

DEVELOPMENT SCHEDULE

RPD	LOT 2 MPH10601
SITE AREA	20270 M2 APPROX
ADDRESS	26 LUNDAGER STREET MOONGAN QLD 4714
ZONE:	RURAL
LOCAL AUTHORITY	RRC
SETBACK FROM ROAD	MIM 25M
PROPOSED BCA/NCC	CLASS 1 & CLASS 10A
GFA DWELLING	105 M2
WASTE DISPOSAL	SEPTIC, SPEC BY OWNER.
SOIL CLASSIFICATION	UNKNOWN, TBC BY OWNER
BUSHFIRE	ASSESSMENT REQUIRED BY OWNER VEGETATION SLOPE CLEARANCE TO DWELLING BAL LEVEL, TBA AS PER AS3959
ENERGY EFFICIENCY	ASSESSMENT REFER LANE ASSESSMENT REPORT & OWNERS SPECIFICATION

REV ID	Issue Date	DESCRIPTION
A	24/07/2019	BUILDING APPROVAL
DATE	REV.	NOTES
APPROVED		
CHECKED		jmt
DRAWN		AMFprojects
DESIGN		jmt

TAPSELL CONSULTING ENGINEERS PTY LTD
 A.B.N. N.o. 78 065 154 949
 14 MILFORD AVENUE,
 NORTH ROCKHAMPTON, 4701
 TELEPHONE: 07 4926 3554
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GENERAL NOTES

THESE DRAWINGS ARE TO BE READ IN CONJUNCTION WITH STRUCTURAL CONSULTING ENGINEERS DOCUMENTATION.

CHECK ALL DIMENSIONS AND SETOUTS ON-SITE PRIOR TO CONSTRUCTION AND NOTIFY PROPRIETOR OF ANY CONCERNS.

DO NOT SCALE OFF DRAWINGS

ALL DIMENSIONS IN MILLIMETRES (UNO)

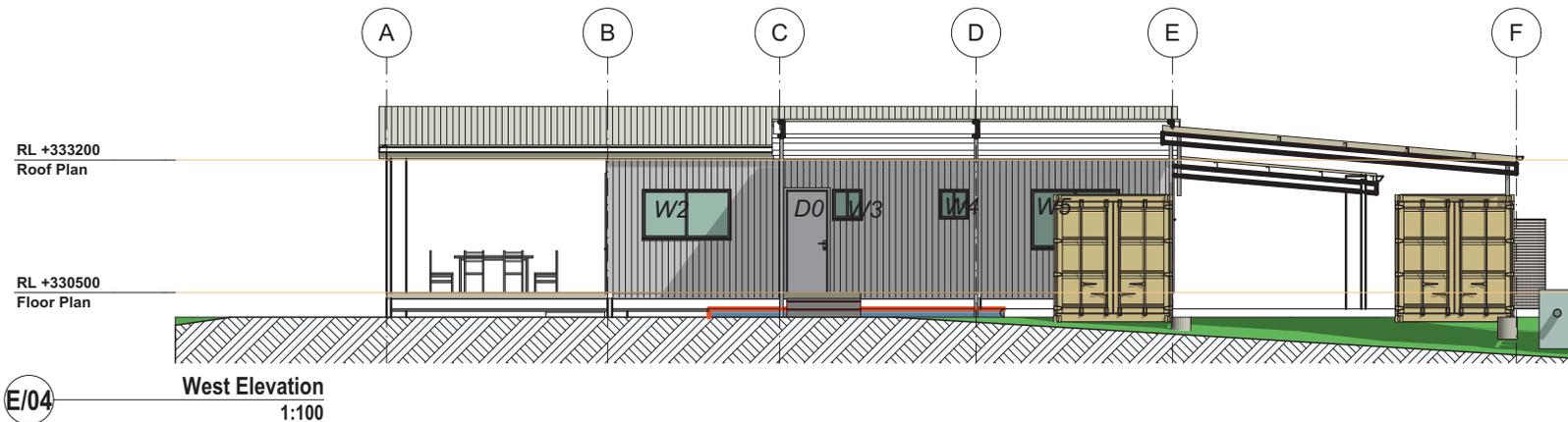
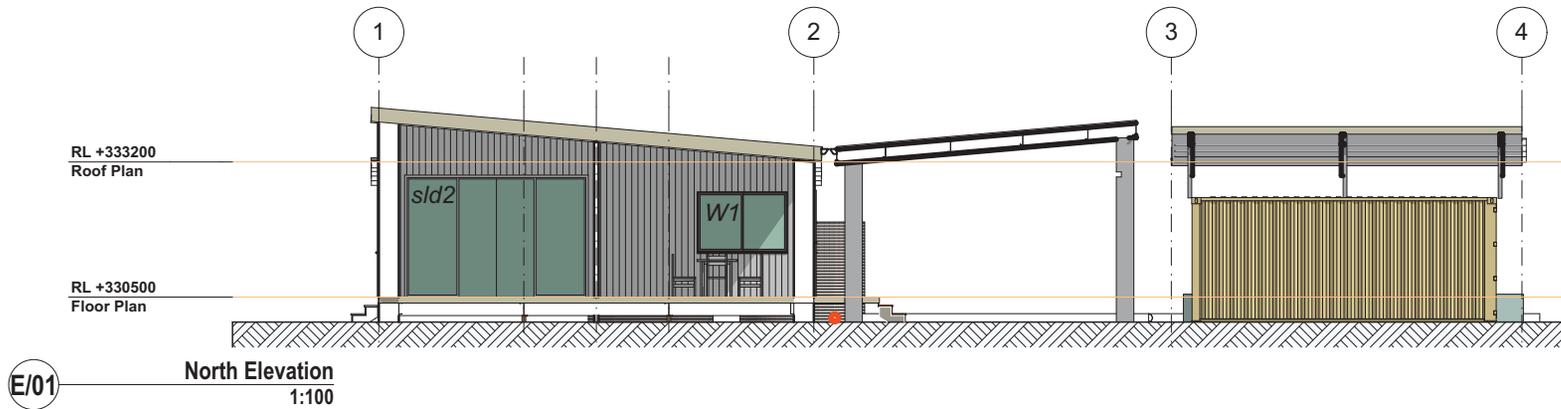
ALL CONSTRUCTION SHALL BE GENERALLY IN ACCORDANCE WITH THE REQUIREMENTS OF THE NATIONAL CONSTRUCTION CODE OF AUSTRALIA, QUEENSLAND BUILDING ACT AND DISABILITY (ACCESS TO PREMISES- BUILDINGS) STANDARD 2010 REFERRED TO AND SHALL BE THE CURRENT EDITION AT TIME OF BUILDING APPROVAL CERTIFICATION.

PROJECT
PROPOSED DWELLING
 FOR
Clive & Julie Lohrey
 AT
26 Lundager Road Moongan

ROCKHAMPTON REGIONAL COUNCIL
APPROVED PLANS
 These plans are approved subject to the current conditions of approval associated with
Development Permit No.: D/105-2020
Dated: 8 December 2020

JOB No.	0118-04
DWG/REV.	Building Plans A/02

3 Site Plan
 Scale 1:1500



WATERPROOFING
WATERPROOF MEMBRANE TO ALL WET AREAS PRIOR TO TILING TO BCA 3.8.1.2 AND 3.8.1.6. THE APPROVED SYSTEMS SHALL BE INSTALLED IN STRICT ACCORDANCE TO THE MANUFACTURERS SPECIFICATIONS. COMPLY WITH AS 3740, WATERPROOFING WET AREAS IN RESIDENTIAL BUILDINGS. (EXTEND 1.5M MIN. FROM THE SHOWER POINT ON THE WALL)

GLAZING
REFER STRUCTURAL ENGINEERS WIND DESIGN PRESSURES FOR ALL WINDOWS, DOORS AND STRUCTURAL ELEMENTS. GLAZING TO BCA 3.6 AND AS1288 AND AS2047. GLASS TYPE FOR SHOWER SCREENS, MIRRORS AND WINDOWS TO BE IN COMPLIANCE WITH AS1288. SAFETY GLASS MARKED AND VISIBLE IN ACCORDANCE WITH BCA. ALL WINDOWS AND DOORS SHALL BE TESTED FOR WATER PENETRATIONS TO CONFORM WITH AUSTRALIAN STANDARDS.

HANDRAIL AND BALUSTRADES
FLOORS MORE THAN 3M ABOVE THE GROUND, ENSURE ANY HORIZONTAL ELEMENTS BETWEEN 150mm & 760mm ABOVE THE FLOOR SHALL NOT FACILITATE CLIMBING.

STAIRS AND RISERS
STAIRS AND RISERS TO COMPLY WITH PART 3.9.1 OF BCA MAX STEP 190MM

VERMIN PROTECTION
ALL OPENINGS TO BE FLASHED
BIRDPROOF ALL WALL AND ROOF CAVITIES

ROCKHAMPTON REGIONAL COUNCIL

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CONSTRUCTION & BCA NOTES

CLASS 1 DWELLING

MATERIALS
ALL BUILDING MATERIALS TO BE OF SERVICEABLE NATURE AND TO COMPLY WITH BCA C1.10, CLAUSES 2.4(C), (D) & 7 CLAUSE D3.6
 FLAMABILITY,
 ENSURE ALL SPECIFIED MATERIALS COMPLY WITH FLAMABILITY RATINGS FOR CLASS 1, DWELLINGS.
 ASBESTOS NOT PERMITTED.
 ANY TILES SPECIFIED FOR PUBLIC AREAS SHALL BE NON-SLIP IN ACCORDANCE WITH AUSTRALIAN STANDARDS AND BCA.

