cognisant of commercial requirements of landowners and developers and establish a value share proposition to support feasibility of Affordable Housing; and
- Approval of an amendment of permit should not be withheld if an agreement to Affordable Housing cannot be reached.<sup>8</sup>

The definition, income ranges and list of ‘matters’ (Figure 2) provide the framework for a landowner and Council to determine that a proposal will achieve an appropriate built form outcome suitable for use as Affordable Housing.

### Knox Council Policy

The *Knox Affordable Housing Action Plan 2015 – 2020* outlines objectives and actions to improve housing affordability in Knox. A key focus of the Action Plan is to increase the supply of Social Housing for the most disadvantaged and vulnerable households.

The Action Plan notes:

*“The Planning Scheme can only encourage the provision of social housing – there is currently no means of specifying the provision of social housing within the Planning Scheme. However, it can be negotiated during the process of amending the Knox Planning Scheme to rezone land for residential use.”*

Since publication of the Action Plan the State Government has made the above mentioned legislative changes and confirmed Affordable Housing may only be agreed not mandated for inclusion.

Council documents define Social Housing as:

<sup>7</sup> Victoria Government Department of Environment, Land, Water and Planning (2020) <https://www.planning.vic.gov.au/policy-and-strategy/affordable-housing>, accessed February 2020

<sup>8</sup> Victoria Government Department of Environment, Land, Water and Planning (2020) <https://www.planning.vic.gov.au/policy-and-strategy/affordable-housing>, accessed February 2020



*“non-profit housing owned and managed for the primary purpose of meeting social objectives such as affordable rents, responsible management, security of tenure and good location in relation to employment services. The term encompasses public housing and includes housing owned or managed by the community. This housing should be well-located and appropriate to the needs of a given household”.*<sup>9</sup>

The *Planning and Environment Act 1987* has since incorporated the definition of Affordable Housing set out page 6 that takes precedence in a planning negotiation. This definition notes that Affordable Housing *includes Social Housing*, defined as either public housing or housing owned and/or managed by a Registered Housing Agency.

## Developing Affordable Housing

The delivery and development of Affordable Housing requires land, planning approval, development and construction expertise, funding and financing, and an organisation with capacity and expertise in management and regulation of outcomes.

Land is a critical element. Housing Agencies are limited in their ability to secure new land due to the high cost and competitive nature of the land market in established areas. Gifted land provides a Housing Agency with considerable benefit both in terms of asset value and opportunity to increase housing supply.

Housing Agencies that have secured land at nil cost have a strong equity position supporting financing and funding applications, control over design and delivery, including environmental and accessibility standards, architectural standards and builder quality and cost, and an enhanced capacity to apply equity to support development costs, thereby reducing subsidy requirements.

Funding is available under the State ‘Big Housing Build’, with the next funding round expected to occur in mid-2021 for projects that will be constructed between 2022-2025. Funding rounds beyond 2021 are to be confirmed.

Planning approval for Affordable Housing is progressed under Clause 52.20 for projects funded under the Big Housing Build. This clause provides exemptions for Affordable Housing projects whilst also setting high standards in terms of design and amenity. Council must be consulted on any permit application under this clause.

## Housing Agency Requirements and Interest

The development of the proposal involved engagement with two registered Housing Agencies to test interest, site and dwelling options and capacity to progress the development should land be gifted. Key feedback included:

- Strong interest in receiving land and managing the costs and development of the built-form;
- Preference to control the design and development;
- Preference for a mix of two and three bedroom dwellings following an initial assessment of demand, location, product typology within the zoning controls and costs and revenue analysis. Potential for a one-bedroom unit was also noted;
- Objective that dwellings would be designed to meet the Liveable Housing Design Standard ‘Silver’ standard; and
- Acknowledgement of the proposed zoning and the subsequent impact in terms of height and requirements in relation to meeting neighbourhood character, dwelling typology and design expectations.

Agencies consulted indicated a strong interest and capacity to directly fund or source funding and/or financing for the construction. The land transfer provides the Housing Agency with a strong equity position which will support borrowings and attraction of funding by government.

<sup>9</sup> City of Knox (2011) Defining affordable housing and a minimum supply of social housing for Knox, September 2011



## Examples of Land Gifting and Delivery

Examples where land has been or will be gifted to a Housing Agency include:

- Provision of 5% Affordable Housing formed part of Knox Council’s sale of land at Stamford Park to Stockland. To realise this outcome Stockland has entered an agreement with a Housing Agency for land to be provided for 9 dwellings (4.7%), comprising a mix of apartments and townhouses, with delivery in 2020 and 2021. The Housing Agency is responsible for securing funding for construction to be undertaken by Stockland.
- Subject to rezoning approval, a commitment to land to be gifted to a Housing Agency to accommodate 5% of dwellings as part of the rezoning of industrial land in Glen Eira. Total development is for 3,000 dwellings within a mixed-use development, with a minimum three parcels of land to be gifted to a Housing Agency to secure funding and finance and develop. Each land parcel is expected to accommodate up to 50 apartments. An agreement has been entered by the landowner and a Housing Agency to support transfer of the first land parcel and an application for government funding.
- Drill Hall, Melbourne – the City of Melbourne gifted the former Drill Hall to a Registered Housing Agency who subsequently secured Federal and State Government grant funding to restore the hall and develop 58 units for Affordable Housing.
- Storey Drive, Pakenham – Cardinia Shire Council provided land at a substantial discount to a Registered Housing Agency that has since secured funding and financing to develop 4 x 3-bedroom and 3 x 2-bedroom dwellings.

## Delivery Process – Norvel Estate

The process of the Affordable Housing outcome being realised will include the following key steps and milestones:



*\*Note steps could occur concurrently or in slightly amended order. Intention is that planning approval is granted in line with timing for title to be transferred to enable progress to development.*

To provide comfort in relation to delivery timeframes:

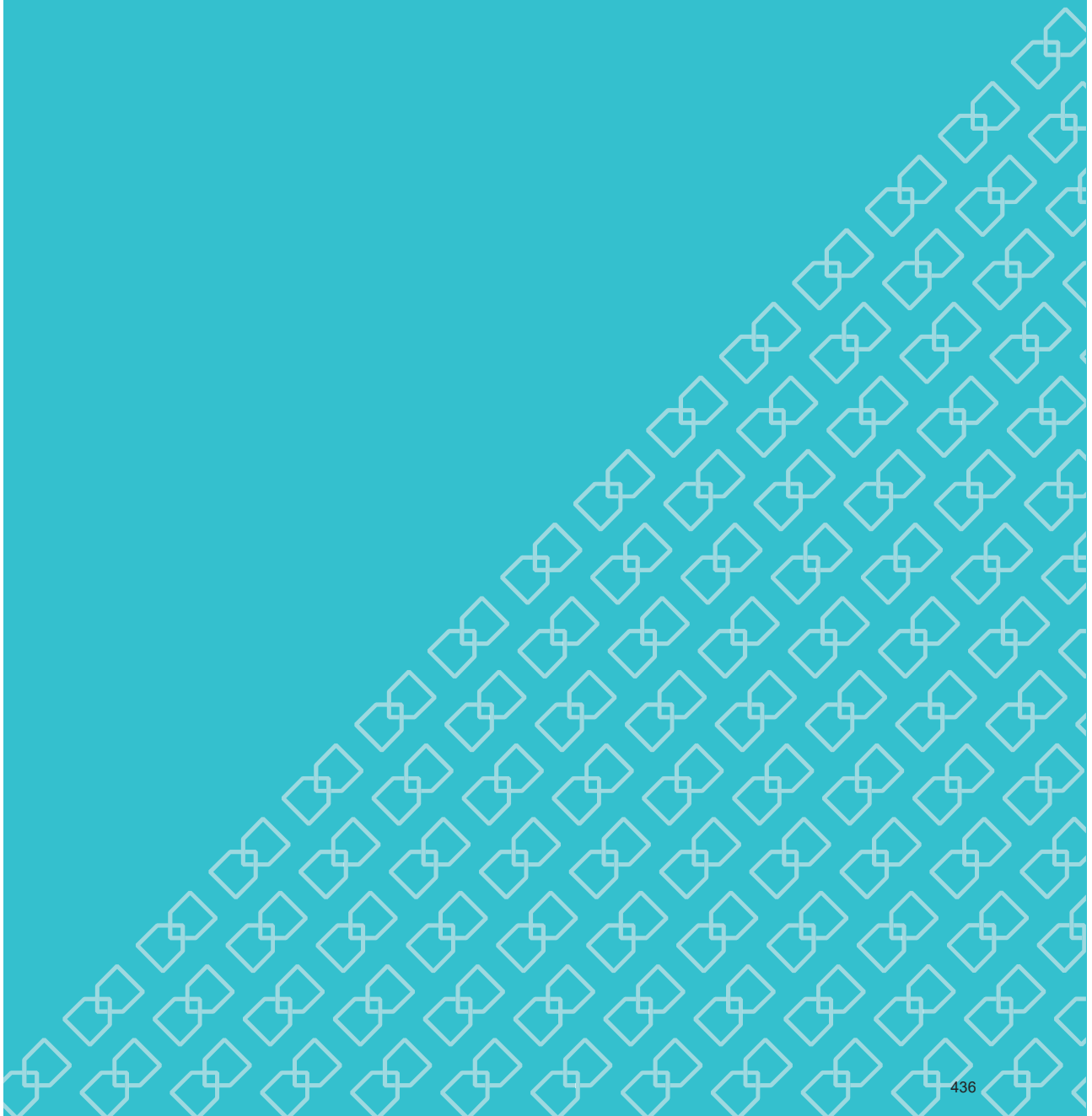
- The landowner will commit to the titles to be transferred to a Housing Agency within 90 days of registration of the plan of subdivision;
- The agreement between the landowner and selected Housing Agency will require the Housing Agency to apply best endeavours to secure planning approval within 12 months of the title transfer and commence construction within 12 months of receipt of a planning permit;
- Planning permit approval will be assessed under Clause 52.20 of the Victorian Planning Scheme.

In addition to transferring the serviced lots, the landowner will meet the Housing Agency appointed architectural costs up to the point of planning lodgement.





# Part 2: Affordable Housing Proposal



## Proposal

Subject to approval of the rezoning and subdivision for 138 lots, the landowner agrees to facilitate the provision of Affordable Housing by:

- Gifting serviced land to accommodate at least 5 per cent of the site’s total residential lot yield to a Registered Housing Agency at nil consideration for development and management as Affordable Housing;
- Transferring the lots to the Housing Agency within 90 days of the registration of the plan of subdivision; and
- Meeting the reasonable architectural costs of a Housing Agency appointed architect to prepare plans for planning lodgement.

Lots 33 - 40 of the land subdivision master plan have been identified for transfer. These lots have capacity to support development of 8 dwellings (5.8% of total yield), exceeding Council’s policy aspirations for 5% Affordable Housing.

In accordance with the Act, the Affordable Housing agreement will be reflected within a Section 173 Agreement. Draft terms for consideration of Council are set out at Attachment 1.

## Alignment to Gazetted ‘Matters’ to Ensure Appropriateness

The Act requires consideration that Affordable Housing will be appropriate for the intended household recipients in terms of a range of ‘matters’ published by Government Gazette (Figure 2).

The proposal addresses each of these matters as follows:

Matter	Project Response and Alignment
Response to Housing Need	<p>The provision of land will result in at least 5% of total dwellings being developed and available to very low, low or moderate income households to rent.</p> <p>An assessment of Affordable Housing demand indicates:</p> <ul style="list-style-type: none"> <li>- Approximately 2,822 lower income households (earning in the bottom 40 per cent of household incomes) were in rental stress in 2016, representing 26.5 per cent of all households in the rental market;<sup>10</sup></li> <li>- Affordability of the private rental market for very low income households has declined significantly over time, with only 2.9 per cent (99 dwellings) of all private lettings made available to rent in 2019 for Knox City households on a statutory (government) income.<sup>11</sup></li> <li>- Knox has limited housing diversity, with a mismatch between existing dwelling supply (1.9 per cent of dwellings had zero to one-bedrooms and 12 per cent had two-bedrooms) and household composition (43.7 per cent of households are lone (single) persons and couples without children)<sup>12</sup>.</li> </ul> <p>Registered Housing Agencies have advised that a mix of two and three bedroom dwellings will best respond to their evidence of demand in the area and the expected dwelling typology and size.</p>
Location	<p>The location has been identified by Council as a strategic site for rezoning and appropriate for Affordable Housing.</p> <p>Registered Housing Agencies have noted that as a new estate the closest bus infrastructure is approximately 800 – 900 m walk but have indicated that the location will support lower income households that either do not need to rely on public transport for daily travel requirements, or that will have a car. Agencies have expressed strong interest in receiving the land and developing in this location.</p>

<sup>10</sup> .id Consulting, 2020, Rental Stress, Social Atlas, City of Knox

<sup>11</sup> Department of Health and Human Services, 2020, [Affordable Lettings by Local Government Area – December quarter 2019](#) and Author Analysis

<sup>12</sup> .id Consulting, 2020, Dwelling Type, Number of Bedrooms, Household Type, Community Profile, City of Knox



Matter	Project Response and Alignment
Type	The resulting dwellings will be either attached townhouses or free-standing dwellings (or a combination) expected to comprise a majority two and three bedrooms which are appropriate for small families, single persons and couples and that fit within the neighbourhood character and zoning requirements.
Affordability	The dwellings will be affordable for tenants as they will be owned and managed by a registered Housing Agency that has policy requirements to ensure tenants do not pay more than 30% of their income on rent.
Tenure	The dwellings will be appropriate in terms of tenure for very low to moderate income households as they will be provided as rental housing offering which is established by the housing need analysis to be the most suitable housing response for these households.
Allocation	The dwellings will be owned and managed by a registered Housing Agency and will be allocated (rented) to households that meet required income eligibility requirements established by government. Housing Agencies are skilled in letting properties, confirming household eligibility and checking affordability benchmarks will be achieved. They are regulated by the State Government to provide this service.
Integration	The dwellings will be appropriately integrated into the development by way of being visually indistinguishable from market housing, with all housing required to meet the same design standards. Each dwelling will have at least one car space.
Longevity of housing outcome	The dwellings will be provided as Affordable Housing for the period they are owned by the Registered Housing Agency. In the future a Housing Agency could elect to sell and reinvest the proceeds in new Affordable Housing should housing demand change or the cost of renovating is determined to be prohibitive. This is part of regulated prudential asset management planning.

## Benefits

Provision of Affordable Housing has been proven to provide a range of economic and social benefits including:

- Savings from reduced reliance on health, justice, emergency services and social services for people experiencing homelessness or housing stress;
- Improved household health, capacity to learn and work, education outcomes and participation in social and economic activities; and
- Support for the expansion of key services such as hospital and education facilities by ensuring there is appropriate and affordable housing options for key workers and ancillary staff.

The inclusion of Affordable Housing dwellings is expected to support housing affordability for an estimated 117 people across a 40 year period who will benefit from lower rent and high quality amenity.<sup>13</sup>

The proposal will:

- Result in an expected 5.8 per cent of the total development being realised as Affordable Housing;
- Meet the objective of Council that these dwellings are owned and managed by a Housing Agency as Affordable Housing for lower income households;
- Align to the land lot sub-division delivery approach for the development of the Site, whereby individual land lots will be transacted, and construction is the responsibility of each new landowner to select a design and builder;
- Be viable for the landowner to achieve and not unduly impact on the progression of the development;
- Transfer significant value in the form of land to a Registered Housing Agency that will support funding and/or financing to be secured to construct dwellings;

<sup>13</sup> Assuming an average of 2.2 persons per dwelling, assuming 8 dwellings, an average lease term of 6 years and a dwelling life-span of 40 years.



- Result in high quality, integrated Affordable Housing that meets the existing and preferred future character of the area, planning and design controls, Housing Agency design standards and the established local Affordable Housing need; and
- Provide a meaningful contribution of significant value to a Registered Housing Agency, enabling them to respond to local Affordable Housing need.



## Attachment 1: Draft Section 173 Term Sheet

Item	
<b>Objective</b>	Confirm the Affordable Housing arrangement agreed as a condition of rezoning.
<b>Parties</b>	Knox Council and Norvel Estate Pty Ltd
<b>Definitions</b>	To include definitions of: <ul style="list-style-type: none"> <li>- Affordable Housing (P&amp;E Act)</li> <li>- Registered Housing Agency</li> <li>- Affordable Housing Lots</li> <li>- Eligible Household</li> <li>- Serviced Lot</li> </ul>
<b>Title Registered with Section 173 Agreement</b>	The Section 173 Agreement applies to Title V9381 F081
<b>Agreement</b>	<p>The landowner agrees to:</p> <ol style="list-style-type: none"> <li>1) Gift at nil consideration Serviced Lots ('Affordable Housing Lots') suitable to accommodate at least 5 per cent of the site's total residential lot yield (a minimum 7 dwellings on the basis of a 138 lot subdivision), to a Registered Housing Agency.</li> <li>2) Meet the reasonable costs of an architect engaged by the Registered Housing Agency to develop dwelling plans for the Affordable Housing Lots to the point they are suitable for town planning lodgement.</li> <li>3) Prior to commencement of works, the landowner agrees to enter an agreement with a Registered Housing Agency confirming: <ol style="list-style-type: none"> <li>1) The Serviced Lots to be transferred by the landowner;</li> <li>2) Anticipated timing of lot transfer, noting the requirement to transfer within 90 days of registration of the plan of subdivision);</li> <li>3) Terms in relation to payment of architectural services by the landowner;</li> <li>4) That the Housing Agency will apply for the exemption of stamp duty;</li> <li>5) That the Housing Agency commits do everything necessary from it is end, to assist the transfer the lot under its name and pay its conveyance fee etc to allow the transfer to take place;</li> <li>6) That the Housing Agency will do everything within its control to secure planning approval within 12 months of transfer of title and to commence construction within 12 months of the date of planning permit.</li> </ol> </li> <li>4) Transfer the title of the nominated Affordable Housing Lots to the nominated Registered Housing Agency within 90 days of the registration of the plan of subdivision.</li> <li>5) Pay the costs for the preparation and registration of the agreement.</li> </ol> <p>Council agrees to:</p> <ol style="list-style-type: none"> <li>1) Do all things necessary to assist in the discharge of the Section 173 Agreement once the Affordable Housing Lots are transferred to the Housing Agency.</li> </ol>
<b>Termination of the Agreement</b>	The Agreement will be automatically terminated once the title to the Serviced Lots has been transferred to a Registered Housing Agency.
<b>Construction</b>	<p>The parties note that the design and construction of the Affordable Housing dwellings and the subsequent letting of dwellings to Eligible Household(s) is the responsibility of the Registered Housing Agency.</p> <p>The parties note that the terms of transfer will include expectations that planning, and construction, is commenced within 24 months of transfer of title.</p>



Item	
<b>Failure to meet condition</b>	<p>Should the lots not be transferred to a Registered Housing within 90 days of the registration of the plan of subdivision the landowner must engage with Council as to the reasons for the delay and the steps to immediately rectify and progress the transfer.</p> <p>Should reasons and rectification not be agreed by Council, Council has the power of authority to enforce the transfer.</p>



*Planning and Environment Act 1987*

## **KNOX PLANNING SCHEME**

### **AMENDMENT C184knox PLANNING PERMIT APPLICATION P/2020/6049**

#### **EXPLANATORY REPORT**

##### **Who is the planning authority?**

This amendment has been prepared by the Knox City Council which is the planning authority for this amendment.

The Amendment has been requested and planning permit application has been made by Norvel Estate Pty Ltd C/- Urbis Pty Ltd.

##### **Land affected by the Amendment**

The Amendment applies to the former Norvel Road Quarry site located at Lot 1 TP297137 (29Q Norvel Road), Lot 1 TP963860 (41Q Norvel Road) and Lot 2 TP963860 (18Q Dion Street) in Ferntree Gully as shown in blue in Figure 1 below.

The amendment also applies to the Seecal Road, Castricum Place, and Norvel Road Reserves and the adjoining bushland site located immediately to the north of the Former Norvel Road Quarry site at Lot 1 TP133877 and Lot 1 TP83661 (54 Agora Boulevard) and Lot 1 TP845832 (59R Rankin Road) in Ferntree Gully specifically on the part that are currently affected by the Special Use Zone as shown as red in Figure 1 below.

Figure 1 – Map of subject site



The amendment is a combined planning scheme amendment and a planning permit application under section 96A of the *Planning and Environment Act 1987* ("Act").

The planning permit application applies to the Norvel Estate at 29Q and 41Q Norvel Road, Ferntree Gully (Lot 1 TP297137 and Lot 1 TP963860), and 18Q Dion Street, Ferntree Gully (Lot 2 TP963860)

### **What the amendment does**

The Amendment proposes to rezone the subject site to facilitate a residential development, recognise open space, and conserve natural environment.

Specifically, the Amendment proposes to:

- Rezone part of the site from the Special Use Zone – Schedule 2 (SUZ2) to the Neighbourhood Residential Zone – Schedule 7 (NRZ7).
- Rezone part of the site consisting of the bushland to be vested to Council from the Special Use Zone – Schedule 2 (SUZ2) to the Public Conservation and Resource Zone (PCRZ).
- Rezone Council Bushland at Lot 1 TP133877 and Lot 1 TP83661 (54 Agora Boulevard) and Lot 1 TP845832 (59R Rankin Road) from the Special Use Zone – Schedule 2 (SUZ2) to the Public Conservation and Resource Zone (PCRZ).
- Rezone part of the proposed bike trail to the north of the Seecal Road Reserve from the Neighbourhood Residential Zone – Schedule 4 (NRZ4) and Special Use Zone – Schedule 2 (SUZ2) to the Public Park and Recreation Zone (PPRZ).
- Rezone part of the Castricum Place, Seecal Road, and Norvel Road reserves from the Special Use Zone – Schedule 2 (SUZ2) to the Neighbourhood Residential Zone – Schedule 4 (NRZ4).
- Insert Schedule 7 to Clause 32.09 a new Neighbourhood Residential Zone – Schedule 7 (NRZ7).
- Amend Clause 22.07 to exempt the NRZ7 from the provisions of Clause 22.07.
- Amend Map 2 to reflect rezoning.

The planning permit application seeks approval for:

- Staged subdivision into 138 residential lots and additional reserves and associated works.
- Buildings and works associated with the construction of pathways/bike trail.
- Vegetation removal.

The draft planning permit is attached as a separate document to this Explanatory Report.

### **Strategic assessment of the Amendment**

#### **Why is the Amendment required?**

The amendment is informed by Clause 21.02 (Vision) and 21.06 (Housing) of the Knox Planning Scheme which outlines the subject site as a 'strategic investigation site' likely to change to residential uses in accordance with the Knox Housing Strategy. The amendment and proposed development has been also informed by Urban Design Assessment that considered the surrounding character and bushfire risk.

The land is currently zoned SUZ2 which is intended for the Earth and Energy Resources Industry. The former quarry on the site has been closed, filled and remediated. As the subject site is intended to be used for residential purposes, it is appropriate to rezone the site to a residential zone. Additionally, dwellings are prohibited under the SUZ2 applying to the site.

The amendment is required to facilitate the redevelopment of the site to infill residential and provide additional housing via a 138 residential lots development. The amendment will also provide for open



space and environmental outcome via the creation of a bushland reserve for conservation. The proposal will assist with accommodating the growing population within the municipality.

It is proposed to rezone the site to the Neighbourhood Residential Zone (NRZ) and to develop the site in accordance with updated urban design guidelines registered under S173 Agreement applying to the land.

The existing ESO is proposed to be retained as it applies to the Blind Creek Corridor and its associated bushland to ensure this area of environmental significance is protected. As a result of the proposal, the core of the bushland is intended to be transferred to Council ownership, and rezoned to Public Conservation and Resources Zone (PCRZ), to support its safeguarding as a significant biological site.

#### **How does the Amendment implement the objectives of planning in Victoria?**

The proposal responds to the objectives of planning in Victoria specified in Section 4 of the *Planning and Environment Act 1987* as:

- It facilitates a fair, economic, sustainable, and orderly subdivision of the land to allow the residential use and development of an underutilised land strategically located within an established residential suburb.
- It maintains a pleasant environment and protect the ecological significance of the Blind Creek Corridor by ensuring the remnant bushland is unaffected by the proposal and retained as a reserve with the part already in Council's ownership recognised for conservation.
- It provides and deliver for affordable housing in Victoria.

This responds to objectives (a)(b)(c)(d)(f) and (fa) of Section 4(1) of the *Planning and Environment Act 1987*.

#### **How does the Amendment address any environmental, social and economic effects?**

##### *Environmental Effects*

The amendment will have a positive environmental benefit for the following reasons:

- Recognising, extending and protecting the bushland reserve under public ownership for conservation purposes.
- Managing fire risk while balancing the protection of biodiversity and landscaping treatment.
- Improving the quality of water entering Blind Creek as well as the hydrology of the existing billabong located within the bushland through the adopted stormwater approach and construction of a wetland (sediment basin) in the north-west corner of the site.
- Providing vegetation offset in accordance with Clause 52.17 to ensure that no threatened flora or fauna species are impacted by the development and providing high quality landscape treatments.
- Improving active transport connectivity to regional trail network, local bus and towards commercial areas.

