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REVISED CONSOLIDATED BUSHFIRE REPORT

FOR A PROPOSED 184 LOT SUBDIVISION CONSISTING OF 175 RESIDENTIAL LOTS, 3 RESIDUAL LOTS, 4 PUBLIC RESERVES, 1 DRAINAGE RESERVE, 1 SEWER PUMP STATION AND SUB-DIVISION WORK, ROAD UPGRADE AND DEMOLITION OF EXISTING ON-SITE STRUCTURES

Sub-Division (s.100B RF Act 1997); Integrated Development (s.4.46 EPA Act1979)
Reference: 1810DAC-b

Location: Lot 163 DP831052, Lots 276 & 277 DP755624 Crown road reserve between Lot 163 DP 821052 and Lot 276 DP 755724 and Crown foreshore reserve; Iron Gates Drive, Evans Head

Client: Gold Coral Pty Ltd

Date of Issue: 12 July 2019

BPAD Bushfire Planning & Design Accredited Practitioner Level 3

This report has been prepared by: **Melanie Jackson**
Grad Dip (Bushfire Protection); B.App.Sc (EnvResMgt)
BPAD-Level 3 Accredited Practitioner & Member of the FPA Australia

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Acknowledgement:

The original Bushfire Safety Authority Report for this project was prepared by Planit Consulting Pty Ltd (September 2014).
The original Bushfire Safety Authority Report has been revised by Bushfire Risk Pty Ltd, with permission, to address requests for further information from Richmond Valley Council and amendment to the Development Application to include upgrading of Iron Gates Drive.

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Executive Summary

This Bushfire Risk Assessment relates to the proposed subject site:	Lot 163 DP 831052, Lots 276 and 277 DP 755624 (Crown Road Reserve between Lots 163 DP 831052 and Lot 276 DP 755724, Crown Foreshore Reserve); Iron Gates Drive, Evans Head NSW
Client:	Gold Coral Pty Ltd
Site inspection date:	18 February 2019
Type of development:	Proposed One Hundred and Eighty Three (184) Lot Subdivision including: • One Hundred and Seventy Five (175) Residential Lots; • Three (3) Residue Lots • Four (4) Public Reserves • One (1) Drainage Reserve • One (1) Sewer Pump Station • Upgrading of Iron Gates Drive • Demolition of Existing Structures Onsite Subdivision Work including road works, drainage, water supply, sewerage, landscaping and embellishment work and street tree planting.
Site Plans:	Plans by: Landpartners Pty Ltd; Dated 29 June 2019 (Ref. Appendix A & B). A full set of final plans shall be provided by the applicant to accompany the DA. All design and site plans must ensure compliance with the minimum building setbacks in relation to this development as proposed and the recommendations contained herein.
Is the Development a Special Fire Protection Purpose?	NO
Are future residential lot able to accommodate a building envelope with a BAL-29 or lower construction level (AS3959-2009)?	YES – subject to final approval complying with the recommendations contained herein.
Does this development comply with the Aims and Objectives of Planning for Bushfire Protection ((PBP) 2006)?	YES – with alternate solutions for access.
Does this development require referral to the NSW Rural Fire Service as per s.100B of the *Rural Fires Act* 1997?	YES – requiring a bushfire safety authority (BFSA) for integrated development
This assessment has been prepared and **Certified by Melanie Jackson** BPAD-D Certified Practitioner **FPAA Cert. No: BPD-PD-21977**	

SECTION 1

Introduction

1.1 Brief

Bushfire Risk has been commissioned by Gold Coral P/L to prepare an application for a Bushfire Safety Authority to accompany a development application for a proposed One Hundred and Eighty Three (184) Lot Subdivision including:

- One Hundred and Seventy Five (175) Residential Lots;
- Three (3) Residue Lots
- Four (4) Public Reserves
- One (1) Drainage Reserve
- One (1) Sewer Pump Station
- Upgrading of Iron Gates Drive
- Demolition of Existing Structures Onsite

Subdivision Work including road works, drainage, water supply, sewerage, landscaping and embellishment work and street tree planting.

1.2 Approvals Sought

This report has been compiled to satisfy the integrated development component of the amended application to be lodged with both Richmond Valley Council and the NSW Rural Fire Service. Subdivision of residential bushfire prone land is considered integrated development pursuant to Section 100B of the Rural Fires Act 1997. A Bushfire Safety Authority and General Terms of Approval are sought from the NSW Rural Fire Service.

Figure 1 – Aerial Photograph – Source; Google Earth

1.3 The Site & Surrounds

The subject site is described as Lot 163 in Deposited Plan 831052 and Lots 276 and 277 in Deposited Plan 755624, Iron Gates Drive, Evans Head NSW. The site represents urban zoned land to the west of the Evans Head town centre. The site has direct frontage frontage to Crown foreshore reserve adjacent to the Evans River and vehicular access is provided to the site via Iron Gates Drive which is a public road, to the south and is surrounded by native vegetation on all other compass bearings. Access is granted by Iron Gates Drive. The site is zoned R1 – General Residential, part RU1 – Primary Production , part E2 – Environmental Conservation and part E3 – Environmental Management under the *Richmond Valley Local Environmental Plan 2012*.

1.4 Bushfire Prone Land

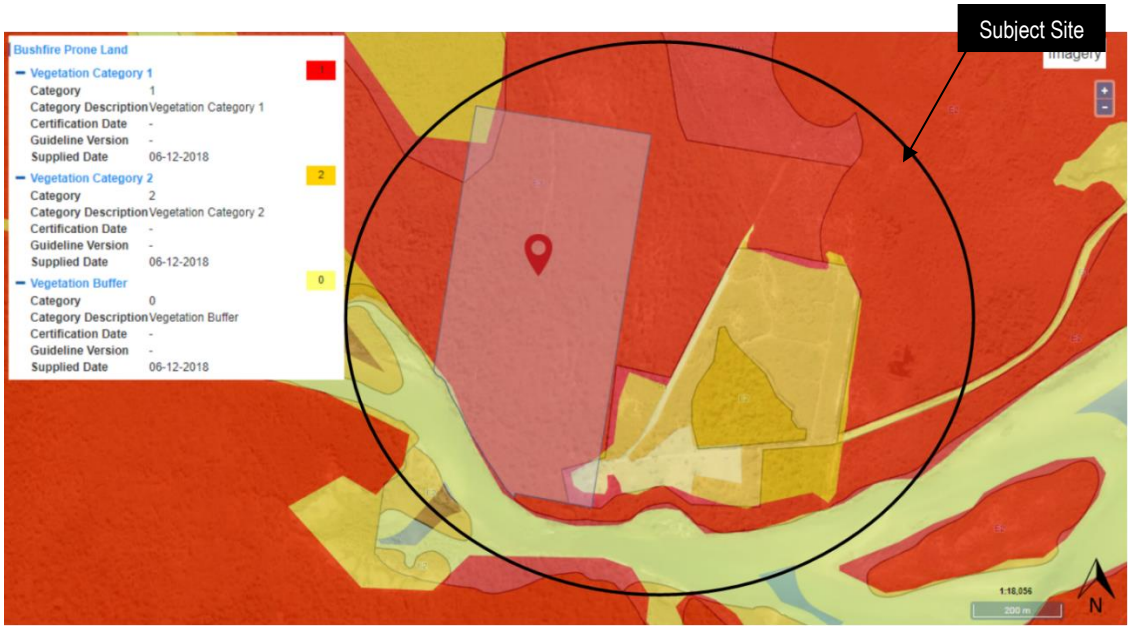

Figure 2 – Bushfire Prone Land Mapping – Source: NSW Government Planning Portal

In accordance with Council's Bushfire Prone Land mapping, the site contains Category 1 and 2 bushfire prone vegetation and buffer zone (Ref. Figure 2). An assessment of the proposed developments design response to the surrounding bushfire threat is included herein (Ref. Section 3 – Bushfire Safety Authority Application).

1.5 Surrounding Vegetation

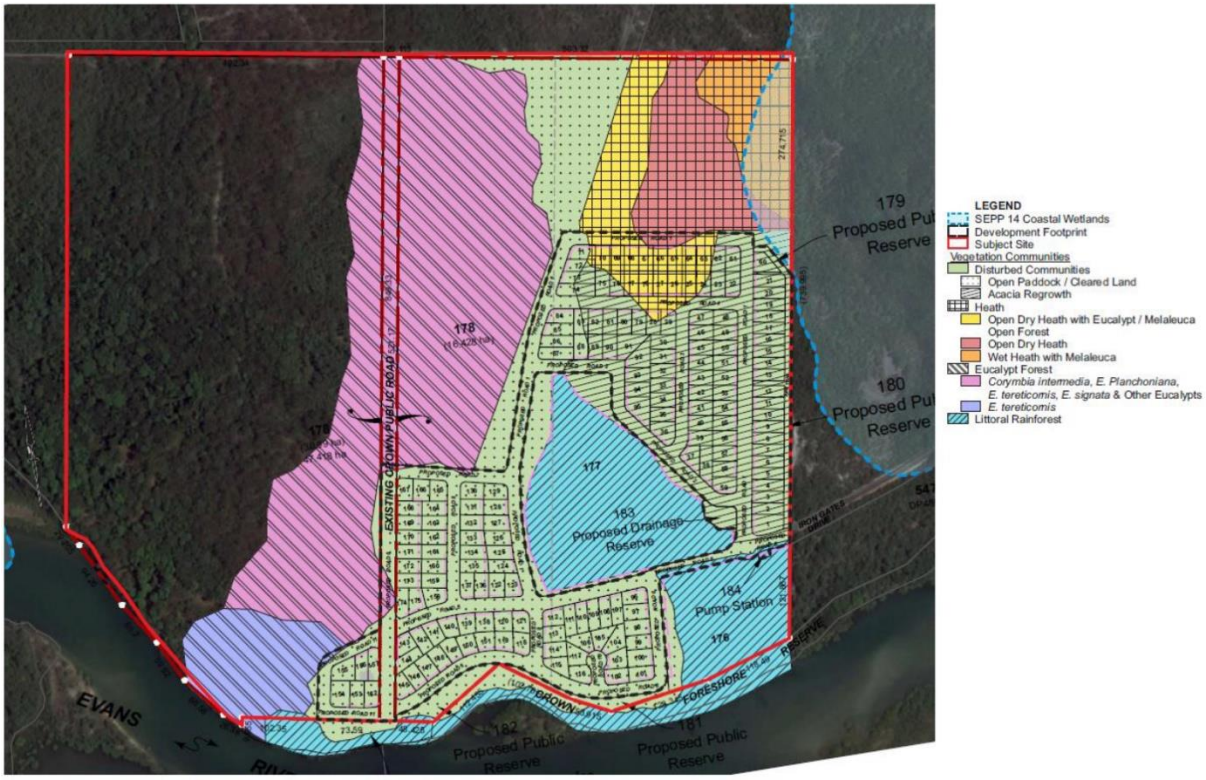

Figure 3 – Vegetation Communities Mapping (Source; Amended Terrestrial Flora & Fauna Assessment (JWA Pty Ltd))

A Flora and Fauna Assessment has been completed for the proposed development by the project ecologist. The vegetation communities surrounding the development have been classified as per Figure 3. Detail regarding the surrounding vegetation and its impact upon the proposed development has been included herein (Ref. Section 3 – Bushfire Safety Authority Application).

SECTION 2

Further Information

Should Council or the NSW RFS require any additional information or wish to clarify any matter raised by this proposal or submission made to same, it is requested that Bushfire Risk Pty Ltd is contacted prior to determination of this application.

The relevant contact details are listed below:-

Bushfire Risk Pty Ltd.
PO Box 685
Lismore NSW 2480
M: 0447 211 375
E: mj@bushfirerisk.com.au
W: www.bushfirerisk.com.au

SECTION 3

Bushfire Safety Authority Application

The following provides an assessment of the proposed development in accord with the matters under Clause 44 of the Rural Fires Regulations 2008 and the relevant controls of Planning for Bushfire Protection 2006 and AS 3959-2009 applying to the subject site.

NSW Rural Fires Regulations 2008

Clause 44 – Application for a bush fire safety authority

a) a description (including the address) of the property on which the development the subject of the application is proposed to be carried out,

Address: Iron Gates Drive, Evans Head NSW

Lot/DP: Lot 163 DP 831052 and Lots 276 and 277 DP 755624

Current Use: Single dwelling, shed and landscaped garden.

Description of the subject site and surrounds

The subject site is described as Lot 163 in Deposited Plan 831052 and Lots 276 and 277 in Deposited Plan 755624, Iron Gates Drive, Evans Head NSW. The site represents urban zoned land to the west of the Evans Head town centre.

The site has direct frontage frontage to Crown foreshore reserve adjacent to the Evans River and vehicular access is provided to the site via Iron Gates Drive which is a public road, to the south and is surrounded by native vegetation on all other compass bearings. Access is granted by Iron Gates Drive. The site is zoned R1 – General Residential, part RU1 – Primary Production , part E2 – Environmental Conservation and part E3 – Environmental Management under the Richmond Valley Local Environmental Plan 2012.

Proposed Development:

This application seeks development consent for a proposed One Hundred and Eighty Three (184) Lot Subdivision including:

- One Hundred and Seventy Five (175) Residential Lots;
- Three (3) Residue Lots
- Four (4) Public Reserves
- One (1) Drainage Reserve
- One (1) Sewer Pump Station
- Upgrading of Iron Gates Drive
- Demolition of Existing Structures Onsite

Subdivision Work including road works, drainage, water supply, sewerage, landscaping and embellishment work and street tree planting. Internal roads will be constructed to provide access to the created allotments and essential services provided.

b) a classification of the vegetation on and surrounding the property (out to a distance of 140 metres from the boundaries of the property) in accordance with the system for classification of vegetation contained in Planning for Bush Fire Protection (PFBP 2006),

The vegetation surrounding the development site has been identified by the project ecologist as four (4) different communities (Ref. Figure 3). For the purposes of bushfire planning assessment,

each of these formations have been defined so as to correspond with the vegetation classifications contained within Planning for Bushfire Protection 2006 and AS-3959-2009.

