Advanced
Bushfire Performance Solutions

# Bushfire Assessment Report

## s.79BA 'Infill Development'

### Lot 26 Sec 6 DP 1591, Lot 1 DP 436706 & Lot B DP 357731
### 7-11 Bent Street Gosford NSW

**Prepared for**
## ADG Architects

**December 2018**


**Prepared by Terence O'Toole**
B.App.Sc Environmental Health
Grad.Dip Design in Bushfire Prone Areas

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## Document Control

| Document Name | Project Ref | Date | Author | Status |
|---|---|---|---|---|
| 20160801KDCG BAR 1.0 | 20160801KDCG | 07-Feb-2017 | TO | Version 1 |
| 20160801KDCG BAR 2.0 | 20160801KDCG | 12-Mar-2018 | TO | Version 2 |
| 20160801KDCG BAR 2.1 | 20160801KDCG | 20-Jul-2018 | TO | Version 3 |
| 20160801KDCG BAR 2.2 | 20160801KDCG | 30-Jul-2018 | TO | Version 4 |
| 20160801KDCG BAR 2.3 | 20160801KDCG | 13-Dec-2018 | TO | Version 5 |

# 1 Bushfire Assessment Certificate

| | |
|---|---|
| **Property Address** | **7-11 Bent Street Gosford NSW** |
| **Description of Proposal** | **Construction of a new residential multi-storey apartment building** |
| **Plan Reference** | Site Plan DA 02 Iss:7 Dated: 23/11/2017 |
| **BAL Rating** | The proposed building has been assessed as requiring a maximum **BAL-29** construction standard. |
| **Does the Proposal Rely on Alternative Solutions** | YES ☑ (Uses Method 2 assessment methodology)<br>NO ☐ (Uses Method 1 assessment methodology) |
| **Does the Proposal Require Referral to the RFS** | YES ☑<br>NO ☐ |
| **Does the Proposal Comply with CDC** | YES ☐ (see section 4 of this report)<br>NO ☑ (see section 4 of this report) |

I, Terence O'Toole of Advanced Bushfire Performance Solutions Pty Ltd have carried out a bushfire risk assessment on the above mentioned proposal and property. This report includes the submission requirements set out in Appendix 4 of *Planning for Bush Fire Protection* 2006 together with recommendations as to how the relevant specifications and requirements are to be achieved.

I hereby certify, in accordance with Section 79BA of the *Environmental Planning and Assessment Act 1979* No 203:

1. That I am a person recognized by the NSW Rural Fire Service as a qualified consultant in bushfire risk assessment; and
2. That, subject to the recommendations contained within this report, the proposed development conforms to the relevant specifications and requirements*.

**The relevant specifications and requirements being; specifications and requirements of the document entitled Planning for Bush Fire Protection, ISBN 0 9751033 2 6, prepared by the NSW Rural Fire Service in co-operation with the Department of Planning and any other document prescribed by Section 79BA(1)(a) of the Environmental Planning and Assessment Act 1979 No 203.*

I am aware that this Bushfire Assessment Report, prepared for the above mentioned site, is to be submitted in support of a development application for this site and will be relied upon by the consent authority as the basis for ensuring that the bushfire risk management aspects of the proposed development have been addressed in accordance with *State Environmental Planning Policy (Exempt and Complying Development Codes) 2008* and *Planning for Bush Fire Protection* 2006.

**Terence O'Toole**

**13 December 2018**

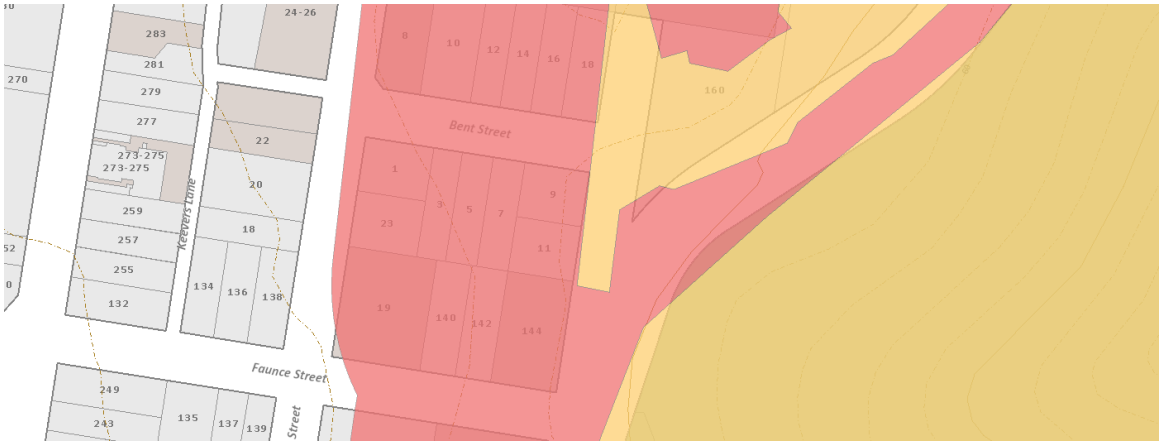
BAppSc Environmental Health
Grad. Dip Design for Bushfire Prone Areas
**Director/Principal Consultant**

BPAD-A Level 3 Certified Practitioner BPD-PA-13734
Corporate Silver Member Fire Protection Association Australia