CONSTRUCTION
CONSTRUCTION DETAILS WHERE NOT SHOWN ARE TO BE IN ACCORDANCE WITH THE BUILDING BY-LAWS AND THE BUILDING CODE OF AUSTRALIA.

SLAB AND FOOTINGS
REFER STRUCTURAL ENGINEER DETAIL DOCUMENTATION

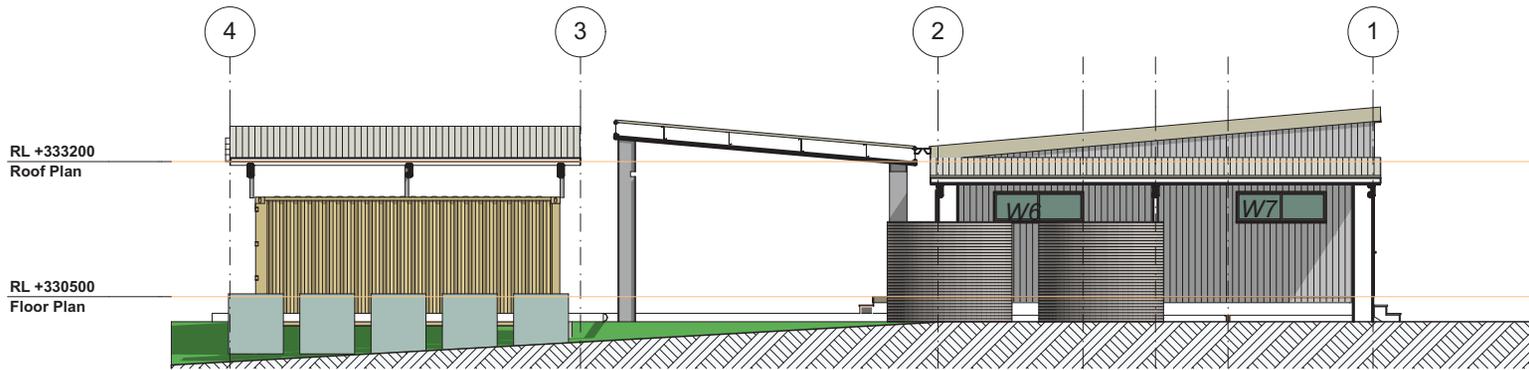
WALL AND ROOF FRAMING
WALL FRAMING, LINTELS ETC ARE TO BE IN ACCORDANCE WITH APPROVED FRAME MANUFACTURERS DETAILS AND ARE TO BE CERTIFIED FOR STRUCTURAL ADEQUACY BY THE MANUFACTURER FOR APPROPRIATE WIND CLASSIFICATION.

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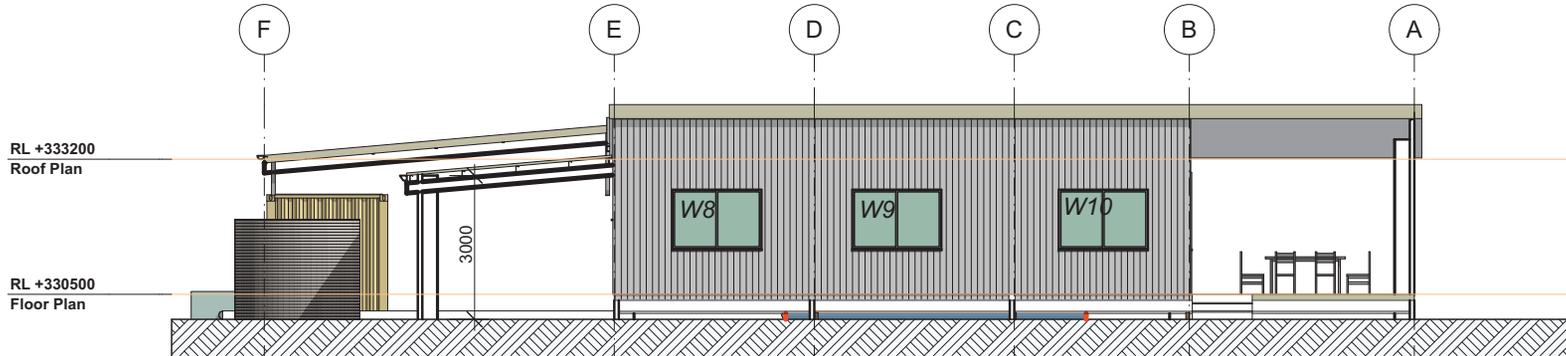
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E/03 South Elevation
1:100



E/02 East Elevation
1:100

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SUSTAINABILITY

ENERGY EFFICIENCY AND SUSTAINABILITY OF MATERIALS AND CONSTRUCTION AS PER QUEENSLAND DEVELOPMENT CODE.

ELECTRICAL LIGHTING TO BE 80% FLUORESCENT LIGHT TO INTERNAL FLOOR AREA.
BUILDING FABRIC & WALL INSULATION TO COMPLY WITH BCA 3.12.1. REFER ENERGY EFFICIENCY REPORT FOR DETAIL SPECIFICATIONS.

EXTERNAL WINDOWS AND DOORS TO ANY AIR-CONDITIONED SPACE MUST BE FITTED WITH A SEAL.

AIR MOVEMENT, THE TOTAL REQUIRED VENTILATION OPENINGS MUST BE CONNECTED TO A BREEZE PATH TO ANOTHER OPENING OR ANOTHER HABITABLE ROOM.

RAINWATER TANKS IF INSTALLED AS PER LOCAL AUTHORITY REQUIREMENTS.

DUAL FLUSH TOILET SUITE (3l / 4.5l LITRE) UNO
TAPWARE, 5 STAR WATER RATING TAPWARE AND SHOWER HEADS (UNO)

WATER HEATING SYSTEM AS PER OWNERS SPECIFICATIONS.

AIR CONDITIONING SYSTEMS IF INSTALLED TO BE MIN 4 STAR RATING AND HARDWIRED.

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DWG/REV.	Building Plans A/07

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**Bushfire Hazard Assessment &
Management Plan**

**Dwelling on Lot 2MPH10601
26 Lundager Road, Moongan 4714**

Publication Details

Title: Bushfire Hazard Assessment & Management Plan. Dwelling on Lot 2MPH10601 26 Lundager Road, Moongan 4714

Date of Publication: 1/09/2020

Authors: Ian Denley.

File Name: 40934 BMP 2MPH10601.docx

Project Number: 40934

Contract Number: 40934



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Version	Author	Recipients	Distribution type
1	Ian Denley	Gideon Town Planning	Electronic

Property Information

Subject Lot	Lot 2MPH10601
Owners	Clive and Julie Lohrey
Street Address	26 Lundager Road, Moongan 4714

Acronyms and Abbreviations

AS 3959: Australian Standard 3959: 2018 Building in Bushfire Prone Areas and amendments.

BAL: Bushfire Attack Level indicated in AS3959 for site specific factors.

BHA: Bushfire Hazard Assessment

BMP: Bushfire Management Plan

QFES: Queensland Fire and Emergency Services

QRFS: Queensland Rural Fire Service

RRC: Rockhampton Regional Council

SPP: *State Planning Policy*. July 2017

SPP Guideline: *Natural hazards, risk and resilience - Bushfire. State Planning Policy – state interest guidance material*. December 2019

NCA 1992: *Nature Conservation Act 1992*

VMA 1999: *Vegetation Management Act 1999*

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Bushfire Hazard Assessment

1 Introduction

The purpose of the Bushfire Hazard Assessment is to determine the level of bushfire hazard with reference to:

- a) The Rockhampton Regional Council 8.2.4 Bushfire hazard overlay code;
- b) SPP Guideline: Natural hazards, risk and resilience - Bushfire. State Planning Policy – state interest guidance material. December 2019;
- c) The Australian Standard AS3959: 2018 Construction of buildings in bushfire-prone areas (AS3959); and
- d) Site specific factors that may influence standardised assessment methods.
- e) The AS3959 Method 2 is used to calculate appropriate Bushfire Attack Levels where an assessable vegetation hazard is within 100 metres of a subject dwelling. Subject buildings at or greater than 100 metres from the identified hazard are exempt.

The subject of this Bushfire Hazard Assessment and Management Plan is a proposed dwelling on Lot 2MPH10601 located at 26 Lundager Road, Moongan 4714.

A plan of the dwelling location and surrounding roads, trails and access is provided in the Appendix.

2 Site Location

This BAL assessment relates to the existing dwelling and any buildings closer than 6 metres from the proposed dwelling situated on Lot 2MPH10601 located at 26 Lundager Road, Moongan 4714. See **Figure 1** for the site location.