Using the definitions outlined within the NSW RFS document 'Planning for Bushfire Protection 2006' as well as the classifications demonstrated by David Keith in his book 'Desert Dunes to Ocean Shores', the surrounding bushfire prone vegetation is classified as the following:

Northern Vegetation

Heathlands (Scrublands) – Tall Heath (Shrub)
Heathlands greater than 2 metres tall. Includes Hawksbury Sandstone vegetation with overstorey trees and predominantly healthy understory and coastal heath. May include some mallee eucalyptus in coastal locations

Heathlands (Scrublands) – Short Heath (Open Shrub)
Heathlands less than 2m in height. Often more open in canopy. Sparsely connected.

Eastern Vegetation

Forested Wetlands
Restricted to riverine corridors and floodplains subject to periodic inundation. Dominated by eucalypts, tea-trees and paperbarks or sheoaks. Distinguished by presence of hydrophytes, woody plants that can live in flooded environments e.g. sedges, rushes, buttercups, knot weeds, lignum, ferns and grasses. Found generally low altitudes. Soils vary from peaty and semi-humic loam soils to mineral clays and sandy loams. Coast, tablelands and inland.

Southern and Central Vegetation

Rainforests (Closed Forest)
Closed and continuous tree canopy composed of relatively soft, horizontally held leaves. Generally lacking in eucalypts. Understorey typically includes ferns and herbs. Vines often present in canopy or understorey. Occur mainly in areas that are reliably moist, mostly free of fire and have soils of moderate to high fertility. Typically coastal and escarpment locations.

Western Vegetation

Dry sclerophyll forests (Open Forest)

Dominated by eucalypts 10-30m tall with crowns that touch or overlap (i.e. foliage cover of 20-50%). Prominent layer of hard-leaved shrubs. Infertile soils. Rainfall >500mm. Coast, tablelands and western slopes.

As a result of this classification, the design responses and separation distances employed throughout this report use the 'Scrub', 'Rainforest' and 'Forest' controls that are applicable within PFBP 2006 and AS 3959-2009. Tall heath is noted within Table A3.5.1 of Addendum: Appendix 3 – PFBP 2006 to be considered as 'Scrub' when using AS-3959-2009. Forested wetlands are noted within Table A3.5.1 of Addendum: Appendix 3 – PFBP 2006 to be considered as 'Forest' when using AS-3959-2009.

c) an assessment of the slope of the land on and surrounding the property (out to a distance of 100 metres from the boundaries of the property),

The subject site is predominantly flat in topography. The western extent of the property rises from flat to an elevation of approximately 30m AHD.

d) identification of any significant environmental features on the property,

Identification of any significant environmental features on the property is outside the scope of this report. However, a Flora and Fauna Assessment for the Iron Gates Development and an Ecological Assessment for Iron Gates Drive have been prepared by the project ecologist, JWA Pty Ltd, for the proposed development and shall be read in conjunction with this report. Refer to the revised SEE.

e) the details of any threatened species, population or ecological community identified under the Threatened Species Conservation Act 1995 that is known to the applicant to exist on the property,

This is outside the scope of this report and shall be read in conjunction with the Terrestrial Flora and Fauna Assessment for Iron Gates Development and the Ecological Assessment for Iron Gates Drive, prepared by the project ecologist, JWA Pty Ltd, for the proposed development. Any endangered ecological communities prescribed under the Threatened Species Conservation Act 1995 which exist on-site shall be discussed within the flora and fauna report accompanying the DA. Refer to the revised SEE. It is however noted that the proposed APZ and Access roads have been designed to accommodate any recommendations by the ecologist, including proposed alternate solutions to provide a single Public Access Road via Iron Gates Drive with provisions to negate additional clearing of land identified as SEPP 14 Coastal Wetlands.

f) the details and location of any Aboriginal object (within the meaning of the National Parks and Wildlife Act 1974) or Aboriginal place (within the meaning of that Act) that is known to the applicant to be situated on the property,

A Cultural Heritage Assessment is outside the scope of this report. However, a cultural heritage report was undertaken by the project specialist for the subject site which shall be read in conjunction with this report. Any Aboriginal heritage items and places that exist on the subject property shall be addressed in the report. Potential impacts of the development on these items and mitigation measures shall be set out within the report. Refer to the revised SEE.

g) a bush fire assessment for the proposed development (including the methodology used in the assessment) that addresses the following matters:

i. the extent to which the development is to provide for setbacks, including asset protection zones,

Upon site inspection, the proposed residential lots shall be sited in areas having been previously cleared of vegetation. Currently some areas present with managed grassland, scrub and regrowth vegetation which require modification in order to achieve the recommended setbacks from areas identified as a bushfire threat. Subdivision design has utilised existing cleared and/or regrowth areas to create the lots.

The overall design incorporates on-site and/or off-site managed areas e.g. perimeter roads and a fire trail, to ensure sufficient separation distance between indicative building envelopes and the surrounding bushfire threat can be maintained in perpetuity.

The proponent commits to the ongoing maintenance of all created allotments by way of routine mowing of grass cover and the removal of fuel loads such as fallen leaves and branches until contracts of sale are exchanged for each lot. It is recommended this is carried out in a manner which maintains low fuel loads consistent with the NSW Rural Fire Service document '*Standards for Asset Protection Zones*' (2005). The ongoing maintenance of each allotment will then become the responsibility of the landowner.

As the proposed development will be a low density urban subdivision, all lots will be maintained by the future owners as managed landscaped gardens. Public access roads and fire trails shall become the ongoing responsibility of and be maintained by Council as an IPA. These highly managed areas are considered to be in keeping with Inner Protection Areas (IPA's) as prescribed within the NSW RFS document *'Standards for Asset Protection Zones'* (RFS 2005). It is considered that all lots will have sufficient space outside of the building envelope to establish an APZ.

Min. APZ (setbacks) from the hazard is required to ensure radiant heat flux to the receiver (potential dwelling/s) in excess of 29kW/m^2 and direct flame contact is negated pursuant to the acceptable solutions of s.4.1.3 – '*Asset Protection Zones'* with the exception of proposed Lot 174 being assessed against the performance criteria, using Method 2 – '*Complex Procedure'* described in AS3959-2009 to determine the setbacks, BAL rating and radiant heat flux to the

receiver from the hazard (Ref. Figure 4 herein). The setback of the building envelopes in closest proximity to fire threats are illustrated within Appendix A – Bushfire Safety Authority Plan.

ii. the siting and adequacy of water supplies for fire fighting,

The subdivision is to be serviced by reticulated water supplies consistent with the acceptable solutions as per s.4.1.3 – *Services* (PBP 2006). Reticulated water supply and hydrant spacing, sizing and pressure are to be installed as per the requirements set out in AS2419-2005 and/or Councils recommendations. Hydrants shall be located along all proposed internal roads, adequately spaced to ensure the hose distance from the hydrants is capable of reaching the furthest extent of each of the building envelope, namely within 70m min. of the most distant part of each dwelling (Ref. Appendix A).

The location of all hydrants shall be illustrated within the Engineering Impact Assessment within the revised SEE. The subject site is considered adequately serviced with water supplies for fire fighting purposes subject to the engineer's recommendations.

iii. the capacity of public roads in the vicinity to handle increased volumes of traffic in the event of a bush fire emergency,

Compliance for public access shall be achieved by meeting the performance criteria of s.4.1.3 – *Public Roads*. The public road requirements were assessed in two parts as follows:

1. Iron Gates Drive; and
2. Public 'Internal' Roads (including perimeter, internal roads and fire trails).

Results – Public Roads (including perimeter, internal roads and fire trails)

Firstly, the internal road system includes a perimeter road, fire trail and road between the environmental protection zone with various carriageway widths. The proposed roads / fire trails consist of the following:

1. Proposed perimeter road (excluding road 3):
    - Two-way, 9m wide paved carriageway (kerb to kerb);
    - 14m wide cleared road reserve;
2. Proposed road 3 – Environmental protection zone (south-east locality):
    - Two way, 7m wide paved carriageway (kerb to kerb), 3.5m each way;
    - Various width road reserve, clear of vegetation (min. 2.75m each side – non-trafficable);
3. Fire trail – public reserve (north-east locality – east of lots 1 to 21 & 60):
    - 5m wide (min.), gravel carriageway; &
    - 8m cleared width / reserve, to be maintained by Council in perpetuity.

Public access roads and fire trails shall become the ongoing responsibility of and be maintained by Council as an IPA. Both acceptable and alternate solutions were used to demonstrate compliance against the performance criteria of s.4.1.3 *Access [1] – Public Roads*.

A Bushfire Safety Brief (BSB) was undertaken by Melanie Jackson of Bushfire Risk, providing a standalone document addressing the alternate measures in relation to '*Iron Gates Drive*' only, which is presented in the SEE accompanying the DA. The Alternate Solutions were based on research and consultation with various stakeholders including the developer and NSW RFS; This document provides recommendations that meet the performance criteria for public roads based on a single access road to and from the estate via Iron Gates Drive to Evans Head.

In addition, Peter Thornton of Bushfire Certifiers conducted a bushfire threat assessment and report for the subject site, entitled '*Bushfire Threat Assessment Report Lot 163 DP831052, Lots 276 & 277 DP 755624 Iron Gates Road, Evans Head, Proposed 184-Lot Residential*

Subdivision', dated 14 August 2015 (Thornton 2015). This report included an assessment of the '*Public 'Internal' Roads and Fire Trail*' system, which formed the basis of the current sub-division layout, having been modified as a result of recommendations from that report which was generally supported by the NSW RFS – Coffs Harbour Customer Service Centre (Thornton 2015).

To ensure consistency, Melanie Jackson of Bushfire Risk undertook a literature review of previous documents, site visit on 18 March 2019 to provide a conclusive, final bushfire risk assessment of the subject site and surrounds in consultation with various stakeholders.

The results of the final bushfire risk assessment and more specifically in relation to access provisions are presented in the following BSB, attesting that the '*Public 'Internal' Roads and Fire Trail'* meet the performance criteria set out in s.4.1.3 *Access [1] Public Roads*, having the ability to meet increased traffic volumes in a bush fire emergency.

Emergency services will have all weather access to the site and the proposed internal roads have been designed for compliance with the controls prescribed within PBP 2006. The internal roads will be dedicated to Council after construction and become public roads. The proposed public road systems are considered to provide sufficient manoeuvrability for emergency vehicles throughout the site.

Iron Gates Drive – Alternate Solution

Bushfire planning and design investigations in relation to provisions to provide a single access road via '*Iron Gates Drive'* were undertaken in consultation with the various stakeholders i.e. NSW RFS, the developer and myself etc. Both written documentation and various on-site meetings were attended by the stakeholders and as a result, a standalone bushfire report entitled *'Bushfire Assessment – Additional Information Response Re: Iron Gates Drive, Evans Head NSW by Melanie Jackson of Bushfire Risk Pty Ltd (8 March 2017 – Version 1)* (Bushfire Risk 2017) was undertaken providing a summary of work which demonstrates the proposed single access road i.e. '*Iron Gates Drive'* is of an acceptable standard, able to accommodate increased traffic volumes in the event of a bushfire. Therefore demonstrating compliance against the Performance criteria set out in s.4.1.3 [1] – *Public Roads* (PBP 2006).

It is noted '*Iron Gates Drive'* is dedicated to Richmond Valley Council for ongoing maintenance in perpetuity and shall be designed and upgraded in a manner consistent with the performance criteria set out in s.4.1.3 [1] – *Public Roads* (PBP 2006); meeting the intent of measures by providing '*safe operational access to structures and water supply for emergency services while residents are seeking to evacuate from an area'.* In addition the recommendations included in the Bushfire Assessment have considered the environmental constraints identified in the Ecological Assessment for Iron Gates Drive, prepared by the project ecologist (JWA Pty Ltd).

Bushfire Safety Brief – *Public 'Internal' Roads*

The Performance Criteria of s.4.1.3 [1] – Public Roads (PBP 2006) states the following:

> *Public road width and design that allow safe access for fire fighters while residents are evacuating an area.*

The first non-compliance issue for the sub-division plan is a single access road to and from the proposed development shall be provided via 'Iron Gates Drive'; having potential to create a '*bottleneck'* and '*pinch point'* to the development. This has been addressed / resolved in the standalone document by Melanie Jackson of Bushfire Risk (2017) referred to above.

The second non-compliance issue relates to proposed 'Road 5' which dissects two areas of ecological significance near the south-east of the development. The proposed formed, paved road width being a two-way, 7m in width (3.5m each way) and approx. 100m long is proposed to negate further clearing of significant ecological communities on either side of this road. There are additional cleared areas on either side of the carriageway, clear of vegetation (min. 2.75m each side), non-trafficable due to installation of guard rails at the back of the kerb.

The third non-compliance issue relates to the public '*internal'* road system within the estate whereby a fire trail shall be used in lieu of a perimeter road at the rear of lots 1 to 21 & lot 60. This assessment demonstrates the road system with a fire trail will meet the performance criteria and objectives of s.1.2.1 and s.4.1 of PBP (2006), the following BSB is based on extracted works from the '*Bushfire Threat Assessment Report Lot 163 DP831052, Lots 276 & 277 DP 755624 Iron Gates Road, Evans Head, Proposed 184-Lot Residential Subdivision'*, dated 14 August 2015 (Thornton 2015).