##### *Economic Effects*

The proposal will have positive economic impacts by providing 138 residential lots to support increased housing and the construction industry.

##### *Social Effects*

The proposal will enable the creation of 138 residential lots of varying sizes in an adequate location with access services and parkland.

The proposal will also provide for 8 lots to be gifted to a registered housing provider/association for social housing providing a net community benefit in term of affordable housing.

### **Does the Amendment address relevant bushfire risk?**

The subject land is located within a designated bushfire prone area and the proposal has considered bushfire risk.

The objective of Clause 13.02-1S Bushfire planning seeks to strengthen the resilience of settlements and communities to bushfire through risk-based planning that prioritises the protection of human life. The policy outlines that planning must give priority to the protection of human life over all other policy considerations, directing population growth and development to low risk locations and reduce the vulnerability of communities to bushfire through the consideration of bushfire risk in decision making at all stages of the planning process.

Additionally, the operation of the Planning Policy Framework at Clause 71.02-3 Integrated decision making requires that:

- Planning and responsible authorities should endeavour to integrate the range of planning policies relevant to the issues to be determined and balance conflicting objectives in favour of net community benefit and sustainable development for the benefit of present and future generations. However, in bushfire affected areas, planning and responsible authorities must prioritise the protection of human life over all other policy considerations. The amendment will ensure that the imperative at this clause, supporting the operation of the Clause 13.02-1S policy requirements, will be complied with.

The proposed development will ensure that this objective is adhered to.

The views of the Country Fire Authority (CFA) were sought in addition the provision of a Bushfire Development Report and the proposal has implemented measures and buffer separation that consider the protection of human life in the face of bushfire risk while also balancing the importance of protecting biodiversity.

### **Does the Amendment comply with the requirements of any Minister's Direction applicable to the amendment?**

The amendment was prepared and presented in a manner consistent with the Ministerial Direction on the Form and Content of Planning Schemes under section 7(5) of the *Planning and Environment Act 1987*.

The proposal is also consistent with the relevant Ministerial Directions as follows:

- **Ministerial Direction 1 – Potentially Contaminated Land**
  - The site was used as a quarry and has been filled up to a depth of 10 metres.
  - The proposal assumed that the rehabilitation of the site utilised clean fill and therefore has been successfully rehabilitated with respect to contamination. The proposal was referred to the Environment Protection Authority (EPA) for comments whom confirmed an Environment Audit Report was prepared by Australian Environmental Auditors on 20 April 2016 in accordance with the requirements of Section 53X of the *Environment Protection Act 1970* and a Certificate of Environmental Audit was issued.
  - Additionally, the geotechnical reports prepared by Civil Test Pty Ltd attached to this application provides additional details on this rehabilitation and confirmed the fill was placed in accordance with project specifications.
- **Ministerial Direction 9 – Metropolitan Planning Strategy**
  - The proposal is consistent with the current Metropolitan Planning Strategy as it provides for 138 residential lots which will accommodate a diverse range of dwellings to cater for forecasted population growth within an established residential area proximate to jobs, services and transportation routes.
- **Ministerial Direction 11 – Strategic Assessment of Amendments**

- The requirements of this Direction have been followed in the course of preparing this amendment and are embodied within this explanatory report.

- **Ministerial Direction 15 – The Planning Scheme Amendment Process**

- This amendment and planning permit application under section 96A of the Planning and Environment Act 1987 will follow the set times and steps specified for planning scheme amendments under this Direction.

**How does the Amendment support or implement the Planning Policy Framework and any adopted State policy?**

The amendment supports and implements the Planning Policy Framework as demonstrated below.

- It facilitates the rezoning of the site to a residential to support the consolidation, redevelopment and low scale intensification of existing urban areas and by providing new walking and cycling trails and links to the Blind Creek Corridor in accordance with Clauses 11.01-1S and 11.02-1S.
- It extends the bushland reserve to protect biodiversity while also avoiding and minimising native vegetation removal of the bushland in accordance with Clauses 12.01-1S and 12.01-2S.
- It prevents inappropriate future development within the bushland reserve and extending the bushland reserve and its buffer zone to address the resilience of settlements through risk-based bushfire planning in accordance with Clause 13.02-1S.
- It incorporates a sophisticated system that will retard the flow of stormwater, protect nearby waterways, and manage sediments in accordance with Clause 14.02-1S.
- It provides for an attractive design outcome that responds to its context including, landscape and built form consistent with the residential nature of the surrounding area and its environmental characteristics in accordance with Clauses 15.01-1S, 15.01-1R.
- It provides for a walkable and connected subdivision pattern in accordance with Clauses 15.01-3S and 15.01-4S.
- It provides 138 new residential lots within a strategically advantageous location proximate to identified activity centres, providing access to jobs and services. Further, the proposal will increase the supply of housing in an existing urban area on an underutilised piece of land with several lot sizes to positively contribute to residential diversity in accordance with Clause 16.01-1S and 16.01-1R.
- It provides for the increase supply of well-located affordable housing in accordance with Clause 16.01-2S.
- It includes the creation of a new road as well as pedestrian and cycling networks to service the new residential area with linkages to the surrounding networks in accordance with Clause 18.02-1S.

**How does the Amendment support or implement the Local Planning Policy Framework, and specifically the Municipal Strategic Statement?**

The Strategic Framework Plan at Clause 21.02 includes the subject land identified as a Strategic Investigation Sites – Residential. This amendment effects and reinforces this vision for the site as a residential infill and also responds to estimated population forecasts by providing 138 new residential lots within an established residential area with adequate access to jobs and services.

The Knox Housing Strategy (2015) at Clause 21.06 further identifies the site as suitable for residential use only with a range of density consistent with the surrounding area. The surrounding area is identified as Neighbourhood Residential Zone Knox Neighbourhood - minimal change area where development should respect the existing character. The amendment effect this with its own Neighbourhood Residential Zone consistent with the surrounding.

Moreover, the proposal minimises vegetation removal and improves the interface with the Blind Creek Corridor and bushland by providing fire management buffer between the residential area and

bushland and activating the interface through the alignment of lots facing the reserve. This bushland is identified as a site of biological significance and primary natural corridor at Clause 21.03, the amendment reinforces the conservation importance of the bushland.

The proposal will include measures to facilitate the vibrant and high quality redevelopment of the site to positively contribute to and respect the abutting residential and landscape character. Further, the proposal will achieve environmentally sustainable design outcomes for the site through stormwater management and landscaping. By providing its own design guidelines, the amendment will be exempted from neighbourhood character provisions of Clause 22.07.

For these reasons, it is considered that the proposed rezoning supports the relevant clauses of the LPPF

#### **Does the Amendment make proper use of the Victoria Planning Provisions?**

The proposed rezoning of the land to the Neighbourhood Residential Zone, Public Park and Recreation Zone, and Public Conservation and Resource Zone, and retention of the Environmental Significance Overlay as it applies to the northern part of the site, is an appropriate use of the Victorian Planning Provisions given the surrounding zoning pattern and land use context.

#### **How does the Amendment address the views of any relevant agency?**

The proposal has stemmed from multiple discussions and consultations with Council.

Further consultation with relevant agencies was undertaken throughout the preparation and assessment of the proposed planning application and the Amendment. Notably:

- Melbourne Water, SEWater, Comdain Infrastructure, Department of Transport (DoT), Country Fire Authority, and Ausnet Services as Section 55 referrals in accordance with Clause 66 of the Knox Planning Scheme.
- Country Fire Authority was consulted with regard to Bushfire risk.
- Environment Protection Authority was consulted with regard to potential land contamination in accordance with Ministerial Direction No. 19.

The views of relevant agencies will further be sought during the public exhibition process.

#### **Does the Amendment address relevant requirements of the *Transport Integration Act 2010*?**

The proposal is considered to have minimal impact on the existing transport infrastructure and network, and therefore satisfactorily addresses the *Transport Integration Act 2010*.

#### **Resource and administrative costs**

- **What impact will the new planning provisions have on the resource and administrative costs of the responsible authority?**

The amendment is not expected to result in any unreasonable resource or administrative costs for the responsible authority.

#### **Where you may inspect this Amendment**

The amendment can be inspected free of charge at the Department of Environment, Land, Water and Planning website at [www.delwp.vic.gov.au/public-inspection](http://www.delwp.vic.gov.au/public-inspection)

And

[TBA - insert Knox Council C184knox webpage link]

Subject to COVID-19 restrictions, the Amendment may be available for public inspection, free of charge, during office hours at the following places:

Knox City Council, Civic Centre  
511 Burwood Highway, Wantirna South  
Operating hours: Monday to Friday: 8.30am-5:00pm

### **Submissions**

Any person who may be affected by the Amendment and/or planning permit may make a submission to the planning authority. Submissions about the Amendment and/or planning permit must be received by **Date TBA**

A submission must be sent to Knox City Council via:

- Email to: [psamendments@knox.vic.gov.au](mailto:psamendments@knox.vic.gov.au)
- Post (no stamp required) to: City Strategy and Planning, City Futures Department, Knox City Council, Reply Paid 70243, WANTIRNA SOUTH VIC 3152

### **Panel hearing dates**

In accordance with clause 4(2) of Ministerial Direction No.15 the following panel hearing dates have been set for this amendment:

- directions hearing: Week commencing Monday, Date TBA
- panel hearing: Week commencing Monday, Date TBA

**AMENDMENT C184KNOX**

**System Note: The following ordinance will be modified in Clause:22 LOCAL PLANNING POLICIES**

**AMENDMENT C184KNOX**

**22.07**  
C184knox

**DEVELOPMENT IN RESIDENTIAL AREAS AND NEIGHBOURHOOD CHARACTER**

This policy applies to development on residentially zoned land shown in Figure 1 - Housing Map at Clause 21.06 (Housing).

This policy does not apply to land in a [Neighbourhood Residential Zone Schedule 7](#), Design and Development Overlay or Development Plan Overlay.

**System Note: The following schedule will be inserted after Sub-Clause:32.09  
NEIGHBOURHOOD RESIDENTIAL ZONE, Schedule:SCHEDULE 6 TO CLAUSE 32.09  
NEIGHBOURHOOD RESIDENTIAL ZONE**

## AMENDMENT C184KNOX

C184knox

**SCHEDULE 7 TO CLAUSE 32.09 NEIGHBOURHOOD RESIDENTIAL ZONE**Shown on the planning scheme map as **NRZ7**.**NORVEL ESTATE****1.0**

C184knox

**Neighbourhood character objectives**

- To ensure that new development reflect the preferred neighbourhood character of the surrounding area.
- To support a diversity of housing stock typology consisting of detached dwellings, villa units and townhouses.
- To ensure a green and leafy identity through visual dominance of landscaping along street alignment.
- To provide vegetated front setbacks with no front fencing or the use of low, visually permeable front boundary treatments which enhance the spaciousness and strong avenue planting of the streetscapes.
- To maximise the opportunities to create high quality landscaping through minimal paving and the use of permeable ground surfaces.

**2.0**

C184knox

**Minimum subdivision area**

None specified.

**3.0**

C184knox

**Permit requirement for the construction or extension of one dwelling or a fence associated with a dwelling on a lot**

	Requirement
Permit requirement for the construction or extension of one dwelling on a lot	None specified.
Permit requirement to construct or extend a front fence within 3 metres of a street associated with a dwelling on a lot	None specified.

**4.0**

C184knox

**Requirements of Clause 54 and Clause 55**

	Standard	Requirement
<b>Minimum street setback</b>	A3 and B6	<b>Context: The site is on a corner</b> Minimum setback from a side street: Side walls of new development on a corner site should be setback the same distance as the setback of the front wall of any existing building on the abutting allotment facing the side street or 1.5 metres, whichever is the lesser.
<b>Site coverage</b>	A5 and B8	None specified.
<b>Permeability</b>	A6 and B9	None specified.
<b>Landscaping</b>	B13	Provision of a minimum of one canopy tree within the front setback per 5 metres of width of the site (excluding the width of one driveway). Each tree should be surrounded by 20 square metres permeable surface with a minimum radius of 3 metres. Up to 50 per cent of the permeable surface may be shared with another tree.
<b>Side and rear setbacks</b>	A10 and B17	None specified.



**AMENDMENT C184KNOX**

	Standard	Requirement
<b>Walls on boundaries</b>	A11 and B18	The height of a new wall constructed on or within 200mm of a side or rear boundary or a carport constructed on or within 1 metres of a side or rear boundary should not exceed an average of 3.6 metres with no part higher than 4.0 metres unless abutting a higher existing or simultaneously constructed wall.
<b>Private open space</b>	A17	None specified.
	B28	None specified.
<b>Front fence height</b>	A20 and B32	Streets in a Road Zone Category 1: 2 metres Other streets: 1.2 metres

**5.0**

C184knox

**Maximum building height requirement for a dwelling or residential building**

None specified.

**6.0**

C184knox

**Application requirements**

The following application requirements apply to an application for a permit under Clause 32.09, in addition to those specified in Clause 32.09 and elsewhere in the scheme and must accompany an application, as appropriate, to the satisfaction of the responsible authority:

- For developments of five or more dwellings and for residential buildings, a report which demonstrates how the proposal will be accessible to people with limited mobility.
- For developments of three or more dwellings and for residential buildings, an application must be accompanied by a Sustainable Design Assessment.

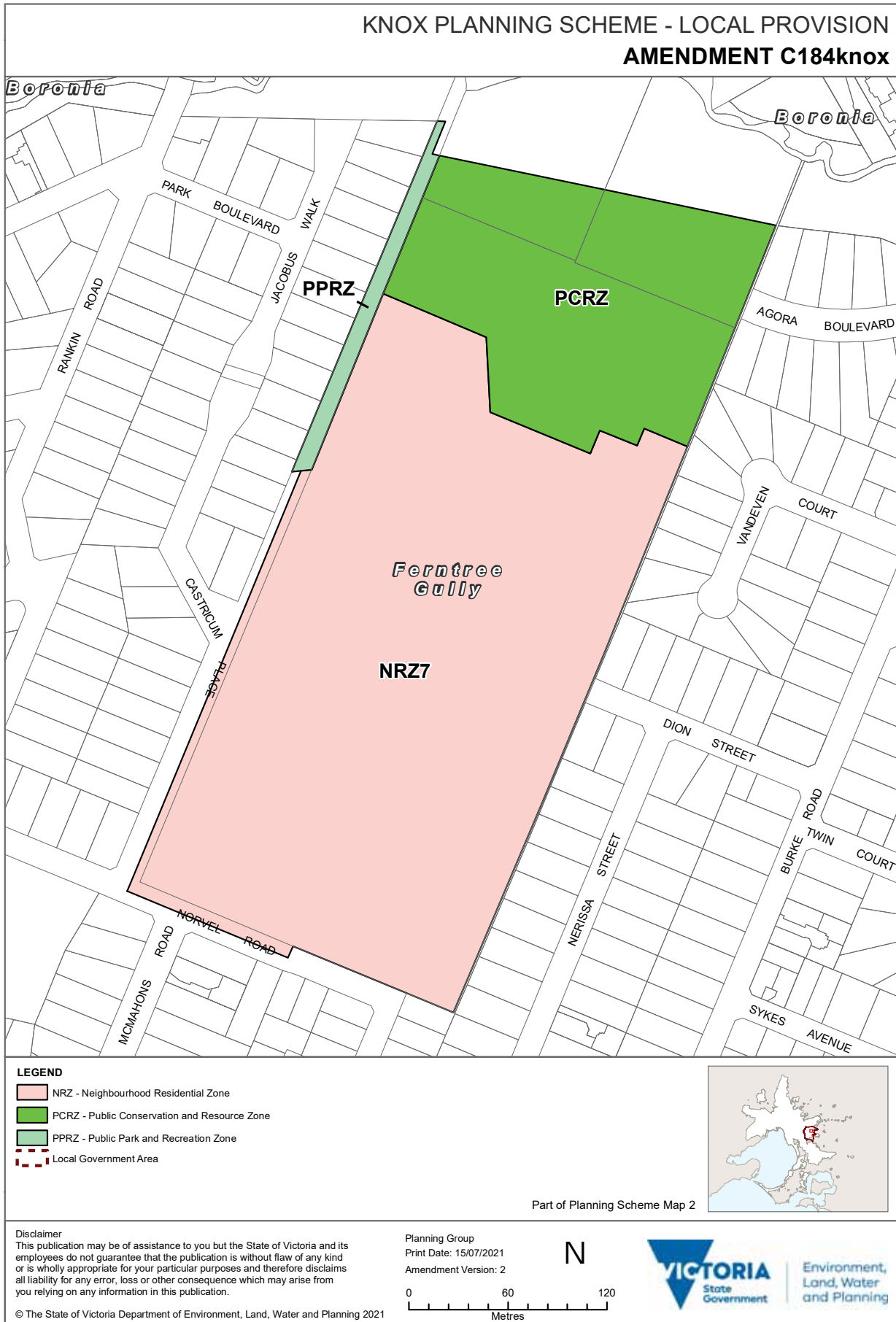
**7.0**

C184knox

**Decision guidelines**

The following decision guidelines apply to an application for a permit under Clause 32.09, in addition to those specified in Clause 32.09 and elsewhere in the scheme which must be considered, as appropriate, by the responsible authority:

- Whether the layout and appearance of areas set aside for car parking storage, including garages and carports are sensitively designed and sited to not dominate the streetscape by including the following features:
  - Locate carports and garages behind the line of the dwellings or in the rear yard.
- How vehicle crossovers are located and minimised in number to prevent traffic disruption, and preserve nature strips and street trees.
- Whether the built form and development complements the landscape setting by including the following features:
  - Minimises hard paving throughout the site by limiting driveway widths and lengths, providing landscaping on both sides of driveways, and restricting the extent of paving within open space areas.
  - Maximises planting opportunities adjacent to the street by reducing the impact of hard paving and building encroachment within the front setback.
- Whether the development accommodate landscaping opportunity within front setbacks for the planting of small and medium indigenous canopy trees.



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**Responsible Authority:** Knox City Council

### ADDRESS OF THE LAND:

---

29Q and 41Q Norvel Road, FERNTREE GULLY VIC 3156 (Lot 1 TP297137 and Lot 1 TP963860)  
18Q Dion Street, FERNTREE GULLY VIC 3156 (Lot 2 TP963860)

### THE PERMIT ALLOWS:

---

Staged subdivision (including 138 residential lots), development of pathways, removal of native vegetation, and associated works

in accordance with the endorsed Plan(s)

### THE FOLLOWING CONDITIONS APPLY TO THIS PERMIT:

---

#### Amended Plans

- 1) Prior to certification of any stage of the plan of subdivision and the commencement of any buildings and works including removal of vegetation, amended plans must be submitted and approved by the Responsible Authority. When approved, the plans will be endorsed and will then form part of the permit. The plans must be drawn to scale with dimensions and three copies must be provided. The plans must be generally in accordance with the submitted plans but modified to show:
  - a) Amended subdivision layout plan, consistent with the relevant requirements of conditions 5, 6, and 18 of this permit, which includes the following changes:
    - i) A building envelope on lot 52 with a size of 10 metres by 15 metres that is setback 3 metres from the western boundary. If this cannot be achieved, then lots 51 and 52 may have to be consolidated, realigned or the size of lot 52 increased;
    - ii) Removal of on-street car parking bays affecting vehicle movements at intersections of Road E/F, A/E, B/A, Norvel Road and Road H, and the bend of Dion Street-Road G/F and Road B/C;
    - iii) The bend at Dion Street-Road G/F must have an outer radius rather than a sharp 90-degree angle;
    - iv) Crossovers to lots 1, 31, and 32 to be relocated as much as practical to be clear of the intersection;
    - v) Building setbacks consistent with the requirements of condition 18;
    - vi) Show garden area calculation and demonstrate that minimum garden area can be achieved for lots less than 400sqm;
    - vii) Pram ramp footpath connection for pedestrian access across Norvel Road at the new intersection with Road H and the footpath on the eastern side of Road H to connect with the crossover of 60 Norvel Road;

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- viii) Pram ramp footpath connection across Norvel Road at either side McMahons Road intersection on the eastern side and the western side;
  - ix) The nature strip verge for Road H increased to 2.4 metres on both sides;
  - x) A crossover from Road C and Castricum Place to enable emergency vehicle to enter the removable bollard emergency access from these roads.
- b) Requirements from the CFA as per condition 42.
  - c) A subdivision staging plan.
  - d) A plan showing vegetation removal.

### Layout not altered

- 2) The subdivision, buildings and works, and extent of native vegetation removal, as shown on the endorsed plans, must not be altered except with the prior written consent of the Responsible Authority.
- 3) Unless otherwise agreed to by the Responsible Authority, works associated with the approved subdivision must only commence when all detailed plans associated with the particular stage are approved by the Responsible Authority and once commenced, these works must be undertaken and completed in accordance with the endorsed detailed plans to the satisfaction of the Responsible Authority prior to the issue of a Statement of Compliance.

### Sequencing of staging

- 4) The subdivision must proceed in the order of stages as shown on the endorsed plan unless otherwise agreed in writing by the Responsible Authority.

### Engineering Plans Required

- 5) Prior to the certification of a plan of subdivision, detailed engineering construction plans prepared by a qualified Civil Engineering Consultant must be submitted for all works and approved by the Responsible Authority for each stage of the subdivision. Construction plans must be clearly dimensioned and detail all roads, pathways, drainage works (*including WSUD*) and computations (to AHD). Three copies and digital formal (*Autocad and .pdf*) must be provided. The detailed plans must be generally in accordance with the endorsed plan, including the stormwater management plan (*Cardno V161919 dated 25 May 2021*), and show:
  - a) Any changes required under Condition 1.
  - b) Tree protection zone for all trees being retained with annotation that services works within tree protection zone must be thrust bored.
  - c) CFA requirements at Condition 42, 47, and 48.

### Drainage

- d) Details of stormwater management, including provision for all stormwater to be directed to the legal point of discharge for each lot as per Knox City Council's Civil Works and Stormwater Drainage Guidelines for subdivisions;

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- e) Functional design of the sedimentation basin, retarding basin, wetlands and any other WSUD system in the subdivision;
- f) Stormwater directed into the Melbourne Water's drainage system must do so only with the consent of Melbourne Water and must meet their requirements;
- g) Water Sensitive Urban Design treatments.
- h) Maintenance regime for the stormwater treatment system that include activity description, frequency and ongoing maintenance, management responsibility and a checklist for handover to Council;
- i) A design and construction schedule of the stormwater treatment/detention system.
- j) All Council pipelines must be designed for 10% Annual Exceedance Probability (AEP) event.
- k) The minimum pipe diameter for the drainage system must be 300mm.

### Road and footpath

- l) Details including surface and underground drainage, intersections, pavement and footpath/shared path details, street lighting, fire hydrants, vehicle crossovers, line marking, street signage, concrete kerbs and channels and outfall drainage;
- m) Swept path diagrams for junctions, bends, and hammerhead turning areas to ensure suitable access for all vehicles, including emergency vehicles, to turn and remain free of encroachment or obstructions, including on-street car parking;
- n) The location and design depth and composition of pavement, including raised traffic islands and speed control devices;
- o) Proposed traffic calming devices and speed humps, including speed humps in the detailed design for Road A and H;
- p) Right angle bends require a painted centre line and raised reflective markers to separate traffic travelling in opposite directions including give-way signage and surface treatment design to accentuate priority traffic along Road E/F and A/E at the junction of the north-east access cul-de-sac and Road D and support pedestrian movement across Road D;
- q) A minimum 8 metres is required for kerb returns at bends. The kerb between the North-East access lane and Road E must be altered to show an 8 metre radius;
- r) The location of all services and cables to be underground and the annotation that all services works within Tree Protection Zone must be thrust bored;
- s) The location of all "no parking" and "Street name" and various traffic signage. No parking must be provided on the residential side of Road C and D. Street signage, such as "No Through Road" along Norvel Road must be relocated to the satisfaction of the Responsible Authority;

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- t) A fully mountable splitter island must be constructed at the intersection of McMahons Road and Norvel Road to the satisfaction of the Responsible Authority;
- u) If construction is done in stage, turnaround provision for waste collection vehicles must be provided where roads are not yet completed;
- v) Cross sections for roads and access lanes to be provided; and

### On-street car parking plan

- w) Details of on-street car parking including CFA requirements at Condition 42;
- x) Parking restrictions limiting on-street parking to only one side on the narrower Access Place type roads with preference of the no parking to be located on the residential side; and,
- y) Waste bin collection points to be designated for each lots to show planned access for garbage collection.

### Bicycle path, trail, and bushland track

- z) Detail bushland boardwalk location and construction design including the location of existing vegetation;
- aa) Detail of construction of bike path, and maintenance trail to Agora Blvd, including that paths and trails located within tree protection zone must be constructed above grade;
- bb) Removable bollard at either end of the trail to Agora Boulevard to limit vehicle access to maintenance and emergency vehicles only.

### Street Lighting

- cc) Details of Street Lighting type and location, provided to the satisfaction of the relevant authority and in accordance with AS1158. This must include a lighting to all intersections, bends in the road and at the end of roads.
- dd) Street lighting to be incorporated at both end of the Pedestrian Link between Road A and H.
- ee) Lighting along the bushland reserve frontage (Road E, Road D, and the end of Road F) to consider measures that avoid any light spilling to the bushland reserve.