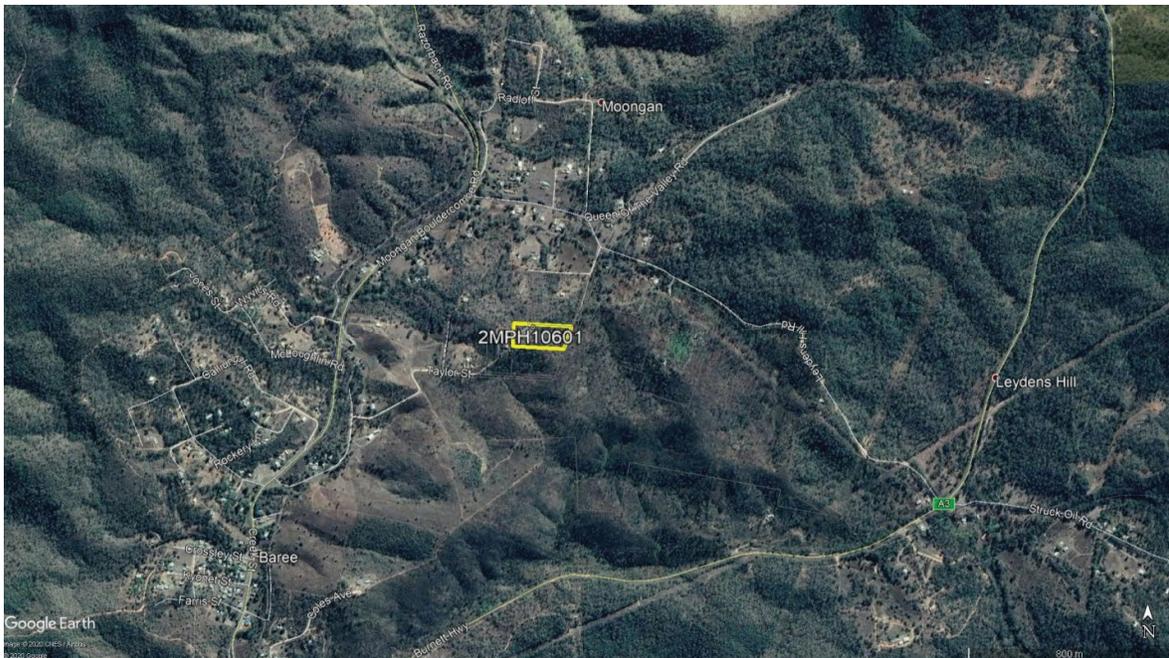


Figure 1. The yellow box indicates the boundary of Lot 2MPH10601 in relation to surrounding hazards and 1 metre contours. Red lines indicate the boundaries of the identified vegetation hazard.

3 Dwelling Location

The location of the proposed dwelling is provided in Tapsell Consulting Engineers Drawing 0118-04 Rev. A, A/02 in **Appendix** and an extract is provided in **Figure 2**.

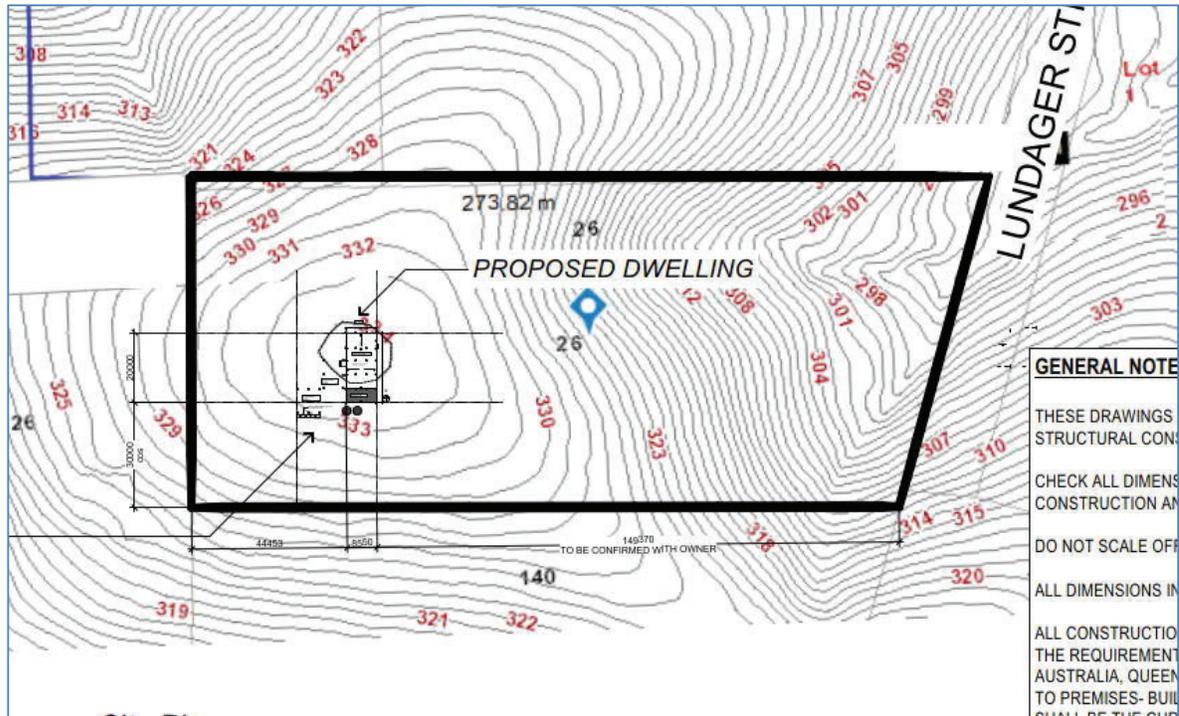


Figure 2. The proposed location of the dwelling (Extract of Tapsell Consulting Engineers Drawing 0118-04 Rev. A, A/02).

4 Vegetation Hazard

Vegetation adjacent to the dwelling location consisted of grassy ironbark woodland to grassy open woodland to the North and West with shrubby woodland to the East of the dwelling location. Vegetation to the South largely consisted of open woodland cleared under. The shrubby woodland to the East represents the most significant hazard and cleared open woodlands to the South the least relative hazard. See **Figure 3** for the location of vegetation types in relation to the dwelling site.

The distance between the identified hazards and the dwelling location was approximately 30 metres. However this should be determined once the dimensions and exact location of the dwelling surfaces are known. The distance is measured from the nearest facing surface of the dwelling, including non-livable structures < 6 metres from the dwelling to the hazard. The edge of the hazard is generally identified by the start of associated understorey vegetation.

Vegetation with an overall canopy cover of less than 10% and either grass less than 30 centimetres tall or slashed is considered 'Low Risk' vegetation and is not included in the BAL hazard assessment. Descriptions of AS3959 *Low Risk Vegetation* and *Exclusions* of the AS3959 for certain Queensland vegetation types (NCC 2018) are provided in the **Appendix**.



Figure 3. Location of vegetation types in relation to the proposed dwelling site on 12.95.

4.1 Slope Hazard

Slope was determined using one metre contours (QLD Data) and is calculated at the location of the identified hazard (effective slope). See Figure 4.

The site slope grades gently downhill in all directions and has been calculated as 6.5 degrees for the purposes of calculating BAL. Effective slopes in degrees (under the vegetation hazard) were:

East 12.95
South 14.36
North 12.63
West 9.79



Figure 4. One metre contours over lot 2MPH10601. The driveway is indicated by the grey line.

5 BAL Results

BAL Calculations have been provided using Method 2 (AS3959). Surface and overall fuel loads were taken from the QFES *SPP Bushfire Asset Protection Zone Width Zone Calculator* for *Temperate eucalypt woodlands* (E, N and W vegetation) and *Dry eucalypt open forest on sandstone and shallow soils* (Sth vegetation) (QFES, 2020).

The particular calculation uses a minimum distance which is an AS3959-2009 Method 2 based calculation which will determine the minimum distances required to achieve a range of different radiant heat levels (represented by BAL's). A summary of results is provided in **Table 1**. See the **Appendix** for the complete AS3959: 2018 BAL Method 2 Minimum Distance results.

Table 1. Minimum distance ranges for each aspect. I.e. for a dwelling built to BAL-12.5 each facing surface of the dwelling should be no closer to the hazard than minimum distance indicated in the *BAL 12.5 distance range (m)* column for the associated aspect. Distances at 100m or greater are BAL-LOW.

Aspect	BAL 29 distance range (m)	BAL 19 distance range (m)	BAL 12.5 distance range (m)
East	11.7 to < 17.4	17.4 to < 25.4	25.4 to < 100m
South	15.3 to < 22.6.	22.6to < 32.1	32.1 to < 100m
North	11.5 to < 17.1	17.1 to < 25.0	25.0 to < 100m
West	9.8 to < 14.7	14.7 to < 21.8	21.8 to < 100m

Bushfire Management Plan

6 Purpose

The purpose of this Bushfire Management Plan is to reduce risks from bushfire hazard to a tolerable level of risk.

The aim of the Bushfire Management Plan is to provide appropriate construction standards, setbacks, hazard maintenance and recommendations based on the identified hazard components present at the time of survey. Conditions may change over time so that owners and occupiers should be prepared to increase risk reduction when required.

Owners and occupiers must bear in mind that implementation of the Bushfire Management Plan will assist in addressing and mitigating identified fire hazards on the subject site, however, the plan does not in itself prevent the loss of life or property. Owners should consider additional mitigation measures such as those provided as recommendations in this Plan or as advised by your local Rural Fire Service Warden.