S4.1.3 [1] – Public Roads in Planning for Bushfire Protection 2006 states that a '*perimeter road' is the 'preferred' option to separate bushland from urban areas*, however it is acknowledged that other options are permissible. Fire trails are considered acceptable in exceptional circumstances and where the performance criteria and objectives can be satisfied. Furthermore, the 'Aim' of PBP2006 is to minimise the impacts on property and people from the threat of bushfire, '*while having due regard to development potential, onsite amenity and protection of the environment'*.

The purpose of the public road system is to:

- Provide fire-fighters with easier access to structures, allowing more efficient use of
- fire-fighting resources;
- Provide a safe retreat for fire-fighters; and
- Provide a clear control line from which to conduct hazard reduction or back burning.

It is considered that the proposed fire trail location will be at least equivalent to providing a public perimeter road in a bushfire event. The assessment provides a comparative assessment method by '*Expert Judgement'* as outlined in BCA A0.5 (c) against the objectives and performance criteria identified within this report.

Aim and Objectives of PBP2006

The aim of PBP is to use the NSW development assessment system to provide for the protection of human life (including firefighters) and to minimise impacts on property from the threat of bushfire, while having due regard to development potential, on site amenity and protection of the environment.

Comment

All asset protection zone requirements, water supply, utilities and public road specification (except where fire trails used in lieu of perimeter roads) will need to be fully compliant with Planning for Bushfire Protection whilst having regard to the development potential as is one part of the aim of Planning for Bushfire Protection 2006.

More specifically, the objectives are to:

Afford occupants of any building adequate protection from exposure to a bush fire;

Comment

The use of a fire trail specifically for emergency services to operate will provide sufficient area for fire-fighters whilst forming part of a compliant asset protection zone that will meet the minimum requirements of PBP 2006 and NSW RFS Fast Facts. The asset protection zones are considered by the legislation as being the minimum for adequate building protection when a building is constructed to AS 3959-2009.

The use of the fire trail will also ensure that future occupants of lots 1 to 21 and lot 60, where the fire trail is located will not be exiting the dwellings toward the hazard but away from the hazard via the internal public road network. Similarly, occupants of the entire subdivision using

the internal road network will not be within 20m of the hazard interface but will be approximately 60m from the hazard with the proposed fire trail option.

Conversely, the perimeter road option will potentially place occupants evacuating toward the hazard within the 'flame zone' whereas occupants exiting to the internal road 60m from the hazard will be exiting where radiant heat will be less than 10kW/m^2 calculated without the reduction of shielding from the dwellings factored in which would further decrease radiant heat levels.

It is therefore considered that this design is a better outcome for occupants of the buildings in a bushfire event.

Provide for a defendable space to be located around buildings;

Comment

Defendable space will be provided in combination of the fire trails and surrounds and the asset protection zones once the fire front has passed allowing occupants to undertake property protection. As the asset protection zones will be fully compliant with the requirements of Planning for Bushfire Protection 2006, this will be compliant.

The land where the fire trail is located will be 8m in width, to be managed as an IPA by Council in perpetuity with a 5m wide gravel carriageway. This shall provide a comparable defendable space as that of a perimeter road option.

Provide appropriate separation between a hazard and buildings which, in combination with other measures, prevent direct flame contact and material ignition;

Comment

As the asset protection zones will be fully compliant with the requirements of Planning for Bushfire Protection 2006, this will be compliant. Buildings will be required to be constructed to AS 3959-2009.

Ensure that safe operational access and egress for emergency service personnel and residents is available;

Comment

The fire trails will be fully compliant with s4.1.3 [3] PBP2006 which will provide adequate access for fire-fighters for APZ maintenance and fire control lines. As required by s4.1.3 [3] PBP2006 the fire trails will be connected to the public road system at frequent and compliant intervals of less than 200m.

The fire trails will be utilised by fire-fighters predominantly and therefore unlike with a perimeter road fire-fighters can operate without the direct impact of occupants passing by during evacuation and/or the scenario where fire fighters are operating within an 8m wide perimeter road with occupants evacuating in one directions and other emergency services or the like passing in the same space in the opposite direction. In this regard it can be considered that at the least, equivalence has been demonstrated.

Provide for ongoing management and maintenance of bush fire protection measures, including fuel loads in the asset protection zone (APZ);

Comment

As outlined in s4.1.3 [3] the fire trails will be under the management and control of Richmond Valley Council whom shall be responsible to ensure adequate on-going maintenance is undertaken on a regular basis in perpetuity, i.e. being an equivalent to the management of a perimeter road. The recommendations herein include provisions for Richmond Valley Council take this responsibility and instigating and/or ensure the 'Northern Rivers Bushfire Management Plan' (BMP) is updated accordingly.

Ensure that utility services are adequate to meet the needs of firefighters (and others assisting in bushfire fighting);

Comment

The perimeter road design solution incorporates fire hydrants for fire-fighters to use along the bushfire hazard interface and in this regard, in order to demonstrate equivalence it is recommended fire hydrants are placed along the fire trail in accordance with s4.1.3 PBP 2006 providing equivalence as for a perimeter road. Design details shall be provided in the engineering study and SEE in support of this DA and submitted to the Consent Authority for approval prior to installation.

Section 4.1.2 Specific Objectives for Subdivisions

The specific objectives for residential and rural residential subdivisions are to:

Minimise perimeters of the subdivision exposed to the bush fire hazard. Hourglass shapes, which maximise perimeters and create bottlenecks, should be avoided;

Comment

This component has been addressed herein and in the standalone bushfire report addressing a single access road via Iron Gates Drive, by Melanie Jackson of Bushfire Risk (2017) which shall be submitted to the NSW RFS for approval with a Bush Fire Safety Authority (Ref. SEE).

Minimise bushland corridors that permit the passage of bush fire.

Comment

Bushfire corridors are minimal by incorporating perimeter roads compliant with the requirements of s4.1.3 [1] PBP 2006. The exception being part of 'Road 5' being approx. 100m long, and 7m wide, traverses via an existing area of ecological significance near the south-east corner of the subject site. In order to negate additional clearing of significant ecological communities, the road incorporates an existing road width of 7m (3.5m each way). This stretch of road forms part of a perimeter road system around proposed lot 177, providing the option to bypass this stretch of road if required.

Either side of the road reserve are 2.75m (min.) verges clear of vegetation. Despite being non-trafficable the verges provide a suitable area for fire fighters working about their vehicles. Thus negating the requirement for a full 4m wide trafficable (one-way) width having additional room on the verges to work about the vehicle, which is otherwise afforded on the recommended road width of (4m either side).

I understand this area of road was recommended for closure for ecological purposes i.e. for wildlife connectivity (corridor), having potential to impact on safe access / egress for fire fighters and occupants in an emergency. The compromise in order to negate further clearing of vegetation was to maintain the existing road, with a 7m wide carriageway with min. 2.75m wide verges either side, in lieu of an 8m wide carriageway.

The vegetation is classified 'littoral rainforest', an endangered community, which presents as a low bushfire threat to the subject site. Lot 176 on the southern side of this road, abuts the Evans River foreshore, which is unlikely to present as a bushfire threat, and unlikely to impact on the community from this direction.

The proposed width is unlikely to have an impact on traffic passing in opposite directions as the design incorporates a perimeter road design, in addition that the cleared verges and paved carriageway combine to provide safe operational all weather access for fire fighters whilst occupants evacuate the area without impacting on fire fighter's ability to work about their vehicle.

The access road is therefore deemed acceptable provided the road reserve is maintained as an IPA and trees should be pruned in a manner that creates a break in the canopy in perpetuity. Richmond Valley Council shall be responsible for the ongoing maintenance of all public roads across the development.

Provide for the siting of future dwellings away from ridge-tops and steep slopes – particularly up-slopes, within saddles and narrow ridge crests;

Comment

The development is located predominantly on flat to gently undulating ground in the vicinity of the Evans River compliant with this objective.

Ensure that separation distances (APZ) between a bush fire hazard and future dwellings enable conformity with the deemed-to-satisfy requirements of the BCA. In a staged development, the APZ may be absorbed by future stages.

Comment

APZs are provided in the body of this report with recommendations for asset protection zones (APZs) to be compliant with PBP 2006 and the relevant NSW RFS Fast Facts for APZs.

Provide and locate, where the scale of development permits, open space and public recreation areas as accessible public refuge areas or buffers (APZs).

Comment

The development does not propose open space and public recreation areas specifically for use as public refuge areas or APZs however, adequate buffers have been applied in accordance with PBP 2006.

Ensure the ongoing maintenance of asset protection zones.

Comment

The proposed fire trails are to be managed by Richmond Valley Council with the remainder of the required asset protection zones being located primarily within the managed public road reserves and within proposed residential allotments.

Provide clear and ready access from all properties to the public road system for residents and emergency services.

Comment

All properties will have clear and direct access to the public road system as per the recommendations set out herein.

Ensure the provision of and adequate supply of water and other services to facilitate effective fire fighting;

Comment

All water supply and utility services are to comply with s4.1.3 PBP 2006. Additionally water supply is to be provided to the proposed fire trails in accordance with the prescriptive requirements of PBP 2006 (as for public roads).

Performance Criteria s4.1.3 (1) PBP2006

Public road widths and design that allow safe access for firefighters while residents are evacuating an area.

Comment

The public road widths and design are recommended to comply with s4.1.3 [1] of Planning for Bushfire Protection 2006 by acceptable and alternate solutions as per the recommendations provided herein.

iv. whether or not public roads in the vicinity that link with the fire trail network have two-way access,

As detailed within the revised SEE, one (1) fire trail will be dedicated to Richmond Valley Council as a Proposed Public Reserve, sited to the east of lots 1 to 21, and east and north of Lot 60 as part of the proposed development.

The proposed fire trails shall be provided consistent with the Alternate Solutions set out herein based on research, consultation and site assessment. The fire trail network is deemed acceptable, meeting the performance criteria of s.4.1.3.

Specifically the fire trails shall consist of a proposed 8m wide public reserve under Richmond Valley Council management to be maintained as an IPA in perpetuity. It is important Council notify the Northern Rivers Bushfire Management Committee to ensure risk management and treatment options are implemented and documented in the next review of the Northern Rivers Bushfire Management Plan (BMP).

The proposed fire trails have been designed to meet the performance criteria set out within s.4.1.3 [3] – *Fire Trails* (PBP 2006), an access gate shall be located at all entry points with keys provided to the local Rural Fire Service. Gates for fire trails are provided and locked with a key/lock system authorized by the local RFS.

v. the adequacy of arrangements for access to and egress from the development site for the purposes of an emergency response,

The subdivision design incorporates perimeter roads and fire trail access (See **Appendix A – Bushfire Safety Authority Plan**). Access and egress throughout the proposed subdivision for emergency response is considered to be adequately provided for pursuant to the alternate solutions presented in the BSB herein, and supporting bushfire report:

- *'Bushfire Assessment – Additional Information Response Re: Iron Gates Drive, Evans Head NSW by Melanie Jackson of Bushfire Risk Pty Ltd (8 March 2017 – Version 1)*

(Bushfire Risk 2017) – this report provides detailed information pursuant to pre-DA negotiations, consultation with various stakeholders and documentation in determining a resolution for a single access road via Iron Gates Drive, in lieu of providing a secondary access road.

vi. the adequacy of bush fire maintenance plans and fire emergency procedures for the development site,

The subject site is currently in a semi-managed low fuel state with the existing cleared areas routinely slashed and fuel loads removed upon sighting. The proponent commits to the ongoing maintenance of all stages by way of routine mowing and the removal of fuel loads such as fallen leaves and branches up until contracts of sale are exchanged for each lot (pursuant to the NSW RFS guideline '*Standards for Asset Protection Zones* (2012)). The ongoing maintenance of each allotment will then become the responsibility of the landowner.

As the proposed development will be a low density urban subdivision, all lots will be maintained by the future owners as managed landscaped gardens. These areas are to be maintained to the required NSW RFS '*Standards for Asset Protection Zones'*. This includes but is not limited to mowing on a regular basis, saplings and encroaching shrubs will be removed upon sighting along with fuel loads such as fallen leaves, bark and branches.

Richmond Valley Council will take ownership of the fire trails and public open space on the Evans River foreshore and public roads. Proposed lot 176 & 177 will be retained in Private ownership as environmental land and maintained as 'littoral rainforest' in perpetuity by the landowner. The use of fire is not recommended as a management tool, detrimental to rainforest communities, which presents as a low bushfire threat.

vii. the construction standards to be used for building elements in the development,

AS-3959-2009 prescribes the construction requirements for buildings on bushfire prone land. As no dwellings are being erected as part of this development application, a 10m x 15m building envelope has been assessed for each lot. The Fire Danger Index (FDI) for the Richmond Valley is noted as FDI-80. The separation of each lot from the surrounding fire threat is presented in Figure 4 herein where BAL-29 construction level or lower can be achieved over the interface lots of the subject site. A building location envelope (BLE) is depicted within **Appendix A – Bushfire Safety Authority Plan.** These BAL denominations have been tabulated as follows:

Lot 1 - 21	BAL – 29	**Lot 118 - 119**	BAL – 29 or lower
Lot 22 - 34	BAL – 12.5	**Lot 120 - 121**	BAL – 29
Lot 35	BAL – 29 or lower	**Lot 122**	BAL – 19
Lot 36 - 38	BAL – 29	**Lot 123 – 130**	BAL – 29
Lot 39	BAL – 29 or lower	**Lot 131**	BAL – 29 or lower
Lot 40 - 57	BAL – 12.5	**Lot 132 - 141**	BAL – 29
Lot 58	BAL – 19	**Lot 142**	BAL – 29 or lower
Lot 59 - 74	BAL – 29	**Lot 143**	BAL - 29
Lot 75 – 83	BAL – 12.5	**Lot 144 - 153**	BAL – 29 or lower
Lot 84 - 101	BAL – 29	**Lot 154 - 157**	BAL - 29
Lot 102	BAL – 29	**Lot 158 - 164**	BAL – 12.5
Lot 103 - 106	BAL – 12.5	**Lot 165 - 173**	BAL – 29
Lot 107 - 112	BAL – 29	**Lot 174**	BAL – 29 (Method 2)
Lot 113 - 114	BAL – 29 or lower	**Lot 175**	BAL – 29
Lot 115 - 117	BAL – 29 or lower		

Note: erring on the side of caution, the forest classification was nominated over Lot 177.