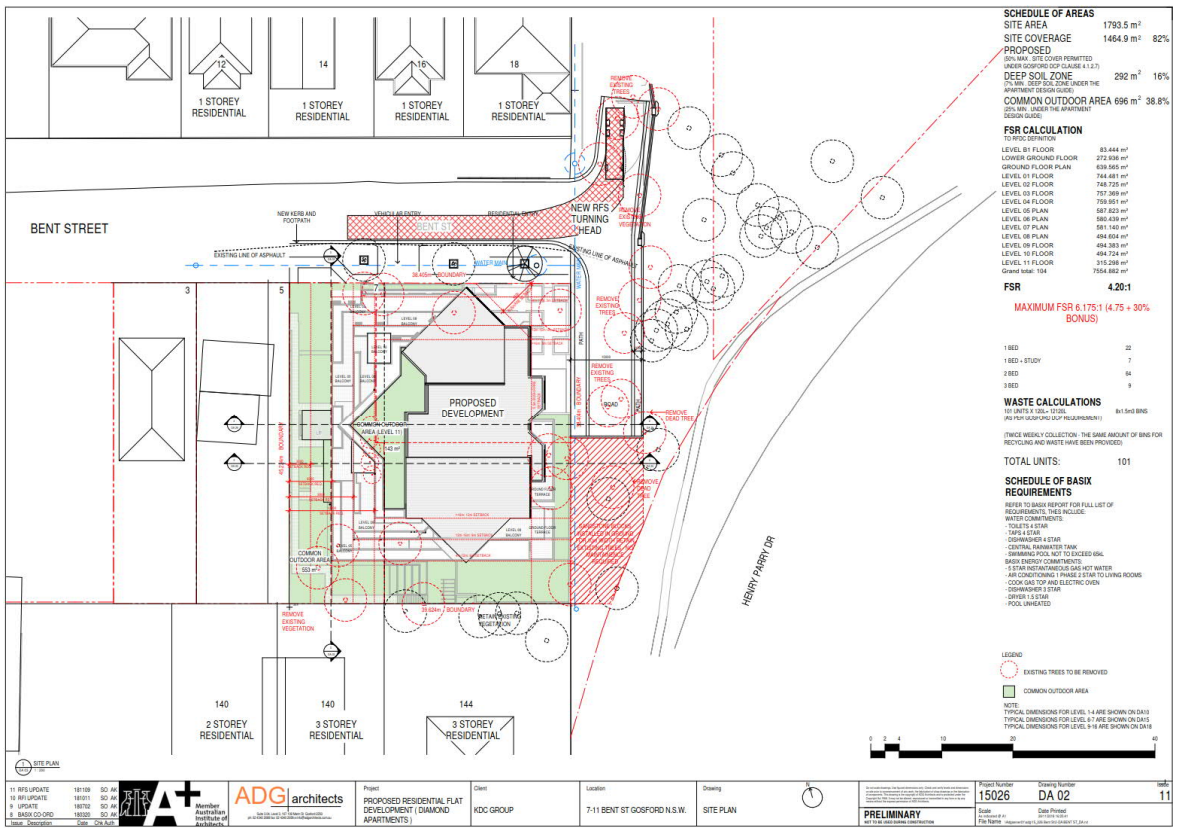
# 2 Proposed Development

**Is the proposal on bush fire prone land**

The site is within the bushfire prone land on the **Gosford LGA** Bush Fire Prone Land Map.




