

Steve Brooks Bushfire Consultant

Bushfire Hazard Assessment Report

For Proposed.

Alterations and Additions to the existing dwelling and installation of a swimming pool

5 Brooker Ave, Beacon Hill. NSW 2100



17th October 2022

Prepared By:
Steve Brooks
Tel: 0431572604
Email: sbrooks14@bigpond.com
1327 Booral Rd, Girvan. NSW 2425



Steve Bushfire Consultant Brooks

Bushfire Risk Assessment Certificate

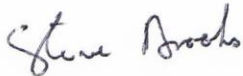
This form is to be completed by a recognised consultant in Bushfire Risk Assessment in accordance with Section 4.14 of the Environmental Planning and Assessment Act

<i>Property Address</i>	5 Brooker Ave, Beacon Hill. NSW 2100
<i>Description of the Proposal</i>	Alterations and Additions to the existing dwelling and installation of a swimming pool
<i>Plan Reference</i>	17 th October 2022 - 1
<i>BAL Rating</i>	BAL – 12.5
<i>Does Proposal rely on Alternate Solutions</i>	Yes – Method 2 Calculation of AS3959
<i>Is Referral to NSW RFS Required</i>	Yes

I, Steve Brooks have carried out a Bushfire Risk Assessment on the above-mentioned property and the proposed development. A detailed Bushfire Assessment Report is attached which includes the requirements set out in Appendix 1 of Planning for Bushfire Protection 2019.

I hereby certify that in accordance with Section 4.14 of the Environmental Planning and Assessment Act 1979, I am a person recognised by the NSW Rural Fire Service as a qualified consultant in bushfire risk management. The bushfire risk assessment report for the development conforms to the relevant specifications and requirements of Planning for Bushfire Protection 2019 (NSWRFS).

I acknowledge that the Bushfire Assessment Report prepared for the above-mentioned property will be submitted and relied upon by Council in support of the proposed Development Application as the basis for ensuring that the bushfire requirement aspects of the proposed development have been met in accordance with Planning for Bushfire Protection 2019 (NSWRFS).



BPAD - Certification No. 40765
Graduate Diploma Bushfire Planning and Design (UWS)
Graduate Certificate in Fire Investigation (CSU)



Terms and Conditions

This Bushfire Hazard Assessment Report may only be copied, distributed or forwarded to other parties in its original format with the permission of Steve Brooks. This document cannot be altered in any way unless given permission by myself, Steve Brooks.

Disclaimer

Quote from Standards Australia *"It should be borne in mind that measures contained in this Standard cannot guarantee that a building will survive a bushfire event on every occasion. This is substantially due to the degree of vegetation management, the unpredictable nature of behaviour of fire, and extreme weather conditions.*

This report has been prepared with all honesty and the opinions contained in this report are provided in good faith and all comments and opinions are not misleading.

AS 3959-2018 is designed to improve the performance of buildings in designated Bushfire Prone Areas but there is no guarantee of a structure surviving a bushfire event due to the sometimes erratic and unpredictable behaviour of bushfires.

Steve Brooks is therefore not liable to any person or company for any damage or loss incurred in a bushfire event due to a person or company taking actions in respect to advice or statements contained within this Bushfire Hazard Assessment Report.

"

Document Control

Document Name	Project Ref	Date	Author	Status
5 Brooker Ave	1	17/10/2022	S.Brooks	Complete

Contents

0 – Executive Summary	Page 5
1- Introduction	Page 7
1.1-Purpose of the Report	Page 8
1.2-Scope of the Report	Page 8
1.3-Referenced Documents	Page 8
1.4-Methodology of the Report	Page 8
1.5-The Proposed Development	Page 9
1.6-Bushfire Prone Land Map	Page 10
2- Bushfire Hazard Assessment	Page 12
2.1-Preface	Page 12
2.2-Location	Page 13
2.3-Vegetation	Page 14
2.4-Slope	Page 17
2.5-Asset Protection Zones	Page 19
2.6-Compliance with AS 3959-2018	Page 21
3-Site Constraints	Page 21
4-Compliance with the Performance Criteria of PBP 2019	Page 24
5-Recommendations	Page 30
6-Conclusion	Page 31
References	Page 33
Appendix 1 – Site Plans	Page 34
Appendix 2 – Site Photos	Page 36

List of Abbreviations

APZ	Asset Protection Zone
AS3959	Australian Standard 3959-2018
BAL	Bushfire Attack Level
BCA	Building Code of Australia
EP&A Act	Environmental Planning and Assessment Act 1979
FDI	Fire Danger Index
FRNSW	Fire & Rescue NSW
IPA	Inner Protection Area
NCC	National Construction Code
OPA	Outer Protection Area
PBP	Planning for Bushfire Protection – 2019
RF Act	Rural Fires Act – 1997
RFS	NSW Rural Fire Service
SEPP	State Environmental Planning Policy
SFPP	Special Fire Protection Purpose
SWS	Static Water Supply

Executive Summary

I have been requested to undertake a Bushfire Hazard Assessment Report on the subject Lot located at 5 Brooker Ave, Beacon Hill. NSW 2100, on behalf of the proponents, for the proposed construction of alterations and additions to the existing dwelling and the installation of a swimming pool.

The alterations and additions to the existing dwelling involve the installation of a new glass sliding door and, the removal of the rear garage door and window and replacing these with a fixed panel window on the Western façade.

The proposal is Residential Infill Development and has been identified as being Bushfire Prone Land and is therefore subject to consideration under Section 4.14 of the *Environmental Planning and Assessment Act 1979* (EP&A Act) and Planning for Bushfire Protection (NSW RFS 2019). The subject Lot is located within the Northern Beaches Council LGA.

The subject Lot is classified as being within a Buffer Zone of Category 1 Bushfire Hazard Vegetation Buffer Zone as per the Northern Beaches Council LGA Bushfire Prone Land Map. However, the Northern Beaches Council has not deemed the vegetation across Oxford Falls Rd to the West to be hazardous bushfire vegetation, but it must be considered as a potential bushfire threat to the proposed development. Therefore, for this hazard assessment I am deeming the vegetation to the West as Category 1 Bushfire Hazard Vegetation.

The nearest Classified Bushfire Hazard Vegetation is Tall Heath Classified Vegetation - Category 1 Bushfire Hazard Vegetation located 20m to the North-West of the proposed alterations and additions. The effective slope under the Tall Heath Classified Vegetation is 4° Downslope. However, it is important to note that the Tall Heath Classified Vegetation has a maximum flame width of approx. 10m.

To the West is Remnant Classified Vegetation located 38m from the proposed development and is located within the boundaries of the neighbouring Lot to the West across Oxford Falls Rd. The effective slope under the Remnant Classified Vegetation is 18° Downslope however, the maximum fire-run of the Remnant Classified Vegetation towards the proposed development is approx. 10m.

To the South of the neighbouring Lot to the West, across Oxford Falls Rd, is Remnant Classified Vegetation with an effective slope of Cross Slope/Flat. The vegetation is <1 Ha in area.

Section A1.11.1 - Simplified Approach of PBP 2019 states, “*The simplified approach provides an acceptable method for assessing Remnant vegetation. Remnant vegetation is a parcel of vegetation with a size of less than 1 Ha or a shape that provides a potential fire run that could threaten buildings not exceeding 50m. These remnants are considered*

a low hazard and APZ setbacks and building construction standards for these may be the same as for Rainforests”.