To the satisfaction of the Responsible Authority. Once approved, these plans become the endorsed plans of this permit.

### Landscaping Plan Required

- 6) Prior to the certification of a plan of subdivision for any stage, a detailed landscaping plan prepared by a suitably qualified landscape architect must be approved for all reserves, including road reserves and public spaces, relevant to that stage by Responsible Authority. Once approved, the plan will be endorsed and then form part of the Planning Permit. A digital format (.pdf) must be provided generally in accordance with the Landscape Report Revision H 17/02/2021 prepared by Urbis and modified to show:

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- a) Any changes required under Condition 1.
- b) Streetscape and reserve designs detailing location of water sensitive urban design features, garden beds, location of street furniture, the position of street lighting, fire hydrants, side entry and service pits, pathways within reserves, electricity substations and planting of vegetation.  
  
The species and planting size of trees must be selected to the satisfaction of the Responsible Authority.
- c) The planting species modified as:
  - i) *Tilia cordata* to be changed to *Nyssa Sylvatica* 'Forum';
  - ii) *Nyssa sylvatica* is a more adaptable species to a warming climate;
  - iii) *Acer platanoides* 'Norwegian Sunset' to be changed to *Acer truncatum* x *A. platanoides* 'Warrenred' Pacific Sunset. Norwegian sunset cultivar is not available anymore;
  - iv) The *Eucalyptus melliodora* planting area have the following understorey species additions to add to diversity/beauty;
  - v) *Allocasuarina littoralis*, *Acacia pravissima*, *Kunzea ericoides*, *Leptospermum petersonii*, *Bursaria spinose*;
  - vi) Northern end planting (area that abuts bushland reserve) to be changed to the native tree species, *Angophora hispida* (Dwarf Apple);
  - vii) *Angophora hispida* to be planted on the northern side of Road E and Road D, spaced at 12 metre centres to incorporate the 5 metre canopy separation when they reach maturity.
- d) Delineation of the bushfire defendable space area and proposed planting schedule and location within the defendable space area modified to accord with bushfire management requirements as per condition 44.
- e) No street tree for lots 137 and 138 to meet bushfire defendable space requirement.
- f) The street trees on the south side of Road E and along Lot 52 moved to the north side of Road E and D to meet bushfire defendable space requirement.
- g) The opportunity for a second canopy tree to be located at the northern end of Road H to help frame the dead end to the road.
- h) A planting schedule of all proposed trees, shrubs and ground covers including botanical names, common names, pot sizes, sizes at maturity and quantities of each plant, to be planted within the nature strip and reserves.
- i) Details of the surface finishes of roads, pathways, tracks, and bike path.
- j) Annotation that all services works within Tree Protection Zone must be thrust bored and bike path within tree protection zone must be constructed above grade.

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- k) Details and location of all services including above and below ground lines, cables, hydrants and pipes (including as cross-section) with annotation that all services to be located at a minimum depth of 600mm within road reserves; and
- l) Trees to be retained and their respective tree protection zones (reserves only).

To the satisfaction of the Responsible Authority. Once approved, these plans become the endorsed plans of this permit.

- 7) Prior to Statement of Compliance for Stage 1, the owner/developer must pay to the Council a financial contribution towards stormwater management and construction of the bushland boardwalk to the satisfaction of the Responsible Authority.
- 8) Prior to issue of a Statement of Compliance for each stage, the following works must be completed or bonded in accordance with approved plans to the satisfaction of the Responsible Authority:
- a) stormwater drainage;
  - b) roads and lighting;
  - c) traffic devices;
  - d) car parking and access ways must be drained, sealed and line marked;
  - e) footpaths, bike path, trails, and pram crossings; and
  - f) landscaping.
- 9) Prior to any works commencing within Council Bushland reserve and Seecal reserve, Council's Biodiversity Officer must be contacted to arrange an inspection of the works area.

### Native Vegetation

- 10) Before works start, the permit holder must advise all persons undertaking the vegetation removal and works on site of all relevant conditions of this permit.
- 11) In order to offset the removal of 0.391 hectares of native vegetation approved as part of this permit, the applicant must provide a native vegetation offset that meets the following requirements and is in accordance with the Permitted clearing of native vegetation – Biodiversity assessment guidelines and the Native vegetation gain scoring manual:

The general offset must:

- contribute offset amount of 0.126 general habitat units,
- be located within the Port Phillip and Westernport Catchment Management Authority boundary or Knox municipal district,
- have a strategic biodiversity score of at least 0.202.

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- 12) Prior to the removal of any native vegetation and the issue of a Statement of Compliance, evidence that the required offset for the project has been secured must be provided to the satisfaction of the Responsible Authority.

### Tree Protection Conditions

- 13) Prior to any buildings and works, subdivision works, and vegetation removal commencing, all trees and vegetation to be retained and the bushland reserve must be fenced off with barrier fencing to create a protection zone. The tree protection zone must be a minimum radius of 12x the diameter of the trunk, measured at a height of 1.4 metres from the ground as identified in the Australian Standard for the protection of trees (AS 4970-2009). The fence is to be maintained and clearly marked throughout the construction period and removed at the completion of all works.
- 14) All works, including excavation and fill, within the tree protection zone areas of the trees to be retained, within and adjacent to the site including reserves, must be undertaken under the supervision of a qualified Arborist to ensure that there is no unreasonable damage to the root system of trees to be retained and/or protected, to the satisfaction of the Responsible Authority.
- 15) Trees are to be watered thoroughly prior to construction works commencing and throughout the period of construction works to the satisfaction of the Responsible Authority.
- 16) No materials, vehicle, equipment, waste, soil or other goods must be stored or placed within the tree protection zone.
- 17) Entry and exit pits for underground services must not be constructed within the tree protection zone of native tree.

### Section 173 Agreement

- 18) Prior to the issue of a statement of compliance, the owner of the land must enter into an agreement with the Responsible Authority pursuant to Section 173 Agreement of the Planning and Environment Act 1987 and provide evidence to the Responsible Authority that the agreement has been registered on the certificate of title for the land. The agreement will stipulate the following building design requirements applies to the development of future dwellings on the land.

#### Front Setbacks

- a) *Front walls of a building must be setback a minimum of:*
- i. *5.5 metres from a street frontage for lots facing Castricum Place.*
  - ii. *4 metres from a street frontage for lots on the northern side of "Road B" shown as Lots 33 to 40 on the attached plan. No encroachment within the front setbacks are allowed for these lots.*

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- iii. *The distance set as defensible space for the lots affected by bushfire defensible space as shown on the endorsed plans and as a restriction on the plan of subdivision. No encroachment within the defensible space are allowed for these lots.*
- iv. *4.5 metres from a street frontage for all other lots.*

*Any encroachment into the front street setback of point (i.) and (iv.) above must be limited to the following structure provided it encroaches no more than 0.5 metres into the specified setback distances:*

- *porches, pergolas and verandahs that are less than 3.6 metres in height;*
- *decks, terraces, landings, stairways, ramps, eaves, window hoodings, sunblinds, fascias, gutters, masonry chimneys, flues, pipes, and domestic services normal to a dwelling.*

### Front Setbacks for garages or carports

- b) *Front walls of a car parking structure (such as garages and carport) must be setback a minimum of:*
- i. *0.5 metres from the front wall of the building for lots facing Castricum Place.*
  - ii. *5.4 metres from a street frontage and at least 0.5 metres behind the front wall of the building for all other lots.*

### Side Setbacks

- c) *Side walls of a building on a corner lot must be setback a minimum of 1.5m from a side street frontage. No encroachment within the side street setback is allowed.*

### Rear Setbacks

- d) *Rear walls of a building must be setback a minimum of 3 metres from the rear boundary for all lots except for:*
- i. *Lots 33-40 inclusive.*
  - ii. *Lots 113-138 inclusive.*
- e) *Rear walls of a building for lots 113-138 inclusive must be setback a minimum of 5 metres from the rear boundary.*

*Any encroachment into the rear setback of point d) and e) above must be limited to the following structure provided it does not encroach within the minimum radius of the large feature shrubs required under point j):*

- *porches, pergolas and verandahs that are less than 3.6 metres in height;*
- *terraces, patios, decks, landings that are less than 800mm in height, stairways, ramps, eaves, fascia or gutter, water tanks, and domestic services normal to a dwelling;*

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- *outbuildings that does not exceed a gross floor area of 10 square metres.*

### Lot 138

- f) *The dwelling on Lot 138 should be single storey. However, if a double storey building is proposed, the upper level must meet the following requirement:*
- setback by at least 3 metres behind the ground floor north and west wall façade to ensure a recessive second storey element.*  
  
*The upper level setback means the recess above the ground floor wall calculated as the shortest horizontal distance from the top of the ground floor wall. It does not include projection such as balconies. Any balconies located within this setback must be clear to the sky.*
  - The wall of a building must be setback a minimum of 3.8 metres from the northern boundary and 2 metres from the part of the western boundary that does not constitute part of a street frontage.*
  - Regardless of point (ii.) above, no building and works, other than fencing, are allowed in the tree protection zone of any tree. An arboricultural report will be required to determine the tree protection zone of any tree encroaching onto Lot 138 and tree protection fencing must be installed prior to any works commencing on this lot.*
  - The western boundary fence with the bushland reserve must be no more than 1.2 metres in height.*
  - The northern boundary fence with the bushland reserve must be no more than 1.2 metres in height for the first 12 metres from the western boundary.*

### Front Boundary

- Front fences are not allowed on a road frontage or within 3 metres of a road frontage (excludes side boundaries).*
- No structures within 200 millimetres of a footpath in the road reserve.*

### One Crossover per Lot

- Only one (1) crossover per lot is allowed. The crossover must not exceed a width of 3 metres but may be merged with that of an adjoining lot provided that it results in no more than one (1) crossover per lot.*

### Landscaping

- Each lots must provide minimum one (1) small canopy tree with a mature height of 5-8 metres within the front setback. Each tree should be surrounded by 20 square metres permeable surface with a minimum radius of 3 metres. This requirement does not apply to lots 52, 87-91 inclusive, 137, and 138 subject to bushfire management.*
- Each lots must provide minimum one (1) large feature shrubs with a mature height of 4-5 metres within the rear setback of each lot. Each large feature shrubs should be*

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*surrounded by 15 square metres permeable surface with minimum radius of 2 metres.  
This requirement does not apply to Lot 138.*

- l) *The planted canopy trees and large feature shrubs must be maintained to the satisfaction of the Responsible Authority and must not be removed.*

Lots less than 400 square metres in area

- m) A minimum garden area of 25 percent must be set aside in accordance with the Knox Planning Scheme.

Bushfire Management – Lots 52, 87 to 91, 137 to 138

- n) *The development and management of defensible space on lots 52, 87 to 91 inclusive, and 137-138 must be in accordance with the endorsed Bushfire Management Plan.*

All costs associated with the preparation and registration of the agreement must be borne by the owner of the land.

### Certification of plan

- 19) The plan of subdivision submitted for certification under the Subdivision Act 1988 must be referred to the relevant authority in accordance with Section 8 of the Act.

### Easements and Utilities

- 20) All existing and proposed easements required for utility services on the land must be set aside in the plan submitted for certification in favour of the relevant authority for which the easement is to be created.
- 21) The owner/developer of the land must enter into agreements with the relevant authorities for the provision of water supply, drainage, sewerage facilities, electricity, gas and telecommunication services to each lot shown on the plans of subdivision in accordance with that authority's requirements and relevant legislation at the time.

### Telecommunications

- 22) The owner of the land must enter into an agreement with:
- a) A telecommunications network or service provider for the provision of telecommunication services to each lot shown on the endorsed plan in accordance with the provider's requirements and relevant legislation at the time; and
  - b) A suitably qualified person for the provision of fibre ready telecommunication facilities to each lot shown on the endorsed plan in accordance with any industry specifications or any standards set by the Australian Communications and Media Authority, unless the applicant can demonstrate that the land is in an area where the National Broadband Network will not be provided by optical fibre.
- 23) Before the issue of a Statement of Compliance for any stage of the subdivision under the Subdivision Act 1988, the owner of the land must provide written confirmation from:

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- a) A telecommunications network or service provider that all lots are connected to or are ready for connection to telecommunications services in accordance with the provider's requirements and relevant legislation at the time; and,
- b) A suitably qualified person that fibre ready telecommunication facilities have been provided in accordance with any industry specifications or any standards set by the Australian Communications and Media Authority, unless the applicant can demonstrate that the land is in an area where the National Broadband Network will not be provided by optical fibre.

### Road naming

- 24) Prior to the Certification of any stage, proposed naming for all new roads must be submitted to and approved by the Responsible Authority with the approved names to be then applied on the Plan of Subdivision for certification.

Names must be in accordance with the Naming rules for places in Victoria [2016] to the satisfaction of the Responsible Authority. Road G must be named as continuation of Dion Street.

### Public Open Space

- 25) A contribution to the Council for public open space must be required pursuant to Section 18 of the Subdivision Act 1988 and Clause 52.01 of the Knox Planning Scheme.

### Site and Environmental Management

- 26) Prior to the commencement of any works for a relevant stage on the subject land, a Site and Environmental Management Plan to the satisfaction of the Responsible Authority must be submitted and approved by the Responsible Authority. The Site and Environmental Management Plan will be endorsed and form part of the permit. The Site and Environmental Management Plan must address and document as appropriate, the construction activities proposed on the land under the following heading:

- a) Occupational health and safety and site induction, environmental controls, traffic management, amenity and safety of the public as well as site security, and cultural protection measures applicable to the site during construction.

The Site and Environmental Management Plan must include:

- b) Environmental Management:
  - i) Soil erosion and sediment control provisions to protect existing local stormwater infrastructure, Blind Creek and the bushland from erosion product and sediment transport by minimising erosion of lands during work;
  - ii) Measures to prevent construction fill encroaching on or being placed within the bushland;
  - iii) Protection measures to ensure that disturbance to native flora and fauna habitat is avoided in the first instance, minimised where avoidance is not possible with

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appropriate contingencies incorporated to prevent the potential for the introduction of exotic flora and fauna species is abated;

- iv) Specific measures for any works related to the bushland reserve or Seecal Reserve must be included and must include the notification of Council’s Biodiversity Officer prior to any works commencing;
  - v) Hydraulics and hydrology provisions to manage water quality and quantity, and protect the habitat value of Blind Creek (measures used should include the installation of a perimeter fence to protect the waterway prior to the commencement of works);
  - vi) Tree protection in accordance with Conditions 13 to 17.
  - vii) Any recommendations of any approved Cultural Heritage Management Plan (if applicable);
  - viii) The plan must ensure that contractor working on the site are inducted to this Environmental Management Plan prior to conduct any works around or within the bushland reserve.
- c) Site Management
- i) Identifying access and egress opportunities for emergency vehicles, workers, and early residents of approved stage in case of emergency;
  - ii) Country Fire Authority requirements as per conditions 33 and 36;
  - iii) All machinery wash-down area, personnel rest areas and parking;
  - iv) Waste management measures during construction;
  - v) Measures to reduce the impact of noise, dust and other emissions created during the construction process including measures to prevent dirt being tracked onto surrounding roads by vehicles;
  - vi) If requested by the Responsible Authority at any stage, a contamination assessment for a site with suspected contamination must be provided for the relevant stage to the satisfaction of the Responsible Authority;
  - vii) Traffic Management identifying the access and egress access point(s) for construction vehicles and detailing the measures to ensure amenity of the adjoining areas is not impacted by the movement of vehicles (cars, trucks and construction machinery) associated with construction activities on the site.
- 27) The endorsed Site and Environmental Management Plan must be implemented and maintained throughout the construction to the satisfaction of the Responsible Authority and all works must be carried out in accordance with the measures set out in the approved Site and Environmental Management Plan unless otherwise agreed in writing by the Responsible Authority.
- 28) Prior to the commencement of any works on site, an inspection by Council’s Environmental Officer must be carried out to determine compliance with the Site and Environmental Management Plan.

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### **South East Water Conditions (reference: 35707694)**

#### *South East Water – Water and Sewer*

- 29) The owner of the subject land must enter into an agreement with South East Water for the provision of drinking water supply and fulfil all requirements to its satisfaction.
- 30) The owner of the subject land must enter into an agreement with South East Water for the provision of sewerage and fulfil all requirements to its satisfaction.
- 31) All lots on the Plan of Subdivision must be provided with separate connections to South East Water drinking water supply and sewerage systems.

#### *South East Water – Certification*

- 32) Prior to certification, the Plan of Subdivision must be referred to South East Water, in accordance with Section 8 of the Subdivision Act 1988.
- 33) The certified Plan of Subdivision will need to show sewerage supply easements over all existing and/or proposed South East Water sewer mains located within the land, to be in favour of South East Water Corporation pursuant to Section 12(1) of the Subdivision Act.

### **AusNet Services Conditions (reference: 29Q and 41Q Norvel Road, Ferntree Gully)**

- 34) The Plan of Subdivision submitted for certification must be referred to AUSNET ELECTRICITY SERVICES PTY LTD in accordance with Section 8 of the Subdivision Act 1988.
- 35) The applicant must:
  - a) Enter into an agreement with AUSNET ELECTRICITY SERVICES PTY LTD for supply of electricity to each lot on the endorsed plan.
  - b) Enter into an agreement with AUSNET ELECTRICITY SERVICES PTY LTD for the rearrangement of the existing electricity supply system.
  - c) Enter into an agreement with AUSNET ELECTRICITY SERVICES PTY LTD for rearrangement of the points of supply to any existing installations affected by any private electric power line which would cross a boundary created by the subdivision, or by such means as may be agreed by AUSNET ELECTRICITY SERVICES PTY LTD.
  - d) Provide easements satisfactory to AUSNET ELECTRICITY SERVICES PTY LTD for the purpose of "Power Line" in the favour of "AUSNET ELECTRICITY SERVICES PTY LTD" pursuant to Section 88 of the Electricity Industry Act 2000, where easements have not been otherwise provided, for all existing AUSNET ELECTRICITY SERVICES PTY LTD electric power lines and for any new power lines required to service the lots on the endorsed plan and/or abutting land.
  - e) Obtain for the use of AUSNET ELECTRICITY SERVICES PTY LTD any other easement required to service the lots.
  - f) Adjust the position of any existing AUSNET ELECTRICITY SERVICES PTY LTD easement to accord with the position of the electricity line(s) as determined by survey.

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- g) Adjust the position of any existing AUSNET ELECTRICITY SERVICES PTY LTD easement to accord with the position of the electricity line(s) as determined by survey.
- h) Set aside on the plan of subdivision Reserves for the use of AUSNET ELECTRICITY SERVICES PTY LTD for electric substations.
- i) Provide survey plans for any electric substations required by AUSNET ELECTRICITY SERVICES PTY LTD and for associated power lines and cables and executes leases for a period of 30 years, at a nominal rental with a right to extend the lease for a further 30 years. AUSNET ELECTRICITY SERVICES PTY LTD requires that such leases are to be noted on the title by way of a caveat or a notification under Section 88 (2) of the Transfer of Land Act prior to the registration of the plan of subdivision.
- j) Provide to AUSNET ELECTRICITY SERVICES PTY LTD a copy of the plan of subdivision submitted for certification that shows any amendments that have been required.
- k) Agree to provide alternative electricity supply to lot owners and/or each lot until such time as permanent supply is available to the development by AUSNET ELECTRICITY SERVICES PTY LTD. Individual generators must be provided at each supply point. The generator for temporary supply must be installed in such a manner as to comply with the Electricity Safety Act 1998.
- l) Ensure that all necessary auditing is completed to the satisfaction of AUSNET ELECTRICITY SERVICES PTY LTD to allow the new network assets to be safely connected to the distribution network.

### **Melbourne Water Conditions (reference: MWA-1164280)**

#### *Melbourne Water Certification*

- 36) Prior to Certification of any stage of this subdivision, Melbourne Water requires that the applicant submit a detailed Drainage and Stormwater Management Strategy for approval, which demonstrates how stormwater runoff from the subdivision will achieve flood protection standards and State Environment Protection Policy (Waters of Victoria) objectives for environmental management of stormwater. The strategy should also include information regarding the future ownership and maintenance requirements of any proposed assets.
- 37) Unless otherwise agreed in writing by the relevant drainage authority, the subdivision must retard stormwater back to pre-development levels before entering the downstream drainage system/waterway and/or retard stormwater back to the sufficient capacity of the downstream drainage system.
- 38) Stormwater runoff from the subdivision must achieve State Environment Protection Policy (Waters of Victoria) objectives for environmental management of stormwater as set out in the 'Urban Stormwater Best Practice Environmental Management Guidelines (CSIRO) 1999'

#### *Melbourne Water – stormwater connection*

- 39) Prior to the commencement of works, a separate application direct to Melbourne Water must be made for approval of any new or modified stormwater connection to Melbourne Water's

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drains or watercourses, works near or over a Melbourne Water asset and/or waterway crossing.

### *Melbourne Water - Statement of Compliance*

- 40) Prior to the issue of a Statement of Compliance, engineering plans of the subdivision (in electronic format) must be forwarded to Melbourne Water.

### **Multinet Condition**

- 41) A Statement of Compliance must be obtained from Multinet Gas prior the plan of subdivision being released from the Titles Office.

### **CFA Conditions (reference: 13000-68738-107873)**

CFA – Amended plans

- 42) Prior to the certification of any stage of the plan of subdivision amended plans must be submitted and show:
- a) All roads are designed to ensure the road width is constructed as specified in Table C1 of Clause 56.06-8 of the Knox Planning Scheme for an Access Lane and clear of encroachments, such as on-street parking.
  - b) Plans that show the design and location of on-street parking to ensure that the parking bays do not encroach onto the road and hinder the movement of emergency vehicles.
  - c) Plans that demonstrate the turning bays can accommodate emergency vehicles to manoeuvre in accordance with the requirements set out in CFA's Requirements for Water Supplies and Access for Subdivisions, 2006.
  - d) The provision of removable bollards between Road H and Road F for the purposes of access for emergency vehicles.

CFA – Fire management plan

- 43) A Fire Management Plan must be submitted and approved by the Responsible Authority prior to development starting that identifies how the bushfire risk will be managed during each Stage of the subdivision and what stage the various bushfire protection measures will be relied upon for the application.
- 44) Before the certification of the plan of subdivision, a Bushfire Management Plan must be submitted to and endorsed by the Responsible Authority. The plan must show the following information, unless otherwise agreed in writing by the CFA and the Responsible Authority:
- a) The design and layout of the subdivision, including lot layout, road design and access points, both pedestrian and vehicular.
  - b) The location of nearby hazards within 150m of the subdivision boundary.
  - c) The location of any bushfire hazards that will be retained or created on the land within the subdivision.
  - d) The location of any areas of vegetation within the subdivision not located on private land that will be managed to a low threat condition, including the reserves.

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- e) The setback distance of any development from the bushfire hazard for defensible space purposes where vegetation will be managed.
- f) Notations of vegetation management standards and when vegetation management will occur i.e. annually, quarterly, during the fire danger period.
- g) Vegetation must be managed within any area of defensible space to the following standard:
  - i) Grass must be short cropped and maintained during the declared fire danger period.
  - ii) All leaves and vegetation debris must be removed at regular intervals during the declared fire danger period.
  - iii) Within 10 metres of a building, flammable objects must not be located close to the vulnerable parts of the building.
  - iv) Plants greater than 10 centimetres in height must not be placed within 3m of a window or glass feature of the building.
  - v) Shrubs must not be located under the canopy of trees.
  - vi) Individual and clumps of shrubs must not exceed 5 sq. metres in area and must be separated by at least 5 metres.
  - vii) Trees must not overhang or touch any elements of the building.
  - viii) The canopy of trees must be separated by at least 5 metres.
  - ix) There must be a clearance of at least 2 metres between the lowest tree branches and ground level.
- h) Details of any other bushfire protection measures that are to be adopted at the site.
- i) Nominate that any building on a new lot will be required to be designed and constructed to a minimum standard of Bushfire Attack Level (BAL) 12.5.

*CFA – Building envelope*

- 45) Any lot that contains defensible space must include a building envelope that ensures development will not be allowed within the area of defensible space.

*CFA – Construction and site management plan*

- 46) Before commencement of works, A Bushfire Site Management Plan that addresses bushfire risk during, and where necessary, after construction must be submitted and approved by the responsible authority. The plan must specify, at minimum:
- a) The staging of development and the likely bushfire risks from surrounding hazards at each stage;
  - b) An area of land between the development edge and bushfire hazard consistent with the separation distances specified in AS3959-2018, where bushfire risk is managed to enable the development, on completion, to achieve a BAL-12.5 construction standard in accordance with AS3959-2018;

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- c) The land management measures to be undertaken by the developer to reduce the risk from fire within any surrounding rural or undeveloped landscape to protect residents and property from the threat of grassfire and bushfire;
- d) Provision of adequate access and egress for Stage One subdivisions to minimise grass and bushfire risks to new residents prior to the full completion of the subdivision.

### *CFA - Hydrants*

- 47) Prior to the issue of a Statement of Compliance under the Subdivision Act 1988 the following requirements must be met to the satisfaction of the CFA:
- a) Above or below ground operable hydrants must be provided. The maximum distance between these hydrants and the rear of all building envelopes (or in the absence of building envelopes, the rear of the lots) must be 120 metres and the hydrants must be no more than 200 metres apart. These distances must be measured around lot boundaries.
  - b) The hydrants must be identified with marker posts and road reflectors as applicable to the satisfaction of the Country Fire Authority.