**Plan**

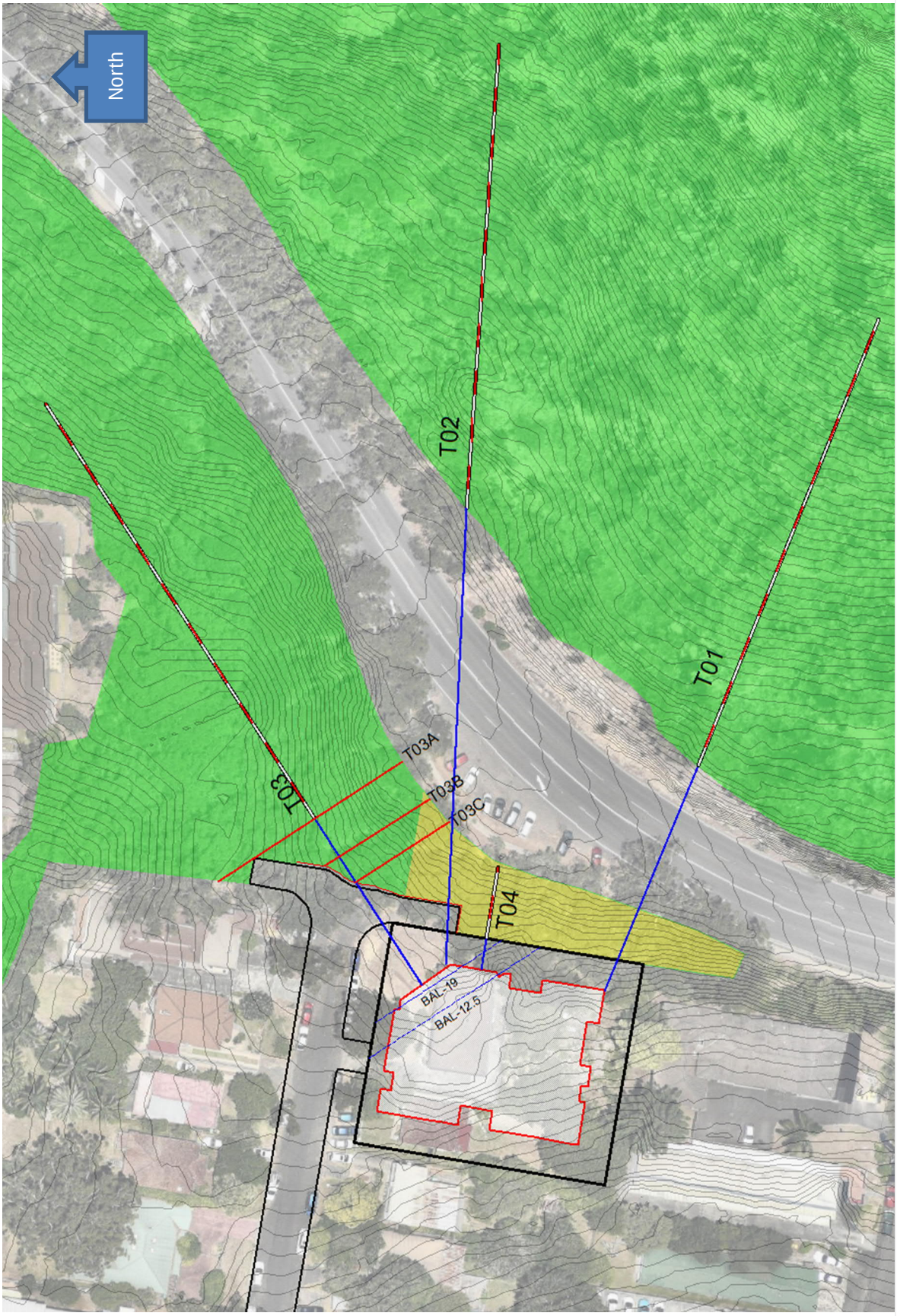



**Plan Reference**

Site Plan DA 02 Iss:11 Dated: 09/11/2018

# 3 Assessment Details

Bushfire Assessment Plan



| Legend and Comments | | |
|---|---|---|
| | Blue line | Setbacks |
| | Thick black line | Proposed boundaries |
| | Red/white dashed line | Slope transect |
| | Thin grey line | 0.5m contour |
| | Green shaded polygon | Bushfire Hazard Vegetation |
| | Yellow shaded polygon | Excluded vegetation |

## Asset Protection Zones

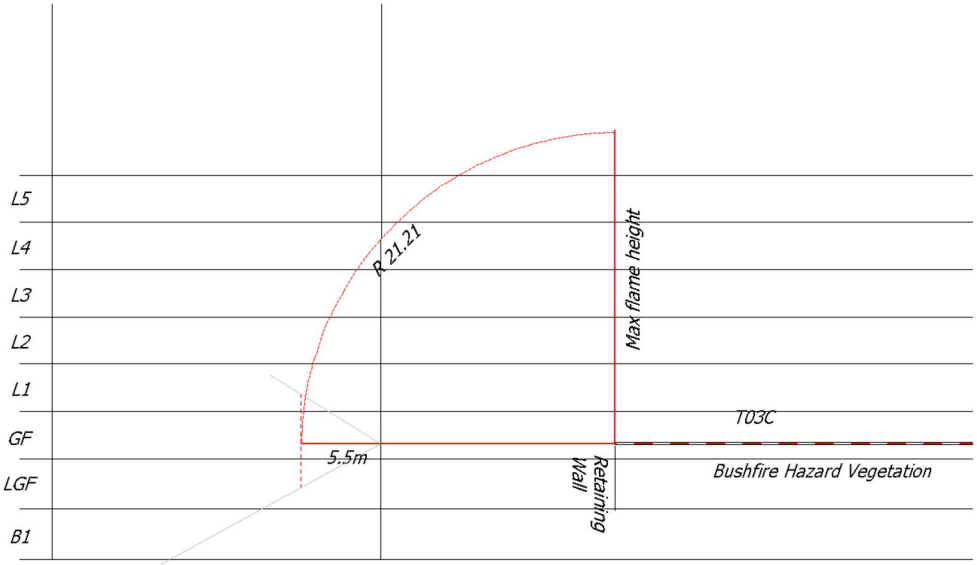
**Complies**

APZ determined in accordance with Appendix 2
APZ located wholly within the development
APZ managed to RFS standards
APZ are easily manageable and do not compromise soil stability or support crown fires