6.1 Bushfire Survival Plan

To assist in mitigating risk, current and future occupants should develop a **Bushfire Survival Plan**. Leaving too late, when a fire is approaching is a common cause of fatalities during a bushfire event. The decision to stay when a fire is approaching involves activating the **Bushfire Survival Plan** and undertaking planned actions before, during, and after the fire. A Bushfire Survival Plan template and/or guidance material can be obtained from the Queensland Fire and Emergency Service.

6.2 Ongoing Risk Management

Occupiers should implement all practical measures to prevent the loss of life and property.

It is imperative that owners and occupiers maintain hazard reduction measures so that they are at hand and functional in a bushfire emergency.

At the start of the bushfire season, revisit your bushfire survival strategy and ensure all intended measures are in place and working. Fine fuels around the house and within the building protection zone are the greatest threat to a dwelling. Ensure these areas are fuel reduced. Check all hoses; water sources; pumps etc. are adequate and functional. Ensure driveways and fire trails are adequate and suitable for firefighting vehicles.

In case of fire, immediate contact should be made with the relevant fire authority and all directions and advice should be followed.

6.3 Responsible Agencies

The responsible Fire Authority is the Queensland Fire and Emergency Services (QFES). The Rural Division of the QFES is responsible for bushfires. The Urban Division of the QFES is responsible for structural fires.

The Local Authority is Rockhampton Regional Council. It is the responsibility of the Council and the building certifier to ensure that the measures outlined in this Management Plan are in place prior to the occupation of any buildings that are subject to this plan.

7 Site Description

The subject of the Bushfire Management Plan is the proposed new dwelling on Lot 2MPH10601 located at 26 Lundager Road, Moongan 4714.

8 Expected Fire Behavior

The greater hazard is the shrubby woodland located on slopes to the south of the proposed dwelling location. Ember attack is likely to be the most significant hazard to structures on the site.

Warm, dry northeast winds are common in late spring to early summer in the local area. This period and wind direction represents the highest risk of bushfire in the area.

The likelihood of fire and fire intensity will depend on fuel accumulation. Fires are likely to be infrequent and usually burn only under severe conditions. Fires may be severe with flame lengths of 15 to 20 metres with some ember attack.

9 Construction Standards and Building Protection Zones

1. Building Protection Zones (fire breaks) will conform to the distances indicated in **Table 2** and in accordance with the AS3959 BAL Construction Standard.
2. The nearest surface of the dwelling must not be located closer to the hazard than the distance ranges indicated in for the BAL Construction Standard employed.
3. Non-liveable structures (garages, sheds etc.) closer than 6 metres to the dwelling are to comply with Section 3.2.3 of the AS3959: 2018.
4. Tree canopy cover in the building protection zone will be less than 10%; and
5. The nearest canopy should be located greater than 2 metres from any part of the roofline of the dwelling.

The installation of a rooftop or perimeter sprinkler system is recommended. The associated pump should be able to be operated independently of the electricity grid. This may be petrol or diesel operated pump or an electric pump powered by a generator.

Table 2. Required construction Standards and associated minimum fire break distances (building protection zone) between the hazard and nearest facing surface of a dwelling located on the subject lot. Minimum distance is derived from AS3959 Method 2.

Aspect	BAL 29 distance range (m)	BAL 19 distance range (m)	BAL 12.5 distance range (m)
East	11.7 to < 17.4	17.4 to < 25.4	25.4 to < 100m
South	15.3 to < 22.6.	22.6to < 32.1	32.1 to < 100m
North	11.5 to < 17.1	17.1 to < 25.0	25.0 to < 100m
West	9.8 to < 14.7	14.7 to < 21.8	21.8 to < 100m

10 Driveways & Tracks

The access driveway to the house site will:

1. Be constructed to a standard so that they are accessible by QFES & QRFS fire fighting vehicles in all weather conditions and capable of accommodating a vehicle of 8 tonnes;
2. Have a minimum formed width of 4 metres,
3. Have a minimum cleared height of 4.8 metres including any gates;
4. Have a working area either side of the formed road that is 3 metres wide and cleared of all flammable vegetation greater than 10cm in height.
5. Have adequate drainage to prevent soil erosion.
6. Gradients greater than 12.5% should be treated (impermeable surface etc.) to ensure fire fighting vehicles can safely traverse these sections.

7. Have passing bays for firefighting appliances every 200 metres along the access driveway; and
 - 7.1. Passing bays are 20 metres long with a formed width of 6 metres.
8. Have a turning circle with a minimum radius of 8m (including roll-over kerbs if they are provided) no further than 50m from the dwelling. Other solutions using T or Y heads of specified dimensions are also appropriate. See **Figure 5** for example turnaround areas;
9. Fire trails are to be constructed to the satisfaction of QRFS.

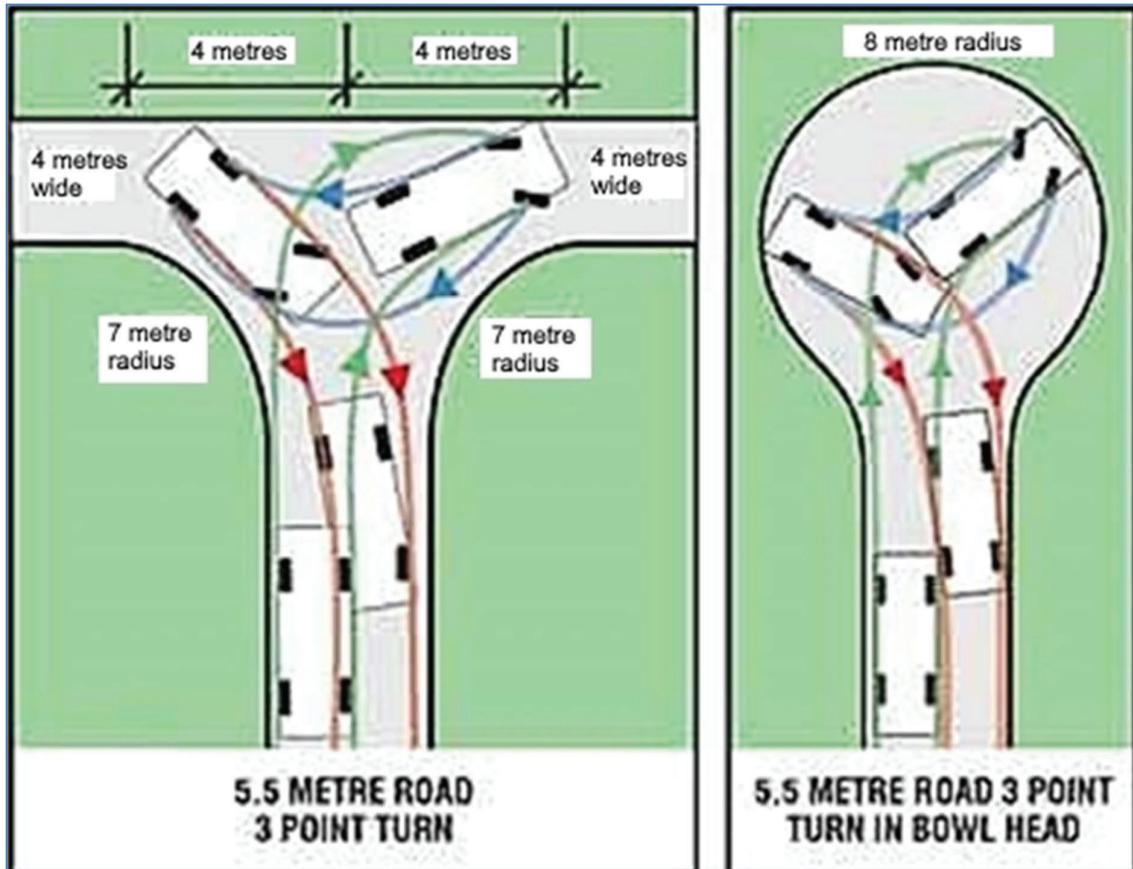


Figure 5. Example turnaround areas (Taken from Building Fire Safety Management Tool & Advisory Notes, State of Queensland (Queensland Fire and Emergency Services) 2015).

10.1 Alternative Access & Egress Routes

The subject lot has a well formed driveway to the building site. There are three access trails from the site in addition to the driveway. These trails have been used on occasion by the Rural Fire Service (pers. com. Clive Lohrey August 2020). Two tracks lead to Ludager Road and another to Taylor Street (see the **Figure 6** in the **Appendix**).

11 Water supply for firefighting purposes

The lot will have:

1. A dedicated on-site water storage for firefighting to be located within 10 metres of the dwelling that:
 - 1.1. Is constructed of non-combustible materials or is an underground tank;

- 1.2. has a take-off connection from the building to the tank which is at a level that provides on-site water storage of not less than 20,000 litres;
 - 1.3. has a hardstand area allowing heavy rigid fire appliance access within six (6) metres of a tank; and
 - 1.4. has fire brigade tank fittings consisting of:
 - 1.4.1. a fifty (50) millimetre ball valve and male camlock coupling for above ground tanks; and
 - 1.4.2. above ground water pipe fittings that are metal; or
 - 1.4.3. for underground tanks, an access hole of 200 millimetre diameter (minimum) to allow access for suction lines.
 - 1.5. Are accessible at all times to any appliance from the Queensland Fire and Emergency Services;
2. Other accessible water sources (e.g. accessible dam, bore or swimming pool) are to be provided with all-weather access.