The proposal is found to be in the BAL – 12.5 range as per the Method 2 Calculation of AS3959-2018. The Method 2 Calculation is regarded as an alternative solution and will require referral to the NSW RFS for review.

The proposed alterations and additions will need to meet the Performance Criteria of Table 7.4a Planning for Bushfire Protection 2019 and will also need to comply with Section 7.5 - Additional Construction Requirements of PBP 2019.

This report makes recommendations to approve the proposal as it meets the requirements of both the Building Code of Australia 2019, AS3959-2018 Construction of buildings in bushfire prone areas and Planning for Bushfire Protection 2019.

Aspect	North (NW)	South	East	West	West
Vegetation Type	Tall Heath	Developed Land	Developed Land	Remnant	Remnant
Slope	4° Downslope	N/A	N/A	Cross Slope/Flat	18° Downslope
Total APZ	20m	>100m	>100m	44m	38m
BAL Rating	BAL-12.5	BAL-12.5	BAL-12.5	BAL-12.5	BAL-12.5

Table 1 – Final BAL Ratings for the proposed alterations and additions to the existing dwelling.

1 Introduction

I have been engaged by the proponents to prepare a Bushfire Hazard Assessment Report for inclusion in a Development Application to Northern Beaches Council for the proposed construction of alterations and additions to the existing dwelling on the subject Lot located at 5 Brooker Ave, Beacon Hill. NSW 2100 as required by Section 4.14 of the Environmental Planning and Assessment Act 1979.

The site has been identified as being Bushfire Prone Land as per the Northern Beaches Council LGA Bushfire Prone Land Map and therefore compliance with Bushfire Legislation is required. The subject Lot is classified as being within a Category 1 Bushfire Hazard Vegetation Buffer Zone as per the Northern Beaches Council LGA Bushfire Prone Land Map.

The proposed development is Residential Infill Development as defined by Planning for Bushfire Protection 2019 and this report has been prepared in accordance with the submission requirements of Section 4.14 of the Environmental Planning and Assessment Act 1979 and Appendix 2 of Planning for Bushfire Protection 2019.

Property Details

Council:	Northern Beaches
Council Reference	N/A
Address:	5 Brooker Ave, Beacon Hill. NSW 2100
	Lot 2 DP 205814
Site Area:	619 sqm approx.
Zoning	R2 – Low Density Residential

1.1 Purpose of this Report

The purpose of this Bushfire Hazard Assessment Report is to provide the owners, consent authority and the NSW Rural Fire Service with an independent Bushfire Hazard Assessment for the subject Lot. The report makes recommendations and details how the development proposal complies/not complies with the performance criteria of Planning for Bushfire Protection 2019.

1.2 Scope of the Report

This Bushfire Hazard Assessment Report and its' recommendations are limited to the subject Lot and the proposed development only and not neighbouring properties or lands. This report considers the current bushfire legislation, planning controls and standards for building in bushfire prone land areas.

This report is based on site plans, a site visit and relevant information from the local council and government agencies.

1.3 Referenced Documents.

This Bushfire Hazard Assessment Report has been prepared with consideration given to the relevant legislation and regulations pertaining to developments in bushfire prone land areas including the *Environmental Planning and Assessment Act 1979*, the Building Code of Australia 2019, *Planning for Bushfire Protection 2019* and AS 3959-2018 *Construction of buildings in bushfire prone areas*.

1.4 Methodology of the Report

The methodology for the Bushfire Hazard Assessment adheres to the method described in Appendix 1 of Planning for Bushfire Protection 2019.

- Determine all vegetation formations within 140m of the proposal.
- Determine the distance of each vegetation formation identified and the building.
- Determine the effective slope for each vegetation group.
- Determine the relevant FDI.
- Match the relevant FDI, appropriate vegetation, distance, and effective slope classes to determine the category of bushfire attack applicable to the site.
- Determine the appropriate level of construction found in Table A1.12.5 of PBP 2019.

1.5 The Proposed Development

The proponents seek to construct alterations and additions to the existing dwelling and, the install a swimming pool on the subject Lot at 5 Brooker Ave, Beacon Hill. NSW 2100. The subject Lot is also known as Lot 2 DP 205814.

The alterations and additions to the existing dwelling involve the installation of a new glass sliding door and, the removal of the rear garage door and window and replacing these with a fixed panel window on the Western façade.

The subject Lot has residential development to the North, South, East, and West. The hazardous bushfire vegetation that is deemed a potential threat to the proposal is Tall Heath Classified Vegetation located 20m to the North-West, Remnant Classified Vegetation located 38m to the West and Remnant Classified Vegetation located 44m West (to the South of the neighbouring Lot to the West across Oxford Falls Rd) of the proposed alterations and additions.

The Northern Beaches Council LGA Bushfire Prone Land Map indicates that the subject Lot is classified as being within a Category 1 Bushfire Hazard Vegetation Buffer Zone.

The land is zoned R2 – Low Density Residential and the proposal constitutes “Residential Infill Development” as defined by Section 7 of PBP 2019 and as such must meet the performance criteria of Table 7.4a *Planning for Bushfire Protection* 2019.

Type of Proposal PBP 2019

<input type="checkbox"/>	New Building	<input checked="" type="checkbox"/>	Urban	<input type="checkbox"/>	Dual Occupancy
<input type="checkbox"/>	Rural Residential	<input checked="" type="checkbox"/>	Alterations/Additions	<input type="checkbox"/>	Isolated Rural

1.6 Bushfire Prone Land Map

The subject Lot has been identified on the Northern Beaches Council LGA Bushfire Prone Land Map which covers the entire site.

A copy of the bushfire prone land status is shown below (Figure 1).