**Vegetation**

- The site is adjoining a remnant Crown Land reserve and is in proximity to a Council reserve (Rumbalara Reserve) to the east of Henry Parry Drive.
- Gosford Council mapping identifies all the vegetation to the east (incl. Rumbalara Reserve) of the site as Narrabeen Coastal Blackbutt Forest. The Lower Hunter REMS classifies this community as Coastal Narrabeen Moist Forest (Keith – Wet Sclerophyll Forest).
- The Flore and Fauna Impact Assessment prepared by Keystone Ecological (Dec 2015) confirms the vegetation classification and describes the forest as supporting a sparse to moderate shrubby understorey and a well-developed grass layer. The report does not go into detail about the structure of the vegetation in the reserves to clarify whether dry or wet sclerophyll forest predominates. Recent aerial images from NearMap suggest that the vegetation about T02 is very open forest-woodland.
- The Rumbalara Reserve vegetation is a relatively undisturbed native bushland consistent with Dry Sclerophyll Forest structure on the northern aspects of the hill. This is the aspect closest to the site. Portions on the sheltered eastern and southern aspects may exhibit wet sclerophyll forest structure; however, these are far removed from the site and do not influence fire behaviour.
- The northeastern vegetation within the Crown Land reserve is disturbed native bushland fragmented by urban development, access paths and uncontrolled local activity. This vegetation contains the remains of make-shift habitats, dumped material and exotic weeds. The widest portion is less than 70m (within 140m of the site). The potential fire front narrows in proximity to the site until the width is less than 20m (perpendicular to the site – yellow zone on plan).
- Although the north eastern vegetation exhibits some of the attributes of remnant vegetation and is unable to support a full fire-front, the vegetation is not classified as remnant for the purposes of bushfire behaviour modelling due to the lack of a clear justification as described in PBP or AS3959.
- In the absence of clarity all bushfire behaviour modelling has been based on Wet Sclerophyll Forest fuel loads from *AS3959-2009*. This may overstate the predicted bushfire behaviour impacting the site, but will be a safe and conservative assessment.
- The vegetation immediately adjacent to the site (yellow zone) is less than 20m wide perpendicular to the site and is predominantly less than 10m wide. It is separated from the residential walls by more than 5-10m. The proposed development will manage this area by modifying and landscaping the zone as described in the plan in Appendix D. This management will allow for a single line of shrubs at the Henry Parry Drive interface to provide visual screening.

View between eastern boundary and Henry Parry Drive (2/3 up photo)

| | |
|---|---|
| **Slope** | • The slope analysis for this proposal was undertaken using contours derived from 1m LIDAR DEM sourced from LPI. This elevation data has been processed to achieve 'Category 1' DEM products as described by the ICSM (Intergovernmental committee on Surveying & Mapping) Guidelines for Digital Elevation Data which specifies accuracies not exceeding 30cm with 2 sigma or 95% confidence.<br>• Contours at 0.5m intervals were extracted from the DEM.<br>• The slopes are represented by 3 transects (T01-T03).<br>• Transects perpendicular to the site boundaries are typically assessed as these will generally describe the greatest impact on the site; however, in this case perpendicular transects do not describe the most significant fire paths impacting the site.<br>• Transects T01 and T02 describe the fire path from within Rumbalara Reserve from the east. These transects are upslope.<br>• Transect T03 addresses the steepest fire run from the northeast that also supports the standard bushfire behaviour modelling.<br>• Transects T01 and T02 are upslope relative to the site. Although these slopes exceed 10°, for the purposes of this assessment each transect has been modelled at no greater than 10° as instructed by the RFS. It is noted that this is inconsistent with the modelling limitations in AS3959-2009 and not formally detailed in any RFS policy document. |
| **Environmental Features** | • None |
| **Setback** | • The proposed building does not comply with AS3959-2009 Method 1 setbacks along T03 for a BAL-29 outcome<br>• Method 2 modelled setbacks included in this report address the distance from the wall of the residential portion of the building (ground floor) to the unmanaged bushfire hazard vegetation and the minimum to achieve BAL-29.<br>• Setbacks along T03 are limited by flame contact. Setbacks to the Ground Floor are along the horizontal plane. Setbacks to Levels L1-L4 progressively decrease as the flame length is inclined to the vertical plane (see diagram below)<br>  <br>*Diagonal section across building NE to SW*<br>• The building is designed with a northeast façade that accommodates the flame length (21.22m).<br>• No APZs are proposed beyond the boundaries of the development; however existing managed lands may be relied upon for APZs.<br>• The area immediately adjacent to the eastern boundary is proposed to be permanently managed as per the Landscaping Plan (see Appendix D).<br>• All proposed APZs (see table below) are practical, do not compromise soil stability and negate potential crown fires within the APZ. |


Concept image shows the cutaway between the ground floor and Level 4 on the left side of the photo

| | |
|---|---|
| **Construction** | • The proposed building will be constructed to AS3959-2009 requirements for BAL-29 along the northeastern façade, BAL-19 along the northern and eastern façades and BAL-12.5 along the western and southern façades.<br>• The BAL thresholds from T03C are described by blue dashed lines in the Bushfire Assessment Plan and the setbacks in the Bushfire Assessment Summary Table.<br>• Portions of the building closer than modelled setbacks (Lower Ground Floor) comply with flame zone standards and are below the ground surface (non-residential). |
| **Management** | • The entire residential lot is to be managed (as a minimum) to inner protection area (IPA) standards and maintained at this standard for the life of the development or until no longer required as per the Landscaping plan (see Appendix D).<br>• All asset protection zones provided within the residential lot will be the responsibility of the landowner.<br>• Vegetation management in the Crown lot adjacent to the eastern boundary will be not be required.<br>• Vegetation management in the Gertrude Street road reserve adjacent to the site will be the responsibility of the Council subsequent to the development works modifying the area. |