Note –CFA’s requirements for identification of hydrants are specified in ‘Identification of Street Hydrants for Firefighting Purposes’ available under publications on the CFA web site ([www.cfa.vic.gov.au](http://www.cfa.vic.gov.au))

### *CFA - Roads*

- 48) Roads must be constructed to a standard so that they are accessible in all weather conditions and capable of accommodating a vehicle of 15 tonnes for the trafficable road width.
- a) The average grade must be no more than 1 in 7 (14.4%) (8.1 degrees) with a maximum of no more than 1 in 5 (20%) (11.3 degrees) for no more than 50 meters. Dips must have no more than a 1 in 8 (12%) (7.1 degree) entry and exit angle.
  - b) Curves must have a minimum inner radius of 10 metres.
  - c) Have a minimum trafficable width of 3.5 metres and be clear of encroachments for at least 0.5 metres on each side and 4 metres above the access way.
  - d) Roads more than 60m in length from the nearest intersection must have a turning circle with a minimum radius of 8m (including roll-over kerbs if they are provided) T or Y heads of dimensions specified by the CFA may be used as alternatives.

### *CFA – Maintenance of defensible space*

- 49) Before the Statement of Compliance is issued under the Subdivision Act 1988, the defensible space on every lot in the subdivision must be implemented and maintained as specified on the endorsed Bushfire Management Plan, unless otherwise agreed in writing by the CFA and the Responsible Authority.

### **Drainage/Construction Conditions**

- 50) All stormwater drainage runoff from the site must be properly collected and discharged in a complete and effective system of drains within the subdivision and connected to the legal point of discharge as directed by the Responsible Authority. It must not cause a nuisance to

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abutting properties. The internal drains of the proposed lots are to be independent of the internal drains of other lots.

- 51) Prior to the issue of a Statement of Compliance, any damage caused to the existing drainage system during the installation of the new property inlet must be repaired or replaced to the satisfaction of the Responsible Authority.

### Payments and Maintenance Bonds

- 52) Prior to the issue of a Statement of Compliance, the owner/developer must pay to the Council a payment for supervision of works being 2.5% of the value of all works shown on the Engineering and Landscape Plans and a payment for checking of Engineering and Landscape Plans being 0.75% of all works shown on the engineering plan.
- 53) Prior to the issue of a Statement of Compliance, the owner/developer must lodge with Council:
- A refundable maintenance bond being 5% of the value of all works shown on the engineering plan; and
  - A refundable outstanding works bond being the value of all works to be completed plus 50%.

*The Developer is responsible for the maintenance of the completed construction works and such works must be kept in good condition for a period of three months.*

*(A priced Bill of Quantities must be supplied to Council to validate the value of works as shown on the plan. This is used to determine the amount of the engineering fees and maintenance bond and provides a record of the value of Councils assets).*

### Bond Return

- 54) Prior to the issue of a Statement of Compliance or the return of maintenance bonds in respect to the subdivision works – whichever is the later, the owner or developer must submit to Council the following information (whichever are applicable) in an electronic format agreed by the Knox City Council:
- Subdivision plans showing title boundaries, road reserves, municipal reserves and easements etc.
  - As constructed engineering plans in electronic format relating to roads, drains and other infrastructure constructed in conjunction with the subdivision.
  - Areas where fill exceeding 150 millimetres has been placed.

### Incomplete works Bond return

- 55) Prior to the return of the incomplete works bond, Council will inspect the works and determine if these works have been constructed in accordance with the approved design and specifications to the satisfaction of the Responsible Authority. Should these works be satisfactory, the incomplete bond will be returned and a practical completion certificate will be issued by the Responsible Authority.

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### Asset Protection

- 56) Prior to the issue of a Statement of Compliance for any stage of the development, the developer must be responsible for the reinstatement and repair of any damage, and costs of all alterations to the Knox City Council and any other Public Authority assets deemed necessary and required by such Authorities for the development/subdivision. Re-instatement or modification of assets as directed by the Responsible Authority will be required or compensation to the value of Council's loss must be paid.

### Fencing of reserves

- 57) Prior to the issue of a Statement of Compliance, any fencing along the common boundary between a lot and a reserve or walkway as shown on the subdivision and detailed endorsed plan must be designed and erected to the satisfaction of the Responsible Authority.

Fencing between lot 138 and the bushland reserve must be in accordance with the requirement of Condition 18(f).

### Final Compliance Inspection

- 58) Prior to the issue of a Statement of Compliance a final inspection by Council's Surveillance Officer must be carried out to verify the completion of works in accordance with the Engineering Plans, to Council's standards and satisfaction.
- 59) Prior to the issue of a Statement of Compliance a final inspection by Council's Enforcement Officer must be carried out to verify the completion of landscaping in accordance with the Landscape Plans, to Council's standards and satisfaction.

### Vehicle crossing

- 60) Prior to the issue of a Statement of Compliance, vehicle crossings must be constructed to service all lots and any vehicle crossing no longer required must be returned to nature strip to the satisfaction of the Responsible Authority. All crossovers must be 10m clear of an intersection, 3m clear of all street trees and 1m clear of all other assets in the road reserve.

### Public Space trees

- 61) Nursery stock must be inspected and approved by a suitably qualified arborist or horticulturalist before planting and a report from this suitably qualified arborist or horticulturalist declaring that the nursery stock complies with the relevant Australian Standard, must be provided to the satisfaction of the Responsible Authority.
- 62) Following the planting of trees within the road reserves and open space reserves, an inspection must be arranged with representatives of the applicant, the landscape contractor appointed by the applicant and Knox City Council Parks Services and Landscape Officer who when satisfied will issue a Certificate of Practical Completion.
- 63) Trees and landscaping works within the road reserves, open space reserves and all landscaping within the development must be maintained at no cost to Knox City Council for a period of two

**Date Issued:**

**Signature for the  
Responsible Authority** \_\_\_\_\_

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Form 9 – Section 96J



## PLANNING PERMIT

GRANTED UNDER SECTION  
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ENVIRONMENT ACT 1987

**Application No:** P/2020/6049

**Planning Scheme:** Knox

**Responsible Authority:** Knox City Council

years following the date of issue of the Certificate of Practical Completion. At the end of this period and following another inspection, Council will determine if the landscaping is satisfactory. Should the landscaping be satisfactory, the landscape bond will be returned if applicable, a Final Completion will be issued and at this point the maintenance responsibility will be assumed by Knox City Council.

- 64) The two-year maintenance of the trees must include formative pruning 12 months after planting to the satisfaction of the Responsible Authority.
- 65) Prior to the issue of a Statement of Compliance, for the final stage, the Developer must pay to the Council a street tree maintenance bond fee of \$350.00 per tree within the final stage.
- 66) Protection of Council's street trees must be in accordance with the Australian Standard for the protection of trees (AS 4970-2009) to the satisfaction of the Responsible Authority.

### Street Lighting

- 67) Prior to the issue of a Statement of Compliance, street lighting must be provided to the satisfaction of the relevant authority and in accordance with AS 1158 and the endorsed plans. Non Standard street lighting will be accepted provided it is to the satisfaction of the Responsible Authority.

### Permit expiry

- 68) The permit will expire if any of the following circumstances applies:
  - a) The plan of subdivision for the first stage of the subdivision is not certified under the Subdivision Act 1988 within two (2) years of the date of this permit.
  - b) The plan of subdivision for the subsequent stage is not certified under the Subdivision Act 1988 within two (2) years of certification of the previous stage.
  - c) The registration of the plan of subdivision for each stage is not completed within five (5) years of the date of Certification under the Subdivision Act 1988 of that stage.
  - d) The buildings and works, including removal of vegetation, component has not commenced within seven (7) years of the date of issue of the permit.

The Responsible Authority may extend the periods referred to if a request is made in writing before the permit expires or in accordance with Section 69 of the Planning and Environment Act 1987.

**Date Issued:**

**Signature for the  
Responsible Authority** \_\_\_\_\_

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Form 9 – Section 96J



## PLANNING PERMIT

GRANTED UNDER SECTION  
96I OF THE PLANNING AND  
ENVIRONMENT ACT 1987

**Application No:** P/2020/6049

**Planning Scheme:** Knox

**Responsible Authority:** Knox City Council

### NOTATIONS:

#### Melbourne Water Notes (Stormwater Management Plan)

- Assessment of the stormwater management strategy indicates that pre-developed flows have been overestimated as the storage of the current site has not been accounted for. Approximately 3.5-4 ha of water of the existing site will be held in storage due to the large depressions on the site, hence pre-developed 1% AEP flows have been overestimated. The stormwater strategy will need to account for the current storage on the site, update the pre-developed 1% AEP flow and update the detention volume required.
- Due to the size of the subdivision and the external catchment area, internal drainage and stormwater requirements will be to the satisfaction of Council as the relevant local drainage authority. It is advised to council that consideration be given to the following:
  - Flows from the external catchment should be conveyed through the new subdivision.
  - Properties finished floor levels should be set 300mm above the applicable 1% AEP flood level associated with any overland flow through the subdivision.
  - Safe access for the subdivided properties should be provided in accordance with the relevant standards in the *DELWP Guidelines for Development in Flood Affected Areas* (considering the roads running south-north will be used for 1% AEP flow conveyance).
- In order to receive further review/approval of the stormwater management strategy, please submit an updated strategy addressing the above requirements via the Melbourne Water website.

#### Knox City Council Notes

- All utility services (drainage, sewer) are to be verified onsite by the applicant/developer prior to the commencement of any works.
- No buildings are permitted to be constructed over Council easements.
- A road opening permit from Council is required for any works within the road reserve, including the nature strip.
- Vehicle crossing must be constructed in accordance with Council's standard drawings, specifications and vehicle crossing policy.
- This permit does not discharge an occupier from any liability relating to the construction, maintenance or the repair of a dividing fence, pursuant to the provisions of the Fences Act 1968 (as amended).

**Date Issued:**

**Signature for the  
Responsible Authority** \_\_\_\_\_

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## **PLANNING PERMIT**

### **IMPORTANT INFORMATION ABOUT THIS PERMIT**

#### **WHAT HAS BEEN DECIDED?**

The responsible authority has issued a permit. The permit was granted by the Minister under section 96I of the **Planning and Environment Act 1987** on approval of Amendment No. C184knox to the Knox Planning Scheme.

#### **CAN THE RESPONSIBLE AUTHORITY AMEND THIS PERMIT?**

The responsible authority may amend this permit under Division 1A of Part 4 of the **Planning and Environment Act 1987**.

#### **WHEN DOES THE PERMIT BEGIN?**

The permit operates from a day specified in the permit being a day on or after the day on which the amendment to which the permit applies comes into operation.

#### **WHEN DOES A PERMIT EXPIRE?**

1. A permit for the development of land expires if—
  - the development or any stage of it does not start within the time specified in the permit; or
  - the development requires the certification of a plan of subdivision or consolidation under the **Subdivision Act 1988** and the plan is not certified within two years of the issue of the permit, unless the permit contains a different provision; or
  - the development or any stage is not completed within the time specified in the permit, or, if no time is specified, within two years after the issue of the permit or in the case of a subdivision or consolidation within five years of the certification of the plan of subdivision or consolidation under the **Subdivision Act 1988**.
2. A permit for the use of land expires if—
  - the use does not start within the time specified in the permit, or if no time is specified, within two years after the issue of the permit; or
  - the use is discontinued for a period of two years.
3. A permit for the development and use of land expires if—
  - the development or any stage of it does not start within the time specified in the permit; or
  - the development or any stage of it is not completed within the time specified in the permit, or, if no time is specified, within two years after the issue of the permit; or
  - the use does not start within the time specified in the permit, or, if no time is specified, within two years after the completion of the development; or
  - the use is discontinued for a period of two years.
4. If a permit for the use of land or the development and use of land or relating to any of the circumstances mentioned in section 6A(2) of the **Planning and Environment Act 1987**, or to any combination of use, development or any of those circumstances requires the certification of a plan under the **Subdivision Act 1988**, unless the permit contains a different provision—
  - the use or development of any stage is to be taken to have started when the plan is certified; and
  - the permit expires if the plan is not certified within two years of the issue of the permit.
5. The expiry of a permit does not affect the validity of anything done under that permit before the expiry.

#### **WHAT ABOUT REVIEWS?**

In accordance with section 96M of the **Planning and Environment Act 1987**, the applicant may not apply to the Victorian Civil and Administrative Tribunal for a review of any condition in this permit.



# Officers Report:

## Combined S96A application Amendment and Development




**Amendment C184knox**  
**Application No: P/2020/6049**  
**Received: 23 April 2018**

**The Applicant:**

**Name:** Urbis Pty Ltd  
**Address:** Level 10/477 Collins St  
MELBOURNE VIC 3000

**The Proposal:**

**Proposal:**

- Staged subdivision (including 138 residential lots), development of pathways, removal of native vegetation, and associated works
- Rezoning of the land to facilitate a residential development

**How is the Land used now:** Vacant

**The Land:**

**Land Address:** **Norvel Estate** located at  
29Q and 41Q Norvel Road, FERNTREE GULLY VIC 3156  
(Lot 1 TP297137 and Lot 1 TP963860)  
18Q Dion Street, FERNTREE GULLY VIC 3156  
(Lot 2 TP963860)

**Other land** 59R Rankin Road, Ferntree Gully (Lot 1 TP845832)  
54 Agora Blvd, Ferntree Gully (Lot 1 TP83661)  
Seecal Road Reserve

**Planning Scheme:** Knox Planning Scheme

**Existing planning controls:** Special Use Zone 2  
Environmental Significance Overlay Schedule 2  
Neighbourhood Residential Zone Schedule 4 (*part*)

**Proposed rezoning:** Neighbourhood Residential Zone Schedule 7  
Public Park and Recreation Zone  
Public Conservation and Resource Zone

#### SITE AND SURROUNDING AREA

**Existing Land Use:** The subject site comprises three parcels of land currently vacant land as the result of rehabilitated works on a former quarry. The southern portion of the site consist of an open meadow while the northern part is a bushland. Council owns four bushland lots to the north of the site along the Blind Creek which are zoned partial Special Use Zone Schedule 2 and partial Urban Floodway Zone.

**Surrounding Land Use:** Land to the East, West, and South consists of an established residential area of Ferntree Gully which developed around the site between the 1970s (eastern side) to the late 1990s (western side).

Land to the north consist of Council owned bushland (site of biological significance) comprising recreational regional pathways along the Blind Creek valley. The Norvel Reserve playground park is also located to the south of the subject site.

The subject site is located approximately 1 kilometre from the southern edge of the Boronia Major Activity Centre (Boronia Park), and 900 metres north of Burwood Highway. The nearest public transport is a bus stop (*bus 753*), which is 600 metres to the north on Springfield Road, Boronia.

The nearest commercial conveniences are located 270 metres to the south on McMahons Road or 600 metres to the east on Wattletree Road.

The subject site has an area of 9.2ha and is located on the northern side of Norvel Road and McMahons Road, east of Castric Place and west of Dion and Nerissa Streets as the following map indicates:



*Figure 1 – Subject site*

The subject site is rectangular in shape with a width of approximately 205 metres and depth of approximately 450 metres. The topography of the site falls approximately 24 metres from Norvel Road in the south to Blind Creek in the north.

## HISTORY

The subject site was formally known as the 'Norvel Road Quarry' operated by Robertsons Industries. The site was used for clay extraction under a licence with 'life of resource' approval for the manufacturing of bricks from 1955 until its closure around 2009. It is estimated that a volume of approximately 400,000m<sup>3</sup> of material were removed throughout the lifespan of the quarry.

The land was previously subject to an S173 Agreement entered with the quarry operator in the 1980s. This old agreement provided for land to be rezoned from residential to extractive industry, the sale of land along the Blind Creek and a further land along Norvel Road to Council, the progressive transfer of the quarry to Council for use as a landfill, and consent for the residential subdivision of residual land (which consisted of land to the south of the current site on Norvel Road court and redeveloped for residential purposes in the 1990s).

This agreement was formally ended and replaced with a new Agreement AG370823M in 2009, which is the current agreement registered on the land at the time of the application. The provisions of this agreement are further detailed in the 'Restrictive Covenants section' below.

The site was subject to the following planning permit history:

- P/2007/6470 – Issued November 2007 for Earthworks: Partial filling of the quarry with clean fill (and associated compaction of fill material). The permit was extended in 2009, 2011, and 2013 to complete the works.

Following the closure of the extractive activity, the site was remediated and rehabilitated through filling and levelling works to original land level and subject to an environmental audit. The geotechnical and compaction testing of the site was undertaken and certified by *Civil Test Pty Ltd Soil Testing & Geotechnical Consultants* and issued in 2015. The environmental audit was undertaken by *Australian Environmental Auditors Pty Ltd* and the certificate of environmental audit was issued in April 2016, which certifies that the site is suitable for sensitive uses such as residential.

## RESTRICTIVE COVENANTS

S173 Agreement AG370823M is registered on the land at the time of the application.

Agreement AG370823M includes several clauses binding to the landowner and to Council that touches different matters. These clauses require updating because as they have either been completed or are drafted in a way that is outdated and inefficient in a contemporary way.

These clauses primarily involve:

	Subject	Officers comments
1	The preparation of a planning scheme amendment for the site	<i>This is currently being assessed by officers as C184knox.</i>
1a	Council's commitment to expedite and exhibit, subject to Ministerial authorisation, a planning scheme amendment to rezone to Residential 1 Zone and apply a Development Plan Overlay (DPO) [...]	<p><i>Council's commitment to exhibit, subject to Ministerial authorisation, a planning scheme amendment to rezone the land to Residential 1 Zone and apply a Development Plan Overlay. This clause is outdated as it refers to zone that no longer exists in the Victorian Planning Provision which would not satisfy the local character nor the Ministerial's Direction.</i></p> <p><i>C184knox is a S96A proposal (i.e. rezoning and permit) which no longer intends to make use of a DPO nor will use the R1Z.</i></p> <p><b>This clause requires updating.</b></p>
1b	Reference to Urban Design Guidelines (UDG) prepared by Jones and Whitehead Pty Ltd (2004) to guide the drafting of a DPO and the assessment of any future proposal.	<p><i>The 2004 UDG are outdated, with limited analysis and content. These UDGs do not meet the contemporary standard developed by the State of Victoria as part of the Urban Design Guidelines for Victoria, 2017.</i></p> <p><i>Urbis have proposed to amend and supersede the UDG with an updated and contemporary version.</i></p>



In addition, Council officers have negotiated for a further 4,078sqm (0.41ha) of bushland, increasing the total contribution to approximately 1.70ha to be committed to Council (inclusive of the land swap and public open space contribution committed under A370823M). This broader bushland area is part of an identified Site of Biological Significance – State Level. Officers have negotiated for the provision of the entire bushland in lieu of public open space contribution and the land swap.

The total 1.70ha of bushland reserve is to be transferred to Council and the intent needs to be updated and reflected in a new section 173 agreement. The recording of the new agreement, will allow Council to assert the outcome of the bushland negotiation.

Consequently, an additional S173 Agreement was negotiated with the developer with the purpose to replace AG370823M. This is detailed in the “proposal” section below. The assessment of the proposal will rely on the component of the new agreement in lieu of the current agreement AG370823M.

These matters and the content of the new agreement are subject to the regular Council Meeting of 27 September 2021. The new agreement will be recorded onto the land to replace AG370823M in parallel to the exhibition of C184knox.

There are no other covenant/encumbrance on title affecting the land at the time the application was lodged.

#### **THE PROPOSAL**

The proposal is a combined application for an amendment of the Knox Planning Scheme and a permit for development of the land.

##### Planning Scheme Amendment/Rezoning

The proposal seeks to rezone land from Special Use Zone Schedule 2 (SUZ2) to:

- Neighbourhood Residential Zone Schedule 7 for the residential part of the land (including the part affecting portion of the surrounding road reserve including the unformed Seecal Road.
- Public Conservation and Resource Zone for the Council owned bushland and the future bushland reserve to be gifted to Council.
- Public Park and Recreation Zone for the bike trail along the extension alignment of Seecal Road (the gazetted closed extension of the former Seecal Road Reserve currently half SUZ2 and Neighbourhood Residential Zone Schedule 4 – NRZ4). This also extends to rezoning the part of that land that is NRZ4 to Public Park and Recreation Zone.

The details of the planning scheme amendment can be read in the explanatory report accompanying this amendment package.

##### Development

The application also proposes the staged subdivision of the land into 138 residential lots as well as buildings and works associated with the construction of pathways (within the bushland) and bike trail within the Seecal Road Reserve (and its extension) connecting to the Blind Creek Trail.

More specifically the application proposes:

- Staged subdivision of the land into 138 residential lots with the additional provision of new road reserves, electric utility substation reserve, drainage facility reserve, and bushland reserve.
- The development of infrastructure associated with the proposed subdivision, including road, drainage, and utilities infrastructure, but also the provision of pathways within the bushland (including on Council land) and a bike trail connecting Castricum Place to the Blind Creek Regional Trail.
- The removal of vegetation consisting of:

- Understorey vegetation management and tree lopping in the north-east part of the site (within the future bushland reserve) to meet the defendable space fire management requirements set out with this proposal. This work will be managed by Council upon taking ownership of the bushland to ensure that both CFA bushfire requirements and vegetation management are balanced within the allowance of the Planning Scheme. *This area is affected by Clause 52.17 – Native Vegetation and the Environment Significance Overlay Schedule 1 (ESO1).*
  - Understorey vegetation removal and tree lopping/removal alongside the north-west part of the bushland where the stormwater management system will be located. *This area is affected by Clause 52.17 – Native Vegetation and the Environment Significance Overlay Schedule 1 (ESO1).*
  - The removal of two native trees within the Seecal Road Reserve extension (Seecal Linear Reserve) for the construction of the bike path (trees 140 and 141). This area is subject to Clause 52.17 only. Tree 140 consists of a year-old Swamp Gum stump re-sprout for which no planning permit is required and Tree 141 consist of a River She-Oak which is not native to Victoria and deemed planted. As such a permit is not required for tree 141.
  - The removal of 4 non-native street trees along Norvel Road (trees 165, 166, 167, and 169). No planning permit is required for the removal of the non-native trees, further noting that trees 165 and 166 have already been removed.
  - The removal of one native street tree along Norvel Road (tree 164). A planning permit is not required for the removal of the native tree as it is not indigenous to Victoria (*tree 164 – Eu. Nicholii*). This area is subject to Clause 52.17 only. The proponent has nonetheless made effort to retain this tree if possible.
- The first stage of the subdivision will comprise the gifting of the bushland reserve for which no planning permit is required under Clause 62.04.

#### Amendment to the Urban Design Guidelines

The proposal also sought to amend and update the Urban Design Guidelines (UDG) prepared in 2004 by Jones and Whitehead Pty Ltd and registered as part of the Agreement AG370823M. The purpose of Urban Design Guidelines is to provide broad objectives guiding the layout of the Estate similar to that of a Development Plan as an intermediary until development started. The UDG will no longer serve a purpose once the development has started as the development will then be linked to the endorsed plans and permit.

In 2017, the Department of Environment, Land, Water, and Planning (DELWP) prepared the “*Urban Design Guidelines for Victoria 2017*” providing a framework on the form and content for preparing Urban Design Guidelines (UDG)<sup>1</sup>.

The 2004 UDG by Jones and Whitehead Ltd do not meet this format. Urbis Pty Ltd, on behalf of the proponent, prepared new urban design guidelines to replace and supersede the UDG referred in Agreement AG370823M.

Officers agreed with the principle that the 2004 UDG were outdated, limited in content and were not meeting contemporary practice in developing Urban Design Guidelines.

The 2004 guidelines included 10 simple objectives and did not follow the proposed structure by DELWP nor addressed every topic highlighted by the DELWP framework. Urbis reused and updated the content of the 2004 guidelines as follow:

- 4 objectives are still valid and retained.

<sup>1</sup> Victoria State Government <https://www.urban-design-guidelines.planning.vic.gov.au>

- 6 objectives are still valid in principles but require refinements, updating and redrafting.

The Urbis UDG update the original 10 objectives into the new format with an additional 30 objectives and guidelines to help direct the future configuration of the Estate.

Council officers reviewed and referred the UDG and recommended replacing the 2004 version with the Urbis UDG recorded into a new S173 Agreement. The amendment of the UDG was reported separately to Council at its 25 October 2021 meeting. The Council resolution proposes to replace Agreement AG370823M including the 2004 UDG with a new agreement that includes the Urbis UDG.

For the purpose of this report, the proposed development is assessed against the 2021 Urbis Urban Design Guidelines [further below].

#### New Section 173 Agreements

Section 173 Agreements have also been proposed for the following purpose:

- Updating the 2004 Urban Design Guidelines (UDG) recorded within S173 Agreement AG370823M with contemporary UDG prepared by Urbis and ensure the development occurs in accordance with the UDG.
- Ensuring the vesting of the bushland reserve to Council.
- Replacing and ending the outdated Agreement AG370823M with a new agreement addressing the above points. This was subject to a resolution of Council adopted on 25 October 2021.
- Make provision for Affordable Housing to be managed and gifted to a participating registered agency (housing association/housing providers).