12 Landscaping

1. The dwelling should be located so that it is:
 - a) 10 meters from any retained vegetation strips or small areas of vegetation;
 - b) Retained trees in the Building Protection Zone should provide a non-continuous canopy with a total canopy cover of less than 10%; and
 - c) All dead and damaged timber is to be removed within the Setback Zone.
2. Lawns and Gardens within 10m width surrounding the dwelling are to be kept at no greater than 50mm in height;
3. Grassed areas and lawns for a further 10m are to be kept at no greater than 150mm;
4. The balance of the setback zone will be kept in a hazard reduced state: free of weeds (particularly lantana and guinea grass) and grasses at no greater than 200mm high: and
5. Landscaping trees within 10m of residences should be fire resistant species. No tree or shrub should be in contact with or overhang buildings.
6. All fencing and other garden structures within 10 metres of the dwelling will be constructed from non-combustible materials.

13 Purchaser/Resident Education and Awareness Programs

Each owner should be provided with a copy of this Fire Management Plan with an alert placed either on the title or Council rate searches that the Fire Management Plan is in existence and is to be made available to subsequent owners. The hazard ratings are to be placed on council plans and / or rate notices.

Owners should read and be familiar with the information contained in this report. Owners are responsible for maintenance of fire reduction measures on the site to reduce the risk of fire.

Owners should establish a Fire Safety Plan and Emergency Evacuation Plan for the event of fire including all suitable evacuation routes from their land and dwelling for fire from all potential directions. In the event of a fire, dialling 000 obtains emergency assistance.

Bushfire Safety Plans should include a series of time actions:

1. out of season observations for general fire safety around your house and property;
2. at the start of the fire season;
3. when very high to catastrophic conditions are announced for your area
4. when a fire is near your area;
5. when QRFS provide a watch and act or elevated warnings; and
6. when you are told to leave

Examples of Fire Safety Plans include the *Rural Property Fire Management Guide* and *'Plan Act Survive' - Bushfire Survival Plan*.

Residents should maintain regular contact with the Fire Brigade for local information updates and check the Queensland Rural Fire Service website for any updated fire safety guides and further information.

Additional recommendations to reduce fire risk around the dwelling are provided in **Table 3**

Table 3. Hazard Reduction Measures: The following recommendations provide additional measures to reduce hazards around the dwelling

Category	Issue	Action
Buildings	Maintenance: Buildings and Grounds	<ul style="list-style-type: none"> • Clear overhanging trees and shrubs from dwellings and associated structures; • Point LPG gas tank relief valves away from dwellings; • Store flammable items well away from dwellings (e.g. woodpiles, boxes, paper); • Secure roof and clean gutters of dry leaf debris to eliminate an ignition source for embers; • Clear fuels around the house for at least 20 metres; • Trim under fences and remove overgrown bushes and plants; • Ensure surrounding grassed areas are trimmed and well-watered; and • Install non-flammable gutter guards. • Ensure door mats and other flammable material is moved away from the building when a bushfire is imminent.
Water	Water Supply and firefighting equipment	<ul style="list-style-type: none"> • Water sources for firefighting may include an accessible dam or tank with fire brigade tank fittings, a swimming pool, bore water etc. These sources should be provided with all-weather access; • All structures should be provided with a garden hose with metal fittings attached to the water supply at all times. The hose should be of sufficient length to reach all sides of a building; and • Regularly check that firefighting equipment is operational. • Rooftop and perimeter sprinkler systems are considered to be very effective in reducing the risk of spot fires around a dwelling.
Hazard Reduction	Close proximity of buildings to hazardous vegetation Hazard reduction:	<ul style="list-style-type: none"> • Trees should be located at a sufficient distance away from dwellings so that when fully mature, branches do not overhang the eaves of the house. • Create a fuel reduction zone adjacent to a dwelling. Remove hazardous vegetation. Do not cause erosion when reducing potential fuel loads in these areas. • Within the hazard reduction zones, hazardous understory vegetation (dry sclerophyll species) should be removed within the setback zone of all structures. These can be replaced with fire resistant species.
Landscaping	Growth of grasses and other fire prone vegetation in disturbed and cleared areas	<ul style="list-style-type: none"> • Remove hazardous grasses and undesirable regrowth from buffer areas; and • Maintain all safety buffer areas free of weeds and tall grasses to maximum heights set out in this Bushfire Management Plan.
	Landscaping species	<ul style="list-style-type: none"> • Many species of locally occurring dry rainforest species are very effective at suppressing the spread of fire. • Avoid using palm trees and ferny leaved trees near the dwelling. These species are susceptible to burning.

14 References & Bibliography

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15 Appendix

1. Descriptions of AS3959 Low Risk Vegetation and Exclusions of the AS3959 for certain Queensland vegetation types (NCC 2018)
2. Driveway Access & Trails figure
3. Tapsell Consulting Engineers Drawing 0118-04 Rev. A, A/02
4. AS3959 Method 2 results

AS3959 Low Risk Vegetation

The AS3959-2018 identifies the following circumstances are identified as Low Risk and excluded from a BAL Assessment (AS3959-2018):

2.2.3.2 Exclusions—Low threat vegetation and non-vegetated areas

The following vegetation shall be excluded from a BAL assessment:

- a) Vegetation of any type that is more than 100 m from the site.
- b) Single areas of vegetation less than 1 ha in area and not within 100 m of other areas of vegetation being classified vegetation.
- c) Multiple areas of vegetation less than 0.25 ha in area and not within 20 m of the site, or each other or of other areas of vegetation being classified vegetation.
- d) Strips of vegetation less than 20 m in width (measured perpendicular to the elevation exposed to the strip of vegetation) regardless of length and not within 20 m 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.

NOTES:

- 1) 1 Minimal fuel condition means there is insufficient fuel available to significantly increase the severity of the bushfire attack (recognizable as short-cropped grass for example, to a nominal height of 100 mm).
- 2) 2 A windbreak is considered a single row of trees used as a screen or to reduce the effect of wind on the leeward side of the trees.

National Construction Code (2019) variations to the AS3959 for Queensland.

The National Construction Code (2019) provides a variation to the AS3959 where the classified vegetation is Group F rainforest (excluding wet sclerophyll forest types), mangrove communities and grasslands under 300 mm high. Extracts are below:

National Construction Code 2019 Volume One Queensland Qld Part G5 Construction in bushfire prone areas.

A building that is constructed in a *designated bushfire prone area* must be designed and constructed to reduce the risk of ignition from a bushfire while the fire front passes.

The *Deemed-to-Satisfy* Provisions of this Part apply to—

- (a) a Class 2 or 3 building; or
- (b) a Class 10a building or deck associated with a Class 2 or 3 building, located in a designated bushfire prone area, **but does not apply when the classified vegetation is Group F rainforest (excluding wet sclerophyll forest types), mangrove communities and grasslands under 300 mm high.**

National Construction Code 2019 Volume Two Queensland Qld Part 3.10.5 Construction in bushfire prone areas.

3.10.5.0 is replaced with the following clause in Queensland:

- (a) Subject to (b), *Performance Requirement P2.7.5* is satisfied for—

(i) a Class 1 building; or

a Class 10a building or deck associated with a Class 1 building, located in a *designated bushfire prone area* if it is constructed in accordance with—

(i) AS 3959; or

NASH Standard – Steel Framed Construction in Bushfire Areas.

(b) The requirements of (a) do not apply when, in accordance with AS 3959, the classified vegetation is Group F rainforest (excluding wet sclerophyll forest types), mangrove communities and grasslands under 300 mm high.