## Bushfire Assessment Summary Table

| Transect | T01 | T02 | T03A | T03B | T03C | T03C | T03C |
|---|---|---|---|---|---|---|---|
| Fire Danger Index (FDI) | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 | 100.00 |
| Vegetation Class | Wet Sclerophyll Forest | Wet Sclerophyll Forest | Wet Sclerophyll Forest | Wet Sclerophyll Forest | Wet Sclerophyll Forest | Wet Sclerophyll Forest | Wet Sclerophyll Forest |
| Table 2.4.2 Vegetation code | A | A | A | A | A | A | A |
| Setback Distance (m) | 43.27m | 80.87m | 34.86m | 26.77m | 21.53m | 22.70m | 27.36m |
| Near Elevation | 52.50m | 52.00m | 40.25m | 41.00m | 41.00m | 41.00m | 41.00m |
| Far Elevation | 67.54m | 66.56m | 44.50m | 44.50m | 44.50m | 44.50m | 44.50m |
| Fall | -15.04m | -14.56m | -4.25m | -3.50m | -3.50m | -3.50m | -3.50m |
| Run | 85.32m | 82.59m | 87.70m | 95.98m | 101.50m | 101.50m | 101.50m |
| Effective Slope | -10.00° | -10.00° | -2.77° | -2.09° | -1.97° | -1.97° | -1.97° |
| Up/Down | US | US | US | US | US | US | US |
| Table 2.4.2 Slope Range | US/Flat | US/Flat | US/Flat | US/Flat | US/Flat | US/Flat | US/Flat |
| Target Table A2.4 Setback | NA | NA | NA | NA | NA | NA | NA |
| Table A2.4 compliance | NA | NA | NA | NA | NA | NA | NA |
| Target Table 2.4.2 Setback Range | 25-<35m | 25-<35m | 25-<35m | 25-<35m | 25-<35m | 25-<35m | 25-<35m |
| Actual Table 2.4.2 Setback Range | 35-<48m | 48-<100m | 25-<35m | 25-<35m | 19-<25m | 19-<25m | 25-<35m |
| Actual Table 2.4.2 BAL | BAL-19 | BAL-12.5 | BAL-29 | BAL-29 | BAL-40 | BAL-40 | BAL-29 |
| Table 2.4.2 BAL-29 compliance | Yes | Yes | Yes | Yes | No | No | Yes |
| Site Slope Near Elevation | 40.00m | 40.00m | 40.00m | 40.00m | 40.00m | 40.00m | 40.00m |
| Site Slope Far Elevation | 52.50m | 52.00m | 40.25m | 41.00m | 41.00m | 41.00m | 41.00m |
| Site Slope Length | 43.27m | 80.87m | 34.86m | 26.77m | 21.53m | 22.70m | 27.36m |
| Site Slope | -16.11° | -8.44° | -0.41° | -2.14° | -2.66° | -2.52° | -2.09° |
| Up/Down | US | US | US | US | US | US | US |
| Modelled Setback | 43.27m | 80.87m | 34.86m | 26.77m | 21.53m | 22.70m | 27.36m |
| Surface Fuel Load | 25.00 t/ha | 25.00 t/ha | 25.00 t/ha | 25.00 t/ha | 25.00 t/ha | 25.00 t/ha | 25.00 t/ha |
| Overall Fuel Load | 35.00 t/ha | 35.00 t/ha | 35.00 t/ha | 35.00 t/ha | 35.00 t/ha | 35.00 t/ha | 35.00 t/ha |
| Elevated Fuel Height | 0.00m | 0.00m | 0.00m | 0.00m | 0.00m | 0.90m | 0.90m |
| Vegetation Height (m) | - | - | - | - | - | - | - |
| Elevation of Receiver | 6m | 6m | 9m | 9m | 8m | 8m | 8m |
| FDF Flame angle | 61° | 73° | 62° | 50° | 43° | 44° | 49° |
| FDF Flame width | 100.00m | 100.00m | 39.00m | 22.18m | 19.89m | 19.89m | 19.89m |
| Flame Temperature | 1090K | 1090K | 1090K | 1090K | 1090K | 1090K | 1090K |
| FDF Flame Length (Lf) | 13.98m | 13.98m | 20.30m | 21.08m | 21.22m | 21.22m | 21.22m |
| FDF Rate of Spread (ROS) | 1.50 kmh | 1.50 kmh | 2.48 kmh | 2.60 kmh | 2.62 kmh | 2.62 kmh | 2.62 kmh |
| FDF Fire Intensity (kW/m) | 27210 kW/m | 27210 kW/m | 44798 kW/m | 46970 kW/m | 47339 kW/m | 47339 kW/m | 47339 kW/m |
| FDF Transmissivity | 0.78 | 0.74 | 0.80 | 0.83 | 0.85 | 0.85 | 0.83 |
| FDF View Factor | 0.1330 | 0.0546 | 0.1864 | 0.2237 | 0.3299 | 0.2952 | 0.1981 |
| FDF Radiant Heat Flux (RHF) | 7.93 kW/m² | 3.06 kW/m² | 11.40 kW/m² | 14.14 kW/m² | 21.34 kW/m² | 19.00 kW/m² | 12.50 kW/m² |
| FDF Method 2 BAL | BAL-12.5 | BAL-12.5 | BAL-12.5 | BAL-19 | BAL-29 | BAL-19 | BAL-12.5 |
| Wind Speed | | | | | | | |
| SFR Length | | | | | | | |
| L/B Ratio | | | | | | | |
| HF/BF Spread Ratio | | | | | | | |
| SFR Ellipse Length | | | | | | | |
| SFR Flame width (Head Fire Width) | | | | | | | |
| SFR Flame angle | | | | | | | |
| SFR Flame Length | | | | | | | |
| SFR Fire Intensity (kW/m) | | | | | | | |
| SFR Transmissivity | | | | | | | |
| SFR View Factor | | | | | | | |
| SFR Radiant Heat Flux (RHF) | | | | | | | |
| SFR Method 2 BAL | | | | | | | |

**Bushfire behaviour modelling**

Transect T03 was modelled as 3 separate scenarios (T03A-T03C) to assess the impact on the site as the fire approached the building and began to be influenced by the narrowing fire front. This ensured that a broader more distant fire did not have a significant impact on the building.