The above BAL construction applies to the building envelopes as detailed within **Appendix A**. Construction of dwellings on each new allotment may be reassessed pursuant to requirements for DA or Complying Development processes in order to establish the actual BAL rating for

that lot specifically. However it is noted no building location envelope has been sited in an area which is exposed to radiant heat flux in excess of 29kW/m^2 and direct flame contact negated.

The minimum setbacks from the hazard land, to achieve a construction level of BAL-29 or lower on each lot were carried out as per the provisions of PBP (2006), using *Method 1 – Simplified Procedure* with Table 2.4.3 FDI 80 (1090 K) and *Method 2 – Complex Procedure* for Lot 174 only (alternate solution) as per the methodology described in '*Appendix B – Detailed Method for Determining the Bushfire Attack Level (BAL) Method 2'* (AS3959). The methodology was used to determine the radiant heat flux to the receiver (future dwelling/s) and associated BAL rating for construction.

The complex calculations were carried out using the Newcastle Bushfire Consultants (NBC) *Bushfire Attack Assessor Calculator* (BFAA) (Couch, P. 2013) attached in Appendix C herein. The required minimum setbacks are presented in the Figure 4 below:

Figure 4: Minimum setbacks for BAL-29 as per Method 1—Simplified Calculations (AS3959)

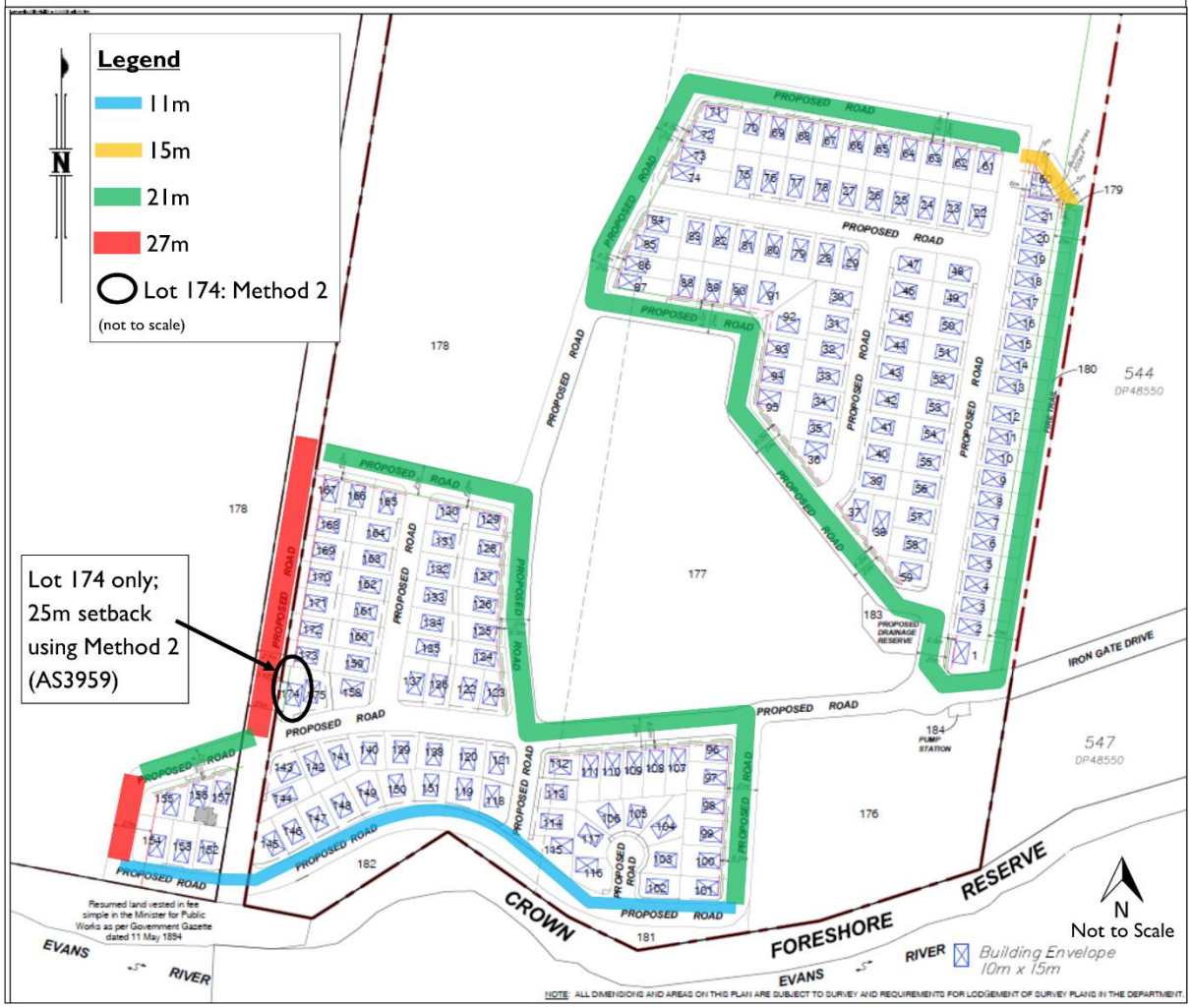

Figure 4 – APZ Min. Setbacks for BAL-29 - Source; Landpartners.

viii. the adequacy of sprinkler systems and other fire protection measures to be incorporated into the development,

The proposed APZ's and IPA's as part of a bushfire maintenance scheme are considered adequate bushfire protection for the proposed development. Fire hydrants shall be made available throughout the proposed roadway, fire trail access has been provided for dedication to Richmond Valley Council and ancillary water supplies will be attached to each new dwelling through State BASIX requirements and s.4.14 (PBP 2006), with a capacity and pressure

pursuant to the recommendations contained in the following tables i.e. Fire hydrant spacing, sizing and pressures comply with AS 2419.1 – 2005 (AS 2119.1 – 2017 - current version).

h) ***an assessment of the extent to which the proposed development conforms with or deviates from the standards, specific objectives and performance criteria set out in Chapter 4 (Performance Based Controls) of Planning for Bush Fire Protection.***

S.4.1.2 – Standards for Bushfire Protection Measures for Residential and Rural Subdivisions

COMPLIANCE TABLES

Performance Criteria	Acceptable Solutions	Comment
Asset Protection Zones		
Radiant heat levels at any point on a proposed building will not exceed 29 kW/m^2	• An APZ is provided in accordance with the relevant tables/ figures in Appendix 2 of this document	**Complies -** All of the building envelopes proposed as part of the development will not experience radiant heat levels of greater than 29kW/m^2 (See above mentioned BAL ratings). The APZ's proposed will offer ongoing maintenance and protection against the surrounding bushfire threat. The separation distances noted within **Appendix A** are formed by privately owned land and in some instances Council dedicated road reserve. There is not considered to be an opportunity for these levels of separation to reduce over time. NOTE: landscaping of the foreshore reserve and road reserves shall be consistent with the provisions set out in s.5 PBP 2006 and the RFS guideline '*Standards for Asset Protection Zones'* (RFS 2012).
	• The APZ is wholly within the boundaries of the development site. Exceptional circumstances may apply (see section 3.3)	**Complies -** As detailed previously, all lots will be maintained as Inner Protection Areas due to the urban low density nature of the total development.

APZs are managed and maintained to prevent the spread of a fire towards the building.	• In accordance with the requirements of Standards for Asset Protection Zones (RFS, 2005) *Note: A Monitoring and Fuel Management Program should be required as a condition of development consent.*	**Complies -** The proposed APZ's will be managed and maintained in keeping with the NSW RFS *'Standards for Asset Protection Zones'.*
APZ maintenance is practical, soil stability is not compromised and the potential for crown fires is negated	• The APZ is located on lands with a slope less than 18 degrees.	**Complies -** All APZ's are located on generally flat land. No slopes of 18^{o} or greater exist across the lots.
Access (1) – Public Roads		
Firefighters are provided with safe all weather access to structures (thus allowing more efficient use of firefighting resources)	• Public roads are two-wheel drive, all weather roads.	**Complies –** Acceptable and alternate solutions; The proposed internal roads will be constructed by the proponent and dedicated back to Council upon completion. As such, all roads are required to meet Council road requirements prior to dedication. The roads will be all two way, bitumen sealed and will provide all weather 2WD access.
Public road widths and design that allow safe access for firefighters while residents are evacuating an area.	• Urban perimeter roads are two-way, that is, at least two traffic lane widths (carriageway 8 metres minimum kerb to kerb), allowing traffic to pass in opposite directions. Non perimeter roads comply with Table 4.1 – Road widths for Category 1 Tanker (Medium Rigid Vehicle).	**Complies –** acceptable and alternate solutions; The perimeter roads proposed vary in kerb to kerb width, (min. 8m & 7.5m (part Road 5)) and are all two way, bitumen sealed with the exception that a fire trail has been provided as an alternative solution to a perimeter road, rear of Lots 1 – 21 & Lot 60 as per the alternate solution presented herein.
	• The perimeter road is linked to the internal road system at an interval of no greater than 500 metres in urban areas.	**Complies –** The road design and interconnectivity with other through roads ensures limited dead ends and a high level of urban connectivity.
	• Traffic management devices are constructed to facilitate access by emergency services vehicles.	**Complies –** RFS approved gates will be used for all proposed fire trails. Access to the public open space foreshore will be regulated by fold down bollards. Keys to all gates and bollards will be circulated to local

		emergency services and the RFS.
	• Public roads have a cross fall not exceeding 3 degrees.	**Complies –** The proposed roads do not have a crossfall of greater than 3 degrees. This is illustrated within the Engineering Impact Assessment report attached within the revised SEE.
	• All roads are through roads. Dead end roads are not recommended, but if unavoidable, dead ends are not more than 200 metres in length, incorporate a minimum 12 metres outer radius turning circle, and are clearly sign posted as a dead end and direct traffic away from the hazard.	**Complies –** The proposed internal–sub-division roads have been designed to comply with the acceptable solution with the exception of the following: Iron Gates Drive; this road deviates from the acceptable solution in that Iron Gates Drive provides a single access road to the proposed development. Being longer than 200m in length, creating a potential pinch point to the proposed development. The requirements as to how Iron Gates Drive can meet compliance has been demonstrated in a standalone document entitled: *'Bushfire Assessment – Additional Information Response Re: Iron Gates Drive, Evans Head NSW by Melanie Jackson of Bushfire Risk Pty Ltd (8 March 2017 – Version 1)* (Bushfire Risk 2017).
	• Curves of roads (other than perimeter roads) are a minimum inner radius of six metres and minimal in number, to allow for rapid access and egress.	**Complies –** All roadways are greater than 6m in width and therefore comply with this control. No curves are considered sharp enough to prohibit rapid access or egress.
	• The minimum distance between inner and outer curves is six metres.	**Complies –** All roads shall comply with the acceptable solution.
	• Maximum grades for sealed roads do not exceed 15 degrees and an average grade of not more than 10 degrees or other gradient specified by road design standards, whichever is the lesser gradient.	**Complies –** The proposed roadways will not exceed 10 degrees gradient as illustrated within the Engineering Impact Assessment attached within the revised SEE.

	• There is a minimum vertical clearance to a height of four metres above the road at all times.	**Complies -** No vegetation or other obstructions will intrude into the 4m space above the proposed roads. The fire trails will be dedicated to Council for ongoing management.
The capacity of road surfaces and bridges is sufficient to carry fully loaded firefighting vehicles.	• The capacity of road surfaces and bridges is sufficient to carry fully loaded fire fighting vehicles (approximately 15 tonnes for areas with reticulated water, 28 tonnes or 9 tonnes per axle for all other areas). Bridges clearly indicate load rating.	**Complies -** The roadway will be built to a standard to cater for a minimum 15 tonne fire fighting vehicle. Bridges i.e. at Iron Gates Drive shall comply with the acceptable solution.
Roads that are clearly sign-posted (with easily distinguishable names) and buildings/properties that are clearly numbered.	Public roads greater than 6.5 metres wide to locate hydrants outside of parking reserves to ensure accessibility to reticulated water for fire suppression.	**Complies -** Hydrant markings are to be made on the proposed roadway. These hydrants will be connected to reticulated water. Road reserve fire hydrant spacing, sizing and pressures to comply with AS2419.1 – 2005 or as required / agreed by Council. See Engineering Impact Assessment within revised SEE. Note: Additional fire hydrants are to be positioned in the fire trail at the rear of lots 1 to 21 & lot 60 pursuant to s.4.1.3 (PBP 2006), which forms part of the alternate solution recommended to achieve compliance.
	Public roads between 6.5 metres and 8 metres wide are No Parking on one side with the services (hydrants) located on this side to ensure accessibility to reticulated water for fire suppression.	**Complies –** On-street parking is not proposed. Hydrant markings are to be made on the proposed roadway. These hydrants will be connected to reticulated water. Road reserve fire hydrant spacing, sizing and pressures to comply with AS2419.1 – 2005 or as a. See Engineering Impact Assessment within revised SEE.
There is clear access to reticulated water supply	• Public roads up to 6.5 metres wide provide parking within parking bays and locate services outside of the parking bays to ensure	**Complies -** On-street parking is not proposed. Hydrant markings are to be made on the proposed roadway. These hydrants

	accessibility to reticulated water for fire suppression.	will be connected to reticulated water. Road reserve fire hydrant spacing, sizing and pressures to comply with AS2419.1 – 2005 and / or as required / agreed by Council. See Engineering Impact Assessment within revised SEE.
	• One way only public access roads are no less than 3.5 metres wide and provide parking within parking bays and locate services outside of the parking bays to ensure accessibility to reticulated water for fire suppression.	**N/A** – One way roads are not proposed within the subdivision.
Parking does not obstruct the minimum paved width	• Parking bays are a minimum of 2.6 metres wide from kerb edge to road pavement. No services or hydrants are located within the parking bays.	**Complies –** On-street parking is not proposed. Hydrant markings are to be made on the proposed roadway. These hydrants will be connected to reticulated water. Road reserve fire hydrant spacing, sizing and pressures to comply with AS2419.1 – 2005 and / or as required / agreed by Council. See Engineering Impact Assessment within revised SEE.
	• Public roads directly interfacing the bush fire hazard vegetation provide roll top kerbing to the hazard side of the road.	**Complies –** Roll top kerbing is to be used for the kerbs adjacent to the hazard side of public roads. See Engineering Impact Assessment.
Access (2) – Property Access		
Access to properties is provided in recognition of the risk to fire fighters and/ or evacuating occupants.	At least one alternative property access road is provided for individual dwellings (or groups of dwellings) that are located more than 200 metres from a public through road	**Complies –** All dwellings are located within 200m of a public road.
The capacity of road surfaces and bridges is sufficient to carry fully loaded firefighting vehicles.	• bridges clearly indicate load rating and pavements and bridges are capable of carrying a load of 15 tonnes	**N/A** – none required