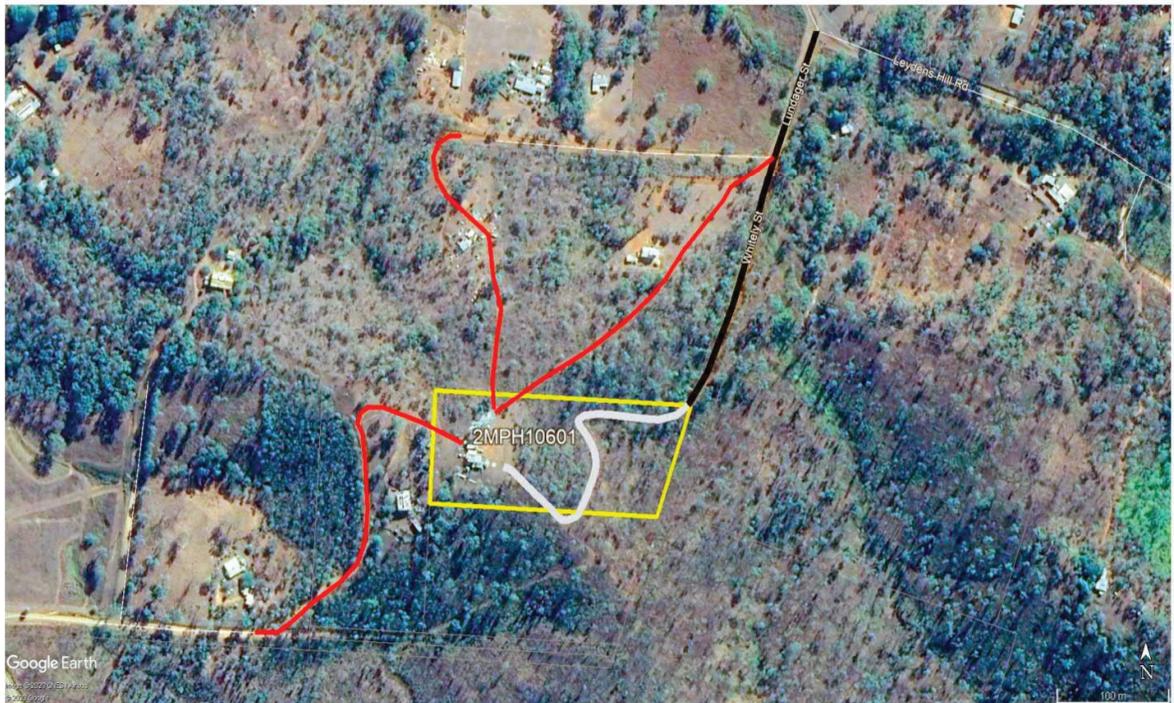
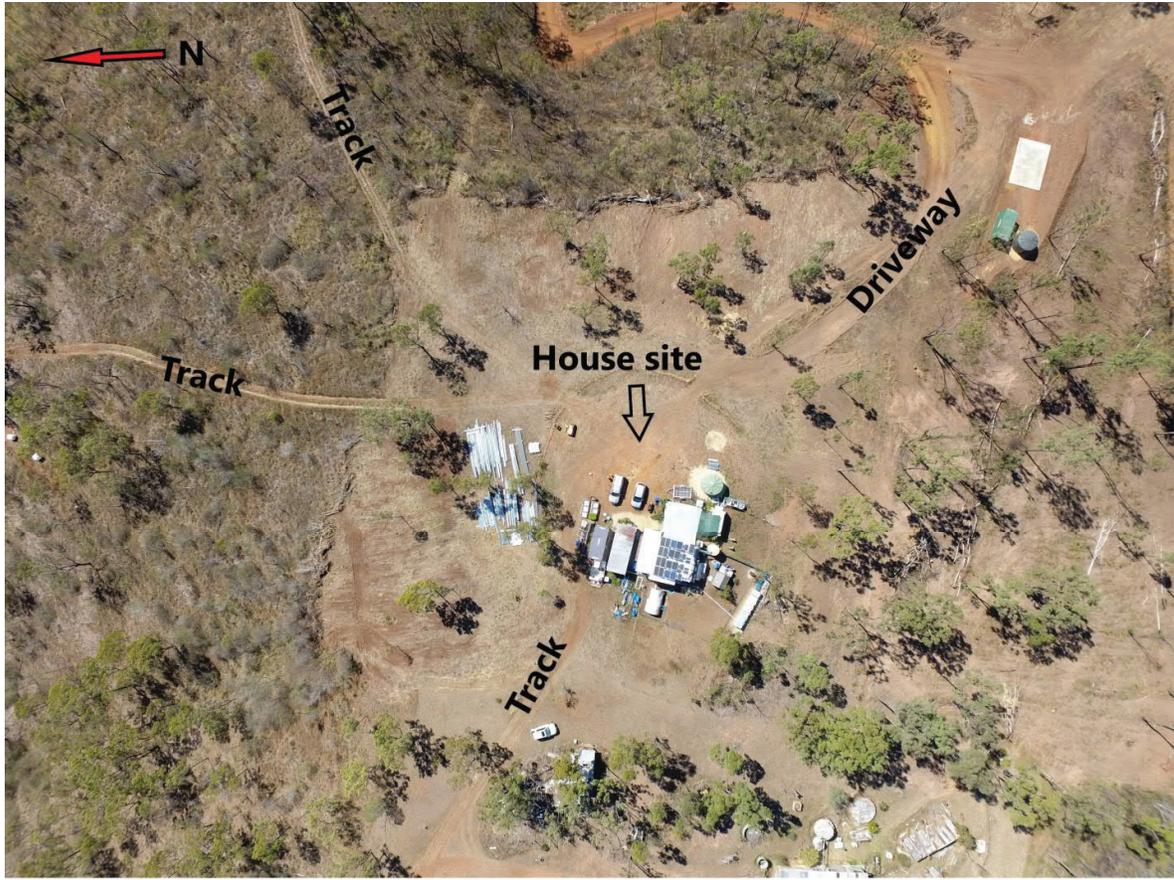


Figure 6. Aerial photographs showing tracks and driveway. Note North is to the left in the top image and up in the bottom image.

DEVELOPMENT SCHEDULE

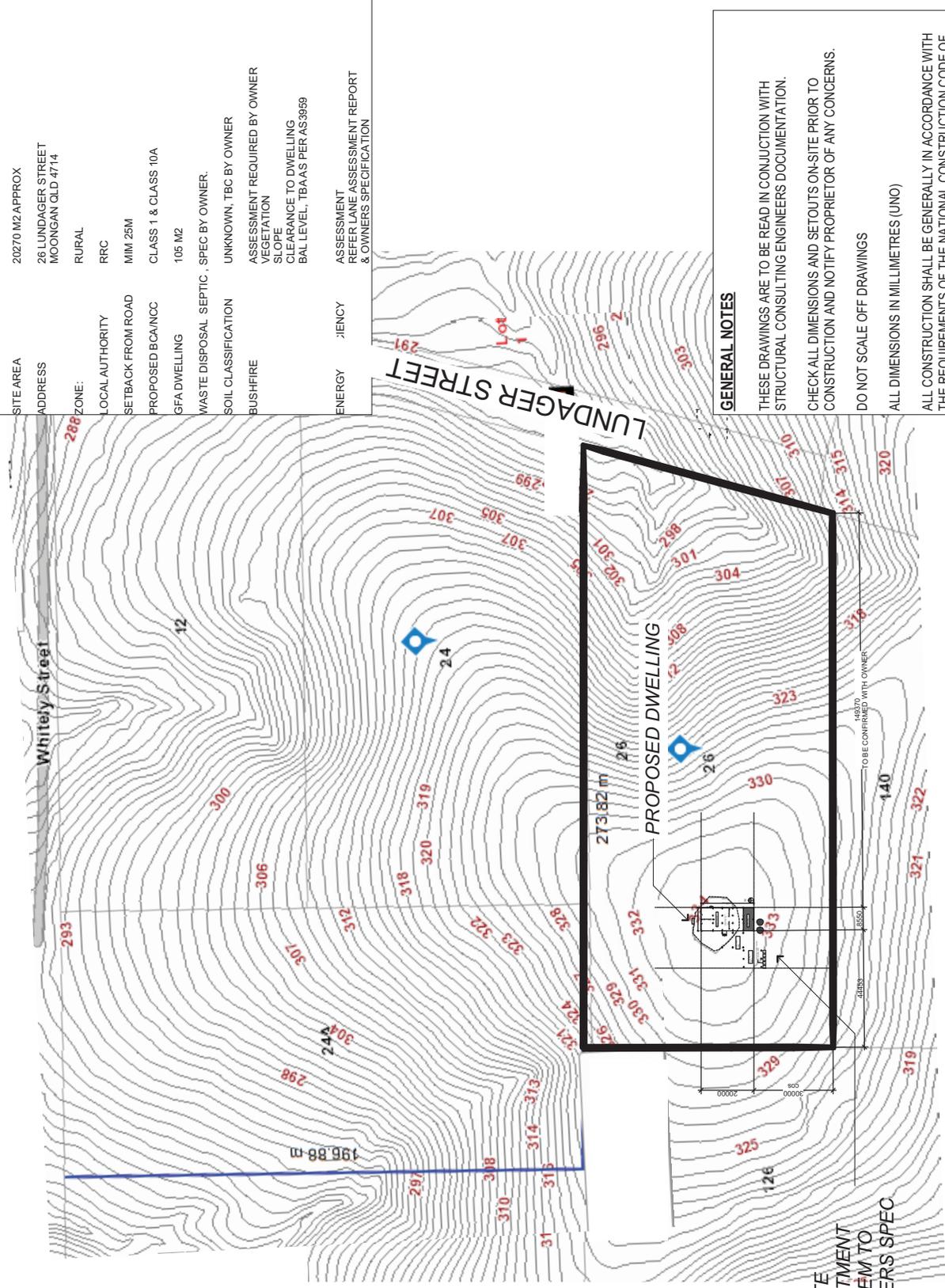
RPD LOT 2 MPH10601
 SITE AREA 20270 M2 APPROX
 ADDRESS 26 LUNDAGER STREET MOONGAN QLD 4714
 ZONE: RURAL
 LOCAL AUTHORITY RRC
 SETBACK FROM ROAD MIM 25M
 PROPOSED BCANCC CLASS 1 & CLASS 10A
 GFA DWELLING 105 M2
 WASTE DISPOSAL SEPTIC, SPEC BY OWNER.
 SOIL CLASSIFICATION UNKNOWN, TBC BY OWNER
 BUSHFIRE ASSESSMENT REQUIRED BY OWNER VEGETATION SLOPE CLEARANCE TO DWELLING BAL LEVEL, TBAAS PER AS3959
 ENERGY EFFICIENCY ASSESSMENT REFER LANE ASSESSMENT REPORT & OWNERS SPECIFICATION

REV ID	Issue Date	BUILDING APPROVAL DESCRIPTION
A	24/07/2019	
DATE	REV	NOTES
		APPROVED
		CHECKED jmt
		DRAWN AMF/projects
		DESIGN jmt