Transect T03C flame lengths had the most significant impact on the building.

The entire building can comply with Method 1 acceptable solutions up to BAL-40, but this is not consistent with the RFS policy of capping higher density development at BAL-29. BAL-29 is achieved using Method 2.

## Services

**Complies**

Compliance with s.4.1.3. for services

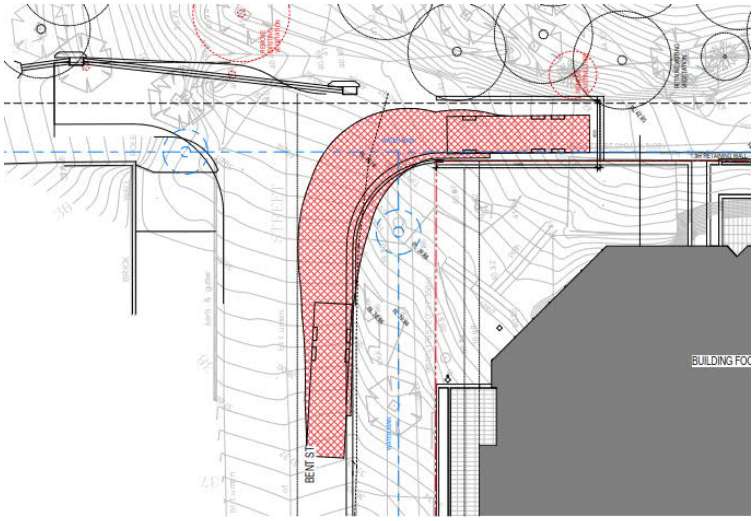
| | |
|---|---|
| **Water** | • A reticulated mains water network is currently available to the site.<br>• An existing hydrant is located adjacent to the northeastern corner of the site.<br>• The entire residential building is within 90m of the hydrant and as such complies with AS29419.1 – 2005 distances (20m from hydrant to tanker, 60m of hose and a 10m jet of water = 90m)<br>• All above ground pipes and fittings are to be metal. |
| **Electricity** | • Power transmission lines external to the site are above-ground.<br>• All new power lines within the site should be located under-ground. |
| **Gas** | • No information provided. Should gas be provided then it must comply with appropriate standards.<br>• All above ground pipes and fittings should be metal |

## Access

**Complies**

Compliance with s.4.1.3(1)

| | | |
|---|---|---|
| **Public access road** | **Perimeter Roads (interfacing with the bushland)**<br>• An access road for services will be provided along the eastern boundary, within the Gertrude Street road reserve. A tuning bay will also be provided to the northeast of the site.<br>• The road will be separated from the bushland by a low retaining wall.<br>• The turning bay will support emergency services vehicles and garbage trucks and should restrict any parking within the service road or turning bay. | Yes |
| | **Non-Perimeter Roads**<br>• No non-perimeter roads are proposed by this development application | Yes |
| | **One Way Access Roads**<br>• No one-way access roads are proposed by this development application | Yes |
| | **Dead Ends**<br>• No dead-end road is proposed by this development application<br>• The existing cul-de-sac was approved by the RFS within an earlier subdivision development application | Yes |
| | **All Roads**<br>• No roads are proposed by this development application | Yes |
| | **Emergency Evacuation**<br>• A Traffic Management Report has been prepared by Barker Ryan Stewart with an addendum (26 July 2018) specifically addressing the capacity of the road network to safely facilitate the emergency evacuation of the site.<br>• The report identifies the existing road network as having the highest level of service. | |

| | | |
|---|---|---|
| | **Hydrants and Parking**<br>• No hydrants or parking are proposed by this development application | Yes |
| **Property access** | • The property access road is not required to comply with the provisions of section 4.1.3 (2) of *Planning for Bush Fire Protection* 2006 as the building less than 70m from the nearest road. The road speed limit is not greater than 70kph.<br>• The driveway should be 4m wide (min) (not mandatory)<br>• Due to the short length of the driveway no turning head, turning bay or the like is warranted.<br>• Access to the Lower Ground Floor parking areas is not recommended for emergency services vehicles.<br>• A turning bay ('T' bay) has been incorporated into the adjacent Gertrude Street road reserve as an extension of the public access road. This turning bay meets specification in PBP2006. The latest plan modification increases the width of this bay as per the landscaping plan in Appendix D.<br>  | Yes |
| **Fire Trails** | • No perimeter fire trails are proposed by this development application | Yes |