All weather access is provided.	• Roads do not traverse a wetland or other land potentially subject to periodic inundation (other than a flood or storm surge).	**N/A –** Land not prone to periodic inundation or intertidal movements.
• Road widths and design enable safe access for vehicles	• A minimum carriageway width of four metres for rural- residential areas, rural landholdings or urban areas with a distance of greater than 70 metres from the nearest hydrant point to the most external part of a proposed building (or footprint). *Note: No specific access requirements apply in a urban area where a 70 metres unobstructed path can be demonstrated between the most distant external part of the proposed dwelling and the nearest part of the public access road (where the road speed limit is not greater than 70kph) that supports the operational use of emergency firefighting vehicles (i.e. a hydrant or water supply).*	**Complies** – Fire hydrants have been positioned so as to ensure that hose lengths of 70m are achievable to all envelopes. This is demonstrated within the Engineering Impact Assessment included within the revised SEE. Note: Additional fire hydrants are to be positioned in the fire trail at the rear of lots 1 to 21 & lot 60 pursuant to s.4.1.3 (PBP 2006), which forms part of the alternate solution for compliance as presented herein.
	• In forest, woodland and heath situations, rural property access roads have passing bays every 200 metres that are 20 metres long by two metres wide, making a minimum trafficable width of six metres at the passing bay.	**N/A –** Not a rural subdivision. The roads proposed will be urban dedicated roads.
	• A minimum vertical clearance of four metres to any overhanging obstructions, including tree branches.	**Complies** – Comply with the acceptable solutions. The fire trails proposed will be dedicated to Council for ongoing management.
	• Internal roads for rural properties provide a loop road around any dwelling or incorporate a turning circle with a minimum 12 metre outer radius.	**N/A –** The proposed development is not considered rural in nature. The roads and services will be to urban standard.

	• Curves have a minimum inner radius of six metres and are minimal in number to allow for rapid access and egress.	**Complies –** All roadways are greater than 6m in width and therefore comply with this control. No curves are considered sharp enough to prohibit rapid access or egress.
	• The minimum distance between inner and outer curves is six metres.	**Complies –** All roadways are greater than 6m in width and therefore comply with this control.
	• The crossfall is not more than 10 degrees.	**Complies –** The proposed road will not have a crossfall of greater than 10 degrees. See Engineering Impact Assessment within the revised SEE.
	• Maximum grades for sealed roads do not exceed 15 degrees and not more than 10 degrees for unsealed roads. *Note: Some short constrictions in the access may be accepted where they are not less than the minimum (3.5m), extend for no more than 30m and where the obstruction cannot be reasonably avoided or removed. The gradients applicable to public roads also apply to community style development property access roads in addition to the above.*	**Complies –** The proposed road not exceed 10 degrees gradient. See Engineering Impact Assessment within the revised SEE.
	• Access to a development comprising more than three dwellings have formalised access by dedication of a road and not by right of way.	**Complies –** The proposed roads will provide public road access to all allotments.

Access (3) – Fire Trails		
The width and design of the fire trails enables safe and ready access for firefighting vehicles	• A minimum carriageway width of four metres with an additional one metre wide strip on each side of the trail (clear of bushes and long grass) is provided.	**Complies – Alternate Solution:** the proposed fire trail shall be 8m wide cleared with min. 5m wide gravel carriageway, designed to comply with the alternate solution presented herein. Fire trails / maintenance shall be dedicated to Richmond Valley Council as part of the proposal.
	• The trail is a maximum grade of 15 degrees if sealed and not more than 10 degrees if unsealed.	**Complies –** Fire trails are located on generally flat ground and will not exceed 10 degrees in grade.
	• A minimum vertical clearance of four metres to any overhanging obstructions, including tree branches is provided.	**Complies –** Fire trails will be dedicated to Council as part of the proposal. Ongoing maintenance will be carried out to ensure compliance with this requirement.
	• The crossfall of the trail is not more than 10 degrees.	**Complies –** The proposed fire trails will not have a crossfall of greater than 10 degrees. All trails are located on generally flat land.
	• The trail has the capacity for passing by: - reversing bays using the access to properties to reverse fire tankers, which are six metres wide and eight metres deep to any gates, with an inner minimum turning radius of six metres and outer minimum radius of 12 metres; and/or - a passing bay every 200 metres, 20 metres long by three metres wide, making a minimum trafficable width of seven metres at the passing bay. *Note: Some short constrictions in the access may be accepted where they are not less than the minimum (3.5m) and extend for no more than 30m and where obstruction cannot be*	**Complies – Alternate Solution –** the proposed fire trails shall comply with the BSB based on the acceptable solutions presented herein.

	reasonably avoided or removed.	
Fire trails are trafficable under all weather conditions. Where the fire trail joins a public road, access shall be controlled to prevent use by non authorised persons.	• The fire trail is accessible to firefighters and maintained in a serviceable condition by the owner of the land.	**Complies –** As the fire trails and public open space will be dedicated to Council, ongoing management will continue in perpetuity.
	• Appropriate drainage and erosion controls are provided.	**Complies –** All fire trails have been designed for adequate drainage and limits site erosion.
	• The fire trail system is connected to the property access road and/or to the through road system at frequent intervals of 200 metres or less.	**Complies – Alternate Solution** The proposed fire trails shall comply with the BSB based on the acceptable solutions presented herein.
	• Fire trails do not traverse a wetlands or other land potentially subject to periodic inundation (other than a flood or storm surge).	**Complies –** No temporary inundation or intertidal influences impact the proposed fire trails.
	• Gates for fire trails are provided and locked with a key/lock system authorized by the local RFS.	**Complies –** All fire trails will be controlled by an RFS approved gate. The Evans River foreshore area and informal emergency access will be regulated by fold down bollards to allow for bicycle access. The keys to the gates and bollards will be circulated to the RFS as well as other local emergency services.
Fire trails designed to prevent weed infestation, soil erosion and other land degradation	• Fire trail design does not adversely impact on natural hydrological flows.	**Complies –** All fire trails have been designed to limit hydrological impact by directing stormwater appropriately. See Engineering Impact Assessment within the revised SEE.
	• Fire trail design acts as an effective barrier to the spread of weeds and nutrients.	**Complies –** The fire trails will be 5m wide gravel carriageway with a min. 1.5m wide turfed strip either side. No encouragement of weed growth or nutrient dispersal is considered to result.

	• Fire trail construction does not expose acid-sulphate soils.	**Complies –** The proposed fire trails will not excavate acid sulfate soils.
Services – Water, Electricity and Gas		
Reticulated water supplies • Water supplies are easily accessible and located at regular intervals	• Reticulated water supply to urban subdivisions uses a ring main system for areas with perimeter roads.	**Complies –** Reticulated water is to be provided to all created allotments and uses a ring main system. See Engineering Impact Assessment within the revised SEE.
	• Fire hydrant spacing, sizing and pressures comply with AS 2419.1 – 2005. Where this cannot be met, the RFS will require a test report of the water pressures anticipated by the relevant water supply authority. In such cases, the location, number and sizing of hydrants shall be determined using fire engineering principles.	**Complies –** Road reserve fire hydrant spacing, sizing and pressures to comply with AS2419.1 – 2005. All dwelling envelopes are within the 70m distance to the further extent. See Engineering Impact Assessment within the revised SEE. Note: Additional fire hydrants are to be positioned in the fire trail at the rear of lots 1 to 21 & lot 60 pursuant to s.4.1.3 (PBP 2006), which forms part of the alternate solution for compliance as per the BSB presented herein.
	• Hydrants are not located within any road carriageway	**Complies –** Hydrants will be located within the road reserve and outside of the road carriageway.
	• All above ground water and gas service pipes external to the building are metal, including and up to any taps.	**Complies –** All external fixtures where applicable will be constructed from metal.
	•The provisions of parking on public roads are met.	**Complies –** The proposed subdivision complies with Council's required carparking controls. No public car parking is to be provided.
Non-reticulated water supply areas • For rural-residential and rural developments (or settlements) in bush fire	• The minimum dedicated water supply required for firefighting purposes for each occupied building excluding drenching systems, is provided in accordance with Table 4.2.	**N/A –** Reticulated water to be supplied

prone areas, a water supply reserve dedicated to firefighting purposes is installed and maintained. The supply of water can be an amalgam of minimum quantities for each lot in the subdivision (community titled subdivisions), or held individually on each lot		
	• A suitable connection for firefighting purposes is made available and located within the IPA and away from the structure. A 65mm Storz outlet with a Gate or Ball valve is provided.	**N/A –** Reticulated water to be supplied
	• Gate or Ball valve and pipes are adequate for water flow and are metal rather than plastic.	**N/A –** Reticulated water to be supplied
	• Underground tanks have an access hole of 200mm to allow tankers to refill direct from the tank. A hardened ground surface for truck access is supplied within 4 metres of the access hole.	**N/A –** Reticulated water to be supplied
	• Above ground tanks are manufactured of concrete or metal and raised tanks have their stands protected. Plastic tanks are not used. Tanks on the hazard side of a building are provided with adequate shielding for the protection of fire fighters.	**N/A –** Reticulated water to be supplied
	• All above ground water pipes external to the building are metal including and up to any taps. Pumps are shielded.	**N/A –** Reticulated water to be supplied
Electricity Services • Location of electricity services limits the possibility of ignition of surrounding bushland	• Where practicable, electrical transmission lines are underground.	**Complies -** Underground electricity is to be provided to each of the created allotments. Electrical design will be completed as part of the Construction Certificate process.

or the fabric of buildings • Regular inspection of lines is undertaken to ensure they are not fouled by branches.	• Where overhead electrical transmission lines are proposed: - lines are installed with short pole spacing (30 metres), unless crossing gullies, gorges or riparian areas; and - no part of a tree is closer to a power line than the distance set out in accordance with the specifications in 'Vegetation Safety Clearances' issued by Energy Australia (NS179, April 2002).	**N/A** – Underground provision to be made.
Gas services • Location of gas services will not lead to ignition of surrounding bushland or the fabric of buildings	• Reticulated or bottled gas is installed and maintained in accordance with AS 1596 and the requirements of relevant authorities. Metal piping is to be used.	**N/A** – Proposed development does not utilize reticulated or bottled gas.
	• All fixed gas cylinders are kept clear of all flammable materials to a distance of 10 metres and shielded on the hazard side of the installation.	**N/A** – Proposed development does not utilize reticulated or bottled gas.
	• If gas cylinders need to be kept close to the building, the release valves are directed away from the building and at least 2 metres away from any combustible material, so that they do not act as a catalyst to combustion. Connections to and from gas cylinders are metal.	**N/A** – Proposed development does not utilize reticulated or bottled gas.
	• Polymer sheathed flexible gas supply lines to gas meters adjacent to buildings are not used.	**N/A** – Proposed development does not utilize reticulated or bottled gas.

Landscaping		
In Relation to Landscaping It is designed and managed to minimise flame contact and radiant heat to buildings, and the potential for wind driven embers to cause ignitions.	• Compliance with Appendix 5 (PBP 2006)	**Complies –** Compliance with the acceptable solutions: Landscaping treatments and property maintenance shall be consistent with the RFS brochure 'Standards for Asset Protection Zones' (RFS 2012) and comply with appendix 5 of PBP (2006).

The proposed subdivision is considered to generally comply with the performance based controls set out within Chapter 4 of PFBP 2006. An alternate solution is sought for access arrangements including a fire trail (rear of lot 1 – 21 & lot 60) and in relation to Iron Gates Drive (Bushfire Risk 2015) being a single access road to the proposed development. Any further recommendations by the NSW RFS are to be conditioned as part of the approval.

SECTION 4

Conclusion

Having reviewed the NSW Rural Fire Service document 'Planning for Bushfire Protection 2006', 'AS-3959-2009 – Construction of Buildings in Bushfire Prone Areas' and the NSW RFS *'Standards for Asset Protection Zones'*, it is submitted that the proposed subdivision and the bushfire protection measures outlined within this report are consistent with the relevant policy and statutory requirements that apply to bushfire prone land.

All of the requirements set out in Clause 44 of the NSW Rural Fires Regulations 2008 have been satisfied and therefore a Bushfire Safety Authority is respectfully requested.