#### **REFERRALS**

This application was referred to the following agencies:

<b>Authority</b>	<b>Type of Referral</b>	<b>Result:</b>
<b>Melbourne Water (MW)</b>	S55 - Determining Clause 66.01	MW reference: <i>MWA-1164280</i>  Consents subject to conditions related to the provision of a final detailed drainage and stormwater management strategy, drainage requirement, runoff management, and referral prior to the issue of a Statement of Compliance.
<b>South East Water (SEW)</b>	S55 - Determining Clause 66.01	SEW reference: 35707694  Consents subject to conditions related to the provision of potable water and sewerage infrastructure, and connection to existing supply systems. Prior to certification, a plan must be referred to SEW and all required easements be shown.  Informed that a Notice of Agreement from SEW will be required.
<b>Department of Transport (DOT)</b>	S55 - Determining Clause 66.02-11	DoT reference: PPR 32060/20  No Objection
<b>Country Fire Authority (CFA)</b>	S55 - Determining Clause 66.01  Strategic views – Clause 13.02-1S	CFA reference: 13000-88738-107873 28 July 2021  Supports the outcome following the negotiation held throughout 2020 and 2021 addressing vegetation and fire management.

		CFA reference 13000-68738-107873 6 August 2021 (amended 23 August)  CFA supports subject to permit conditions related to layout of infrastructure to enable emergency vehicles movement and bushfire management.
<b>Environmental Protection Authority (EPA)</b>	Strategic views – Ministerial Directions 1 and 19	EPA reference: 5010452  EPA considers the Certificate of Environment Audit issued by Australian Environmental Auditors as the appropriate statutory tool to determine the suitability of the land for the proposed use.  EPA have no concerns with the proposed amendment and does not wish to provide any conditions for the proposed planning permit application.
<b>Comdain (gas utilities)</b>	S55 - Determining Clause 66.01	Consent subject to conditions  A statement of compliance be obtained from Multinet Gas prior to the plan of subdivision being released from the Titles office.
<b>Ausnet</b>	S55 - Determining Clause 66.01	Consent subject to conditions related to agreement for the supply of electricity, easements, substations, and plans being submitted to Ausnet prior to certification.

The proposal was also referred internally to relevant Council department consisting of:

City Strategy and Planning, City Planning and Building (*Arborist, Landscaping, Building, Statutory Planning, Development Engineering*), Community Wellbeing (*Social Planning*), Sustainable Infrastructure (*Traffic and Transport, Stormwater, Assets/Capital Project Arborist*), Community Infrastructure (*Biodiversity, Open Space and Landscape*) whom all provided feedback for the assessment of this proposal.

## PLANNING POLICY FRAMEWORK ASSESSMENT

### STATE POLICY

The proposal accords with Clause 11.01-1S (settlement) and 11.02-1S (supply of urban land) as it will facilitate the rezoning of the site to residential as identified as such in Council's strategic framework plan. The site is earmarked as a strategic investigation site for future residential purposes and located within an established residential area of Ferntree Gully. The proposed rezoning and development helps manage a sufficient supply of residential land and meet demand as infill consolidation within existing urban boundary where services are already established. The proposal allows for low scale residential intensification sympathetic to the local surrounding low scale character and will also assist with the protection and retention of the Blind Creek Corridor and associated bushland reserve.

This policy is achieved by rezoning the site to the NRZ and allowing infill of dwellings within an established residential area.

The proposal responds to the objectives of Clause 12.01-1S (protection of biodiversity), 12.01-2S (native vegetation management) and 12.05-1S (environmentally sensitive areas) by protecting and conserving the biodiversity of the bushland adjoining the Blind Creek. The site is already identified as a Site of biological significance subject to an Environment Significance Overlay (ESO2) and appropriate setback and separation have been taken to preserve the integrity of this area and provide it as a future reserve. This supported the three-step approach by avoiding and minimising vegetation removal. The small areas



of understorey vegetation in the north-east required to be removed for bushfire management will be offsets.

This policy is achieved by maintaining the integrity of the bushland as a future reserve and rezoning it Public Conservation and Resource Zone to ensure its future protection.

The proposal responds to Clause 13.02-1S (bushfire planning) by strengthening the resilience of this settlement to bushfire by applying a risk-based approach to the proposal. The subject site is partially identified as bushfire prone land and subject to this policy. The proposal has given priority to the protection of human life by preventing inappropriate future development within or close to the bushland and by provide a fire separation as a buffer zone.

The proposal was accompanied by a Bushfire Development Report prepared by Terramatrix [January 2021] which considered the settlement planning objective and strategies Clause 13.02-1S. The presence of a biologically significant bushland (identified as a Site of State Biological Significance) part of the Blind Creek valley to the north forms the source of the bushfire prone hazard. As a response, the proposal considered and balanced the protection of human life in the face of the bushfire risk with the importance protecting biodiversity (Clause 12.01-1S) and managing native vegetation (Clause 12.01-2S). This has been achieved by ensuring the actions taken were complementary and did not compete or reduced the priority of protecting human life above all things.

This policy is achieved by implementing the following consideration as part of the design:

- Maintaining the integrity of the bushland.
- Pushing the development further from the risk area by implementing an additional buffer to a width of 39m setback between the bushland and future residence and ensure that:
  - the road network is located between the residences and the bushland to act as an additional fire break;
  - no dwellings will result in future residential development being exposed to more than 12.5kw radiant heat as specified in Clause 13.02-1S.
- Implementing specific fire and vegetation management measures on part of the bushland (on the eastern side where the understorey vegetation was already cleared) to be controlled by Knox City Council under its *'Fire Preparedness for Sites of Biological Significance in Knox'* operational manual to ensure the future dwellings on the north-eastern part of the development are provided with the buffer required to not be exposed to more than 12.5kw radiant heat. Additionally, the landscaping management in the buffer area will ensure that a low risk is maintained.
- Providing reticulated hydrant system will be constructed as part of the subdivision to provide a reliable water supply for fire-fighting.
- Ensure access to the hazard area is facilitated and achieved for emergency vehicles, particularly through removable bollard emergency access.

Extensive consultation between the CFA, Council, and the applicant were undertaken to ensure the amendment and design will not increase the risk of bushfire to human life and that it implement appropriate protection bushfire measures to reduce risk to an acceptable level in accordance with Clauses 13.02-1S and 21.04-1.

The proposal responds to Clause 14.02-1S (catchment planning and management) and 14.02-2S (water quality) by incorporating a sophisticated system that will retard the flow of stormwater, protect nearby Blind Creek, manage sediments, and also provide filtered flow to help with the regeneration of the bushland.

The proposal accords with Clause 15.01-1S and 15.01-1R (urban design), 15.01-3S (subdivision design), 15.01-4S (healthy neighbourhood), and 15.01-5S (neighbourhood character) as it provides for an attractive design outcome that responds to its context including, streetscape and lot size. The proposed rezoning to the NRZ and is consistent with the residential nature of the surrounding area and its environmental characteristics, and will not result in any unreasonable amenity impacts on the surrounding area. Further, the proposal provides for adequate connectivity to the future bushland and surrounding areas to promote walkability and accessibility.

The proposal is consistent with Clause 16.01-1S and 16.01-1R (housing supply) as it provides 138 new residential lots within an infill location proximate to identified activity centres, providing an acceptable level of access to jobs and services. This policy is achieved by consolidating supply of housing in an existing residential area on an underutilised piece of land with several lot sizes to positively contribute to residential diversity and choice. The supply is also at a scale that responds positively to the surrounding character and also considers the walking distance to nearby public transport and local services which means the site is not suitable for a drastic increase in density.

The proposal responds to Clause 16.01-2S (housing affordability) as it provides for the delivery of social housing (8 lots) to help meet the gap in social housing availability in proximity to future cycling infrastructure.

The proposal accords with Clause 18.01-1S (land use and transport planning), 18.02-1S and 18.02-1R (sustainable personal transport) and 19.02-6S and 19.02-6R (open space) as it includes the creation of a new road network that integrates with surrounding local network and intends to reduce 'transiting' through the estate. The network also integrates and facilitates movements for pedestrians and cyclists with a desire line approach applied to the estate. It also helps in promoting sustainable transport by providing pedestrian/cyclists linkages to and by providing links to the Blind Creek Corridor and nearby open space.

The proposal accords with Clause 19.03-3S (integrated water management) as it provides adequate infrastructure for the management of stormwater and also require the provision of water tanks.

#### LOCAL POLICY

The proposal responds to Knox estimated forecasts requiring an additional 12,658 dwellings by 2036 to house the population growth. The proposal supports this by enabling 138 new residential lots within an established residential area.

The site is highlighted as a residential 'strategic investigation site' under the Knox Housing Strategy (Clauses 21.02 – Strategic Framework Plan and 21.06 – Housing Plan) as suitable for residential use only with a range of incremental density consistent with the surrounding. The housing strategy identified a possible capacity for 100 dwellings on the site; the proposal surpasses this capacity with a total of 138 lots that will accommodate detached dwellings, duplexes, as well as townhouses for the social housing.

The proposal therefore helps consolidate the existing urban area through an incremental change in density that still remain sympathetic to the general character of the area.

In that regard, the subject site has capacity for housing growth and infill residential and the proposed zone achieves that with strong consideration of the surrounding Knox Neighbourhood character in terms of: height, number of storeys, landscaping, and setbacks.

The proposal differs from the Knox Neighbourhood in that it allows for reduced secluded private open space (relying on the Rescode standard) and it allows a townhouse typology (which will form the social housing node).

The proposal responds to the Knox environmental policy (Clause 21.03) as it protects the integrity of the site of biological significance (*i.e. the bushland*) and minimises vegetation removal at the northern end of the site. The proposal also relies on streetscape with a wider road reserve to provide north-south

green linkages that filters from the bushland and contribute to a more liveable and greener city. These replace the 'central park' mentioned in the housing strategy.

The maintenance of the bushland and the additional buffer separation further improves the interface with the Blind Creek habitat corridor and the proposed fire management buffer further helps alleviate risk while protecting the integrity of the biodiversity of the area ([Clause 21.03 and 21.04](#)).

The proposal also includes new trails and cyclist connection to Blind Creek regional trail and through the bushland to improve connectivity and leisure access. A flora and fauna assessment has also been prepared and has established the appropriate native vegetation offsets associated with the proposal where the understorey vegetation needs to be managed or where it may be partially affected to establish the drainage system ([Clauses 21.03 and 21.05](#)).

The proposal aligns lots to face the reserve and ensure the open space will have adequate activation ([Clause 21.05](#)).

The proposal will include measures to facilitate the vibrant and high quality redevelopment of the site to positively contribute to and respect the abutting residential and landscape character. These includes:

- Building envelopes establishing minimum 5m rear setbacks on the eastern interface to help maintain a separation with the existing dwellings along Nerissa Street.
- A condition on the proposed permit to enter into a S173 Agreement requiring design controls to apply to the future dwellings on the site. This includes, but is not limited to, the landscaping of the frontyard, and ensuring the vehicle storage (garages) is setback behind the front of the dwellings. There will also be a restriction to ensure the built form on lot 138 presents adequately to the bushland by restricting to either single storey only or a second level that is recessed so as to avoid sheer wall presentation to the north.

The proposed zone is a NRZ that maintains the built form to single or double storey dwellings as responsive to the surrounding Knox Neighbourhood character ([Clauses 21.05 and 21.06](#)). Further, the proposal will achieve environmentally sustainable design outcomes for the site through stormwater management and landscaping ([Clauses 21.05 and 22.04](#)).

The proposal also responds to the Knox Affordable Housing Action Plan by providing the required minimum 5% of social housing in the form of 8 lots (which in this instances provides 6% of lots yield to be gifted to a housing associations/providers and constructed). A proposed Section 173 Agreement will ensure this outcome is achieved and forms part of a requirement of the amendment process where the agreement must be registered prior to adoption of this amendment ([Clause 21.06](#)).

For these reasons, it is considered that the proposed rezoning supports the relevant clauses of the LPPF

#### STATUTORY PLANNING CONTROLS ASSESSMENT

The following controls apply to the site, with planning permit triggers as described:

<b>Clause</b>	<b>Permit Trigger</b>
<b>Zoning:</b>	
<b>32.07</b> – Special Use Zone 2 (SUZ2) <b>(Current)</b>	Pursuant to Clause 37.01-3 a permit is required to subdivide land.
<b>32.09</b> – Neighbourhood Residential Zone 7 (NRZ7) <b>(PROPOSED)</b>	Pursuant to Clause 32.09-2 a permit is required to subdivide land.
<b>Overlays</b>	
<b>42.01</b> – Environmental Significance Overlay 2 (ESO2)	Pursuant to Clause 42.01-2 a permit is required to subdivide land.

	<p>Pursuant to Clause 42.01-2 a permit is required to construct bicycle pathways and trails</p> <p>Pursuant to Clause 42.01-2 a permit is required to construct or carry out works (earthworks)*</p> <p>Pursuant to Clause 42.01-2 a permit is required to remove, destroy or lop any vegetation*</p> <p>*a permit is not required under Schedule 2 of the ESO for roadworks, removal of non-indigenous vegetation.</p>
<b>Particular Provisions</b>	
<b>52.17 – Native Vegetation</b>	Pursuant to Clause 52.17-1 a permit is required to remove, destroy or lop native vegetation.

Currently, the use and development of dwellings are prohibited under the SUZ2 applying to the site. The SUZ2 is intended for Earth and Energy Resources Industry, a purpose that is no longer suitable for this site which is within an established residential environment. A planning permit is required to subdivide the land under both the SUZ2 and the proposed NRZ7.

Since the application is a combined amendment and subdivision, the assessment under the provision of the SUZ2 is not required and the proposal is assessed against the proposed NRZ7.

**Neighbourhood Residential Zone**

The subject site is proposed to be rezoned to a Neighbourhood Residential Zone, with a new proposed Schedule. Pursuant to Clause 32.09-3, a Planning Permit is required to subdivide the land and before deciding on an application, the following decision guidelines must be considered:

The Municipal Planning Strategy and Planning Policy Framework.

- *The proposal is considered consistent with the provisions of the Municipal Planning Strategy and Planning Policy Framework. A full assessment against the relevant policies has been outlined in earlier sections of the report.*

The purpose of the zone.

- *The proposal is considered consistent with the purpose of the Neighbourhood Residential Zone, relating to implementing the provisions of the MSS and PPF, as well as ensuring residential development respects the identified neighbourhood character, environmental and landscape characteristics. The proposed subdivision is considered appropriate for the area and maintains a pattern that is consistent with the Neighbourhood Residential Zone. The proposal also provides adequate space for landscaping and canopy tree planting.*

The objectives set out in the Schedule to the Zone

- *The proposal includes the creation of a new Schedule 7 to the Neighbourhood Residential Zone which is specific to this development.*

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.

- *The proposed subdivision will not impact on existing rooftop solar energy systems located in rooftops of adjoining dwellings. Overshadowing amenity impacts will also be assessed during the building permit stage for the construction of each dwelling.*

The pattern of subdivision and its effect on the spacing of buildings.

- *The pattern of subdivision is considered appropriate for the site and consistent with the existing subdivision pattern within the wider area. The proposed subdivision pattern also provides adequate areas for landscaping and canopy tree planting, which will positively contribute to the local area.*

Within the Neighbourhood Residential Zone, an application to subdivide the land must meet the requirements of Clause 56. A full assessment against this Clause can be found below.

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.

- *The proposal includes a total of 48 lots with an area below 400sqm. Building envelopes will be required within the S173 Agreement, therefore ensuring the provision for a minimum of 25% garden area for each lot below 400sqm.*
- *A condition of the S173 Agreement will require all lots to comply with the mandatory garden area requirement, outlined in Clause 32.09-3 and 32.09-4.*

#### **Proposed Schedule 7 to the NRZ:**

The application proposes the addition of a new Schedule to the Zone, specifically relating to the Norvel Quarry Estate. The following variations to ResCode Standards are proposed to be included in the new Schedule:

<b>Standard</b>	<b>Requirement</b>
<b>A3 and B6 – Minimum street setback</b>	Minimum setback from a side street: Side walls of new development on a corner site should be set back the same distance as the setback of the front wall of any existing building on the abutting allotment facing the side street or 1.5 metres, whichever is the lesser.
<b>B13 - Landscaping</b>	Provision of a minimum of one canopy tree within the front setback per 5 metres of width of the site (excluding the width of one driveway). Each tree should be surrounded by 20 square metres permeable surface with a minimum radius of 3 metres. Up to 50 per cent of the permeable surface may be shared with another tree.
<b>A11 and B28 - Walls on Boundaries</b>	The height of a new wall constructed on or within 200mm of a side or rear boundary or a carport constructed on or within 1 metre of a side or rear boundary should not exceed an average of 3.6 metres with no part higher than 4.0 metres unless abutting a higher existing or simultaneously constructed wall.
<b>A20 and B32 - Front Fence Height</b>	Streets in a Road Zone Category 1: 2 metres Other streets 1.2 metres

*Officer Response: The proposed variations to the ResCode standards are considered appropriate for the site and will be included in the new proposed Schedule.*

## URBAN DESIGN GUIDELINES – URBIS 2021

The land is subject to Urban Design Guidelines (UDG) prepared by Urbis (to amend the previous UDG) and proposed to be registered into a S173 Agreement in parallel to this proposal.

As the conditions of the site and surrounds have undergone significant change, it was proposed to update these guidelines to ensure they correspond with the current conditions of the site and its surrounds. This has resulted in the proposed S173 Agreement presented to Council on 25 October 2021 with a resolution to enter into a new agreement updating the current agreement.

The proposal responds to the following categories and guidelines of the UDG:

Urban Structure	Officers response
Permeable and functional structure that align pedestrian connection along desire lines	<i>The proposal has ensured the road and pathway networks provide for ease of pedestrian movements through the estate as well as connection to the surrounding. The pedestrian paths through the bushland and east-west in the middle of the estate allows for permeable movements that benefit both the future residents and the existing surrounding residents.</i>
Legible structure that support access to destination	
Integrate with surrounding character for both network and streetscape.	
Ensure street serve their function in movement and place.	
<b>Movement Network</b>	
Cater for all abilities	<i>Footpaths are provided to all street frontages</i>
Maximum one crossover, clear sightlines, garages recessed to ensure vehicles to not overhang footpath.	<i>Crossovers are limited to one, which can be further addressed via conditions and S173 Agreement design.</i>
Adequate design of footpath as per guidelines	<i>Footpaths will be designed to Council requirements.</i>
Ensure green character	<i>Road reserves are wide enough to ensure street trees can grow.</i>
Adequate and convenient at-grade crossing	
Efficient car parking	
<b>Public Open Space</b>	
Convenient access and amenity	<i>The bushland reserve will protect the ecological value of the site.</i>
Sense of place and character with planting and art	<i>Additional infrastructure is not requested.</i>
Protect ecological values	
<b>Public Transport Environs</b>	
Convenient pedestrian and cyclist access to public transport nodes by allowing continuous routes	<i>Achieved via pathway connectivity.</i>
<b>Buildings</b>	
Allow a mix of building types that allow a greater proportion of multi-storey houses compared to surrounding	<i>The site will allow for double storeys and different typologies. The zone will limit development to two storeys which aligns with the surrounding character.</i>
Complementary form and character to surrounding through building façade and treatments are varied and articulated, garages are setbacks behind the front building line and front setbacks of outward facing lots respond to surrounding character.	<i>Conditions for a S173 Agreement design requirement will ensure future built form addresses minimum design requirements such as recess of garages, and frontyard trees.</i>
Local amenity is maintained through windows not overlooking and eastern boundary setback to respect the open rear yard character.	<i>CFA requirements will be included as conditions on the permit.</i>
Supports bushfire safety through trees in defendable space complying with CFA requirements.	

Supports establishment of new trees through front setback	
Minimise impact of impermeable paved areas, stormwater run-off, earthworks near significant vegetation, water permeable surface around significant trees.	
<b>Objects in the Public Realm</b>	
Support safety and amenity of public realm by avoiding cluttering, placing objects outside main paths, undergrounding infrastructure, and large infrastructure not being obtrusive of visually unpleasant.	<i>Condition can ensure no front fence is provided. The proposal ensures the development maximises surveillance to the public reserve and conditions can ensure fences along lot 138 maintains surveillance and good design interface.</i>
Facilitate maintenance through simple standardised palette of materials and design, resilient and meeting Council standards	<i>Streetscape/tree planting and species can be addressed via conditions.</i>
Trees and planting suitable, drought resistant, appropriate root space, deciduous tree where winter sun is desired, dense canopied tree where summer shade is desirable, evergreen species where screening is desired, species placed to accord with bushfire guidelines and at locations as guided by the UDG.	<i>Lighting will not be required along pathways within the reserve.</i>
Fence contribute to the character	
Maximise informal surveillance by avoiding front fence, or visually permeable when abutting a public reserve.	
Lighting and signage to provide safe travel	

#### **FUTURE BUILDING DESIGN GUIDELINES**

The applicant has proposed Design Guidelines to control and covenant certain elements of the design of the future dwellings to be constructed.

*Officer Response: The proposed Urban Design Guidelines contain no prescriptive guidelines for the development of individual lots and instead rely on broad subjective statements dictating the general layout of the estate (similar to a Development Plan Overlay). These guidelines do not provide clear direction for both residents and Council on the future development of individual lots and without such direction, it risks resulting in an adhoc and disorderly development of the estate. The purpose of the Urban Design Guidelines is not to govern the development of the dwellings on each site. In addition to this, the “green and leafy” image that Council strive to achieve with all new development requires additional prescriptive design guidelines as the green and leafy outcome would not be achievable without them. For example, prescriptive Design Guidelines will ensure minimum front setbacks remain free of encroachment to promote front landscaping, setbacks to garages to promote recess to the front of the dwelling wall, and minimum open space areas for each dwelling to additional landscaping. Officers therefore support the inclusion of design guidelines in the form of a S173 Agreement, inspired by those provided by the applicant but modified to provide the outcome Council wants for the estate.*

*The proposed planning permit conditions require the owner to enter into a Section 173 Agreement to implement the proposed Design Guidelines to include the following building requirements are met by future owner of each lots:*

##### Front Setbacks

- a) *Front walls of a building must be setback a minimum of:*
  - i. *5.5 metres from a street frontage for lots facing Castricum Place.*
  - ii. *4 metres from a street frontage for lots on the northern side of “Road B” shown as Lots 33 to 40 on the attached plan. No encroachment within the front setbacks are allowed for these lots.*

iii. The distance set as defensible space for the lots affected by bushfire defensible space as shown on the endorsed plans and as a restriction on the plan of subdivision. No encroachment within the defensible space are allowed for these lots.

iv. 4.5 metres from a street frontage for all other lots.

Any encroachment into the front street setback of point (i.) and (iv.) above must be limited to the following structure provided it encroaches no more than 0.5 metres into the specified setback distances:

- porches, pergolas and verandahs that are less than 3.6 metres in height;
- decks, terraces, landings, stairways, ramps, eaves, window hoodings, sunblinds, fascias, gutters, masonry chimneys, flues, pipes, and domestic services normal to a dwelling.

#### Front Setbacks for garages or carports

b) Front walls of a car parking structure (such as garages and carport) must be setback a minimum of:

- i. 0.5 metres from the front wall of the building for lots facing Castricum Place.
- ii. 5.4 metres from a street frontage and at least 0.5 metres behind the front wall of the building for all other lots.

#### Side Setbacks

c) Side walls of a building on a corner lot must be setback a minimum of 1.5m from a side street frontage. No encroachment within the side street setback is allowed.

#### Rear Setbacks

d) Rear walls of a building must be setback a minimum of 3 metres from the rear boundary for all lots except for:

- i. Lots 33-40 inclusive.
- ii. Lots 113-138 inclusive.

e) Rear walls of a building for lots 113-138 inclusive must be setback a minimum of 5 metres from the rear boundary.

Any encroachment into the rear setback of point d) and e) above must be limited to the following structure provided it does not encroach within the minimum radius of the large feature shrubs required under point j):

- porches, pergolas and verandahs that are less than 3.6 metres in height;
- terraces, patios, decks, landings that are less than 800mm in height, stairways, ramps, eaves, fascia or gutter, water tanks, and domestic services normal to a dwelling;
- outbuildings that does not exceed a gross floor area of 10 square metres.

#### Lot 138

f) The dwelling on Lot 138 should be single storey. However, if a double storey building is proposed, the upper level must meet the following requirement:

- i. setback by at least 3 metres behind the ground floor north and west wall façade to ensure a recessive second storey element.