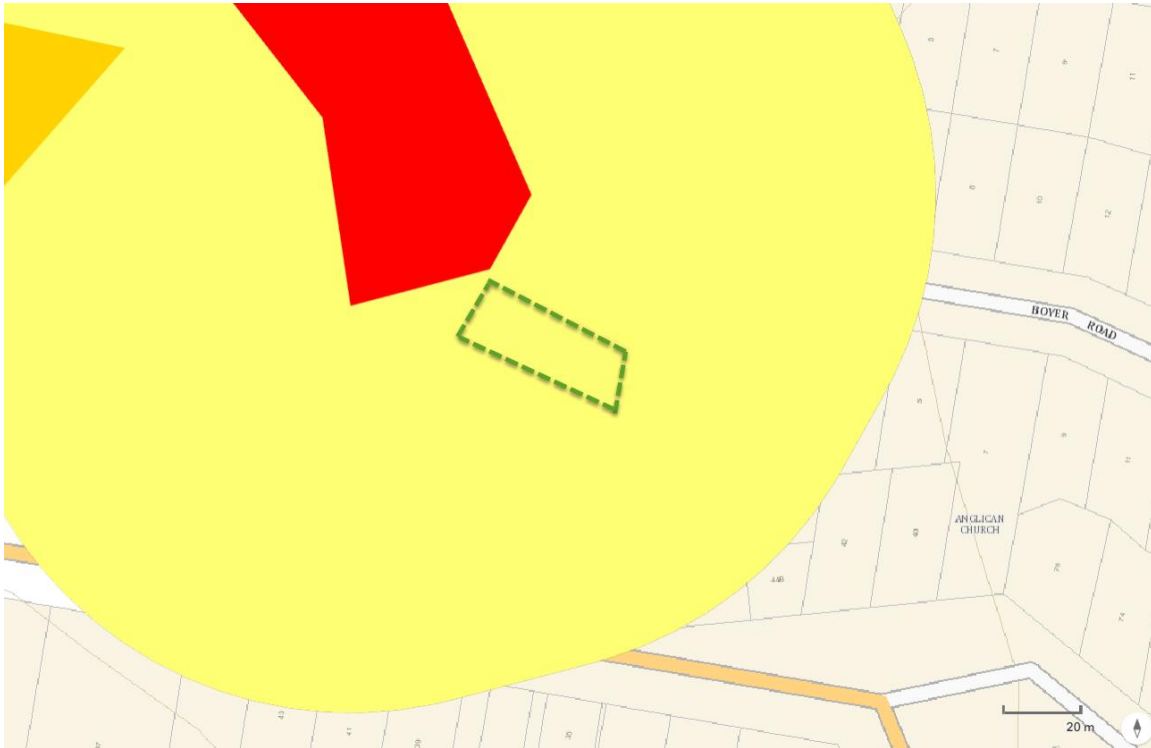


Figure 1 – 5 Brooker Ave, Beacon Hill. NSW 2100 Bushfire Prone Land Map (NSW Government 2022). It should be noted that the Bushfire Prone Land Map above indicates that the subject Lot is located within a Category 1 Bushfire Hazard Vegetation Buffer Zone.

Hazard

Bushfire Prone Land

- Vegetation Category 1
- Vegetation Category 2
- Vegetation Category 3
- Vegetation Buffer

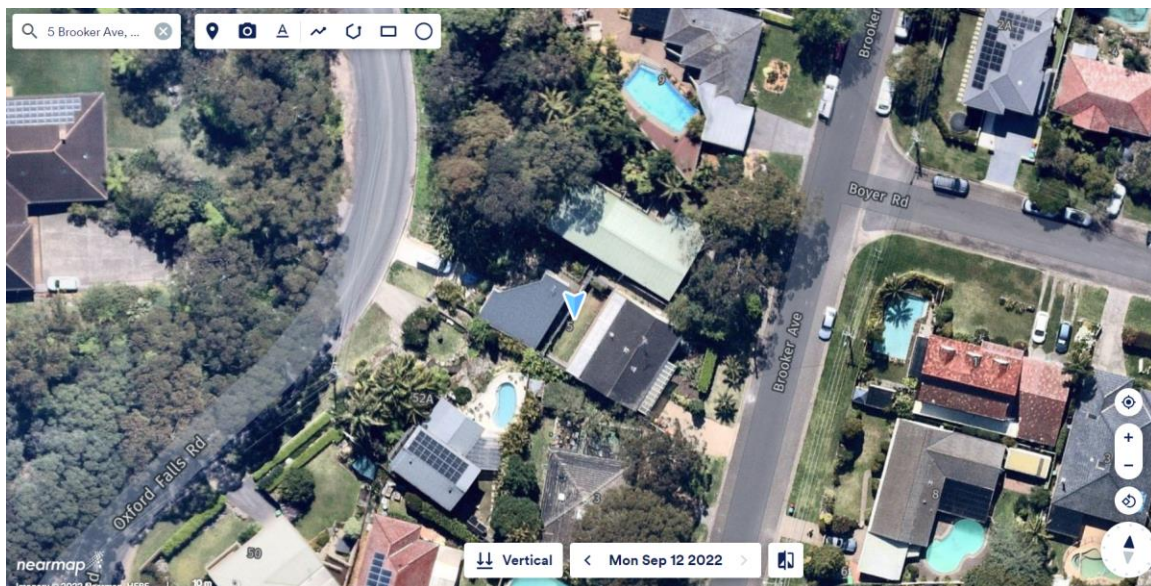


Image 1 – Site Aerial of the subject Lot (Nearmap 2022)

2 Bushfire Hazard Assessment

2.1 Preface

The bushfire hazard assessment was conducted for the proposed development using the methodology described in Appendix 1 of PBP 2019 to determine the bushfire attack level (BAL) likely upon the development.

Properties that are located within a designated Bushfire Prone Area as identified by a Council Area Bushfire Prone Map and Registered with the NSW RFS, must have either a Bushfire Hazard Assessment or a Bushfire Hazard Certificate (in certain Complying Development instances) completed and submitted prior to Council or a Private Certifier being able to approve the development.

The proposed development of the construction of alterations and additions to the existing dwelling on the subject Lot is Residential Infill Development and as such must comply with Section 4.14 of the EP&A Act 1979 and Section 7 of PBP 2019. The property has direct access to Brooker Ave which runs to the East of the subject Lot.

The vegetation that is a potential bushfire hazard to the proposal is Category 1 Bushfire Hazard Vegetation – Tall Heath Classified Vegetation located 20m to the North-West, Remnant Classified Vegetation located 38m to the West and a parcel of Remnant Classified Vegetation located 44m to the West (to the South of the neighbouring Lot across Oxford Falls Rd) from the proposed alterations and additions.

2.2 Location

The subject site is located at 5 Brooker Ave, Beacon Hill. NSW 2100 (Lot 2 DP 205814) and is within a residential area of the Northern Beaches Council LGA.



Image 2 - Site Aerial. (NSW Government 2022)



Figure 2 - Street Location of Property (NSW Government 2022)

2.3 Vegetation

The vegetation that is deemed the hazard and poses a potential threat to the proposal is Tall Heath Classified Vegetation located 20m in the North-Western aspect, and Remnant Classified Vegetation located 38m to the West within the boundaries of the neighbouring Lot across Oxford Falls Rd, No.1884 Oxford Falls Rd and, to the South of the No.1884 Oxford Falls Rd is a parcel of Remnant Classified Vegetation located 44m West of the proposed alterations and additions. Northern Beaches Council has deemed the Tall Heath Classified Vegetation to be Category 1 Bushfire Hazard Vegetation.

However, as stated previously the Northern Beaches Council has not deemed the vegetation across Oxford Falls Rd to the West to be hazardous bushfire vegetation, but it must be considered as a potential bushfire threat to the proposed development.

It is important to note that the Tall Heath Classified Vegetation to the North-West has a flame width of approx. 10m and, the Remnant Classified Vegetation located 38m to the West has a maximum potential fire-run towards the proposed alterations and additions of approx. 10m

To the Southern and Eastern aspects there is no category of Bushfire Hazard Vegetation within 100m of the proposed alterations and additions.

Aspect	Vegetation	Distance to Hazard
North (NW)	Tall Heath	20m
South	Developed Land	>100m
East	Developed Land	>100m
West	Remnant	38m
West	Remnant	44m

Table 2 – Distances to Category 1 Bushfire Hazard Vegetation



Image 3 – Indicates the distance to hazardous bushfire vegetation from the proposed development (NSW Government 2022)