The proposed subdivision at Iron Gates Drive, Evans Head NSW is considered to warrant both Council's and the NSW Rural Fire Service's support.

SECTION 5

Bibliography

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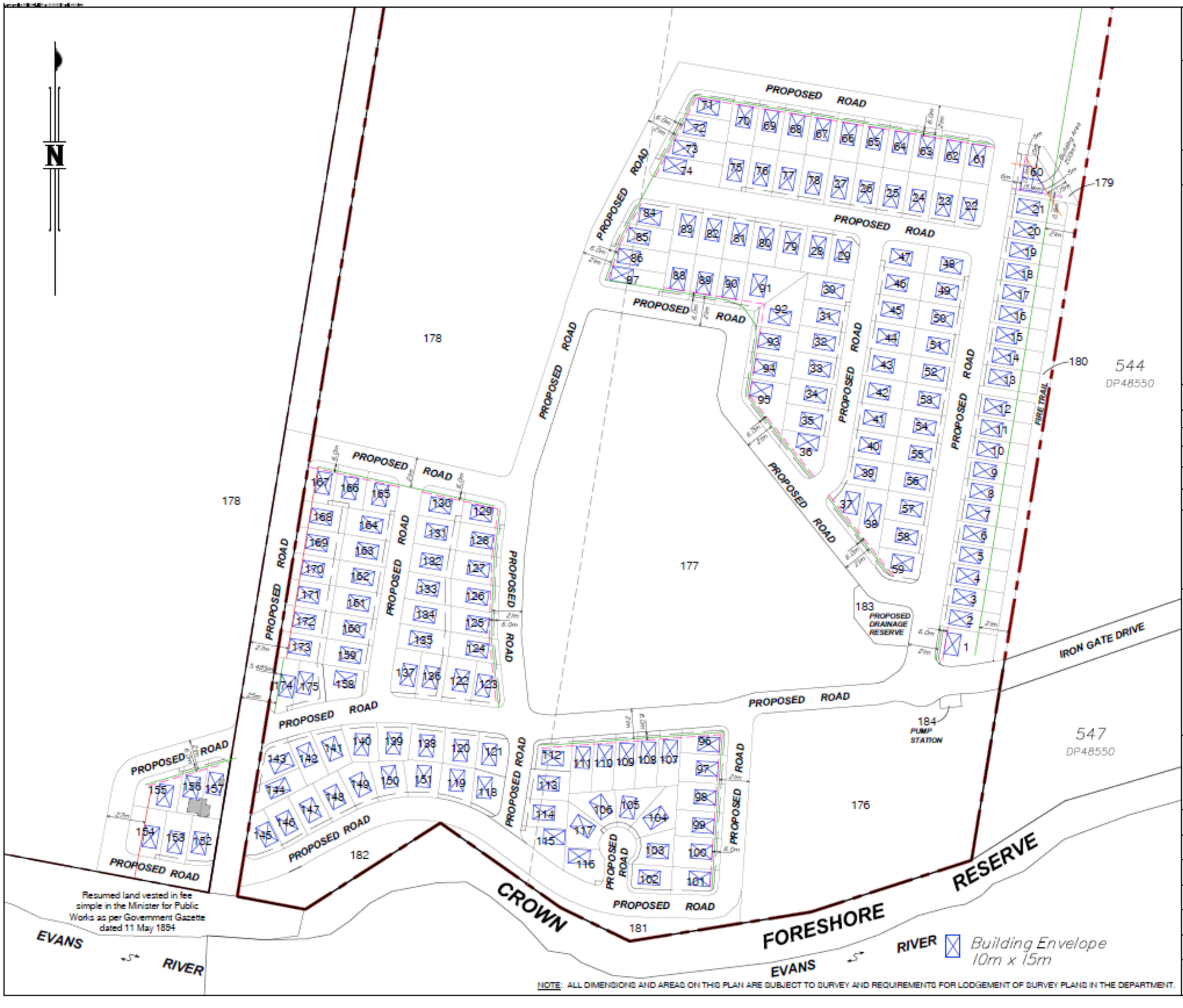
APPENDIX A

Bushfire Safety Authority Plan

Bushfire Safety Authority Plan by: Landpartners Pty Ltd; Dated: 27 June 2019, depicting building location envelopes, concluding every residential lot can achieve a BAL-29 or lower rating.



CLIENT

GOLDCORAL PTY LTD

PROJECT: PROPOSED SUBDIVISION OF LOTS 276 & 277 ON DP755624, LOT 163 ON DP831052, CROWN PUBLIC ROAD RESERVE (BETWEEN LOT 163 DP831052 AND LOT 276 DP755624) AND CROWN FORESHORE RESERVE (ADJACENT TO EVANS RIVER)

LOCAL AUTHORITY: RICHMOND VALLEY

NOTES

(i) This plan was prepared for the purpose and exclusive use of THE INGLES GROUP to accompany an application to RICHMOND VALLEY for approval to reconfigure the land described in this plan and is not to be used for any other purpose or by any other person or corporation.
LandPartners Pty Ltd accepts no responsibility for any loss or damage suffered howsoever arising) to any person or corporation who may use or rely on this plan in contravention of the terms of this clause or clauses (i). or (ii) hereof.

(ii) The dimensions, areas, number of lots, size and location of improvements & flood information (if shown) are approximate only and may vary.

(iii) This plan may not be copied unless these notes are included.

STAGE	No. OF LOTS	NEW ROAD	AREA OF PARK	TOTAL AREA
-	-	-	-	-
TOTAL				

SCALE BAR

50m 0 50 100m

SCALE 1:2500 @ A3

LANDPARTNERS
built environment consultants

Brisbane Office
Level 1 - COOPS
18 Little Cribb Street,
Milton Qld 4064
PO Box 1399
Milton Qld 4064

p: (07) 3842 1000
f: (07) 3842 1001
e: info@landpartners.com.au
w: www.landpartners.com.au

LEVEL DATUM	NA		
LEVEL ORIGIN	NA		
CONTOUR INTERVAL	NA		
DRAWN	CGW	DATE	27/06/2019
CHECKED	MEA	DATE	27/06/2019
APPROVED	CGW	DATE	27/06/2019

UDN: BRJD6396-100-38-4

SHEET 1 OF 1

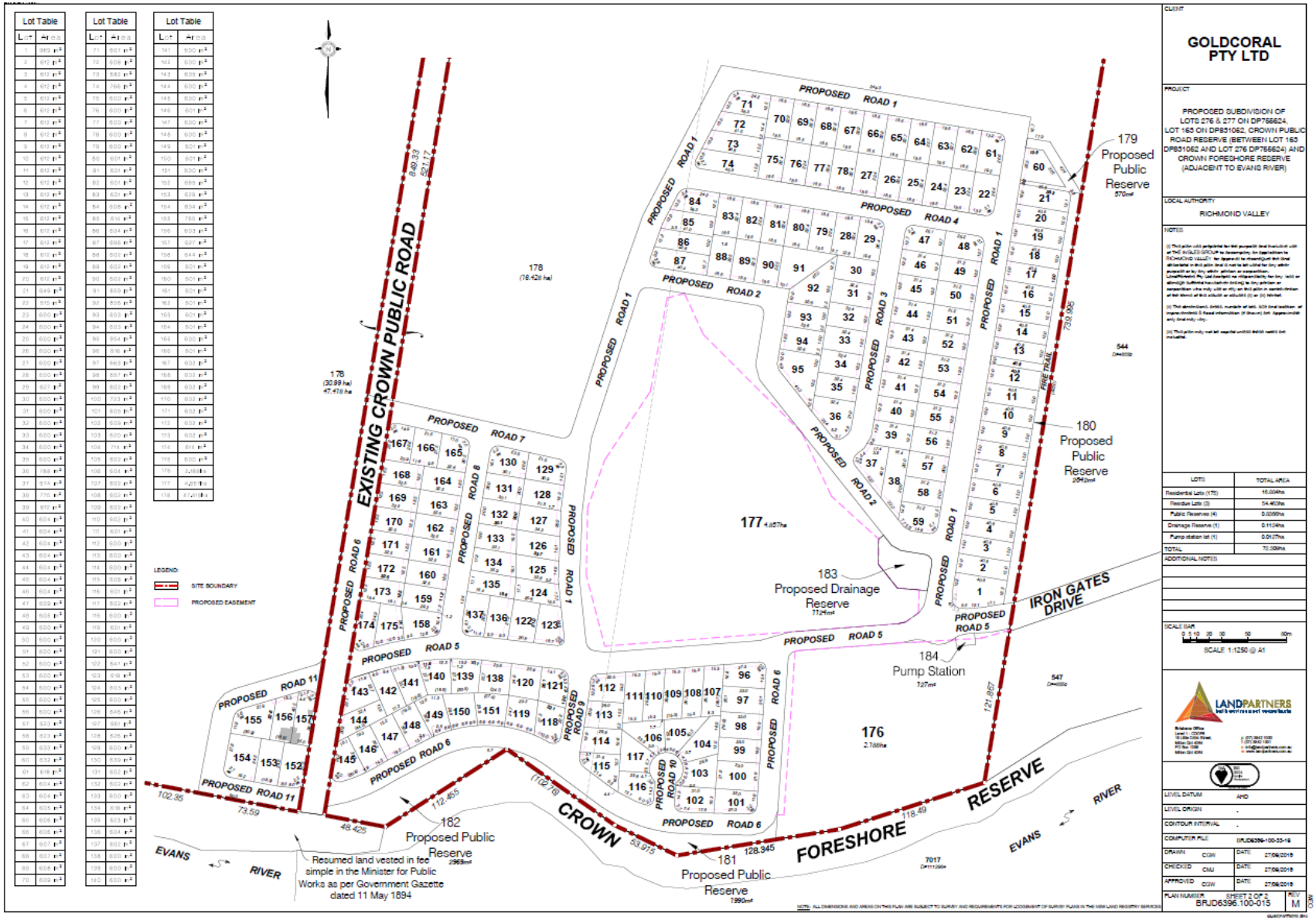
CGW

NOTE: ALL DIMENSIONS AND AREAS ON THIS PLAN ARE SUBJECT TO SURVEY AND REQUIREMENTS FOR LODGEMENT OF SURVEY PLANS IN THE DEPARTMENT.

APPENDIX B
Site Plans

Site Plans by: Landpartners Pty Ltd; Dated: 27 June 2019

A full set of final plans shall be provided by the applicant to accompany the DA. All design and site plans must ensure compliance with the minimum building setbacks in relation to this development as proposed and the recommendations contained herein.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Lot Table
Lot Table
EXISTING CROWN PUBLIC ROAD
PROPOSED ROAD 1
PROPOSED ROAD 2
PROPOSED ROAD 3
PROPOSED ROAD 4
PROPOSED ROAD 5
PROPOSED ROAD 6
PROPOSED ROAD 7
PROPOSED ROAD 8
PROPOSED ROAD 9
PROPOSED ROAD 10
PROPOSED ROAD 11
IRON GATES DRIVE
CROWN RESERVE FORESHORE
EVANS RIVER
FIRE TRAIL
179 Proposed Public Reserve 570m²
180 Proposed Public Reserve 2042m²
181 Proposed Public Reserve 1990m²
182 Proposed Public Reserve 2963m²
183 Proposed Drainage Reserve 1124m²
184 Pump Station 727m²
Resumed land vested in fee simple in the Minister for Public Works as per Government Gazette dated 11 May 1894
LEGEND:
SITE BOUNDARY
PROPOSED EASEMENT
GOLDCORAL PTY LTD
PROPOSED SUBDIVISION OF LOTS 276 & 277 ON DP756624, LOT 163 ON DP831062, CROWN PUBLIC ROAD RESERVE (BETWEEN LOT 163 DP831062 AND LOT 276 DP756624) AND CROWN FORESHORE RESERVE (ADJACENT TO EVANS RIVER)
LOCAL AUTHORITY
RICHMOND VALLEY
LOT/I
TOTAL AREA
Residential Lots (175)
16.004ha
Residue Lots (3)
54.463ha
Public Reserves (4)
0.0060ha
Drainage Reserve (1)
0.1124ha
Pump station lot (1)
0.0127ha
TOTAL
70.308ha
ADDITIONAL NOTES
SCALE BAR
0 5 10 20 30 50 80m
SCALE 1:1250 @ A1
LANDPARTNERS
LEVEL DATUM
AHD
LEVEL ORIGIN
CONTOUR INTERVAL
COMPUTER FILE
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CHECKED
CMJ
DATE
27/06/2019
APPROVED
CGW
DATE
27/06/2019
PLAN NUMBER
BRUD6396.100-015
SHEET 2 OF 2
REV
M

Lot Table

Lot	Area
1	969 m^2
2	612 m^2
3	612 m^2
4	612 m^2
5	612 m^2
6	612 m^2
7	612 m^2
8	612 m^2
9	612 m^2
10	612 m^2
11	612 m^2
12	612 m^2
13	612 m^2
14	612 m^2
15	612 m^2
16	612 m^2
17	612 m^2
18	612 m^2
19	612 m^2
20	612 m^2
21	649 m^2
22	615 m^2
23	600 m^2
24	600 m^2
25	600 m^2
26	600 m^2
27	600 m^2
28	600 m^2
29	627 m^2
30	600 m^2
31	600 m^2
32	600 m^2
33	600 m^2
34	600 m^2
35	600 m^2
36	788 m^2
37	674 m^2
38	775 m^2
39	612 m^2
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54	600 m^2
55	600 m^2
56	600 m^2
57	623 m^2
58	633 m^2
59	633 m^2
60	632 m^2
61	618 m^2
62	604 m^2
63	604 m^2
64	605 m^2
65	606 m^2
66	606 m^2
67	607 m^2
68	607 m^2
69	608 m^2
70	609 m^2