The upper level setback means the recess above the ground floor wall calculated as the shortest horizontal distance from the top of the ground floor wall. It does not include



*projection such as balconies. Any balconies located within this setback must be clear to the sky.*

- ii. The wall of a building must be setback a minimum of 3.8 metres from the northern boundary and 2 metres from the part of the western boundary that does not constitute part of a street frontage.*
- iii. Regardless of point (ii.) above, no building and works, other than fencing, are allowed in the tree protection zone of any tree. An arboricultural report will be required to determine the tree protection zone of any tree encroaching onto Lot 138 and tree protection fencing must be installed prior to any works commencing on this lot.*
- iv. The western boundary fence with the bushland reserve must be no more than 1.2 metres in height.*
- v. The northern boundary fence with the bushland reserve must be no more than 1.2 metres in height for the first 12 metres from the western boundary.*

Front Boundary

- g) Front fences are not allowed on a road frontage or within 3 metres of a road frontage (excludes side boundaries).*
- h) No structures within 200 millimetres of a footpath in the road reserve.*

One Crossover per Lot

- i) Only one (1) crossover per lot is allowed. The crossover must not exceed a width of 3 metres but may be merged with that of an adjoining lot provided that it results in no more than one (1) crossover per lot.*

Landscaping

- j) Each lots must provide minimum one (1) small canopy tree with a mature height of 5-8 metres within the front setback. Each tree should be surrounded by 20 square metres permeable surface with a minimum radius of 3 metres. This requirement does not apply to lots 52, 87-91 inclusive, 137, and 138 subject to bushfire management.*
- k) Each lots must provide minimum one (1) large feature shrubs with a mature height of 4-5 metres within the rear setback of each lot. Each large feature shrubs should be surrounded by 15 square metres permeable surface with minimum radius of 2 metres. This requirement does not apply to Lot 138.*
- l) The planted canopy trees and large feature shrubs must be maintained to the satisfaction of the Responsible Authority and must not be removed.*

*The proposed design controls subject to the changes proposed above are considered acceptable and reasonable for the proposed subdivision as it helps support an integration of the proposal with the surrounding Knox Neighbourhood Character and also respect of the bushfire management requirements.*

*A condition will require a S173 agreement to be entered to implement these design guidelines to future dwellings prior to the release of a Statement of Compliance.*

*The applicant proposal to provide 1 metre rear setback is not supported as it does not support an adequate spacious layout with garden area being met and also doesn't allow for landscaping that achieves the 'green and leafy' image of Knox. Council has requested the rear setback be increased to 3 metres.*

## Overlays

### Environmental Significance Overlay – Schedule 2

The subject site is affected by the Environmental Significance Overlay, Schedule 2 (ESO2). This Overlay relates to sites of biological significance identified in 'Sites of Biological Significance in Knox – 2nd Edition,' 2010. Pursuant to Clause 42.01-2, a Planning Permit is required to subdivide the land, works (including roadworks) with excavation or fill within the TPZ of trees, and remove, destroy, or lop vegetation including dead vegetation.

- *The application proposes the removal of four (4) trees (Tree no. 141, 164, 167 and 169) which are not subject to the ESO. One hundred and seven (107) trees have been retained with the proposal, particularly within the Seecal Reserve extension and the bushland. Vegetation will be removed/lopped on the edge of the bushland for the construction of the stormwater detention system but the extent of vegetation affected by the works has been kept to the minimum required. This is considered a positive outcome and is compliant with the provisions and guidelines of the Overlay. Council's Arborist is satisfied with this approach, subject to conditions for tree protection measures for the trees to be retained, as well as the submission of a Tree Management Plan. This is to be included on any permit issued.*
- *Roadworks will be primarily out of the area of ESO2, however in the northeast a small portion of roadworks will occur within the TPZ of 1 or 2 trees. The extent of the works will remain minimal and will not affect more than a third of the TPZ of the tree in question. The construction of pathways will also occur within TPZ but appropriate condition will ensure no excavation affecting the trees will result making this an acceptable outcome.*
- *The construction of the drainage facility also triggers a permit under the ESO, appropriate conditions will ensure that the design of the facility will have little to no impact on the vegetation.*
- *The lopping of some vegetation within the area subject to the ESO may be required, but the extent of lopping will remain minimal for maintenance and defensible space only.*
- *Furthermore, the defensible separation as well as the transfer of the bushland to Council as a reserve provide for the protection of this site of biological significance and realises the environmental objectives of the ESO2.*

## PARTICULAR PROVISIONS

### Native Vegetation – Clause 52.17

Clause 52.17 ensures that there is no net loss to biodiversity as a result of the removal, destruction or lopping of native vegetation. This is achieved by applying the following three step approach in accordance with the *Guidelines for the removal, destruction or lopping of native vegetation* (Department of Environment, Land, Water and Planning, 2017):

1. Avoid the removal, destruction or lopping of native vegetation.
2. Minimise the removal, destruction or lopping of native vegetation that cannot be avoided.
3. Provide an offset to compensate for the biodiversity impact if a permit is granted to remove, destroy or lop native vegetation.

To manage the removal, destruction or lopping of native vegetation to minimise land and water degradation. Pursuant to Clause 52.17-1, a Planning Permit is required to remove, destroy or lop native vegetation, including dead native vegetation.

- *The proposed subdivision is considered consistent with the purpose and guidelines of this Clause. The proposed design allows for the retention of majority of trees on the site with a high retention value. Only four (4) trees are proposed for removal which are not subject to Clause 52.17. The removal of understorey vegetation and tree lopping for bushfire management will result on the edge of the bushland where fire management measures must be applied, this is considered reasonable and will not be detrimental to the landscape character of the site.*
- *The native vegetation to be removed will primarily consist of understorey vegetation to be removed for the construction of the drainage facility or to effect the bushfire management plan on the edge of the bushland. Tree lopping will be kept to a minimum and likely within the exemption parameters to effect the bushfire management plan.*
- *The proposal has effected an avoid, minimise, offset approach by pushing the development away from the bushland via appropriate buffer and minimisation of the fire management impact on vegetation. Any remaining native vegetation to be removed, including the understorey vegetation fire management will be offset via a condition on the permit.*

#### **Public Open Space – Clause 53.01**

The proposed subdivision must make a contribution to the Council for public open space in an amount specified in the schedule to this Clause in accordance with Section 18(8) of the Subdivision Act 1988.

Clause 4.3 of S173 Agreement AG370823M states that:

*“the transfer or vesting of the Open Space Land to or in Council in accordance with the terms of this Agreement by the Owner will comprise and be treated as the open space contribution required by Clause 52.01 of the Planning Scheme for the subdivision of the balance of the Robertson Land [...].*

This Clause has formed the base of the renegotiation of what constitute the ‘Open Space Land’ which consists of the whole of the bushland under the new agreement. Additional land will also be provided as the buffer to the bushland and for the stormwater detention system. These form the contribution to the Council for public open space in accordance with Clause 53.01.

#### **Stormwater Management - Clause 53.18**

The purpose of this Clause is to ensure that stormwater in urban development, including retention and reuse, is managed to mitigate the impacts of stormwater on the environment, property and public safety, and to provide cooling, local habitat and amenity benefits. An application to subdivide the land must meet all the objectives of Clauses 53.18-4 and 53.18-6, and should meet all the standards of Clauses 53.18 and 53.18-6. The applicant submitted an amended stormwater management plan (Cardno v161919 – dated 25 May 2021).

##### Clause 53.18-4

<b>Objectives</b>	<b>Standards</b>	<b>Comments</b>
<p>To minimise damage to properties and inconvenience to the public from stormwater.</p> <p>To ensure that the street operates adequately during major storm events and provides for public</p>	<p>The stormwater management system should be:</p> <ul style="list-style-type: none"> <li>• Designed and managed in accordance with the requirements and to the satisfaction of the relevant drainage authority.</li> <li>• Designed and managed in accordance with the requirements and to the satisfaction of the water authority where reuse of stormwater is proposed.</li> <li>• Designed to meet the current best practice</li> </ul>	<p><i>Can comply.</i></p> <p><i>The proposed stormwater management strategies are considered generally compliant with the objectives and standards of this Clause. The applicant has provided a Stormwater Management Plan for assessment by</i></p>

<p>safety.</p> <p>To minimise increases in stormwater and protect the environmental values and physical characteristics of receiving waters from degradation by stormwater.</p> <p>To encourage stormwater management that maximises the retention and reuse of stormwater.</p> <p>To encourage stormwater management that contributes to cooling, local habitat improvements and provision of attractive and enjoyable spaces.</p>	<p>performance objectives for stormwater quality as contained in the <i>Urban Stormwater - Best Practice Environmental Management Guidelines</i> (Victorian Stormwater Committee, 1999).</p> <ul style="list-style-type: none"> <li>• Designed to ensure that flows downstream of the subdivision site are restricted to pre-development levels unless increased flows are approved by the relevant drainage authority and there are no detrimental downstream impacts.</li> <li>• Designed to contribute to cooling, improving local habitat and providing attractive and enjoyable spaces.</li> </ul> <p>The stormwater management system should be integrated with the overall development plan including the street and public open space networks and landscape design.</p> <p>For storm events greater than 20% AEP and up to and including 1% AEP standard:</p> <ul style="list-style-type: none"> <li>• Provision must be made for the safe and effective passage of stormwater flows.</li> <li>• All new lots should be free from inundation or to a lesser standard of flood protection where agreed by the relevant floodplain management authority.</li> <li>• Ensure that streets, footpaths and cycle paths that are subject to flooding meet the safety criteria <math>da Vave &lt; 0.35 \text{ m}^2/\text{s}</math> (where, <math>da</math> = average depth in metres and <math>Vave</math> = average velocity in metres per second).</li> </ul> <p>The design of the local drainage network should:</p> <ul style="list-style-type: none"> <li>• Ensure stormwater is retarded to a standard required by the responsible drainage authority.</li> <li>• Ensure every lot is provided with drainage to a standard acceptable to the relevant drainage authority. Wherever possible, stormwater should be directed to the front of the lot and discharged into the street drainage system or legal point of discharge.</li> <li>• Ensure that inlet and outlet structures take into account the effects of obstructions and debris build up. Any surcharge drainage pit should discharge into an overland flow in a safe and predetermined manner.</li> <li>• Include water sensitive urban design features to manage stormwater in streets and public open space. Where such features are provided, an application must describe</li> </ul>	<p><i>Council's Stormwater Department, as well as the relevant external Authorities (Melbourne Water and South East Water). The plan included an assessment of the potential mitigation option and how they address the potential flood impacts of the 1% AEP storm event, with relation to the surrounding properties, existing footpath and the bushland between properties and Blind Creek.</i></p> <p><i>Council's Stormwater Department and the relevant external authorities are generally satisfied with the concept stormwater design provided by the applicant, subject to a detailed engineering drainage and stormwater plans to be conditioned on any permit issued.</i></p>
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	<p>maintenance responsibilities, requirements and costs.</p> <p>Any flood mitigation works must be designed and constructed in accordance with the requirements of the relevant floodplain management authority.</p>	
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Clause 53.18-6

Objectives	Standards	Comments
<p>To protect drainage infrastructure and receiving waters from sedimentation and contamination.</p> <p>To protect the site and surrounding area from environmental degradation prior to and during construction of subdivision works.</p>	<p>An application should describe how the site will be managed prior to and during the construction period and may set out requirements for managing:</p> <ul style="list-style-type: none"> <li>• Erosion and sediment.</li> <li>• Stormwater.</li> <li>• Litter, concrete and other construction wastes.</li> <li>• Chemical contamination.</li> </ul>	<p><i>Can comply.</i></p> <p><i>The proposed development will distribute outflows along the bushland sections, to ensure more even flooding of the remnant billabong and limit the erosion potential. This has been assessed by Council and the relevant external authorities and deemed satisfactory.</i></p> <p><i>Managing the site prior to and during the construction period has not been fully assessed by the applicant at this stage, as only a conceptual strategy was provided. Concrete levels, forebays and the location of pits and pipes will all be confirmed during the detailed design stage. Currently the applicant is proposing treatment measures consisting of gross pollutant traps (GPTs), vegetated swale and an ephemeral wetland, which is considered satisfactory at this stage and will also be refined at detailed design stage.</i></p> <p><i>The proposed system does not meet the State pollutant removal target required through their relevant State Environmental Protection Policy (SEPP). However, the proposal achieved a satisfactory outcome with regard to using the natural wetland in the immediate vicinity. As a condition, the applicant will be required to provide for the financial cost of the treatment system that would have been required to ensure Council has the ability to make improvement works to the natural system of the bushland/wetland. A condition requiring financial contribution that alleviate their SEPP requirements will be included in the permit.</i></p>

**Clause 56 (ResCode)**

Clause 56 of the Knox Planning Scheme applies to the subdivision of land in residential areas, including for the proposed Neighbourhood Residential Zone, other than the subdivision of existing dwellings or car parking spaces.

#### Liveable and Sustainable Communities

Compact and Walkable Neighbourhoods – *Can comply. The proposal has been generally designed with good pedestrian access and footpaths to all frontages as well as to nearby streets and parks and allows for easy movement throughout the neighbourhood. To ensure maximum accessibility and walkability, the following conditions will be included on any permit issued:*

- *Pram ramps to be included in the detailed design to ensure adequate access for pram carriers throughout the estate.*
- *Pram ramps and a footpath connection for pedestrian access across Norvel Road at the new intersection with Road H (on the western side of the intersection) and the footpath on the eastern side of Road H to connect with the crossover of 60 Norvel Road.*
- *Pram ramp connections to be added across Norvel Road at McMahons Road.*

Built Environment – *Complies. The subdivision pattern is considered appropriate for the area and responds appropriately to the existing Knox Neighbourhood character within the surrounds. The updated Urban Design Guidelines, the proposed new Schedule to the Zone and the Section 173 building design provisions will also contribute to ensure the built form of the future dwellings is appropriate and consistent with the existing and preferred neighbourhood character for the site.*

#### Lot Design

Lot Diversity and Distribution – *The proposed lot design and distribution is generally consistent with the objectives of this Clause. The proposal provides for a range of lot sizes (ranging from 116sqm to 581sqm) to facilitate a range of different housing options, including eight (8) lots allocated to social housing.*

*The proposal generally complies with the standards specified. At least 95% of the lots are located within 400-600 metres of the bus stops within the 753 bus route to the north across Blind Creek. However, the site is located in excess of 900 metres from the Boronia Railway Station and approximately 2 kilometres from Ferntree Gully Railway Station. This is considered acceptable for the density proposed.*

Lot Area and Building Envelopes – *Complies. The proposed lot areas and orientation of the lots are generally compliant with this Clause. Subject to satisfying the proposed Draft Guidelines, the lots will enable dwellings to be constructed with appropriate solar access, vehicle access and car parking. The lots have been designed to ensure minimal vegetation removal and maintain the dense vegetation cover located to the north of the site. The applicant has not sufficiently demonstrated that the required building envelope can be provided for lot 52 and a condition is included in the officer recommendation that addresses this concern.*

Solar Orientation of Lots – *Complies. The proposed lots allow for good solar orientation and solar access for future dwellings.*

Street Orientation – *Complies. The proposed lots have been provided with appropriate street orientation. The proposed subdivision provides lots that are under 300sqm in size, and lots along the northern side of the site have been positioned to maximise the views of the bushland reserve.*

Common Area – N/A.

#### Urban Landscape

Integrated Urban Landscape – *Complies. The proposal is compliant with the landscape objectives sought out in this Clause. It is considered that adequate landscaping areas have been provided throughout the site, to allow for the planting of canopy trees. This will contribute to the character of the new neighbourhood and is consistent with the landscape setting within the wider area, particularly from the street. A streetscape Landscape Plan has been submitted and assessed by the Landscaping Department with no objections raised and only minor changes required. Landscaping consideration will also be given to the bushfire requirements for the lots abutting the bushland reserve.*

Public Open Space Provision – *Complies. The site is within close proximity (400m-800m) of several existing open space reserves, such as the Norvel Road Reserve and Burke Road Reserve. The proposal also allows for the retention of the existing bushland reserve.*

#### Access and Mobility Management

Integrated Mobility – *Complies. The proposal has provided adequate integration of walking and cycling network to further connect to nearby public transport. Minor changes are required to ensure that walkability is accessible to pram carriers, as outlined under the assessment for Clause 56.03-1 (Compact and Walkable Neighbourhoods).*

Walking and Cycling Network – *Complies. The application provides adequate pedestrian and cycling pathways throughout the site, contributing to safe and direct movement and reducing the need for car travel.*

Public Transport Network – *Not applicable. The application does not propose any new public transport, however the site is provided with good access to existing bus stops and other public transport facilities such as the Boronia Railway Station.*

Neighbourhood Street Network – *Complies. The proposed road network provides for safe and easy movement through neighbourhoods.*

Walking and Cycling Detail – *Can comply. The walking and cycling network is generally acceptable with minor changes required as outlined under the assessment for Clause 56.03-1 (Compact and Walkable Neighbourhoods). The network has been provided to facilitate throughout movements for pedestrian and cyclist under the Desired line principle allowing shortest distance as well as connections to the nearest network (aka the Blind Creek Regional Trail).*

Public Transport Network Detail – *Not applicable. Public transport is not provided throughout the Estate and the proposal relies on existing network in the vicinity.*

Neighbourhood Street Network Detail – *Can comply subject to the conditions.*

- *A minimum 8 metres is required for kerb returns. The kerb between the access lane and Road E must be altered to show an 8 m radius.*
- *Street parking can be achieved with a total 139 car parks maintained once rectification to the plan are realised to ensure adequate movement. This 139 car parks complies with the requirement.*

Lot Access – *Can comply. The plans provided show the location or detail of the crossovers. A condition of any permit issued will require the crossovers to be constructed to the satisfaction of the responsible authority. The crossover at the junction of Norvel Road may require to be amended to facilitate safe access and egress.*

#### Integrated Water Management

Drinking Water Supply – *Complies. Water supply systems will be provided to the boundary of all lots where required by the relevant water authority.*

Reused and recycled water - *Complies. Reused and recycled water supply systems can be provided to the boundary of all lots where required by the relevant water authority.*

Waste water management – *Complies. Reticulated waste water systems will be provided to the boundary of all lots where required by the relevant water authority.*

Stormwater management – *Complies. The proposed stormwater management approach relies on the existing billabong to the north-west for detention and water quality mitigation and the construction of a sediment basin which will disperse overflow into adjoining bushland reserve. The application has been referred to Council's Stormwater Department who did not object to the stormwater management proposed, subject to standard conditions related to detailed engineering plans. The application has also been referred to Melbourne Water, who did not object to the proposal subject to the submission of a detailed Drainage and Stormwater Management Strategy.*

*The stormwater system is designed to not rely on rainwater tanks to each future dwellings. The addition of tanks would be supplemental and will not be required as part of the permit.*

#### Site Management

Site management – *Can comply, subject to the provision of a Construction Management Plan to the satisfaction of the Responsible Authority. This is to be included as a condition of any permit issued.*

#### Utilities

Shared Trenching – *Can comply, subject to the submission of engineering plans which will be a requirement of any permit to issue.*

Electricity, Telecommunication and Gas – *Can comply, Authority conditions to be included on any permit issued.*

Fire Hydrants – *Can comply, CFA conditions to be included on any permit to issue.*

- *The CFA has further requested that bollarded access arrangement be maintained for emergency vehicle between Castricum place and Road B/C. As such a crossover arrangement will need to be provided in the detailed design to Castricum Place and Road B/C.*
- *The CFA has also further requested that access be maintained between Road H and Dion Street/Road F. This can be arranged as bollarded access for emergency vehicles as Council is not supportive of allowing through vehicle movements between Road F and H.*

Public Lighting – *Can comply. Standard conditions to be included on any permit issued. Further consideration for public lighting that is sympathetic to the biodiversity in the vicinity of the reserve can be addressed via conditions for detailed design by ensuring lighting spill to the reserve is minimised.*

#### **Subdivision not requiring a permit – Clause 62.04**

The proposed Section 173 Agreement related to the bushland will require the vesting of the bushland to occur prior to the gazetting of the amendment. Pursuant to Clause 62.04, the subdivision of the bushland from the subject site is exempted if the following elements are met:

- *“A subdivision by an authority acquiring the land which does not create an additional lot.” This will be achievable on this site via resubdivision of the land.*



Or,

- *“A subdivision by an authority acquiring the land which creates additional lots if the additional lots are severed parcels of land without legal access to an existing road and the additional lots are retained by the acquiring authority or sold to an abutting land owner on the condition that the lot be consolidated with abutting land.”* Which is another option available of the subdivision creates a new lot instead of resubdividing the three existing lots.

This will be required to enable the transfer of the bushland, but also ensure the bushland can be rezoned to PCRZ and vested into public ownership prior to the gazettal of the amendment.

#### **Subdivision of land in more than one zone - Clause 64.03**

This clause states that if a provision of this scheme provides that a permit is required to subdivide land and the land is in more than one zone, a permit may be granted even if one of the lots does not comply with a zone.

While the proposed rezoning of the land in the proposed rezoning context would result in the subject land being in both the Neighbourhood Residential Zone and the Public Conservation and Resources Zone; the permit will not be issued until the bushland is subdivided and vested to Council.

The proposed Section 173 Agreement to ensure the bushland is vested to Council will require the vesting to occur prior to the gazetting of the amendment. As such, as a combined application the permit and rezoning are linked together and the process will not trigger this clause.

#### **Decision Guidelines – Clause 65**

Clause 65 of the Knox Planning Scheme and Section 60 of the Planning and Environment Act 1987 set out decision guidelines/matters which the responsible authority must consider when deciding any planning application.

- *The decision guidelines of Clause 65 of the Knox Planning Scheme and Section 60 of the Planning and Environment Act (1987) have been appropriately considered.*

#### **Aboriginal Cultural Heritage Management Plan**

Part of the subject land is affected by the Aboriginal Cultural Sensitivity Overlay area being 200 metres from the Blind Creek. This affects primarily the bushland area which is to be handed over as a reserve to Council.

The application relates to subdivision (and associated works) for multiple lots which is not an exempted activity from requiring a Cultural Heritage Management Plan (CHMP). The majority of the works will be undertaken on the area not subject to the Aboriginal Cultural Sensitivity Overlay and on the site of the former quarry, which was recently been filled and subject to significant ground disturbance. As such, a CHMP would not be required on the disturbed/southern part of the site. The construction of the drainage infrastructure is however located on the Aboriginal Cultural Sensitivity Overlay area on the edge of the bushland and the construction of this infrastructure does create ground disturbance.

The applicant has engaged Andrew Long & Associates (an appointed Heritage Advisor identified by AAV) to confirm whether a CHMP might be required for this part of the site and preliminary works has lead the advisor to be of the opinion that a CHMP might not be required. However, due to the Covid restrictions, the advisor has not been able to undertake the site visit required to confirm the position which has cause delay for this matter. The matter can nonetheless be presented to Council and subject to public exhibition while the advisor finalise his works. A final confirmation would then be required prior to Council adopting the amendment and this would be a requirement on the applicant.

The construction of the path within the bushland reserve will not result in significant ground disturbance and therefore would not require a CHMP as specified in the Aboriginal Heritage Regulations 2007.

#### **CONCLUSION**

A recommendation for approval is based on the above assessment of the application against the relevant requirements of the Knox Planning Scheme.

On balance, it is considered that the proposed combined S96A rezoning and development to Staged subdivision (including 138 residential lots), development of pathways, removal of native vegetation, and associated works is consistent with the proposed neighbourhood residential zone, the urban design guidelines existing for the site as well as the relevant Particular Provisions, the decision guidelines of Clause 65.02 of the Knox Planning Scheme and Section 60(1)(a) and (1A)(i) of the P&E Act (1987). It is therefore recommended that Council support a request to the Minister for Planning to authorise the exhibition of the combined amendment with the ultimate outcome to issue a Planning Permit subject to conditions.

*(refer to draft planning permit Form 9 for permit conditions)*



**KNOX CITY COUNCIL**

and

**NORVEL ESTATE PTY LTD**  
(ACN 619 386 855)

**HOUSING 173 AGREEMENT**

Land: Norvel Estate, Norvel Road and Dion Street, Ferntree Gully Victoria 3156

Russell Kennedy Pty Ltd ACN 126 792 470 ABN 14 940 129 185  
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Ref LAG 115608-00327

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**AllyLaw**

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**THIS AGREEMENT** is made on

2021

## **PARTIES**

1        **KNOX CITY COUNCIL**  
of 511 Burwood Highway, Wantirna South, Victoria, 3152  
("Council")

2        **NORVEL ESTATE PTY LTD**  
ACN 619 386 855  
[REDACTED]  
("Owner")

## **RECITALS**

- A        The Council is the responsible authority under the Act for the Scheme.
- B        The Owner is registered or is entitled to be registered as proprietor of the Land.
- C        The Owner wishes to achieve the Development, a precondition to which is the adoption of the Amendment.
- D        The Owner and Council have agreed on arrangements for the provision of the Housing Dwellings as set out in this Agreement.
- E        The Owner must enter into this Agreement prior to Council seeking Ministerial approval of the Amendment.
- F        This Agreement has been entered into in order to:
- make provision for the Housing Dwellings; and
  - prohibit, restrict or regulate the use or development of the Land.
- G        This Agreement is made under Division 2 of Part 9 of the Act.

## **THE PARTIES AGREE THAT:**

### **1        DEFINITIONS**

In this Agreement:

- 1.1      **Act** means the *Planning and Environment Act 1987*.
- 1.2      **Affordable Housing** means housing as defined under the Act.
- 1.3      **Agreement** means this deed of Agreement, including the Recitals and any Annexures or Schedules to this Agreement.
- 1.4      **Amendment** means proposed Planning Scheme Amendment C184knox to the Scheme.
- 1.5      **Annexure** means an annexure to and forming part of, this Agreement.
- 1.6      **Business Day** means Monday to Friday excluding public holidays in Victoria.