## Landscaping

**Complies**

Compliance with Appendix 5

| | |
|---|---|
| **Landscaping** | • Site and adjacent land will be landscaped as per the Landscaping Plan prepared by Xeriscapes dated 28th Nov 2018<br>• The landscaping adjacent to the site in Gertrude street will provide suitable permanent management of the bushfire hazard and setback requirements to the east of the site. The plan is attached in Appendix D.<br>• Any new landscaping within the development should adopt (where practical) the following principles:<br>o Moisture content of leaves should be high (250-400% of dry oven weight)<br>o Volatile oil content of leaves should be low<br>o Mineral content of leaves should be high<br>o Leaves should be thick (broad) with low area to volume ratio<br>o Density of foliage should be high and less permeable to air flow<br>o Continuity of plant form should be broken or separated<br>o Height of lowest foliage above ground should be maximised<br>o Size of plant should be wide spread rather than tall and narrow<br>o Dead foliage on the plant should be minimal<br>o Bark texture should be tight and smooth<br>o Quantity of ground fuels should be minimised<br>o Fineness of ground fuels should be minimised<br>o Compaction ability of ground fuels should be maximised<br>o Mineral content of ground fuel should be maximised |

## Other

| | |
|---|---|
| **Environmental Impact** | • None noted |
| **Other BPMs** | • No additional measures |
| **Deviations** | • The assessment does not deviate from the standards, specific objectives and performance criteria of Planning for Bush Fire Protection 2006 |

# 4 SEPP (Exempt & Complying Development Codes) 2008

## Part 3 General Housing Code, Subdivision 9
## Clause 3.36B Development standards for bush fire prone land
## Part 3A Rural Housing Code, Subdivision 9
## Clause 3A.37 Development standards for bush fire prone land

| Sub Clause | Determination | Compliance |
|---|---|---|
| **2(a)** | 1. The development conforms to the specifications of Planning for Bush Fire Protection 2006 and Addendum Appendix 3 | Yes |
| **2(b)** | 2. The development is not within bushfire attack level – 40 (BAL-40) or the flame zone (BAL-FZ). | No |
| **2(c)** | 3. The lot has direct access to the public road. | Yes |
| **2(d)** | 4. A reticulated water supply is connected to the lot | Yes |
| **2(e)** | 5. Hydrant is located within 60m of the development | Yes |
| **2(f)** | 6. Mains electricity is connected to the site | Yes |
| 2(d) | 7. The development is within 200m of the public road | Yes |
| 2(e) | 8. The property access road complies with s.4.1.3. (2) of Planning for Bush Fire Protection 2006 | Yes |
| 2(f) | 9. A 20,000L water storage tank is provided with 65mm Storz fitting | Yes |
| **2(g)** | 10. Bottled gas is installed and maintained in accordance with Australian Standard AS/NZS 1596:2002: 'The storage and handling of LP gas' and the requirements of relevant authorities | Yes |
| **2(h-j)** | 11. Gas cylinders are provided. Gas cylinders kept close to the building shall have release valves directed away from the building and be located at least 2 metres away from any combustible material. Connections to and from gas cylinders are to be metal. There are no polymer sheathed flexible gas supply lines to gas meters adjacent to the dwelling | Yes |

# 5 Bushfire Protection Measures - recommendations

| Performance Criteria | Recommendation | Compliance |
|---|---|---|
| **APZ** | 1. The residential lot shall be managed to inner protection area standards as described in the RFS documents *Planning for Bush Fire Protection* 2006 and *Standards for Asset Protection Zones*.<br>2. Gertrude Street shall be designed and managed as per the Landscaping Plan in Appendix D | Yes |
| **Construction** | 3. The entire residential building shall be constructed to the requirements of AS3959-2009 for BAL-29, with the except of the northern and eastern western façade which may be constructed to BAL-19 and the western and southern façades which may be constructed to BAL-12.5 | Yes |
| **Access** | 4. Proposed turning bays off Bent Street shall be 4.0m wide with an inner turning radius of 6.0m | Yes |
| **Services** | 5. All services shall comply with Section 4.1.3 of *Planning for Bush Fire Protection* 2006 | Yes |
| **Landscaping** | 6. None | Yes |
| **Emergency** | 7. The developer is encouraged to prepare a NSW RFS Bush Fire Survival Plan (Appendix A) | NA |

# Appendix A – Bush Fire Survival Plan


http://www.rfs.nsw.gov.au/__data/assets/pdf_file/0003/36597/GetReadyforaBushFire.pdf

# Appendix B – Asset Protection Zone Standards

Planning for Bush Fire Protection 2006

| Asset Protection Zone | Inner Protection Area | Outer Protection Area |
|---|---|---|
| (p.10)Buffer zone between bush fire hazard and buildings. Managed progressively to minimise fuel loads and reduce bushfire attack. | (p.10) Closest to buildings, incorporating the defendable space and for managing heat intensities at the building surface | (p.10) reducing the potential length of flames by slowing the rate of spread, filtering embers and suppressing crown fire |
| (p.10) defendable space is a subset of APZ | (p.50) The IPA is critical to providing a defendable space and managing heat intensities at the building surface.<br>The IPA may be increased at the expense of the OPA | (p.50) the OPA serves to reduce the potential length of flames by slowing the ROS, filtering embers and reducing the likelihood of crown fires |
| (p.12) fuel reduced physical separation.<br>Based on keeping radiant heat levels at buildings below 29kWm$^{-2}$ | (p.51) An IPA should provide a tree canopy cover of less than 15% and should be located >2m from any part of the roofline of a dwelling.<br>Garden beds and flammable shrubs are not to be located under trees and should not be located <10m from an exposed window or door.<br>Lower limbs should be pruned to a height of 2m above the ground | (p.51) An OPA should provide a tree canopy cover of less than 30% and should have understorey managed (mowed) to treat all shrubs and grasses on an annual basis in advance of the fire season |
| (p.13) Where an APZ easement is established to the benefit of Community Title is shall be maintained in accordance with a PoM | | |
| (p.18) Intent of Measures- to provide sufficient space and maintain reduced fuel load, so as to ensure radiant heat levels at the building are below critical limits and to prevent direct flame contact with a building | | |
| (p.18) APZ is designed to minimise the presence of fuels which could become involved in a fire | | |
| (p.19) APZs are managed and maintained to prevent the spread of fire towards the building.<br>In accordance with the requirements of Standards for | | |