Lot Table

Lot	Area
71	607 m^2
72	608 m^2
73	582 m^2
74	766 m^2
75	600 m^2
76	600 m^2
77	600 m^2
78	600 m^2
79	600 m^2
80	601 m^2
81	601 m^2
82	601 m^2
83	601 m^2
84	608 m^2
85	616 m^2
86	634 m^2
87	696 m^2
88	602 m^2
89	602 m^2
90	602 m^2
91	659 m^2
92	656 m^2
93	603 m^2
94	603 m^2
95	954 m^2
96	616 m^2
97	663 m^2
98	657 m^2
99	602 m^2
100	723 m^2
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102	609 m^2
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134	616 m^2
135	623 m^2
136	604 m^2
137	602 m^2
138	600 m^2
139	600 m^2
140	600 m^2

Lot Table

Lot	Area
141	600 m^2
142	600 m^2
143	605 m^2
144	600 m^2
145	600 m^2
146	601 m^2
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166	601 m^2
167	602 m^2
168	603 m^2
169	602 m^2
170	602 m^2
171	602 m^2
172	602 m^2
173	602 m^2
174	614 m^2
175	600 m^2
176	2.168ha
177	4.857ha
178	47.018ha

LEGEND:

SITE BOUNDARY

PROPOSED EASEMENT

CLIENT

GOLDCORAL PTY LTD

PROJECT

PROPOSED SUBDIVISION OF LOTS 276 & 277 ON DP755624, LOT 163 ON DP831052, CROWN PUBLIC ROAD RESERVE (BETWEEN LOT 163 DP831052 AND LOT 276 DP755624) AND CROWN FORESHORE RESERVE (ADJACENT TO EVANS RIVER)

LOCAL AUTHORITY

RICHMOND VALLEY

NOTES

Aerial Photography sourced from Nearmap 15-5-2019.
Date of photography - 05/07/2012

LOTS	TOTAL AREA
Residential Lots (175)	16.004ha
Residue Lots (3)	54.463ha
Public Reserves (4)	0.9066ha
Drainage Reserve (1)	0.1124ha
Pump station lot (1)	0.0127ha
TOTAL	72.309ha