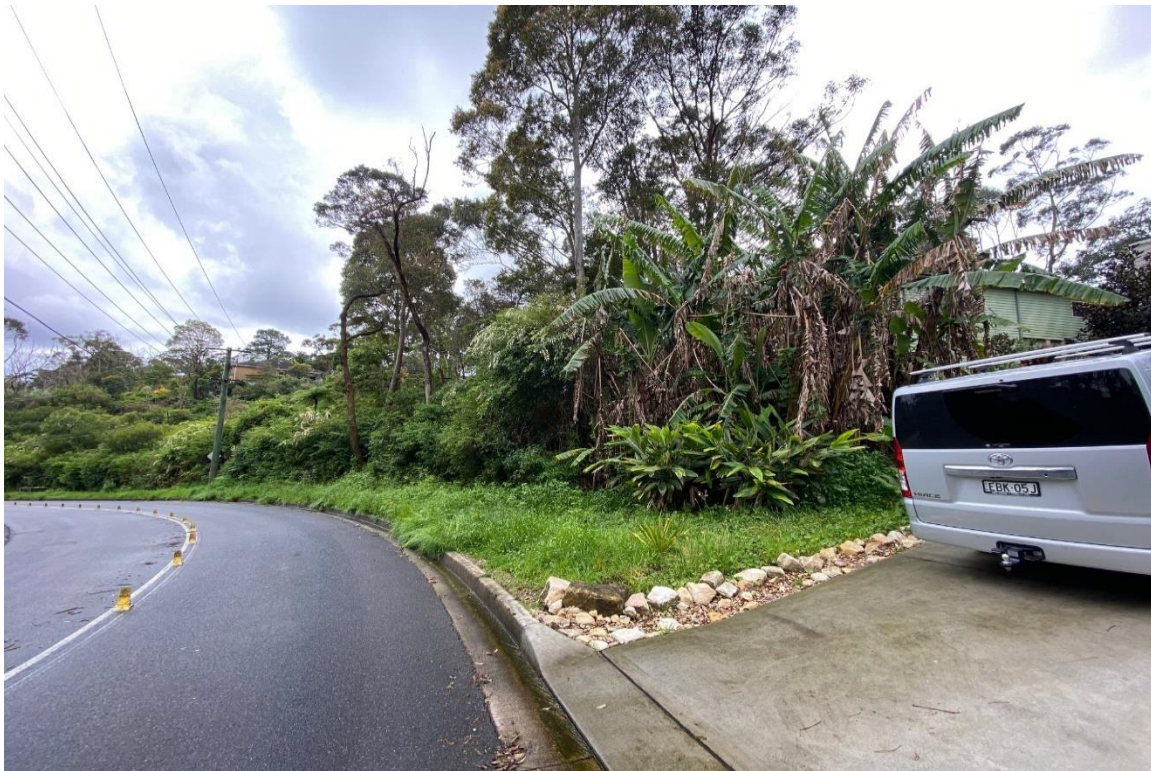


Photo 1 – Indicates Tall Heath Classified Vegetation to the North-West of the proposed alterations and additions (Steve Brooks 2022)



Photo 2 – Indicates Remnant Classified Vegetation to the West of the proposed alterations and additions (Steve Brooks 2022)

2.4 Slope

The effective slope that would most significantly affect bushfire behaviour is assessed for no less than 100 metres from the proposed development. The effective slope is measured is under the identified hazard.

The effective slope under the Tall Heath Classified Vegetation located 20m to the North-West is 4° Downslope. The effective slope under the Remnant Classified Vegetation located 38m to the West is 18° Downslope, with a maximum fire-run of approx. 10m and, the effective slope under Remnant Classified Vegetation located 44m to the West is Cross Slope/Flat.

The need to assess the effective slopes in the Southern and Eastern aspects is not required as there is no Bushfire Hazard Vegetation within 100m in these aspects.

North	South	East	West (38m)	West (44m)
<input type="checkbox"/> N/A >100m	<input checked="" type="checkbox"/> N/A >100m	<input checked="" type="checkbox"/> N/A>100m	<input type="checkbox"/> N/A >100m	<input type="checkbox"/> N/A >100m
<input type="checkbox"/> Upslope <input type="checkbox"/> Flat	<input type="checkbox"/> Upslope <input type="checkbox"/> Flat	<input type="checkbox"/> Upslope <input type="checkbox"/> Flat	<input type="checkbox"/> Upslope <input type="checkbox"/> Flat	<input checked="" type="checkbox"/> Cross Slope Flat
<input checked="" type="checkbox"/> 0-5	<input type="checkbox"/> 0-5	<input type="checkbox"/> 0-5	<input type="checkbox"/> 0-5	<input type="checkbox"/> 0-5
<input type="checkbox"/> >5-10	<input type="checkbox"/> >5-10	<input type="checkbox"/> >5-10	<input type="checkbox"/> >5-10	<input type="checkbox"/> >5-10
<input type="checkbox"/> >10-15	<input type="checkbox"/> >10-15	<input type="checkbox"/> >10-15	<input type="checkbox"/> >10-15	<input type="checkbox"/> >10-15
<input type="checkbox"/> > 15-20	<input type="checkbox"/> > 15-20	<input type="checkbox"/> > 15-20	<input checked="" type="checkbox"/> > 15-20	<input type="checkbox"/> > 15-20

Table 3 - Degree of Slope under the Classified Bushfire Hazard Vegetation

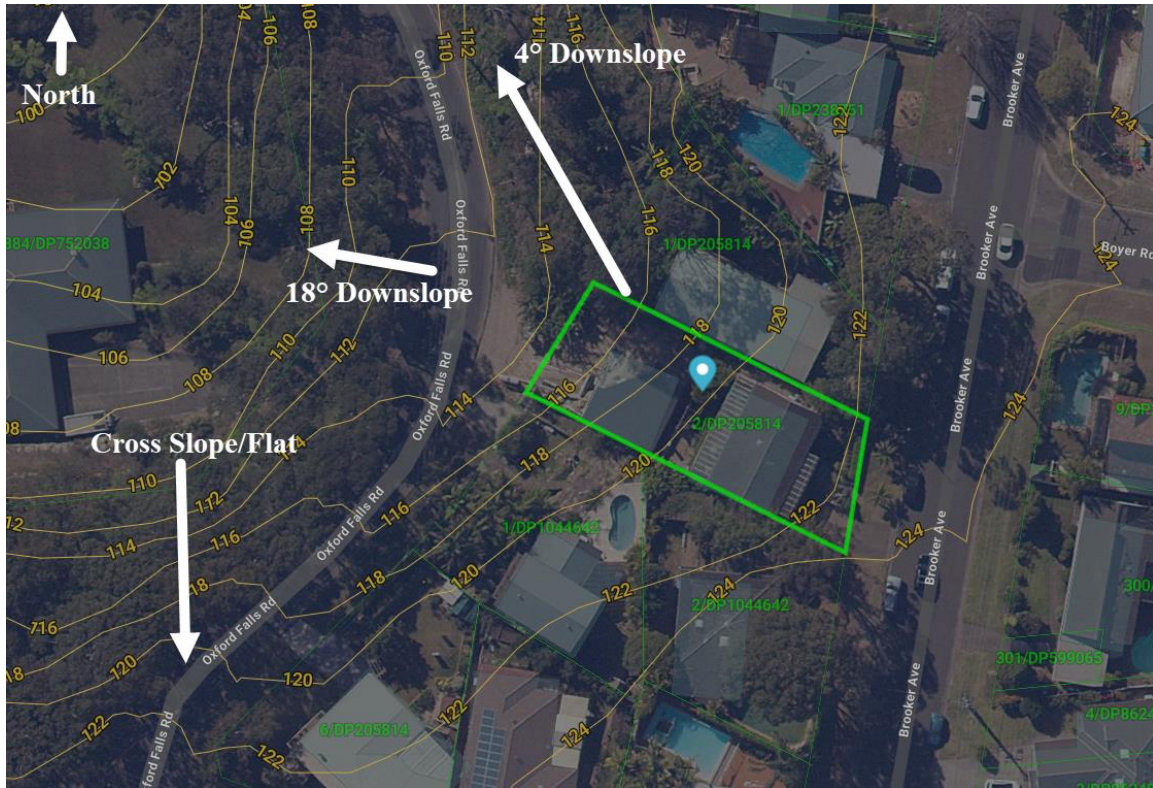


Image 4 – Effective slope under Bushfire Hazard Vegetation (Nearmap 2022)

2.5 Asset Protection Zones

Asset Protection Zones are a fuel-reduced area surrounding a building or structure. It is located between the building or structure and the bushfire hazard and provides: a Buffer Zone between a bushfire hazard and an asset; an area of reduced bushfire fuel that allows for suppression of fire; an area from which back burning, or hazard reduction can be conducted; and an area which allows emergency services access and provides a relatively safe area for firefighters and homeowners to defend their property.