- 1.7 **Concept Plan** means the current concept plan in respect of the Amendment and for the Development, including designation of a Stage 1 and a Stage 2, attached at Annexure 1.
- 1.8 **Development** means the proposed residential development and subdivision of the Land as contemplated in the Amendment and Concept Plan.
- 1.9 **Dwelling** means a dwelling as defined under the Act and Scheme.
- 1.10 **Housing Builder Contract** means the contract for the construction of the Housing Dwellings.
- 1.11 **Housing Building Permit** means a building permit or permits for the construction of the Housing Dwellings under the *Building Act 1993*.
- 1.12 **Housing Dwellings** means the number of Dwellings that must be provided through a Housing Provider as Social Housing (and therefore Affordable Housing), as part of the Development.
- 1.13 **Housing Funding** means the funding that is required to be held or obtained to meet the cost of provision of the Housing Dwellings.
- 1.14 **Housing Land** means the land shown as Lot 33-40 on the Concept Plan being land within the Development of a size and configuration sufficient for the Housing Dwellings to be constructed.
- 1.15 **Housing Planning Permit** means a planning permit or permits for the construction of the Housing Dwellings under the Act.
- 1.16 **Housing Provider** means a housing association authorised or registered as a Participating Registered Agency under the *Housing Act 1983* to provide the Housing Dwellings.
- 1.17 **Housing Provider Agreement** means the agreement between the Owner and the Housing Provider concerning the transfer at no cost of the Housing Land together with related requirements in respect of the Housing Dwellings.
- 1.18 **Input Tax Credit** in relation to a supply, means a credit under the GST Act for the GST payable by the recipient in respect of the supply.
- 1.19 **Land** means the land within the Scheme described as:
- (i) lot 1 on Title Plan 297137X being the land more particularly described in certificate of title volume 09381 folio 087;
  - (ii) lot 1 on Title Plan 963860L being the land more particularly described in certificate of title volume 11909 folio 762; and
  - (iii) lot 2 on Title Plan 963860L being the land more particularly described in certificate of title volume 11909 folio 763.
- 1.20 **LG Act** means the *Local Government Act 1989*.
- 1.21 **Minister** means the Minister for Planning.
- 1.22 **Mortgagee** means the person or persons registered or entitled from time to time to be registered by the Registrar of Titles as mortgagee of the Land or any part of it.

- 1.23 **Plan of Subdivision** means a plan of subdivision of the Land (or any stage thereof) under the Subdivision Act.
- 1.24 **Planning Approvals** means any necessary subsequent planning approvals required for the Development, after approval of the Amendment, including any required Development Plan, Planning Permit or approval or endorsement of any plan or document by the Council as responsible authority.
- 1.25 **Residential Lot** means a lot which in the opinion of the Council is of a size and dimension such that it is intended to be developed as a lot for a dwelling or dwellings without further subdivision.
- 1.26 **Schedule** means a schedule to this Agreement.
- 1.27 **Scheme** means the Knox Planning Scheme or any other planning scheme which applies to the Land from time to time.
- 1.28 **Social Housing** has the same meaning as in section 4(1) of the *Housing Act 1983*.
- 1.29 **Stage** means a stage of the Development presently identified in the Concept Plan.
- 1.30 **Stage 1** means Stage 1 of a proposed Plan of Subdivision as designated on the Concept Plan, including the Housing Land.
- 1.31 **Stage 2** means Stage 2 of a proposed Plan of Subdivision as designated on the Concept Plan containing the balance of the Development beyond Stage 1.
- 1.32 **Termination Date** means the date upon which Council notifies the Owner in writing that the Owner has fully satisfied the Owner's obligations pursuant to this Agreement or that the Council no longer requires the Owner to comply with the obligations specified in this Agreement.
- 1.33 **VCAT** means the Victorian Civil Administrative Tribunal.

## 2 COMMENCEMENT

This Agreement comes into force on the date it was made as set out above.

## 3 TERMINATION OF THIS AGREEMENT

### 3.1 Ending of Agreement

This Agreement will end progressively in respect of parts of the Land, as follows:

- 3.1.1 for all of the Residential Lots in Stage 1, except the Housing Land, upon satisfaction of the obligations at clause 4.6.1(a); and
- 3.1.2 for the Housing Land and the land in Stage 2, upon satisfaction of the remaining obligations of the Owner, including under clause 4.6.1(b).

### 3.2 Cancellation of this Agreement

When this Agreement has ended in respect of any relevant part of the Land the Council must, at the request and at the cost of the Owner, apply to the Registrar of Titles under section 183(2) of the Act to cancel the recording of this Agreement on the Register.

#### **4 HOUSING DWELLINGS**

##### **4.1 Housing Dwellings Requirement**

The Owner must ensure the provision of the Housing Dwellings;

4.1.1 within Stage 1;

4.1.2 on the Housing Land to be transferred at no cost to the Housing Provider; and

4.1.3 otherwise in accordance with this Agreement.

##### **4.2 Concept Plan and Staging**

The Concept Plan, together with the parts of the Land making up Stage 1 and Stage 2:

4.2.1 may include multiple stages of a Plan of Subdivision, provided, however the Housing Land must be included in the first stage of any Plan of Subdivision which includes a Residential Lot;

4.2.2 may be amended, at the request of the Owner, provided through such amendment:

- (a) the number of Residential Lots or Dwellings within Stage 1 and contained within the first stage of any Plan of Subdivision must not be greater than one hundred and six (106); and
- (b) the number of Residential Lots or Dwellings proposed within Stage 2 must not be less than thirty two (32); and
- (c) the first stage of any Plan of Subdivision incorporating Residential Lots must include the Housing Land; and
- (d) is subject to obtaining the Council's consent as provided in clause 4.4.

##### **4.3 Number and Make Up of Housing Dwellings**

4.3.1 Where the Development proceeds as a subdivision in accordance with the attached Concept Plan (of one hundred and thirty eight (138) residential lots), eight (8) Housing Dwellings must be provided.

4.3.2 If the number of Residential Lots or Dwellings is reduced below the one hundred and thirty eight (138) proposed in the Concept Plan, eight (8) Housing Dwellings must still be provided.

4.3.3 If the density of the Development increases to more than one hundred and thirty eight (138) Residential Lots or Dwellings then the number of Housing Dwellings to be provided must equal the greater of eight (8) or 5% of the total number of Residential Lots or Dwellings within the Development, with the calculation of the number of Housing Dwellings required rounded up (for example, 161 to 180 Residential Lots or Dwellings will mean nine (9) Housing Dwellings must be provided).

- 4.3.4 The proposed Housing Dwellings must comply with any Urban Design or other guidelines applied to the Development and Dwellings on the Land.
- 4.3.5 The proposed Housing Dwellings must be “tenure blind”, that is, with finishes reflecting all other Dwellings within the Development, being integrated into the Development and broadly indistinguishable from comparable private market dwellings in the Development.
- 4.3.6 The Housing Dwellings must be suitably located, accessible and fitted out to meet the needs of the Housing Provider.

#### 4.4 **Requirements for the Variation of Housing Land**

In any case where the Owner seeks to vary the Housing Land from that contemplated in the Concept Plan the following requirements apply:

- 4.4.1 the consent of the Council must be obtained, with such consent:
  - (a) being at the Council’s discretion; and
  - (b) not unreasonably withheld; and
  - (c) not being a Planning Approval and not made as a Responsible Authority under this Agreement or the Act; and
- 4.4.2 if the variation includes a request that any part of the Development does not proceed as a subdivision into Residential Lots, as contemplated in the Concept Plan the parties must cooperate on a bona-fide basis to establish an alternate arrangement for the timing and securing the provision of the relevant number of Housing Dwellings, as otherwise contemplated in this Agreement; and
- 4.4.3 no Planning Approval shall be granted or given, nor may any development of the Land commence, until the consent of the Council to the variation of Housing Land is obtained.

#### 4.5 **Provision of Housing Dwellings**

The provision of the Housing Dwellings is intended to be as follows:

- 4.5.1 The Owner entering into the Housing Provider Agreement with Housing Provider;
- 4.5.2 Confirmation of the Housing Funding;
- 4.5.3 Obtaining of the Housing Planning Permit;
- 4.5.4 The no cost transfer of the Housing Land to the Housing Provider;
- 4.5.5 Obtaining of the Housing Building Permit; and
- 4.5.6 Entry into of the Housing Builder Contract.

#### 4.6 **Timing of Provision of Housing Dwellings**

- 4.6.1 The Housing Dwellings must be provided as follows:



6

- (a) prior to and as a precondition of the issue of a statement of compliance for any Plan of Subdivision for land within Stage 1:
  - (1) the Housing Provider Agreement must exist between the Owner and the Housing Provider;
  - (2) the confirmation of the Housing Funding; and
  - (3) the obtaining of the Housing Planning Permit.
- (b) prior to and as a precondition of the issue of a statement of compliance for any Plan of Subdivision for land within Stage 2:
  - (1) the Housing Land must be transferred, at no cost, to the Housing Provider;
  - (2) the Housing Builder Contract must be entered into;
  - (3) the Housing Building Permit must be obtained; and
  - (4) the construction of the Housing Dwellings must have commenced.

4.6.2 In order to satisfy the Council that the various requirements set as preconditions to a statement of compliance for any Stage of the Plan of Subdivision are met, the Owner will procure and provide the Council with copies of appropriate documents, confirmations or consents as are reasonably required.

#### 4.7 **Alternate Provision of Housing Dwellings**

In any case where the Owner itself wishes to construct the Housing Dwellings, for a future transfer to a Housing Provider, the parties must negotiate for such amendment on a cooperative and bona fide basis provided the overall intention of providing the Housing Dwellings is effectively achieved, including as a precondition to relevant statements of compliance in respect of the Stage 1, the Housing Land and Stage 2.

## 5 **OWNERS GENERAL COVENANTS**

### 5.1 **Planning and other Approvals**

5.1.1 The Owner must:

- (a) obtain all Planning Approvals for the Development at the Owner's cost; and
- (b) exercise its best endeavours to expeditiously pursue the adoption of the Amendment, all Planning Approvals and all other applications for all permits and approvals required for the Development.

5.1.2 The Council will proactively facilitate the processing and decision making in respect of the Amendment, Planning Approvals or any other approvals that are required to be granted by Council in order for construction of the Development to occur.

## 5.2 **Successors in title**

Until this Agreement is recorded on the folio of the Register which relates to the Land pursuant to section 181 of the Act, the Owner must ensure that the Owner's successors in title give effect to and do all acts and sign all documents which will require those successors to give effect to this Agreement including requiring the successors in title to execute a deed agreeing to be bound by the terms of this Agreement. Until that deed is executed, the Owner, being a party to this Agreement, remains liable to perform all of the Owner's obligations contained in this Agreement.

## 5.3 **Further assurance**

The Owner must do all things necessary (including signing any further agreement, acknowledgment or document) to enable the Council to record this Agreement on the folio of the Register which relates to the Land.

## 5.4 **Payment of Council's costs**

The Owner agrees to pay on demand to the Council the Council's reasonable costs and expenses (including any legal fees incurred on a solicitor-client basis but excluding Council staff costs) of and incidental to the preparation, execution and recording of this Agreement.

## 5.5 **Mortgagee to be bound**

The Owner covenants to obtain the consent of any Mortgagee to be bound by the covenants in this Agreement if the Mortgagee becomes mortgagee in possession of the Land.

## 5.6 **Indemnity**

5.6.1 The Owner covenants to indemnify and keep the Council, its officers, employees, agents, workmen and contractors indemnified from and against all costs, expenses, losses or damages which they or any of them may sustain incur or suffer or be or become liable for or in respect of any suit action proceeding judgement or claim brought by any person arising from or referable to this Agreement or any non-compliance with this Agreement but excluding any costs, expenses, losses or damages caused by the negligence or reckless act of the Council.

5.6.2 The parties agree that each will conduct itself in a manner that ensures mitigation of its loss in respect of any claim, suit, action, proceeding or judgment brought by any person.

## 5.7 **Non-compliance**

If the Owner has not complied with this Agreement within twenty-eight (28) days after the date of service on the Owner by the Council of a notice which specifies the Owner's failure to comply with any provision of this Agreement, the Owner covenants:

5.7.1 to allow the Council its officers, employees, contractors or agents to enter the Land and rectify the non-compliance;

5.7.2 to pay to the Council on demand, the Council's reasonable costs and expenses (**Costs**) incurred as a result of the Owner's non-compliance;

- 5.7.3 to pay interest at the rate of 2% above the rate prescribed under section 2 of the *Penalty Interest Rates Act 1983* on all moneys which are due and payable but remain owing under this Agreement until they are paid in full;
- 5.7.4 if requested to do so by the Council, to promptly execute in favour of the Council a mortgage to secure the Owner's obligations under this Agreement,

and the Owner agrees:

- 5.7.5 to accept a certificate signed by the Chief Executive Officer of the Council (or any nominee of the Chief Executive Officer) as prima facie proof of the Costs incurred by the Council in rectifying the Owner's non-compliance with this Agreement;
- 5.7.6 that any payments made for the purposes of this Agreement shall be appropriated first in payment of any interest and any unpaid Costs of the Council and then applied in repayment of the principal sum;
- 5.7.7 that all Costs or other monies which are due and payable under this Agreement but which remain owing shall be a charge on the Land until they are paid in full; and
- 5.7.8 if the Owner executes a mortgage as required by clause 5.7.4, any breach of this Agreement is deemed to be a default under that mortgage.

**5.8 Standard of works**

The Owner covenants to comply with the requirements of this Agreement and to complete all works required by this Agreement as expeditiously as possible at its cost and to the reasonable satisfaction of the Council.

**5.9 Council access**

The Owner covenants to allow the Council and its officers, employees, contractors or agents or any of them, to enter the Land (at any reasonable time) to assess compliance with this Agreement and in accordance with the requirements of the Act.

**5.10 Covenants run with the Land**

The Owner's obligations in this Agreement are intended to take effect as covenants which shall be annexed to and run at law and in equity with the Land and every part of it, and bind the Owner and its successors, assignees and transferees, the registered proprietor or proprietors for the time being of the Land and every part of the Land.

**5.11 Owner's warranty**

The Owner warrants and covenants that:

- 5.11.1 the Owner is the registered proprietor (or is entitled to become the registered proprietor) of the Land and is also the beneficial owner of the Land;

- 5.11.2 there are no mortgages, liens, charges or other encumbrances or leases or any rights inherent in any person other than the Owner affecting the Land which have not been disclosed by the usual searches of the folio of the Register for the Land or notified to the Council;
- 5.11.3 no part of the Land is subject to any rights obtained by adverse possession or subject to any easements or rights described or referred to in section 42 of the *Transfer of Land Act 1958*; and
- 5.11.4 until this Agreement is recorded on the folio of the Register which relates to the Land, the Owner will not sell, transfer, dispose of, assign, mortgage or otherwise part with possession of the Land or any part of the Land without first disclosing to any intended purchaser, transferee, assignee or mortgagee the existence and nature of this Agreement.

## **6 ACKNOWLEDGEMENTS**

- 6.1 The parties acknowledge and agree that all obligations and contributions set out in this Agreement are in addition to any future requirements arising from the Amendment or any Planning Approvals for the Development except that the Public Open Space is considered by Council to be sufficient to satisfy the requirements of clause 52.01 of the Scheme and that Council agrees that the Development Contributions set out in this Agreement are sufficient to meet the reasonable obligations of the Owner in relation to the Development.
- 6.2 In any case where the Owner has failed to comply with this Agreement, including by a relevant due date or specified event, for that obligation, the Council may withhold its issue of a Statement of Compliance under the *Subdivision Act 1988* for any Stage unless or until compliance with this Agreement is achieved.
- 6.3 In any case where any attachment, schedule or annexure to this Agreement is considered unsatisfactory by the Office of the Registrar of Titles, for registration against the Certificates of Title to the Land, then the parties agree that they will consent to the inclusion of any replacement plan or document prepared of a different form to the same effect of the plan or document being replaced, to allow this Agreement, including all relevant attachments, to be registered against the title to the Land. The acknowledgement and consent of the parties under this clause includes agreement to execute, if required, a replacement version of this Agreement.

## **7 GOODS AND SERVICES TAX**

### **7.1 Definitions and expressions**

Expressions used in this Agreement that are defined in the GST Act have the same meaning as given to them in the GST Act, unless expressed to the contrary.

### **7.2 Amounts payable do not include GST**

Each amount, of whatever description, specified as payable by one party to the other party under this Agreement is expressed as a GST exclusive amount unless specified to the contrary.

### **7.3 Liability to pay any GST**

Subject to clause 7.4, in addition to any amount payable by one party to the other party under this Agreement in respect of a taxable supply, the party liable to pay

the amount (**Recipient**) must pay to the other party (**Supplier**) a sum equivalent to the GST payable, if any, by the Supplier in respect of the taxable supply on the date on which the Supplier makes a taxable supply to the Recipient irrespective of when the Supplier is liable to remit any GST under this Agreement in respect of a taxable supply to any governmental authority.

#### 7.4 **Tax Invoice**

A party's right to payment under clause 7.3 is subject to a Tax Invoice being delivered to the Recipient.

### 8 **GENERAL**

#### 8.1 **No fettering of Council's powers**

This Agreement does not fetter or restrict the Council's power or discretion in respect of any of the Council's decision making powers including but not limited to an ability to make decisions under the LG Act, and the Act or to make or impose requirements or conditions in connection with any use or development of the Land or the granting of any planning permit, the approval or certification of any plans of subdivision or consolidation relating to the Land or the issue of a Statement of Compliance in connection with any such plans.

#### 8.2 **Time of the essence**

Time is of the essence as regards all dates, periods of time and times specified in this Agreement.

#### 8.3 **Counterparts**

8.3.1 This Agreement may be executed in any number of counterparts and all the counterparts together constitute one and the same instrument; and

8.3.2 A copy of an original executed counterpart received by email:

(1) must be treated as an original counterpart;

(2) is sufficient evidence of the execution of the original; and

(3) may be produced in evidence for all purposes in place of the original.

8.3.3 If the signatures on behalf of one party are on different counterparts, this will be taken to be, and have the same effect as, signatures on the same counterpart and on a single copy of this Agreement.

#### 8.4 **Governing law and jurisdiction**

This Agreement is governed by and is to be construed in accordance with the laws of Victoria. Each party irrevocably and unconditionally submits to the non-exclusive jurisdiction of the courts and tribunals of Victoria and waives any right to object to proceedings being brought in those courts or tribunals.

#### 8.5 **Enforcement and severability**

8.5.1 This Agreement shall operate as a contract between the parties and be enforceable as such in a Court of competent jurisdiction regardless of

whether, for any reason, this Agreement were held to be unenforceable as an agreement pursuant to Division 2 of Part 9 of the Act.

- 8.5.2 If a Court, arbitrator, tribunal or other competent authority determines that a word, phrase, sentence, paragraph or clause of this Agreement is unenforceable, illegal or void, then it shall be severed and the other provisions of this Agreement shall remain operative.

## **9 NOTICES**

### **9.1 Service of notice**

A notice or other communication required or permitted, under this Agreement, to be served on a person must be in writing and may be served:

- 9.1.1 personally on the person;
- 9.1.2 by leaving it at the person's address set out in this Agreement;
- 9.1.3 by posting it by prepaid post addressed to that person at the person's current address for service;
- 9.1.4 by email to the person's current email address notified to the other party; or
- 9.1.5 by facsimile to the person's current number notified to the other party.

### **9.2 Time of service**

A notice or other communication is deemed served:

- 9.2.1 if served personally or left at the person's address, upon service;
- 9.2.2 if posted within Australia to an Australian address, five (5) Business Days after posting, by standard post, six Business Days after posting;
- 9.2.3 if sent by email, subject to the clause 9.2.5, at the time of receipt as specified in section 13A of the *Electronic Transactions (Victoria) Act 2000*;
- 9.2.4 if served by facsimile, subject to clause 9.2.5, at the time indicated on the transmission report produced by the sender's facsimile machine indicating that the facsimile was sent in its entirety to the addressee's facsimile; and
- 9.2.5 if received after 5.00pm in the place of receipt or on a day which is not a Business Day, at 9.00am on the next Business Day.

### **9.3 Proof of receipt of notice by email**

In proving that a notice given by email has been received by the recipient, it is sufficient to produce an acknowledgement or receipt that the email has reached the recipient's email address.

## 10 INTERPRETATION

In this Agreement, unless the contrary intention appears:

- 10.1 the singular includes the plural and vice versa;
- 10.2 a reference to a document or instrument, including this Agreement, includes a reference to that document or instrument as novated, altered or replaced from time to time;
- 10.3 a reference to an individual or person includes a partnership, body corporate, government authority or agency and vice versa;
- 10.4 a reference to a party includes that party's executors, administrators, successors, substitutes and permitted assigns;
- 10.5 words importing one gender include other genders;
- 10.6 other grammatical forms of defined words or expressions have corresponding meanings;
- 10.7 a covenant, undertaking, representation, warranty, indemnity or agreement made or given by:
  - 10.7.1 two or more parties; or
  - 10.7.2 a party comprised of two or more persons,
 is made or given and binds those parties or persons jointly and severally;
- 10.8 a reference to a statute, code or other law includes regulations and other instruments made under it and includes consolidations, amendments, re-enactments or replacements of any of them;
- 10.9 a recital, schedule, annexure or description of the parties forms part of this Agreement;
- 10.10 if an act must be done on a specified day that is not a Business Day, the act must be done instead on the next Business Day;
- 10.11 if an act required to be done under this Agreement on a specified day is done after 5.00pm on that day in the time zone in which the act is performed, it is taken to be done on the following day;
- 10.12 a party that is a trustee is bound both personally and in its capacity as trustee;
- 10.13 a reference to an authority, institution, association or body (**original entity**) that has ceased to exist or been reconstituted, renamed or replaced or whose powers or functions have been transferred to another entity, is a reference to the entity that most closely serves the purposes or objects of the original entity;
- 10.14 headings and the provision of a table of contents are for convenience only and do not affect the interpretation of this Agreement.
- 10.15 A reference to the Council includes the Council in its capacity as responsible authority pursuant to the Scheme.

**11 REGISTRATION OF AGREEMENT**

- 11.1 The Owner will do all things necessary to enable the Council to make an application to the Registrar of Titles to make a recording of this Agreement on the Certificate of Title to the Land in accordance with Section 181 of the Act including the signing of any further agreement, acknowledgement or other document.
- 11.2 The Council will record this Agreement on the Title to the Land.
- 11.3 In any case where the Amendment is not adopted, this Agreement will end and the Council will promptly arrange for the cancellation of registration of the Agreement pursuant to the Act.

**EXECUTED** as a deed of agreement under Division 2 of Part 9 of the Act.

**THE COMMON SEAL of KNOX CITY** )  
**COUNCIL** was affixed in the presence of: )

\_\_\_\_\_  
Councillor

\_\_\_\_\_  
Councillor

\_\_\_\_\_  
Chief Executive Officer

**EXECUTED** by **NORVEL ESTATE PTY LTD** )  
in accordance with section 127(1) of the )  
*Corporations Act 2001* (Cth) by being signed )  
by the authorised person: )

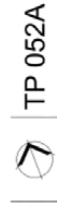
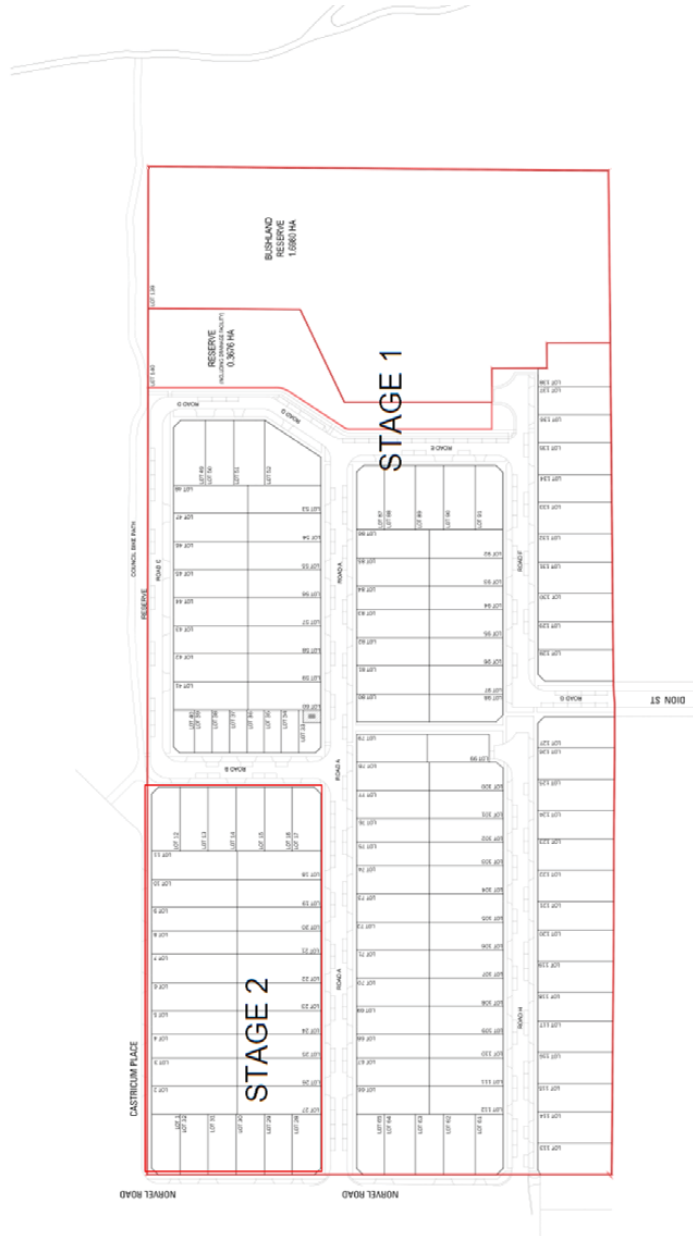
\_\_\_\_\_  
Sole director and sole company secretary

\_\_\_\_\_  
Full name

\_\_\_\_\_  
Usual Address



### SCHEDULE 1 CONCEPT PLAN



TP 052A



1:750 @ A1/1:1500 @ A3

**NORVEL ROAD | FERNTREE GULLY**  
**RESIDENTIAL MASTERPLAN**  
 36-0125

**PEDDLE THORP**



32 Swan Street, Footscray, 3011

[affordabledevelopmentoutcomes.com.au](http://affordabledevelopmentoutcomes.com.au)  
abn 56969019423

22 July 2021

Patrick Dubuc  
Senior Strategic Planner  
[Patrick.Dubuc@knox.vic.gov.au](mailto:Patrick.Dubuc@knox.vic.gov.au)

Thank you for your email sent on Wednesday 21 July attaching an updated draft Section 173 Housing Agreement in relation to Norvel Estate.