TAPSELL CONSULTING ENGINEERS PTY LTD
 A.B.N. N.o. 78 065 154 949
 14 MILFORD AVENUE,
 NORTH ROCKHAMPTON, 4701
 TELEPHONE: 07 4926 3554
 EMAIL: jtapsell@bigpond.net.au

PROJECT PROPOSED DWELLING
 FOR Clive & Julie Lohrey
 AT 26 Lundager Road Moongan

JOB No.	0118-04
DWG/REV.	Building Plans A/02



GENERAL NOTES

THESE DRAWINGS ARE TO BE READ IN CONJUNCTION WITH STRUCTURAL CONSULTING ENGINEERS DOCUMENTATION.
 CHECK ALL DIMENSIONS AND SETOUTS ON-SITE PRIOR TO CONSTRUCTION AND NOTIFY PROPRIETOR OF ANY CONCERNS.
 DO NOT SCALE OFF DRAWINGS
 ALL DIMENSIONS IN MILLIMETRES (UNO)
 ALL CONSTRUCTION SHALL BE GENERALLY IN ACCORDANCE WITH THE REQUIREMENTS OF THE NATIONAL CONSTRUCTION CODE OF AUSTRALIA, QUEENSLAND BUILDING ACT AND DISABILITY (ACCESS TO PREMISES- BUILDINGS) STANDARD 2010 REFERRED TO AND SHALL BE THE CURRENT EDITION AT TIME OF BUILDING APPROVAL CERTIFICATION.

WASTE TREATMENT SYSTEM TO OWNERS SPEC

Site Plan
 Scale 1:1500



Calculated September 1, 2020, 3:32 pm (MDc v.4.8)

2MPH10601_East

Minimum Distance Calculator - AS3959-2018 (Method 2)

Inputs		Outputs	
Fire Danger Index	40	Rate of spread	1.4 km/h
Vegetation classification	Woodland	Flame length	10.8 m
Surface fuel load	12 t/ha	Flame angle	57.5 °, 69.5 °, 77.5 °, 82.5 °, 84.5 ° & 90.5 °
Overall fuel load	13.8 t/ha	Elevation of receiver	3.57 m, 3.71 m, 3.28 m, 2.46 m, 1.89 m & 0 m
Vegetation height	n/a	Fire intensity	10,036 kW/m
Effective slope	12.95 °	Transmissivity	0.88, 0.864, 0.842, 0.8169999999999999, 0.804 & 0.737
Site slope	6.5 °	Viewfactor	0.5953000000000001, 0.4377, 0.2961, 0.2005, 0.1629 & 0.0445
Flame width	100 m	Minimum distance to < 40 kW/m ²	8.5 m
Windspeed	n/a	Minimum distance to < 29 kW/m ²	11.7 m
Heat of combustion	18,600 kJ/kg	Minimum distance to < 19 kW/m ²	17.4 m
Flame temperature	1,090 K	Minimum distance to < 12.5 kW/m ²	25.4 m
		Minimum distance to < 10 kW/m ²	30.6 m

Rate of Spread - Mearthur, 1973 & Noble et al., 1980

Flame length - NSW Rural Fire Service, 2001 & Noble et al., 1980

Elevation of receiver - Douglas & Tan, 2005

Flame angle - Douglas & Tan, 2005

Radiant heat flux - Drysdale, 1999, Sullivan et al., 2003, Douglas & Tan, 2005



Calculated September 1, 2020, 3:33 pm (MDC v.4.8)

2MPH10601_Nth

Minimum Distance Calculator - AS3959-2018 (Method 2)

Inputs		Outputs	
Fire Danger Index	40	Rate of spread	1.37 km/h
Vegetation classification	Woodland	Flame length	10.6 m
Surface fuel load	12 t/ha	Flame angle	58.5 °, 69.5 °, 77.5 °, 83.5 °, 84.5 ° & 90.5 °
Overall fuel load	13.8 t/ha	Elevation of receiver	3.55 m, 3.64 m, 3.21 m, 2.42 m, 1.84 m & 0 m
Vegetation height	n/a	Fire intensity	9,817 kW/m
Effective slope	12.63 °	Transmissivity	0.88, 0.864, 0.843, 0.8179999999999999, 0.805 & 0.738
Site slope	6.5 °	Viewfactor	0.5911999999999999, 0.4371, 0.2959, 0.2003, 0.1629 & 0.0445
Flame width	100 m	Minimum distance to < 40 kW/m ²	8.4 m
Windspeed	n/a	Minimum distance to < 29 kW/m ²	11.5 m
Heat of combustion	18,600 kJ/kg	Minimum distance to < 19 kW/m ²	17.1 m
Flame temperature	1,090 K	Minimum distance to < 12.5 kW/m ²	25 m
		Minimum distance to < 10 kW/m ²	30.1 m

Rate of Spread - McArthur, 1973 & Noble et al., 1980

Flame length - NSW Rural Fire Service, 2001 & Noble et al., 1980

Elevation of receiver - Douglas & Tan, 2005

Flame angle - Douglas & Tan, 2005

Radiant heat flux - Drysdale, 1999, Sullivan et al., 2003, Douglas & Tan, 2005



Calculated September 1, 2020, 3:26 pm (MDC v.4.8)

2MPH10601_Sth

Minimum Distance Calculator - AS3959-2018 (Method 2)

Inputs		Outputs	
Fire Danger Index	40	Rate of spread	1.88 km/h
Vegetation classification	Woodland	Flame length	14.35 m
Surface fuel load	14.6 t/ha	Flame angle	57.5 °, 68.5 °, 76.5 °, 81.5 °, 82.5 ° & 88.5 °
Overall fuel load	17.4 t/ha	Elevation of receiver	4.76 m, 4.92 m, 4.4 m, 3.44 m, 2.77 m & 0 m
Vegetation height	n/a	Fire intensity	16,969 kW/m
Effective slope	14.36 °	Transmissivity	0.873, 0.854, 0.828, 0.802, 0.789 & 0.727
Site slope	6.5 °	Viewfactor	0.6012, 0.4436, 0.3003, 0.204, 0.1662 & 0.0451
Flame width	100 m	Minimum distance to < 40 kW/m ²	11.2 m
Windspeed	n/a	Minimum distance to < 29 kW/m ²	15.3 m
Heat of combustion	18,600 kJ/kg	Minimum distance to < 19 kW/m ²	22.6 m
Flame temperature	1,090 K	Minimum distance to < 12.5 kW/m ²	32.1 m
		Minimum distance to < 10 kW/m ²	38.1 m

Rate of Spread - Mcarthur, 1973 & Noble et al., 1980

Flame length - NSW Rural Fire Service, 2001 & Noble et al., 1980

Elevation of receiver - Douglas & Tan, 2005

Flame angle - Douglas & Tan, 2005

Radiant heat flux - Drysdale, 1999, Sullivan et al., 2003, Douglas & Tan, 2005



Calculated September 1, 2020, 3:29 pm (MDC v.4.8)

2MPH10601_Wst

Minimum Distance Calculator - AS3959-2018 (Method 2)

Inputs		Outputs	
Fire Danger Index	40	Rate of spread	1.13 km/h
Vegetation classification	Woodland	Flame length	9.01 m
Surface fuel load	12 t/ha	Flame angle	57.5 °, 69.5 °, 78.5 °, 83.5 °, 85.5 ° & 90.5 °
Overall fuel load	13.8 t/ha	Elevation of receiver	2.98 m, 3.09 m, 2.72 m, 1.99 m, 1.48 m & 0 m
Vegetation height	n/a	Fire intensity	8,070 kW/m
Effective slope	9.79 °	Transmissivity	0.884, 0.87, 0.85, 0.827, 0.8139999999999999 & 0.744
Site slope	6.5 °	Viewfactor	0.5933, 0.4359, 0.2937, 0.1977, 0.1608 & 0.0441
Flame width	100 m	Minimum distance to < 40 kW/m ²	7.1 m
Windspeed	n/a	Minimum distance to < 29 kW/m ²	9.800000000000001 m
Heat of combustion	18,600 kJ/kg	Minimum distance to < 19 kW/m ²	14.7 m
Flame temperature	1,090 K	Minimum distance to < 12.5 kW/m ²	21.8 m
		Minimum distance to < 10 kW/m ²	26.4 m

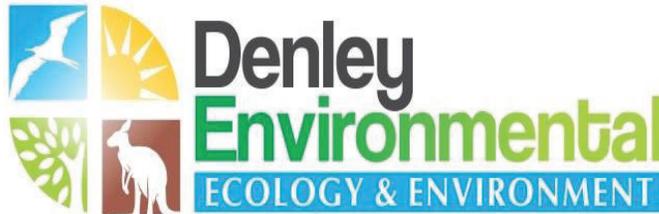
Rate of Spread - Mcarthur, 1973 & Noble et al., 1980

Flame length - NSW Rural Fire Service, 2001 & Noble et al., 1980

Elevation of receiver - Douglas & Tan, 2005

Flame angle - Douglas & Tan, 2005

Radiant heat flux - Drysdale, 1999, Sullivan et al., 2003, Douglas & Tan, 2005



ROCKHAMPTON REGIONAL COUNCIL

APPROVED PLANS

These plans are approved subject to the current conditions of approval associated with

Development Permit No.: D/105-2020

Dated: 8 December 2020

22 October 2020

Gideon Genade
Gideon Town Planning
208 Quay Street
Rockhampton 4700

Reference: Information Request D/105-2020: 26 Lundager Street, Moongan

Following are my responses and comments with regard to matters concerning bushfire contained within the Rockhampton Regional Council Information Request D/105-2020.