The proposed construction of alterations and additions to the existing dwelling on the subject Lot has been found to have an Asset Protection Zone (APZ) to Tall Heath Classified Vegetation of 20m in the North-Western aspect, >100m to any category of hazardous vegetation in the Southern aspect, >100m to any category of hazardous vegetation in the Eastern aspect and 38m and 44m to Remnant Classified Vegetation in the Western aspect.

As stated previously, the flame width of the Tall Heath Classified Vegetation to the North-West is approx. 10m and, the maximum potential fire-run of the Remnant Classified Vegetation located 38m to the West is approx. 10m.

These APZ's are made up of maintained land within the subject Lot and will be maintained in perpetuity as an Inner Protection Area in accordance with guidelines outlined in Appendix 4 – APZ Requirements of PBP 2019.

The proposed development has APZs in neighbouring developed and the Northern, Southern, Eastern and Western aspects which meets the intent of Section 3.2 – Asset Protection Zones, which states, *“the APZ can include roads or properties managed to be consistent with APZ standards set out in Appendix 4 and the NSW RFS document Standards for Asset Protection Zones”*, Section A1.10 – Low Threat Vegetation Exclusions and Appendix 4 – APZ Requirements of PBP 2019.

Direction/Aspect	Effective Slope	Distance to Hazard	Required by PBP Table A1.12.2	Vegetation Classification	Complies
North (NW)	4° Downslope	20m	18m	Tall Heath	Yes
South	N/A	>100m	N/A	Managed/Developed Land	Yes
East	N/A	>100m	N/A	Managed/Developed Land	Yes
West	18° Downslope	38m	30m	Remnant	No
West	Cross Slope/Flat	44m	16m	Remnant	Yes

Table 5 -APZ distances as required by Table A1.12.2 of PBP 2019.

The APZ in the Western aspect to Remnant Classified Vegetation, located 38m from the proposed alterations and additions, does not meet the required distances outline in Table A1.12.2 of PBP 2019. However, the Method 2 Calculation of AS3959-2018 was used to determine the BAL Rating which resulted in a BAL rating of BAL – 12.5 and therefore, the APZ in this aspect is satisfactory.



Image 5 – Indicates the proposed alterations and additions to the existing dwelling in proximity to Bushfire Hazard Vegetation (NSW Government 2022)

2.6 Compliance with AS 3959-2018

Based on the known Vegetation Classification, Distance from Vegetation (APZ), effective slope and FDI for the subject Lot, the BAL for the proposed alterations and additions to the existing dwelling can be determined in accordance with the Method 2 Calculation of AS3959-2018. The FDI for Northern Beaches Council LGA is 100.

The following BAL Rating has been determined for the proposed development on the subject Lot at 5 Brooker Ave, Beacon Hill. NSW 2100.

Aspect	Distance to Vegetation	Vegetation Classification	Slope in degrees	Construction Requirements AS3959-2018
North	20m	Tall Heath	4° Downslope	BAL- 12.5
South	>100m	Managed Land	N/A	BAL- LOW
East	>100m	Managed Land	N/A	BAL- LOW
West	38m	Remnant	18° Downslope	BAL- 12.5
West	44m	Remnant	Cross Slope/Flat	BAL- 12.5

Table 5 - Construction requirements of AS3959-2018.

The proposed alterations and additions to the existing dwelling has been found to be in the BAL-12.5 range of AS3959-2018 and must comply with the construction standards outlined in Sections 3 & 5 of AS3959-2018 Construction of buildings in bushfire prone areas. The proposed alterations and additions to the existing dwelling must also comply with the standards outlined in Section 7.5 – Additional Construction Requirements of PBP 2019.

The final BAL Ratings for the proposed development has been found to be BAL-12.5 for the proposed alterations and additions on the Western façade of the existing dwelling.

PBP allows where more than one facade is exposed to a hazard, then the facade with the highest requirement is used to determine the appropriate level of construction. Other facades may be reduced by one level of construction unless that facade is also subject to the same level of bushfire attack. Should the highest level be BAL-12.5 then the entire site shall be deemed as BAL - 12.5.



Calculated October 17, 2022, 11:53 am (BALc v.4.9)

5 Brooker Ave, Beacon Hill

Bushfire Attack Level calculator - AS3959-2018 (Method 2)			
Inputs		Outputs	
Fire Danger Index	100	Rate of spread	5.49 km/h
Vegetation classification	Scrub	Flame length	13.2 m
Understorey fuel load	25 t/ha	Flame angle	73 °
Total fuel load	25 t/ha	Panel height	12.62 m
Vegetation height	3 m	Elevation of receiver	0 m
Effective slope	4 °	Fire intensity	70,921 kW/m
Site slope	18 °	Transmissivity	0.836
Distance to vegetation	20 m	Viewfactor	0.0992
Flame width	10 m	Radiant heat flux	6.31 kW/m ²
Windspeed	45 km/h	Bushfire Attack Level	BAL-12.5
Heat of combustion	18,600 kJ/kg		
Flame temperature	1,090 K		

Rate of Spread - Catchpole et al. 1998

Flame length - Byram, 1959

Elevation of receiver - Douglas & Tan, 2005

Figure 3 – Indicates the Method 2 Calculation of AS3959-2018 for the Tall Heath Classified Vegetation located 20m to the North-West of the proposed alterations and additions (Flamesol 2022)



Calculated October 17, 2022, 12:11 pm (BALc v.4.9)

5 Brooker Ave, Beacon Hill

Bushfire Attack Level calculator - AS3959-2018 (Method 2)			
Inputs		Outputs	
Fire Danger Index	100	Rate of spread	4.15 km/h
Vegetation classification	Rainforest	Flame length	10 m (user defined value)
Understorey fuel load	10 t/ha	Flame angle	96 °
Total fuel load	12 t/ha	Panel height	9.94 m
Vegetation height	n/a	Elevation of receiver	0 m
Effective slope	18 °	Fire intensity	25,761 kW/m
Site slope	18 °	Transmissivity	0.786
Distance to vegetation	38 m	Viewfactor	0.0736
Flame width	43 m	Radiant heat flux	4.4 kW/m ²
Windspeed	n/a	Bushfire Attack Level	BAL-12.5
Heat of combustion	18,600 kJ/kg		
Flame temperature	1,090 K		

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

Elevation of receiver - Douglas & Tan, 2005

Flame angle - Douglas & Tan, 2005

Figure 4 – Indicates the Method 2 Calculation of AS3959-2018 for the Remnant Classified Vegetation located 38m to the West of the proposed alterations and additions (Flamesol 2022)

3 Site Constraints

The subject Lot has not been identified by the NSW Government nor Northern Beaches Council to contain any cultural, historical, or other environmentally significant features.