I am writing to confirm the landowner agreement to the agreement and terms set out within.

We look forward to the Council proactively progressing the processing and decision making in respect of the Amendment in order for construction of the development and the delivery of the Affordable Housing to occur.

Kind regards



**Kate Breen**

Director, Affordable Development Outcomes



# Norvel Estate Plant Regeneration

A Report to  
Knox City Council

by

Graeme S. Lorimer, PhD

**Biosphere Pty Ltd**

ABN 28 097 295 504

[www.biosphere.net.au](http://www.biosphere.net.au)

18 Marie St, Boronia, Vic. 3155

Version 1.1, 15 October 2021

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## 1. Introduction

‘Norvel Estate’ is a proposed new residential subdivision at 29Q Norvel Rd, Ferntree Gully. In the north, it abuts a council bushland reserve beside Blind Creek.

Until 2014, most of 29Q Norvel Rd was occupied by a clay pit surrounded by a bund formed from overburden (i.e. soil scraped away to get to the clay). Based on satellite images, the pit was filled in 2014 and the overburden in the bunds was spread over the area in 2015. The intention of these actions was to make the site suitable for a residential subdivision.

Figure 1 shows a satellite image of the site and its surroundings, with the approximate maximum (2014) extent of the bunded clay pit outlined with magenta dashes.

The clay extraction operations did not include a 0.66 ha triangle of land in the southeast, labelled as ‘former council land’ on Figure 1. That triangle was vacant, grassed land owned by Knox City Council until 2009. It was then swapped with the then-owner of the clay pit in return for an area of bushland of comparable size to be added to the public open space abutting the north-northeastern boundary.

I became familiar with the site’s vegetation in 1997, when I inspected it in connection with my report, ‘*Management Plan for Blind Creek Billabong*’. I also inspected the northern fringe of the site in 2007 when consulted by Council regarding management of the land swapped to Council for the southeastern triangle.

On 29th September 2021, I was asked by Knox City Council if I could inspect the site in response to reports from local community members that regrowth of many locally rare plants had appeared where the clay pit and bunds had been. I was specifically asked to:

- Map any significant plants;
- Advise of any practical and feasible measures that could conserve significant plants off-site; and
- Map plants that could be relocated or from which seeds could be collected, subject to permission from the landowner.

In this connection, it is relevant to note that the only part of the regrowth vegetation with planning protection is in the northeastern corner, where an Environmental Significance Overlay applies. That area is proposed to become a drainage reserve, requiring excavation. None of the regrowth is protected under the *Flora and Fauna Guarantee Act*.

## 2. Stakeholder Consultation

Knox City Council advised me at the outset that the Knox Environment Society and the Friends of Blind Creek Billabong had identified locally-rare plants at the site and had expressed a desire for those plants to be conserved. Therefore, before I inspected the site, I contacted both groups to seek whatever information they had and whatever features or locations they would particularly like me to assess.

Members of both groups responded with lists of plant species they had observed, for which I thank them.



**Figure 1. Map and satellite image of the subject land and its surroundings, including features referred to in the text. In particular, note the outline of the former banded clay pit and the black hatching that represents the area of predominantly indigenous plants that have regenerated.**

### 3. Site Inspection

With the gracious permission of the landowner, I inspected the site with an assistant (Mr Darren Wallace) for four hours on 2nd October 2021. I recorded all plant species that I detected or were drawn to my attention by Mr Wallace. I tracked my route using satellite positioning, resulting in the yellow-dotted line on Figure 1. As can be seen in Figure 2, visibility across the vegetation was very good, allowing me to spot all but the tiniest plants within about 8 m. Points that lay further from my route than 8 m were mostly covered by Mr Wallace, who has a similarly good eye for plant species.



**Figure 2. A view across the area of predominantly indigenous plants regenerating.**

A list of all seventy-two indigenous plant species I saw appears in Table 1.

It is likely that Mr Wallace and I overlooked a few small, mainly grassy plants that are notoriously difficult to identify at this time of year, such as Smooth Wallaby-grass (*Rytidosperma laeve*). I expect them to become detectable during late November or early December. I think there is less than 10% chance that any such species is sufficiently rare to affect Council's consideration of the site.

The lists of plant species provided to me by the Knox Environment Society and the Friends group are significantly shorter than Table 1. They contain a few species that do not appear on Table 1. I believe those extra species are misidentifications in some cases and confined to the proposed Section 173 agreement land in others, hence not at issue here. Regardless, I do not believe they affect Council's decision-making.

**Table 1. Indigenous plant species seen within the black-hatched area of Figure 1.**

The 'Status' column indicates the risk of dying out in Knox, as assessed in 'Sites of Biological Significance in Knox' according to the international 'Red List' criteria. The codes for the 'Status' column are:

- C Critically Endangered;
- E Endangered;
- V Vulnerable.

The symbols in the 'Abundance' column have the following meanings:

- Scarce, or so concentrated in one or two locations as to be at risk of being destroyed by chance;
- ✓ Present in moderate numbers, not dominant within a vegetation stratum;
- D Dominant (or sharing dominance) within the relevant vegetation stratum, at least in some areas;
- M Many individuals but with too little cover to be dominant in the relevant vegetation stratum.

The number of plants was only recorded where it that information was thought to be important.

Species recommended for rescuing (if possible) are highlighted with colour-coding as follows:

- blue collect seeds, which are most available in December–January;
- orange dig up and relocate, e.g. to the 'northeast defensible space' shown on Figure 1; and
- purple collect seeds *and then* dig up and relocate.

Threat rating	Scientific name	Common name	Abundance	No. plants
V	<i>Acacia mearnsii</i>	Black Wattle	M	
V	<i>Acacia melanoxylon</i>	Blackwood	✓	
E	<i>Acacia myrtifolia</i>	Myrtle Wattle	–	1
E	<i>Acacia pycnantha</i>	Golden Wattle	✓	
E	<i>Acacia stricta</i>	Hop Wattle	–	1
V	<i>Acacia verticillata</i>	Prickly Moses	–	4
	<i>Austrostipa rudis</i> subsp. <i>rudis</i>	Veined Spear-grass	✓	
	<i>Billardiera mutabilis</i>	Common Apple-berry	–	
	<i>Bossiaea prostrata</i>	Creeping Bossiaea	M	
	<i>Burchardia umbellata</i>	Milkmaids	–	1
	<i>Bursaria spinosa</i> subsp. <i>spinosa</i>	Sweet Bursaria	–	1
	<i>Carex breviculmis</i>	Short-stem Sedge	–	1
	<i>Carex inversa</i>	Knob Sedge	–	1
	<i>Cassinia sifton</i>	Sifton Bush	M	
E	<i>Centella cordifolia</i>	Centella	D	
E	<i>Daviesia latifolia</i>	Hop Bitter-pea	–	1
	<i>Deyeuxia quadriseta</i>	Reed Bent-grass	–	1
	<i>Dianella revoluta</i>	Black-anther Flax-lily	–	2
V	<i>Dillwynia cinerascens</i>	Grey Parrot-pea	✓	
E	<i>Drosera hookeri</i>	Branched Sundew	–	c. 150
V	<i>Epacris impressa</i>	Common Heath	✓	
	<i>Eragrostis brownii</i>	Common Love-grass	✓	
V	<i>Eucalyptus cephalocarpa</i>	Mealy Stringybark	✓	
V	<i>Eucalyptus ovata</i>	Swamp Gum	✓	
V	<i>Euchiton involucratus/japonicus</i>	a cudweed	✓	
V	<i>Exocarpos cupressiformis</i>	Cherry Ballart	✓	
	<i>Gahnia radula</i>	Thatch Saw-sedge	–	1
E	<i>Gahnia sieberiana</i>	Red-fruit Saw-sedge	–	1
	<i>Gonocarpus tetragynus</i>	Common Raspwort	M	



Threat rating	Scientific name	Common name	Abundance	No. plants
E	<i>Goodenia humilis</i>	Swamp Goodenia	✓	c. 700
	<i>Goodenia ovata</i>	Hop Goodenia	M	
E	<i>Hibbertia australis</i>	Upright Guinea-flower	–	2
E	<i>Hypericum gramineum</i>	Small St John's Wort	✓	
	<i>Juncus amabilis</i>	Hollow Rush	✓	
	<i>Juncus bufonius</i>	Toad Rush	✓	
C	<i>Juncus holoschoenus/fockeii</i>	Joint-leaf Rush	–	2
	<i>Juncus pallidus</i>	Pale Rush	M	
E	<i>Juncus planifolius</i>	Broad-leaf Rush	–	c. 6
	<i>Juncus sarophorus</i>	Broom Rush	M	
	<i>Kunzea leptospermoides</i>	Yarra Burgan	–	
	<i>Lepidosperma elatius</i>	Tall Sword-sedge	–	1
	<i>Lepidosperma gunnii</i>	Slender Sword-sedge	D	
V	<i>Lepidosperma laterale</i>	Variable Sword-sedge	–	1
E	<i>Leptospermum scoparium</i>	Manuka	–	4
	<i>Lomandra filiformis</i> subsp. <i>coriacea</i>	Wattle Mat-rush	✓	
	<i>Lomandra filiformis</i> subsp. <i>filiformis</i>	Wattle Mat-rush	–	1
	<i>Lomandra longifolia</i> ?subsp. <i>exilis</i>	Cluster-headed Mat-rush	–	1
	<i>Lomandra longifolia</i> subsp. <i>longifolia</i>	Spiny-headed Mat-rush	–	6
	<i>Microtis parviflora</i>	Slender Onion-orchid	✓	
V	<i>Opercularia varia</i>	Variable Stinkweed	M	
	<i>Oxalis exilis/perennans</i>	Wood-sorrel	✓	
E	<i>Ozothamnus ferrugineus</i>	Tree Everlasting	–	1
C	<i>Patersonia occidentalis</i>	Long Purple-flag	✓	16
V	<i>Pimelea humilis</i>	Common Rice-flower	–	
V	<i>Platylobium obtusangulum</i>	Common Flat-pea	–	1
	<i>Poa morrisii</i>	Soft Tussock-grass	–	
	<i>Poranthera microphylla</i>	Small Poranthera	✓	
V	<i>Pultenaea gunnii</i> subsp. <i>gunnii</i>	Golden Bush-pea	✓	
	<i>Rytidosperma fulvum</i>	Leafy Wallaby-grass	✓	
E	<i>Rytidosperma semiannulare</i>	Tas. Wallaby-grass	✓	
	<i>Rytidosperma setaceum</i>	Bristly Wallaby-grass	D	
	<i>Rytidosperma tenuius</i>	Purplish Wallaby-grass	M	
	<i>Schoenus apogon</i>	Common Bog-rush	D	
C	<i>Sphaerolobium minus</i>	Globe-pea	✓	35
C/E	<i>Stylidium graminifolium</i>	Grass Trigger-plant	✓	51
V	<i>Thelymitra peniculata</i>	Trim Sun-orchid	✓	
	<i>Themeda triandra</i>	Kangaroo Grass	–	
	<i>Tricoryne elatior</i>	Yellow Rush-lily	–	
V	<i>Veronica gracilis</i>	Slender Speedwell	–	2
C	<i>Viminaria juncea</i>	Golden Spray	✓	100+
E	<i>Viola hederacea</i>	Ivy-leaf Violet	–	
E	<i>Xanthosia dissecta</i>	Cut-leaf Xanthosia	–	1



Aerial photograph taken January 2018

Legend of significant species

- |                                  |                                  |
|----------------------------------|----------------------------------|
| ● <i>Drosera hookeri</i>         | ● <i>Sphaerolobium minus</i>     |
| ● <i>Gahnia sieberiana</i>       | ● <i>Stylidium graminifolium</i> |
| ● <i>Goodenia humilis</i>        | □ <i>Veronica gracilis</i>       |
| ● <i>Juncus holo. / fockei</i>   | ● <i>Viminaria juncea</i>        |
| ● <i>Juncus planifolius</i>      | + <i>Xanthosia dissecta</i>      |
| ● <i>Patersonia occidentalis</i> |                                  |

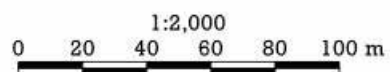


Figure 3. Map of locations of species whose risk of dying out in Knox is listed as ‘endangered’ or ‘critically endangered’ in ‘Sites of Biological Significance in Knox’. The polygons are the same as in Figure 1.

I used satellite positioning to map the locations of each individual or cluster of almost every indigenous plant species whose risk of dying out in Knox is listed as ‘endangered’ or ‘critically endangered’ in ‘*Sites of Biological Significance in Knox*’<sup>1</sup>. Those two categories represent the highest categories of risk. A map of the locations of species in those categories appears in Figure 3 above. That excludes *Centella cordifolia* because it is abundant throughout, and also *Rytidosperma semiannulare* because at that time of year, most individuals are practically indistinguishable from *Rytidosperma setaceum*. The two plants of *Hibbertia australis* grow near the *Veronica gracilis* but they were not mapped during the site inspection.

The third and final category of threatened species is ‘vulnerable’. I mapped very few of the species in the ‘vulnerable’ category because they are considerably less rare and their loss will make considerably less difference to biodiversity in Knox.

The locally-threatened species I saw include:

- 4 species in the ‘critically endangered’ category;
- 1 species (*Stylidium graminifolium*) that was rated ‘endangered’ in 2010 but has since been split into two species, the one represented here being significantly rarer in Knox and quite possibly warrants ‘critically endangered’;
- 16 species in the ‘endangered’ category; and
- 14 species in the ‘vulnerable’ category.

All four ‘critically endangered’ species are generally associated with sites that become boggy in winter and spring. That is also true of seven of the ‘endangered’ species, namely *Centella cordifolia*, *Drosera hookeri*, *Gahnia sieberiana*, *Goodenia humilis*, *Juncus planifolius*, *Rytidosperma semiannulare* and (to a lesser degree) *Xanthosia dissecta*.

These eleven species have achieved their threat ratings mainly because there are very few sites where healthy native vegetation remains on soils that become boggy during winter and spring, and the surviving sites are threatened by climate change and drainage systems.

Of the eleven species, three were not detected in any prior botanical survey of the subdivision land and adjacent council reserve, and one has not been recorded since a 1985 survey. Nine other species dependent on seasonally-boggy conditions have apparently died out in the area since a 1997 survey, namely *Cyathea australis*, *Gonocarpus micranthus*, *Goodenia elongata*, *Gratiola pubescens*, *Leptospermum lanigerum*, *Machaerina rubiginosa*, *Ornduffia reniformis*, *Schoenus lepidosperma* and *Schoenus tesquorum*. These observations suggest that the availability of soil moisture has reduced so much that soil rehydration (e.g. by irrigation) would be required for such species to survive in the area in the long-term.

## 4. Origin of the Regenerating Plants

Of the seventy-two indigenous plant species I saw, only *Cassinia sifton* (Sifton Bush) and the *Juncus* species (rushes) have seeds light enough to have blown in from off-site. The only plausible origins I can think of for the rest of the indigenous plants are either:

- (a) Seeds stored in the overburden for many years; or
- (b) Seeds or plant fragments introduced when the clay pit was filled in.

The latter is very much less likely, for the following reasons:

<sup>1</sup> Lorimer G.S. (2010). ‘*Sites of Biological Significance in Knox*’. Knox City Council, Wantirna South. 2 volumes.

- To germinate, seeds typically have to be in the uppermost 10 cm or so of soil, which was mostly the overburden spread over the top of the material used to fill the pit, not the imported fill.
- It appears from satellite images that the pit was filled with clay subsoil, which does not contain organic material such as seeds or viable plant fragments. (Organic material in soil makes it prone to subsidence and hence makes it unsuitable as fill.)
- It would be a remarkable coincidence if topsoil was brought in from one of the few sites that had a healthy example of the rare, seasonally-boggy vegetation indicated by the species I observed.
- The species I observed are all quite consistent with having grown on-site and left seeds in the overburden that was spread over the site. Since 1997, I have previously seen all but twelve of the seventy-two species in Table 1 (p. 5), either at the northern end of the property or on the adjacent council land. Six of the remaining twelve species are fairly common species that one might expect to see in the type of forest that still abuts the former clay pit. The final six species are all quite consistent with the same, rare type of forest.

Some readers may be surprised at the capacity of so many plant species to persist for decades, interred in the bunds around the clay pit. There are plenty of precedents, though Norvel Estate is unusually large in area. In 1997 and 2007, I observed some of the same species (e.g. *Viminaria juncea* or Golden Spray) regenerating where soil had been disturbed around the lip of the clay pit. The next-closest example is when a cutting was dug for the Belgrave Railway Line beneath central Boronia in 1998. The excavations stimulated germination of seeds of many species that had not been seen there in scores of years, including *Viminaria juncea*, which can still be seen beside the railway line near the 7-Eleven store.

## 5. Site Significance

The regenerating indigenous plants, and particularly the rarer ones, are important for what they tell us about the pre-settlement history of the area. The site is also important for conserving the locally-threatened species but that importance is diminished because the site is evidently too dry for the rarer plants to survive in the long-term, as I explained at the end of Section 3 above.

The '*Sites of Biological Significance in Knox*' report used the state government's standard criteria for assessing the significance level of sites of biological significance<sup>2</sup>. Those criteria do not take into account a situation such as this where locally-threatened species occur but only for a limited period and only as a one-off result of soil disturbance. If one sets aside that limitation of the standard criteria, then the area of regenerating plants rates 'Local' significance because it contains locally-threatened plants and a 'remnant patch' of vegetation (criteria 3.1.5 and 3.2.4).

That rating provides hardly any guidance about what measures would be appropriate to conserve the significant plants. I deal with such measures in the remaining sections of this report.

## 6. Recommended Rescues

Table 1 includes colour-coding to indicate species that I recommend to be rescued and conserved elsewhere, should that be permitted by the landowner. I have selected those species on the basis of their high threat status and the likelihood that rescuing them can make significant contributions to the survival of their species in Knox. As an example of why I place a low importance on rescuing

<sup>2</sup> Amos N. (2004). '*Standard Criteria for Sites of Biological Significance in Victoria*'. Dept of Sustainability & Env't.

some other locally-threatened species, *Acacia myrtifolia* (Myrtle Wattle): (a) would not survive replanting; (b) its seeds would be inbred as there is only one individual; (c) there are quite a few nearby sites where more genetically-diverse seeds could be collected; and (d) the species is already well-represented in cultivation.

Some of the species that I recommend for rescuing can be grown from seed that could be collected this summer (mainly December to early January), as long as they are not mown. *Viminaria juncea* will not have seed until a year later, and only if the plants are not mown (as they have been previously).

Some other species are much more reliably rescued by digging them up during the season of boggy soil, potting them up until stabilised and then planting them.

The other colour-coded species can be rescued by both methods.

I therefore recommend the following actions, if the landowner agrees:

- Leave as much as possible of the black-hatched area of Figure 1 (p. 3) unmown until January 2023, to allow seeds to be produced by all the species colour-coded blue on Table 1 (p. 5). Note that *Viminaria juncea* (Golden Spray) will not produce seeds until December 2022 at the earliest. I note that: (a) the ground tends to be boggy; (b) there is very low bushfire fuel – see Figure 2 (p. 4); and (c) growth rates are low, as the vegetation is already at least five years old.
- During the boggy season of June to early November (preferably in 2021), dig up as many as possible of the species in Table 1 (p. 5) that are colour-coded orange (for digging up but not collecting seed);
- Collect seeds from as many as possible of the colour-coded species in Table 1 during December 2021 to January 2022. Ideally, the local indigenous nurseries would also take the opportunity to collect seeds of any additional species that they are short of; and
- Ideally (but not critically), during the boggy season after seeds have been collected from species colour-coded purple on Table 1, dig up as many as possible of those plants.

Once these actions are taken, a plant nursery could nurture the dug-up plants and propagate the collected seeds so that they can all be planted once a suitable site is available, as discussed in Section 7. These are quite standard tasks for an indigenous plant nursery.

A cheaper but probably less successful approach for the dug-up plants would be to transplant them directly into their final destination, if that destination has been decided and is available at the time. Plants that have been dug up are more likely to survive if they are stabilised in a nursery by watering them and allowing their roots to grow into potting mix.

## 7. Planting Sites

My first preference would be to plant the dug-up and propagated plants in the adjacent council reserve, for three reasons. Firstly, as mentioned above, the seasonally-boggy habitat that so many of the site's locally-threatened plants rely upon has become quite scarce, and there happens to be suitable habitat in the reserve. Secondly, keeping the plants so close to their origin serves to conserve the area's natural heritage. Thirdly, I cannot think of any better site.

### 7.1 The 'Northeast Defendable Space'

The most promising location for relocating and planting many of the rescued plants is within the 'northeast defendable space' mapped on Figure 1 (p. 3) and depicted in the photograph in Figure

4. The paucity of trees there means less competition for soil moisture, which is important for the water-loving rare plants.



**Figure 4. A view across the 'defendable space', looking south to the former clay pit in the distance.**

As a further protection against the worst drought effects of climate change, some of the proposed subdivision's runoff could be directed into the defendable space. This might be done with a suitable design of the swale that is proposed for the northern edge of the subdivision, including a mechanism to regulate the flow.

Importantly, all but two of the species I propose to be rescued are low groundcover species with low fire risk. They do not conflict with the vegetation management specifications devised for the 'defendable space' by Terramatrix in their report titled 'Bushfire Development Report for Norvel Road, Ferntree Gully'.

The two non-groundcover species that I propose to be rescued are *Viminaria juncea* (Golden Spray) – a spindly, large shrub – and a solitary plant of *Gahnia sieberiana* (Red-fruit Saw-sedge). A few of the former and perhaps the latter could be included in the clumps of non-groundcover accommodated by the Terramatrix report.

## 7.2 The Drainage Reserve

A drainage reserve with a wetland is proposed for the northwest corner of the new subdivision – see Figure 1 (p. 3). It is proposed to be managed as 'defendable space' but the landscaping anticipated by Section 5.5 of the Terramatrix report includes planting of some trees, shrubs and groundcovers (or 'grass', in the broad sense). Those shrubs could include some rescued *Viminarias* and the groundcovers could include some of the other rescued species.

### 7.3 Around the Billabong

The Blind Creek Billabong is not required to function as a 'defendable space', as there are no adjacent homes. That leaves open the option of planting a few *Viminarias* there, as well as some of the rescued groundcover plants. However, there is not much available space.

### 7.4 Another Reserve?

There may be another reserve in Knox that could provide suitable habitat for the rescued plants but I cannot think of one and time constraints prevent me from investigating.

## 8. Land Purchase

I understand that some members of the local community have put forward the idea of council purchasing some of the proposed residential subdivision, in which to conserve some of the significant plants. If Council is of a mind to consider such a purchase, I offer the following advice about the best location from an environmental perspective.

Three important parameters are:

- The purchased land should represent an expansion of the bushland reserve, not be separated from it;
- The soil needs to be reliably boggy through much of the year, either naturally or through discharge from the proposed swale; and
- The purchase of land should not conflict with the need for drainage to the northwest of the subdivision.

Ideally, the purchased land would already contain some of the plants that would otherwise be rescued.

Taking these matters into consideration, and recognising that there are many factors that I am unable to consider, it appears to me that the best option for biodiversity would be to effectively move the drainage reserve and the northern east-west road to the south. The distance by which that shift occurs would be limited, in part, by the reduced capacity to drain the most northeasterly lots (the highest-numbered lots) into the proposed swale.

As an example of the way I envisage this suggestion might be implemented, lots 48, 53, 86 and 92 could theoretically be eliminated and the parts of the subdivision elements further downhill be shifted to fill the voids.

Of course, I recognise that any such change would be substantial, particularly at the present stage of consideration of the subdivision proposal.

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