Item 1.0

The effect of Councils' proposed conditions for Bushfire was to modify the inputs and recommendations of an expert report without consultation or approval from the author of the report.

I am of the understanding that it is not Councils' role to provide or independently modify site-specific bushfire hazard assessments¹. Council's role is to ensure a Bushfire Management Plan is consistent with the relevant code and policy and that *the bushfire management plan is prepared by a suitably qualified professional person with appropriate technical expertise in the identification and mitigation of bushfire hazard*². A précis of my relevant professional experience is provided.

The subject bushfire hazard assessment was based on a desktop analysis and site visit. Council may correct me; however, it appears the Council's assessment is desktop only. I am not aware of the professional qualifications and experience of the Council officer who undertook the alternative analysis. Still, given Councils' alternative Asset Protection Zone (APZ) estimate, I would hope I am responding to a person with the professional requirements specified in SC6.5.

Councils' changes were based on (a) Council's disagreement of the degree of the slope; and (b) changes to effective surface and overall fuel loads present at the site. In the case of the latter, fuel loads were modified by the Council from a site based fuel load evaluation to generic values provided in the AS3959: 2018.

I am always open to providing information on how specific evaluations were undertaken, but I strongly object to my recommendations being modified without consultation or my consent.

In responding to a disagreement on the degree of the slope, I will need the information relied upon by the officer who undertook the assessment. That is the location, orientation and run the length of the slopes in question and how the degree of the slope was calculated. Further, I have provided my

¹ P. 30. State Planning Policy—state interest guideline Natural hazards, risk and resilience. April 2016. Under *Bushfire hazard code is currently under review.*

² SC6.5 Bushfire management planning scheme policy

method of calculating degree of slope, location of transects and methodologies for site based fuel load assessments.

1 Relevant Professional Experience.

Ian Denley BSc, Biology

I have been undertaking professional work and volunteering in landscape ecology and vegetation ecology for approximately 35 years. Those years have primarily been spent in Central Queensland but also NSW, WA Pilbara and Tasmania.

I have provided approximately 75 Bushfire Hazard Assessments/Management Plans and a further 20 BAL assessments in Livingstone and Rockhampton Shires.

Other work includes Mine rehabilitation monitoring; weed management; and fire management planning (natural and infrastructure areas) at Omya Mountainside Mine, Bajool. Denley Environmental recently completed Livingstone Shire Councils' Matters of Local Environmental Significance for the 2018 Planning Scheme and provided an independent review of Rockhampton Regional Councils' MLES report and produced MLES mapping layers and suggested triggers for RRC Wetland MLES.

1.1 Research

I am currently undertaking research into the effect of the recent Cobraball wildfire on local vegetation community types with a focus on the potential combustion resistance of communities containing dry rainforest elements and factors contributing to canopy fires. A secondary interest from that research is the investigation of factors leading to the destruction of houses and other infrastructure in the recent Cobraball bushfires.

1.2 Advisory Roles

I have been a member of the Livingstone Shire Council Environment and Regulatory Task Force since 2014 advising on bushfire and environmental impacts from natural disasters.

1.3 Professional Development

I attend webinars and conferences on bushfire management to maintain and improve my understanding of the behaviour and mitigation of wildfire. Recent events include:

- Webinar: *Disaster Averted? How green firebreaks could shield Hobart*. UTAS. March 2019
- Australian Bushfire Building Conference 2020
- 2020 Fire Science Seminar Series (upcoming)

Referees

Dr. Alistair Melzer: (private landscape ecologist) 0458 246 600

Leise Childs. Senior Vegetation Management Officer Livingstone Shire Council.

Melissa Warrick. Acting Coordinator, Development Assessment Liveability and Wellbeing. Livingstone Shire Council.

2 Methodology for Determining Degree of Slope.

My preferred approach to determine the degree of slope is to use QLD Data 1 metre digital contours to calculate rise over run then convert this to degrees for the calculation input into AS 3959: 2018 Method 2. Where 1-metre contours are not available, 5-metre contours are used, supported by a field observations using a Suunto Clinometer. A Suunto clinometer alone is used where contour data is not available.

Transect length and direction is variable and governed by the extent of surrounding hazard and landscape (i.e. nearby built-up areas, cleared paddocks etc. are generally avoided). A 100m length is normally used with an additional assessment of the 50 metres closest to the dwelling location. The last 50 metres is the most relevant slope such that final slope result may be slightly elevated or reduced depending on nearby landscape features.

Transects are orientated with reference to the dwelling location and the location of the estimated greatest hazard (usually) in four directions. These are described as cardinal points in the report but vary, so they are directed at the hazard most relevant to the dwelling location i.e. patch of shrubby woodland in preference to surrounding grassy woodland etc.

Site slope is estimated to be that area contained within the Asset Protection Zone (APZ). The likely area is determined by discussions with the applicants on the likely BAL construction standard they will employ given build costs, surrounding hazards, and other environmental considerations.

Effective slope is estimated to be that area under the identified hazard and usually includes any area between the existing hazard and the projected APZ. I operate under the assumption that cleared / regrowth areas outside the APZ may not be maintained and consequently become weedy or return to the adjacent vegetation structure.

3 Methodology for Determining Fuel Loads

There is considerable complexity in determining the flammability of vegetation. Recent research indicates 92% of houses are destroyed due to ember attack³ such that clearing larger firebreaks may not provide any reduction in risk. The effectiveness of a fire break is also wholly reliant on the occupant to maintain it. There are occasions where clearing vegetation is more likely to increase a hazard i.e. where canopy is removed, encouraging the growth of shrubby/weedy understorey or where fire-resistant dry rainforest is cleared.

Environmental impacts should also be considered⁴. Site based fuel load assessments and a functional knowledge on the response to fire of local vegetation types optimizes the outcome between conservation of biodiversity and functional APZ widths. The use of generic values provided in the AS3959: 2018 usually increases (but not always) the calculated APZ widths, which in turn causes unnecessary environmental damage. Generic AS3959 vegetation category values are based on southern vegetation types. Southern communities are markedly different to local vegetation types in species composition, bark types and associated fuel loads.

³ Australian Bushfire Building Conference 2020. Presentation by Nigel Bell. Retrofitting homes for Better Bushfire Protection.

⁴ Bushfire Overlay Code S. 8.2.4.2 (2) (e)

In addition to fuel load estimates, each site is assessed on species composition in each layer, horizontal and vertical continuity of layers, the amount of dead material in the layer and the thickness of the fuel pieces.

There is a great deal of local variability in a Regional Ecosystem type. i.e. Ironbark woodland (11.11.4) can have a grassy or shrubby understorey or a high degree of dry rainforest understorey. Fuel loads and propensity to burn is substantially different for each of those types.

3.1 Fuel Load Estimate Technique

I conduct occasional Bitterlich sampling for stand density and quadrat sampling of dry litter in a variety of vegetation types to verify and improve the accuracy of site based fuel load assessments. Otherwise estimates on t/ha of fuel for bark type, surface, near surface and elevated fuels are based on the methodology provided in Hines *et. al.* (2010)⁵. Final fuel load estimates are crosschecked against estimated surface and total fuel loads for Queensland vegetation types published by the Rural Fire Service Services ISPP Bushfire Asset Protection Zone Width Calculator⁶ to ensure site estimates are within a reasonable range of published fuel loads for Queensland vegetation types.

Item 1.2

The internal driveway has been constructed as per the Bushfire Management Plan.



Site Plan showing internal driveway and evacuation options

⁵ Hines, F., Tolhurst, K., Wilson, A., & McCarthy, G. 2010. *Overall fuel hazard assessment guide. 4th edition. Fire and adaptive management*, report no. 82. State Government, Victoria.

⁶ https://www.ruralfire.qld.gov.au/Bushfire_Planning/Pages/Bushfire-Resilient-Communities.aspx

Item 1.3

Lundager Road is a council road which links onto Leydens Hill Road. The section of road between Whitely Road and the internal driveway of Lot 2 MPH10601 has 4 meters wide of the formed road reserve. It currently adjoins a further four private lots.

There are sections of the road that are cut into the side of the hill, and it is not practical to further mechanically clear these areas. Furthermore, much of the area is habitat for the endangered cycad *Cycas ophiolitica*. Clearing will cause the loss and degradation of associated habitat, and roadside cycads could be adversely impacted. Removal of canopy trees and tall shrubs will likely cause erosion, introduce weedy grasses, lantana etc. and consequently exacerbate overall flammability of the vegetation.

The purpose of the Bushfire Overlay Code clearly states that natural processes and the protective function of landforms and vegetation should be maintained in bushfire hazard areas. In the areas where it is not practical to mechanically clear and maintain by machine, it is proposed to remove all weedy shrubs, herbs and grasses 3m either side of the formed width and ensure canopy trees, dry rainforest plants and cycads are retained. Maintain the fuel reduced area using hand clearing, chemical clearing and cool burns that are contained within the 3m management area where possible. Conduct broader fuel reduction burns consistent with advice provided by the Department of Environment and Science for Regional Ecosystem 11.12.6.

Yours sincerely



Ian Denley

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