4 Compliance with the Performance Criteria of Table 7.4a PBP 2019

The following indicates that the proposed development complies/not complies with the Performance Criteria outlined in Table 7.4a of PBP 2019 for Residential Infill Development.

Performance Criteria Section 7 PBP 2019	Acceptable Solution	Compliance
Asset Protection Zones APZs are provided commensurate with the construction of the building; and A defensible space is provided.	An APZ is provided in accordance with Table A1.12.2 or A1.12.3 in Appendix 1	Complies – The APZs in all aspects meet the required distances found in Table A1.12.2. for FDI-100 areas. However, for the BAL Rating for vegetation in the North-Western and Western aspects, the Method 2 Calculation of AS3959-2018 was used resulting in a BAL Rating of BAL-12.5. Therefore, the APZ in these aspects is satisfactory and can meet the requirements for a BAL Rating of BAL-29 as required by Table A1.12.2 of PNP 2019.
APZs are managed and maintained to prevent the spread of a fire to the building.	APZs are managed in accordance with the requirements of Appendix 4 of PBP.	Complies – The APZ is to be managed/maintained as an IPA within the subject Lot in the Northern, Southern, Eastern and Western aspects. The IPA/APZ on the subject Lot will be managed in accordance with Appendix 4 of PBP. The APZ also includes managed/developed land on the neighbouring Lots in all aspects which meets the intent of Section 3.2 and Appendix 4 of PBP 2019.

Performance Criteria Section 7 PBP 2019	Acceptable Solution	Compliance
<p>The APZ is provided in perpetuity.</p> <p>The APZ maintenance is practical, soil stability is not compromised and the potential for crown fires is minimized.</p>	<p>APZs are wholly within the boundaries of the development site and</p> <p>The APZs are located on lands with a slope less than 18 degrees.</p>	<p>Complies – the APZs are maintained within the subject Lot boundaries. However, the APZ also includes managed/developed land on the neighbouring Lots which meets the intent of Section 3.2 and Appendix 4 of PBP 2019.</p> <p>Complies – The APZ of the proposed development is made up of maintained land within the subject Lot, neighbouring Lots and a roadway which are <18 degrees slope.</p>
<p>In relation to access/egress:</p> <p>Firefighting vehicles are provided with safe, all-weather access to structures and hazard vegetation.</p> <p>The capacity of access roads is adequate for firefighting vehicles.</p> <p>There is appropriate access to water supply.</p>	<p>Property access roads are two-wheel drive, all-weather roads.</p> <p>The capacity of road surfaces and any bridges/ causeways is sufficient to carry fully loaded firefighting vehicles (up to 23 tonnes), bridges and causeways are to clearly indicate load rating.</p> <p>Hydrants are provided in accordance with the relevant clauses of AS 2419.1:2022.</p>	<p>Complies - The subject Lot has direct access to Brooker Ave to the East which allows occupants an egress route to safety. Brooker Ave is a surfaced all-weather two-wheel drive road and is suitable for fire appliances.</p> <p>Complies - The capacity of Brooker Ave and surrounding roads is enough to carry fully loaded firefighting vehicles (up to 23 tonnes).</p> <p>Complies - Fire hydrants are provided in accordance with the relevant clauses of AS 2419.1:2022. There are reticulated fire hydrants are located along Brooker Ave and the nearest reticulated mains pressure fire</p>

Performance Criteria Section 7 PBP 2019	Acceptable Solution	Compliance
<p>Firefighting vehicles can access the dwelling and exit the property safely.</p>	<p>There are no specific access requirements in an urban area where an unobstructed path (no greater than 70m) is provided 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.</p>	<p>hydrant is located directly at the front of the neighbouring Lot No.3 Brooker Ave.</p> <p>Complies – The existing dwelling, and alterations and additions, can be easily accessed without placing emergency personnel in an unsafe environment.</p>
<p>In relation to Water Supplies</p> <p>An adequate water supply is provided for firefighting purposes.</p> <p>Water supplies are located at regular intervals; and the water supply is accessible and reliable for firefighting operations.</p>	<p>Reticulated water is to be provided to the development, where available; and a static water supply is provided where no reticulated water is available.</p> <p>Fire hydrant spacing, design and sizing comply with the relevant clauses of AS 2419.1:2022; hydrants are not located within any road carriageway; and reticulated water supply to urban subdivisions uses a ring main system for areas with perimeter roads.</p>	<p>Complies - The site is connected to reticulated mains pressure water supply.</p> <p>Complies – There is a reticulated mains pressure fire hydrant located at the front of the neighbouring Lot, No. 3 Brooker Ave.</p>

Performance Criteria Section 7 PBP 2019	Acceptable Solution	Compliance
<p>Flows and pressure are appropriate.</p> <p>The integrity of the water supply is maintained.</p>	<p>Fire hydrant flows and pressures comply with the relevant clauses of AS 2419.1:2022.</p> <p>All above-ground water service pipes external to the building are metal, including and up to any taps.</p>	<p>Complies.</p> <p>Complies - All above-ground service pipes to the proposed alterations and additions, including taps, will be metal.</p>
<p>In relation to Electricity Supply:</p> <p>The Location of electricity services limits the possibility of ignition of surrounding bushland or the fabric of buildings.</p>	<p>Where practicable, electrical transmission lines are underground; and where overhead, electrical transmission lines are proposed as follows: lines are installed with short pole spacing (30m), 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 ISSC3 Guideline for Managing Vegetation Near Power Lines</p>	<p>Complies - The existing dwelling is provided with electricity via an existing supply which is clear of trees and overhanging branches.</p>
<p>In relation to Gas Supply:</p> <p>The location and design of gas services will not lead to ignition of surrounding bushland or the fabric of buildings</p>	<p>Reticulated or bottled gas is installed and maintained in accordance with AS/NZS 1596:2014 and the requirements of relevant authorities, and metal piping is used; all fixed gas cylinders are kept clear of all flammable materials to a</p>	<p>Complies – The site is not connected to reticulated gas supply. Any future gas connection to the existing dwelling shall also comply with AS/NZS 1596:2014</p>

Performance Criteria Section 7 PBP 2019	Acceptable Solution	Compliance
	<p>distance of 10m and shielded on the hazard side.</p> <p>Connections to and from gas cylinders are metal.</p> <p>Polymer-sheathed flexible gas supply lines are not used; and above-ground gas service pipes are metal, including and up to any outlets</p>	
<p>In relation to Construction Standards:</p> <p>The proposed building can withstand bush fire attack in the form of embers, radiant heat and flame contact.</p> <p>Proposed fences and gates are designed to minimise the spread of bush fire.</p> <p>Proposed Class 10a buildings are designed to minimise the spread of bush fire.</p>	<p>BAL is determined in accordance with Tables A1.12.5 to A1.12.7; and construction provided in accordance with the NCC and as modified by section 7.5 (please see advice on construction in the flame zone).</p> <p>Fences and gates are constructed in accordance with section 7.6.</p> <p>Class 10a buildings are constructed in accordance with section 8.3.2.</p>	<p>Complies - The proposed construction of alterations and additions to the existing dwelling and has been found to be in the BAL-12.5 range as per the Method 2 Calculation of AS3959-2018 and will comply with the construction standards outlined in Sections 3 & 5 of AS3959-2018. It will also have to comply with the requirements of Section 7.5 of PBP 2019.</p> <p>N/A</p> <p>N/A</p>