ADDITIONAL NOTES

SCALE BAR

40m 0 80 200m

SCALE 1:4000 @ A1

LANDPARTNERS

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LEVEL ORIGIN	-
CONTOUR INTERVAL	-
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APPROVED CGW	DATE 27/09/2018
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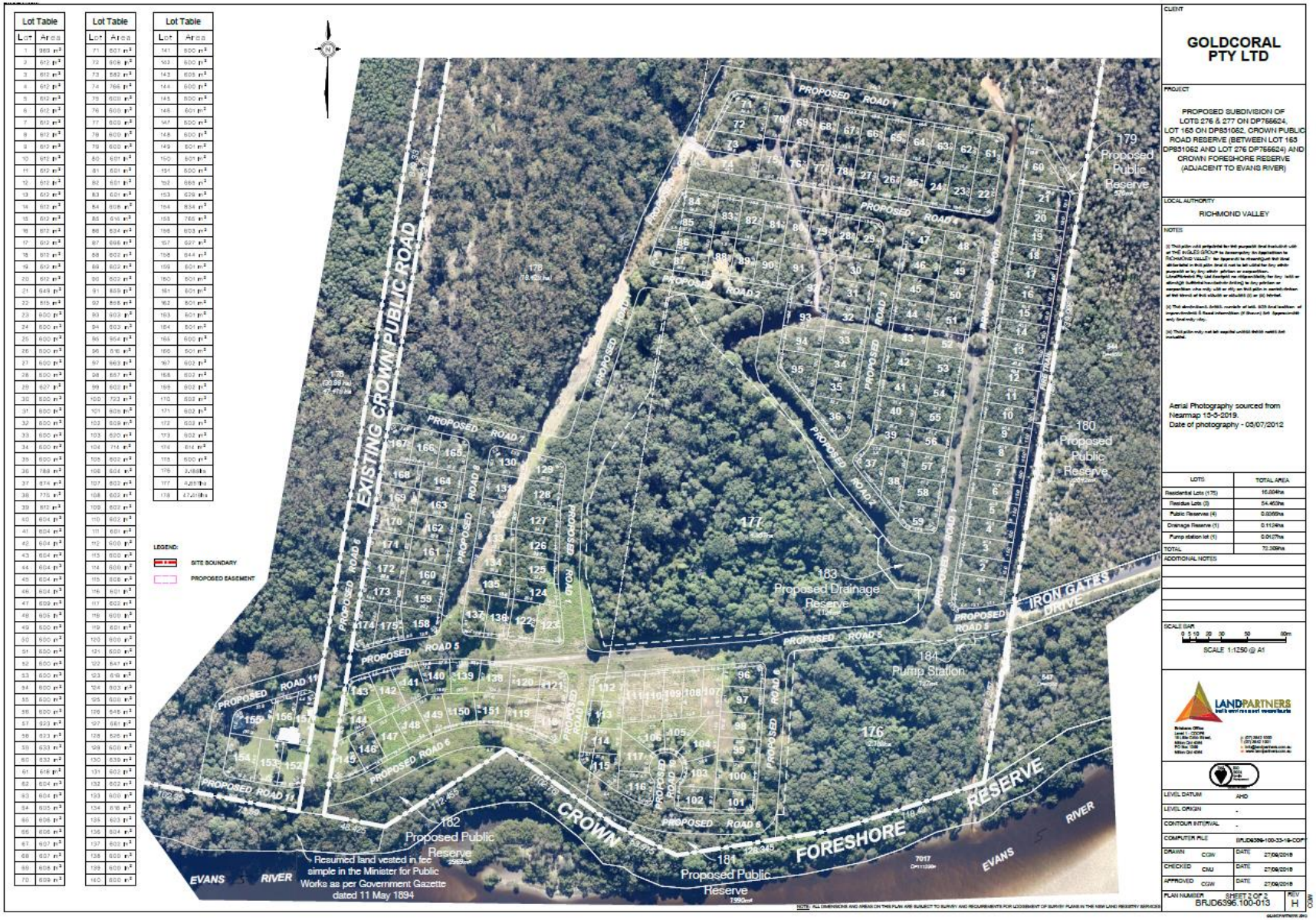
NOTE: ALL DIMENSIONS AND AREAS ON THIS PLAN ARE SUBJECT TO SURVEY AND REQUIREMENTS FOR LODGEMENT OF SURVEY PLANS IN THE NSW LAND REGISTRY SERVICES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PROPOSED ROAD 1
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PROPOSED ROAD 4
PROPOSED ROAD 5
PROPOSED ROAD 6
PROPOSED ROAD 7
PROPOSED ROAD 8
PROPOSED ROAD 9
PROPOSED ROAD 10
PROPOSED ROAD 11
IRON GATES DRIVE
179 Proposed Public Reserve
180 Proposed Public Reserve
181 Proposed Public Reserve
182 Proposed Public Reserve
183 Proposed Drainage Reserve
184 Pump Station
177
176
178
CROWN FORESHORE RESERVE
EVANS RIVER
Resumed land vested in fee simple in the Minister for Public Works as per Government Gazette dated 11 May 1894
CLIENT
GOLDCORAL PTY LTD
PROJECT
PROPOSED SUBDIVISION OF LOTS 276 & 277 ON DP755624, LOT 163 ON DP851062, CROWN PUBLIC ROAD RESERVE (BETWEEN LOT 163 DP851062 AND LOT 276 DP755624) AND CROWN FORESHORE RESERVE (ADJACENT TO EVANS RIVER)
LOCAL AUTHORITY
RICHMOND VALLEY
NOTES
Aerial Photography sourced from Nearmap 10-5-2019.
Date of photography - 05/07/2012
LOTS
TOTAL AREA
Residential Lots (175)
16.004ha
Residue Lots (2)
54.463ha
Public Reserves (4)
0.8099ha
Drainage Reserve (1)
0.1124ha
Pump station lot (1)
0.0127ha
TOTAL
72.309ha
ADDITIONAL NOTES
SCALE BAR
SCALE 1:1250 @ A1
LANDPARTNERS
LEVEL DATUM
AHD
LEVEL ORIGIN
CONTOUR INTERVAL
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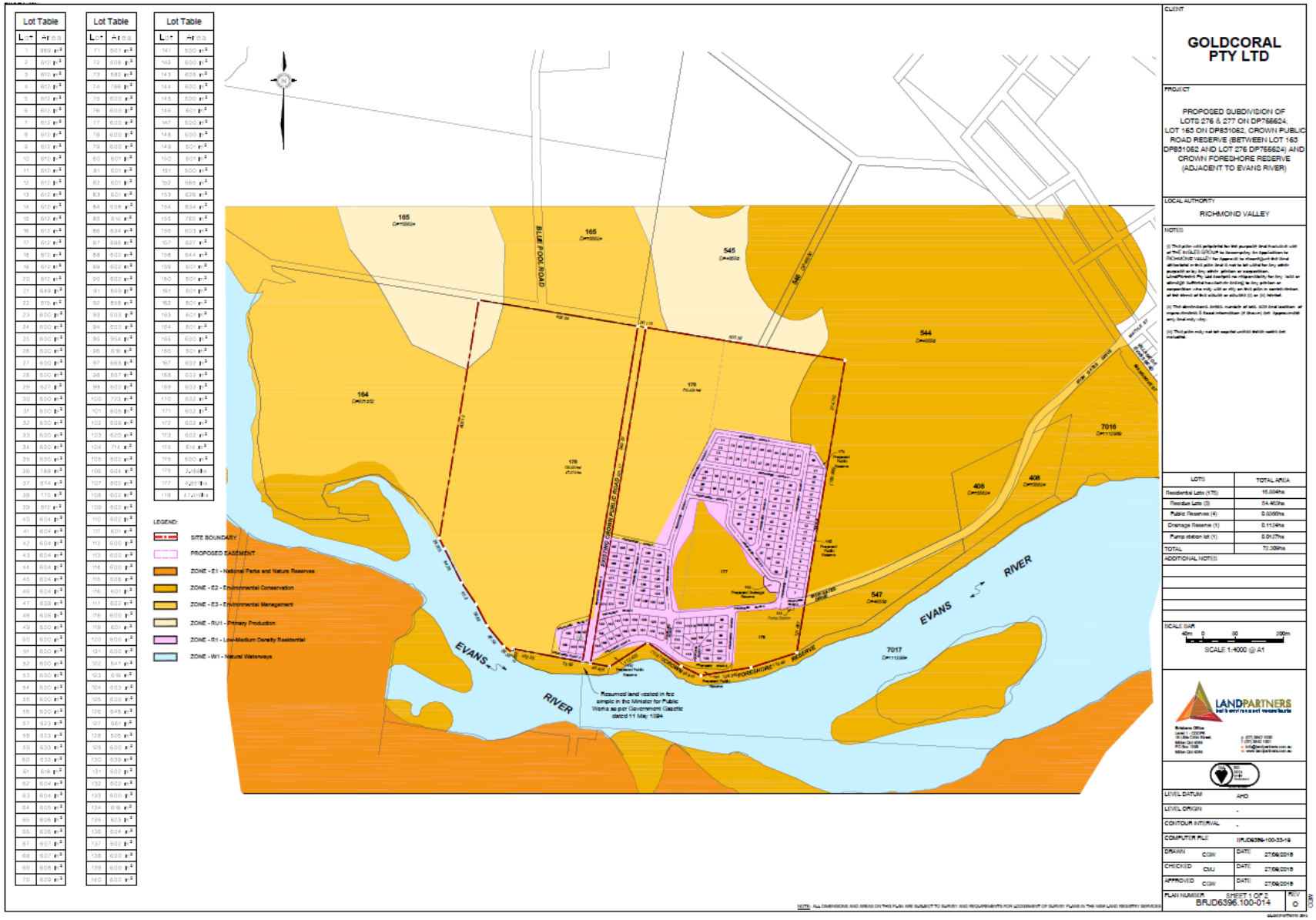
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Lot Table
Lot Table
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SITE BOUNDARY
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ZONE - E1 - National Parks and Nature Reserves
ZONE - E2 - Environmental Conservation
ZONE - E3 - Environmental Management
ZONE - RU1 - Primary Production
ZONE - R1 - Low-Medium Density Residential
ZONE - W1 - Natural Waterways
BLUFF POOL ROAD
EXISTING CROWN ROAD RESERVE
CROWN FORESHORE RESERVE
EVANS RIVER
EVANS RIVER
Resumed land vested in fee simple in the Minister for Public Works as per Government Gazette dated 11 May 1894
CLIENT
GOLDCORAL PTY LTD
PROJECT
PROPOSED SUBDIVISION OF LOTS 276 & 277 ON DP756624, LOT 165 ON DP831062, CROWN PUBLIC ROAD RESERVE (BETWEEN LOT 165 DP831062 AND LOT 276 DP756624) AND CROWN FORESHORE RESERVE (ADJACENT TO EVANS RIVER)
LOCAL AUTHORITY
RICHMOND VALLEY
NOTES
LOTS
TOTAL AREA
Residential Lots (175)
16.004Ha
Residue Lots (3)
54.463Ha
Public Reserves (4)
0.0066Ha
Drainage Reserve (1)
0.1124Ha
Pump station lot (1)
0.0127Ha
TOTAL
70.308Ha
ADDITIONAL NOTES
SCALE BAR
40m 0 00 200m
SCALE 1:4000 @ A1
LANDPARTNERS
LEVEL DATUM
AHD
LEVEL ORIGIN
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27/06/2019
PLAN NUMBER
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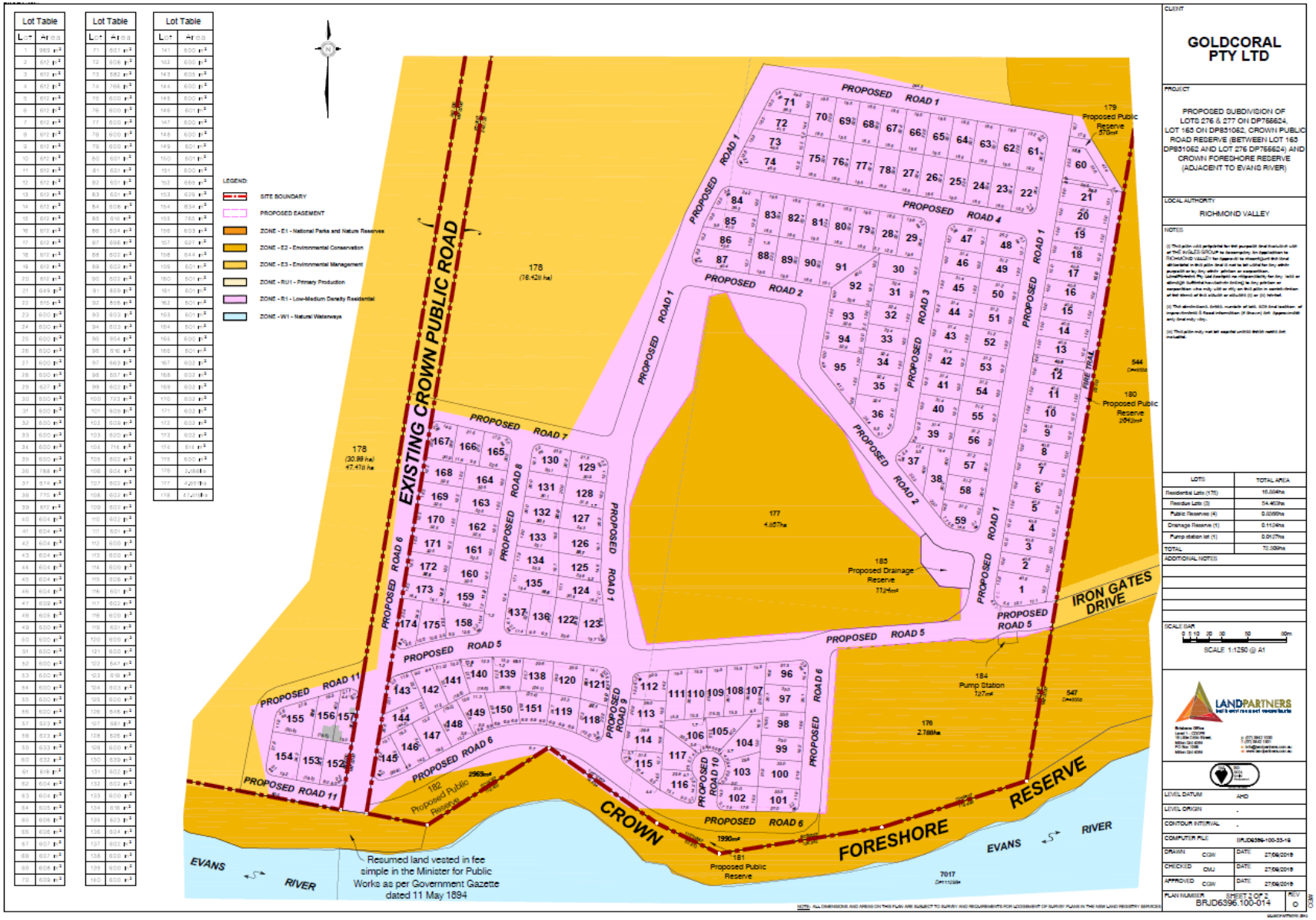
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SITE BOUNDARY
PROPOSED EASEMENT
ZONE - E1 - National Parks and Nature Reserves
ZONE - E2 - Environmental Conservation
ZONE - E3 - Environmental Management
ZONE - RU1 - Primary Production
ZONE - R1 - Low-Medium Density Residential
ZONE - W1 - Natural Waterways
EXISTING CROWN PUBLIC ROAD
PROPOSED ROAD 1
PROPOSED ROAD 2
PROPOSED ROAD 3
PROPOSED ROAD 4
PROPOSED ROAD 5
PROPOSED ROAD 6
PROPOSED ROAD 7
PROPOSED ROAD 8
PROPOSED ROAD 9
PROPOSED ROAD 10
PROPOSED ROAD 11
IRON GATES DRIVE
FIRE TRAIL
178 (78.428 ha)
178 (30.99 ha) 47.418 ha
177 4.857ha
176 2.788ha
179 Proposed Public Reserve 370m²
180 Proposed Public Reserve 2642m²
181 Proposed Public Reserve
182 Proposed Public Reserve 2563m²
183 Proposed Drainage Reserve 772m²
184 Pump Station 727m²
544 DP41552
547 DP41552
7017 DP1110...
1990m²
CROWN FORESHORE RESERVE
EVANS RIVER
EVANS RIVER
Resumed land vested in fee simple in the Minister for Public Works as per Government Gazette dated 11 May 1894
CLIENT
GOLDCORAL PTY LTD
PROJECT
PROPOSED SUBDIVISION OF LOTS 276 & 277 ON DP756624, LOT 163 ON DP831062, CROWN PUBLIC ROAD RESERVE (BETWEEN LOT 163 DP831062 AND LOT 276 DP756624) AND CROWN FORESHORE RESERVE (ADJACENT TO EVANS RIVER)
LOCAL AUTHORITY
RICHMOND VALLEY
NOTES
LOT/S
TOTAL AREA
Residential Lots (175)
15.004ha
Residue Lots (3)
54.463ha
Public Reserves (4)
0.0066ha
Drainage Reserve (1)
0.1124ha
Pump station lot (1)
0.0127ha
TOTAL
70.308ha
ADDITIONAL NOTE(S)
SCALE BAR
0 5 10 20 30 50 80m
SCALE 1:1250 @ A1
LANDPARTNERS
LEVEL DATUM
AHD
LEVEL ORIGIN
CONTOUR INTERVAL
COMPUTER FILE
BRJD6396-100-33-14
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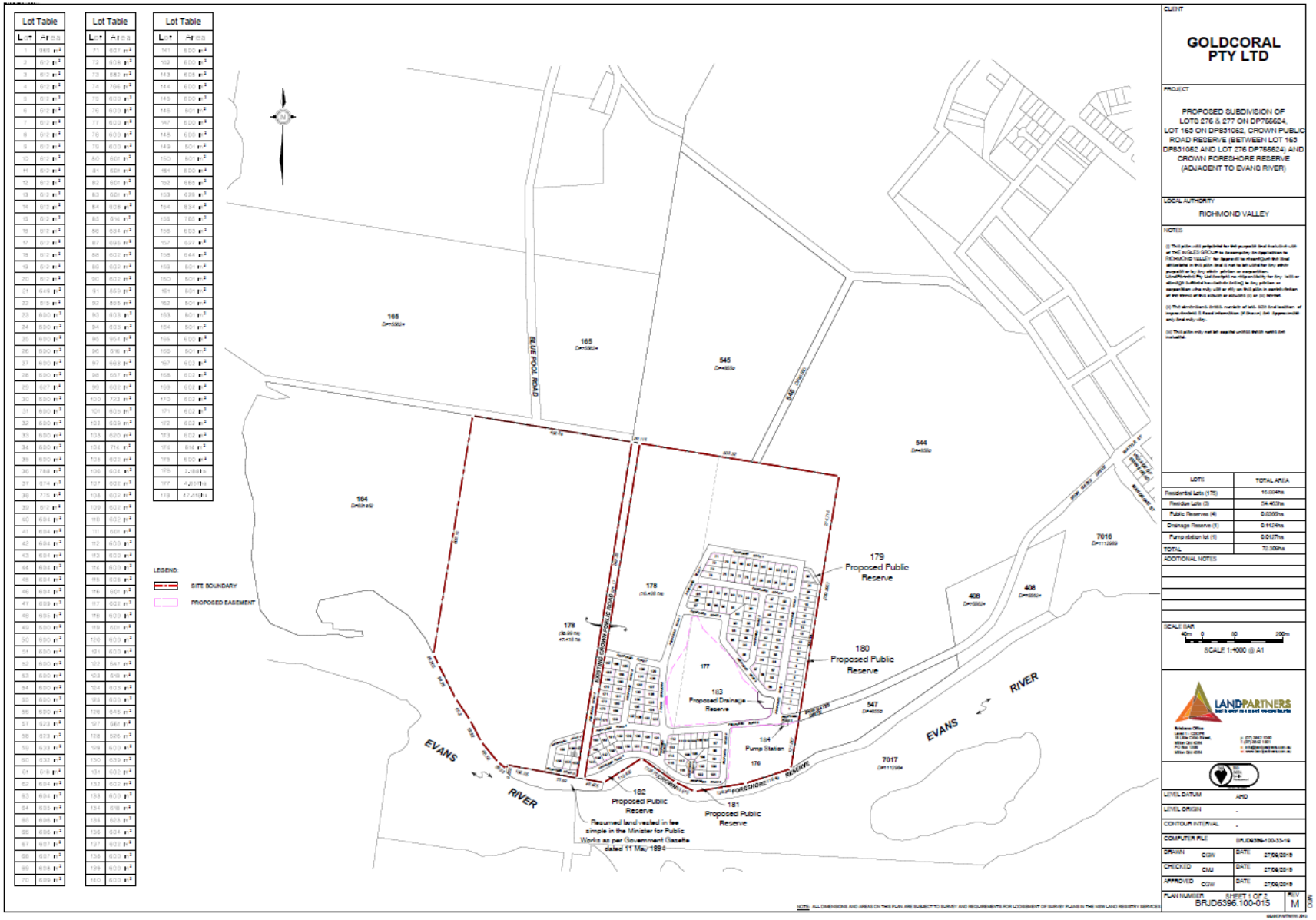
SHEET 2 OF 2
REV
O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Lot Table
Lot Table
LEGEND:
SITE BOUNDARY
PROPOSED EASEMENT
BLUE POOL ROAD
EVANS HEAD ROAD
EXISTING CROWN ROAD RESERVE
EVANS RIVER
EVANS RIVER
179 Proposed Public Reserve
180 Proposed Public Reserve
182 Proposed Drainage Reserve
184 Pump Station
182 Proposed Public Reserve
Resumed land vested in fee simple in the Minister for Public Works as per Government Gazette dated 11 May 1894
181 Proposed Public Reserve
CLIENT
GOLDCORAL PTY LTD
PROJECT
PROPOSED SUBDIVISION OF LOTS 276 & 277 ON DP756624, LOT 165 ON DP831062, CROWN PUBLIC ROAD RESERVE (BETWEEN LOT 165 DP831062 AND LOT 276 DP756624) AND CROWN FORESHORE RESERVE (ADJACENT TO EVANS RIVER)
LOCAL AUTHORITY
RICHMOND VALLEY
NOTES
LOTS
TOTAL AREA
Residential Lots (170)
16.004ha
Residue Lots (3)
54.463ha
Public Reserves (4)
0.0000ha
Drainage Reserve (1)
0.1124ha
Pump station lot (1)
0.0127ha
TOTAL
70.330ha
ADDITIONAL NOTES
SCALE BAR
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SCALE 1:4000 @ A1
LANDPARTNERS
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LEVEL ORIGIN -
CONTOUR INTERVAL -
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APPROVED CGW DATE: 27/06/2019
PLAN NUMBER BRJD6396.100-015
SHEET 1 OF 1
REV M

APPENDIX C

NBC Bushfire Attack Assessment Report

NBC Bushfire Attack Assessment Report V3.0

AS3959 (2009) Appendix B - Detailed Method 2

Print Date: 05-Dec-18 **Assessment Date:** 05-Dec-18

Site Street Address:	Test Lot 174, Evans Head		
Assessor:	Melanie Jackson; Bushfire Risk P/L		
Local Government Area:	Richmond Valley	**Alpine Area:**	No

Equations Used

Transmissivity: Fuss and Hammins, 2002
Flame Length: RFS PBP, 2001/Vesta/Catchpole
Rate of Fire Spread: Noble et al., 1980
Radiant Heat: Drysdale, 1985; Sullivan et al., 2003; Tan et al., 2005
Peak Elevation of Receiver: Tan et al., 2005
Peak Flame Angle: Tan et al., 2005

Run Description: SW - Lot 174

Vegetation Information

Vegetation Type:	Forest	**Vegetation Group:**	Forest and Woodland
Vegetation Slope:	3 Degrees	**Vegetation Slope Type:**	Downslope
Surface Fuel Load(t/ha):	25	**Overall Fuel Load(t/ha):**	35
Vegetation Height(m):	2	Only Applicable to Shrub/Scrub and Vesta	

Site Information

Site Slope:	0 Degrees	**Site Slope Type:**	Downslope
Elevation of Receiver(m):	Default	**APZ/Separation(m):**	25

Fire Inputs

Veg./Flame Width(m):	100	**Flame Temp(K)**	1090

Calculation Parameters

Flame Emissivity:	95	**Relative Humidity(%):**	25
Heat of Combustion(kJ/kg)	18600	**Ambient Temp(K):**	308
Moisture Factor:	5	**FDI:**	80

Program Outputs

Category of Attack:	HIGH	**Peak Elevation of Receiver(m):**	10.13
Level of Construction:	BAL 29	**Fire Intensity(kW/m):**	53381
Radiant Heat(kW/m2):	28.96	**Flame Angle (degrees):**	60
Flame Length(m):	23.39	**Maximum View Factor:**	0.457
Rate Of Spread (km/h):	2.95	**Inner Protection Area(m):**	16
Transmissivity:	0.834	**Outer Protection Area(m):**	9