Performance Criteria Section 7 PBP 2019	Acceptable Solution	Compliance
<p>In relation to Landscaping:</p> <p>Landscaping is designed and managed to minimise flame contact and radiant heat to buildings, and the potential for wind-driven embers to cause ignitions</p>	<p>Compliance with the NSW RFS 'Asset protection zone standards' (see Appendix 4); a clear area of low-cut lawn or pavement is maintained adjacent to the house; fencing is constructed in accordance with section 7.6; and trees and shrubs are located so that: the branches will not overhang the roof; the tree canopy is not continuous; and any proposed windbreak is located on the elevation from which fires are likely to approach.</p>	<p>Complies – The APZ will be managed as an Inner Protection Area within the subject Lot and neighboring maintained/developed land in all aspects which meets the intent of Section 3.2 Asset Protection Zones of PBP 2019.</p> <p>The APZs meet the standards outlined in Appendix 4 of PBP 2019 in relation to APZ Standards.</p> <p>The existing dwelling and proposed alterations and additions are in a cleared area with no trees or shrubs providing a continuous fuel path to the existing dwelling and alterations and additions.</p>

Table 6 – Performance Criteria of Table 7.4a of PBP 2019

Furthermore, the proposal must also comply with Section 7.5 - Additional construction requirements of PBP 2019. To ensure the performance criteria for construction standards given in Section 7.4 of PBP can be met, PBP adopts additional measures over and above AS 3959-2018 and NASH Standard.

The following variations to AS 3959 apply in NSW for the purposes of NSW G5.2(a)(i) of Volume One and NSW 3.10.5.0(c)(i) of Volume Two of the NCC:

- Clause 3.10 of AS 3959 is deleted and any sarking used for BAL-12.5, BAL-19, BAL-29 or BAL-40 shall: be non-combustible; or comply with AS/NZS 4200.1, be installed on the outside of the frame, and have a flammability index of not more than 5 as determined by AS 1530.2; and

5 Recommendations

- 1- The proposed development of the construction of alterations and additions to the existing dwelling and has been assessed as BAL-12.5 and is recommended to comply with the construction standards outlined in Sections 3 & 5 of AS3959-2018.
- 2- The proposed development is also required to meet the construction standards outlined in Section 7.5 of PBP 2019.
- 3- Any new above ground water pipes external to the proposed alterations and additions are to be metal including and up to any taps.
- 4- Any future gas connection is to be installed and maintained in accordance with AS1596, metal piping should be used.
- 5- The Asset Protection Zone is to be maintained as an Inner Protection Area on the subject Lot and the vegetation selections for landscaping, vegetation management and property management should be in accordance with Appendix 4 PBP 2019 and the RFS document “Standards for Asset Protection”.
- 6- It is recommended that a Bushfire Emergency Plan be developed for the existing dwelling if not already developed.

It is recommended that Northern Beaches Council and the NSW Rural Fire Service approve the proposed construction of alterations and additions to the existing dwelling and the installation of a swimming pool on the subject Lot located at 5 Brooker Ave, Beacon Hill. NSW 2100 in respect to Bushfire Requirements.

6 Conclusion

The proposed construction of alterations and additions to the existing dwelling on the subject Lot located at 5 Brooker Ave, Beacon Hill. NSW 2100 can meet the planning requirements of *Planning for Bushfire Protection* 2019 and, are capable of meeting Australian Standard AS3959-2018 and the *Building Code of Australia* in relation to construction standards.

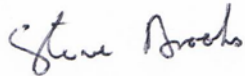
The hazardous bushfire vegetation posing a potential bushfire risk to the proposal is Tall Heath Classified Vegetation located 20m to the North-West and Remnant Classified Vegetation located 38m and 44m to the West of the proposed development.

The BAL for the proposed construction of alterations and additions to the existing dwelling was determined by the Method 2 Calculation of AS3959-2018 and rated to be BAL- 12.5 and will therefore comply with the construction standards outlined in Sections 3 & 5 of AS3959-2018. Furthermore, the proposed development will also be required to comply with Section 7.5 - Additional Construction Requirements of PBP 2019.

The required Asset Protection Zones determined from Table A.1.12.2 of PBP 2019 exceed the requirements. The proposal has Asset Protection Zones in all aspects made up from an Inner Protection Area on the subject Lot and within the neighbouring developed Lots which meets the intent of Section 3.2 Asset Protection Zones and Appendix 4 – APZ Requirements of PBP 2019.

In accordance with the bushfire measures contained with this report and the site-specific assessment as per Appendix 1 of PBP 2019, it is my opinion that combined will provide a satisfactory level of bushfire safety to the property and satisfies the requirements of the RFS and Councils obligations for this area.

Prepared by Steve Brooks



BPAD - Certification No. 40765

Graduate Diploma Bushfire Planning and Design (UWS)

Graduate Certificate in Fire Investigation (CSU)

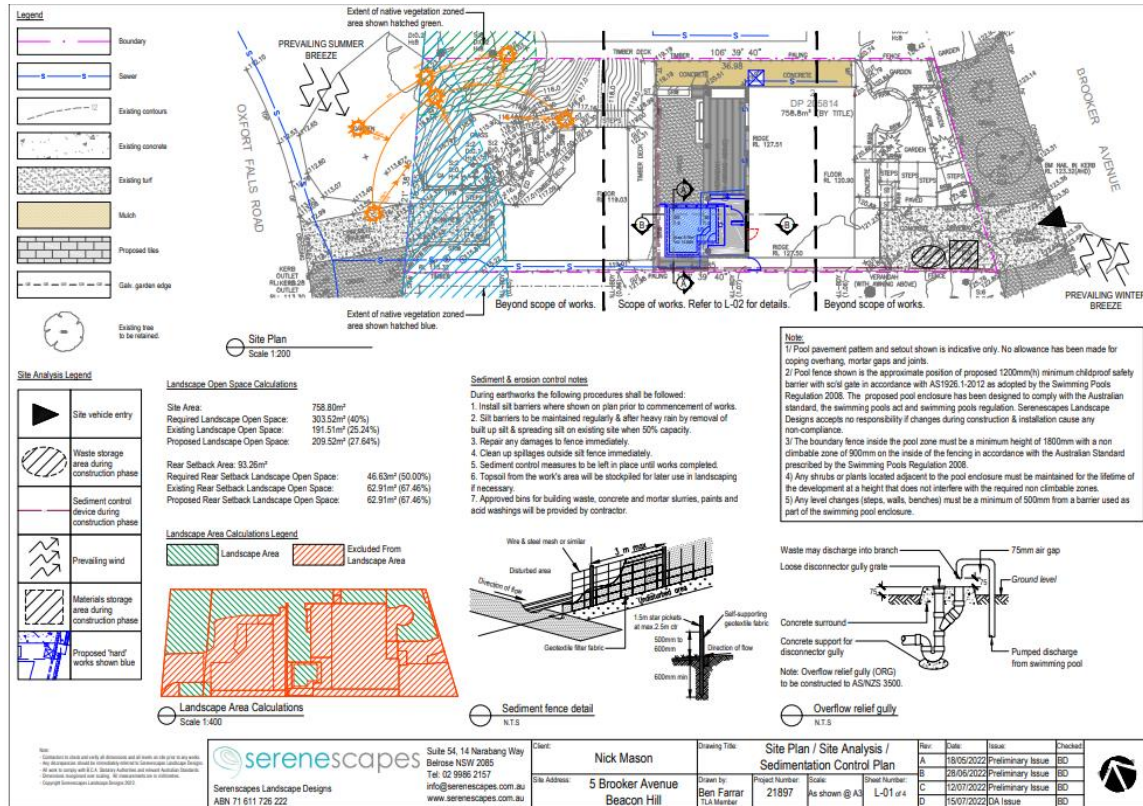


References

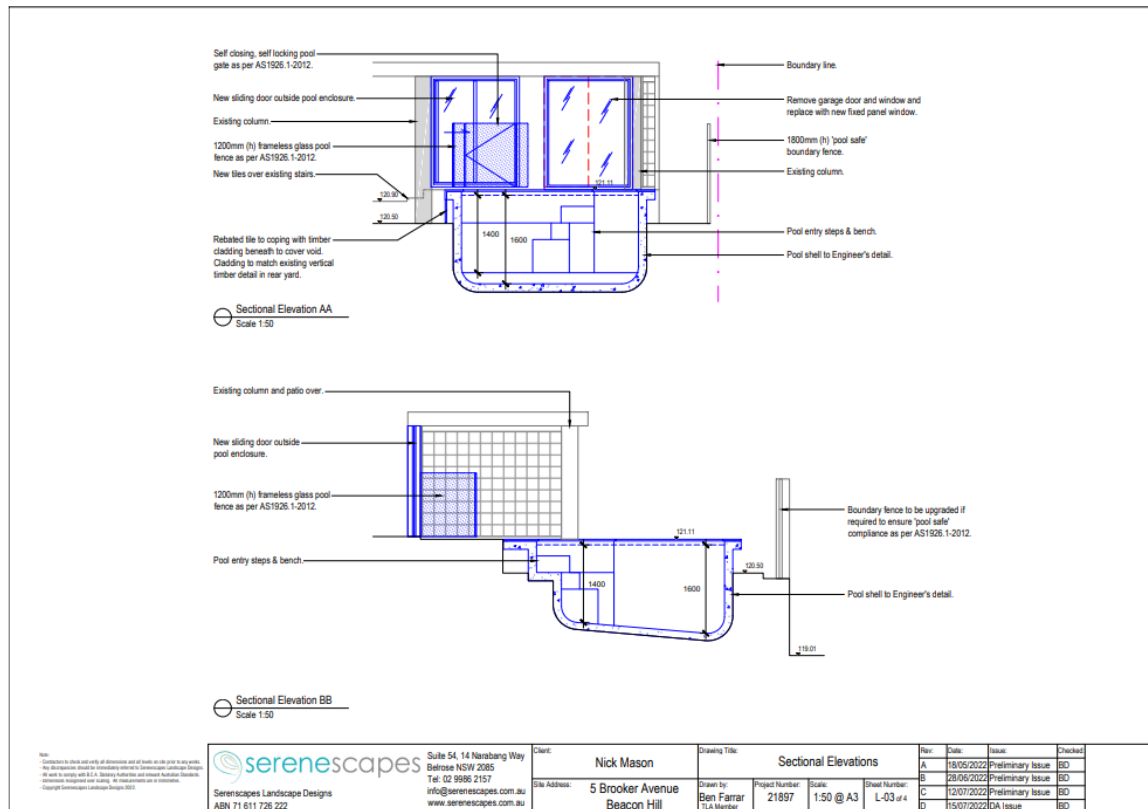
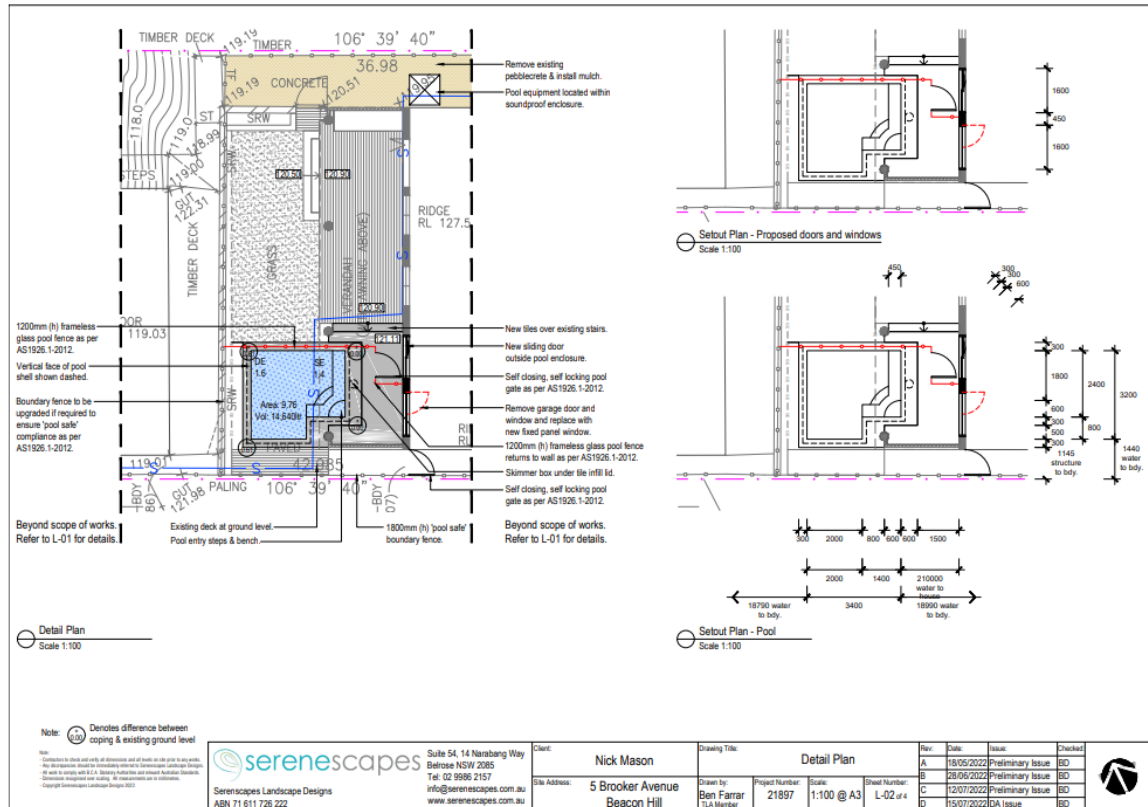
- Australian Building Codes Board (ABCB), 2019, *Building Code of Australia*, Volume 2, Canberra.
- Keith David, 2004, *Ocean Shores to Desert Dunes: the native vegetation of NSW and the ACT*, Dept of Environment and Conservation, NSW Government.
- Environmental Planning and Assessment Act 1979. NSW Government
- NSW Rural Fire Service, 2019, *Planning for Bush Fire Protection*. Sydney
- NSW Rural Fire Service, 2022, website – www.rfs.nsw.gov.au :
- Standards Australia, AS 3959-2018 *Construction in Bushfire Prone Areas* SAI Global, Melbourne.
- NSW Government E-Planning Spatial Viewer 2022
- NSW Government Six Maps 2022
- Nearmap 2022
- Mecone Mosaic Mapping 2022
- Flamesol 2022 (Method 2 Calculation)

Appendix 1

Site Plans



Bushfire Hazard Assessment Report 5 Brooker Ave, Beacon Hill. NSW 2100 17th October 2022



Appendix 2

Site Photos



Photo 3 - Indicates Brooker Ave looking North (Steve Brooks 2022)



Photo 4 – Indicates Tall Heath Classified Vegetation to the North-West of the proposal
(Steve Brooks 2021)