| | | |
|---|---|---|
| Asset Protection Zones (RFS,2005) | | |
| Location of APZs on slopes >18 is not supported for new development on wooded vegetation due to environmental constraints and difficulties in management. In addition, vegetation could carry a canopy fire without the support of understorey fuel | | |
| (p.71) Retention of taller trees will assist in filtering out embers | | |
| Tree canopy is not contiguous | | |

Standards for Asset Protection Zones

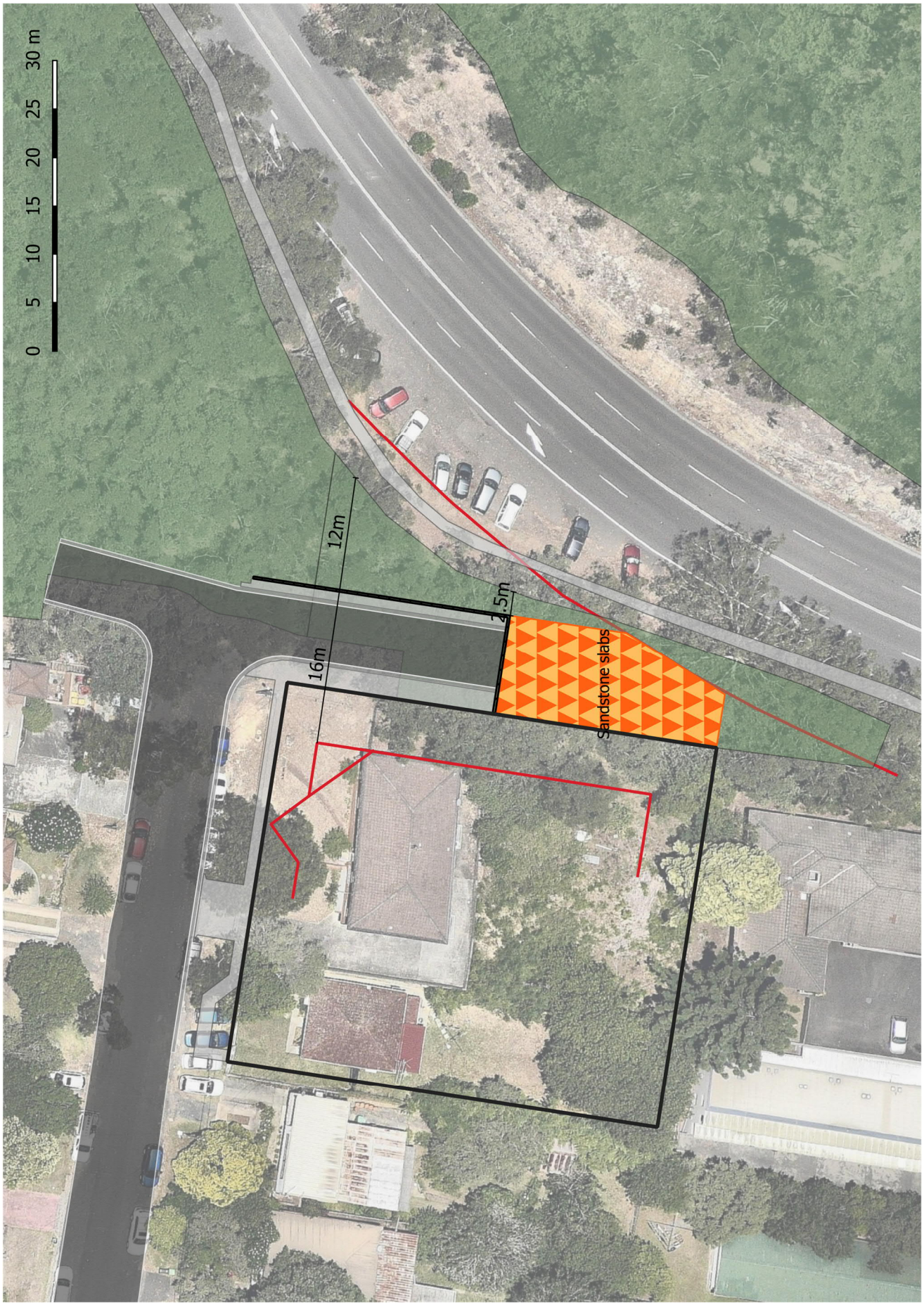
| Asset Protection Zone | Inner Protection Area | Outer Protection Area |
|---|---|---|
| APZ is a fuel reduced area surrounding a built asset or structure | | |
| APZ should be wholly located within your land | | |
| Fallen ground fuels <6mm dia and bark should be removed on a regular basis | | |
| Grasses need to be kept short and where possible green | | |
| Separate tree crowns by 2-5m | | |
| Canopy should not overhang within 2-5m of a dwelling | | |
| Native trees and shrubs should be retained as clumps or islands and should maintain a covering of <20% of the area. | | |
| Ensure there is no contiguous fuel path to the dwelling | | |
| Fire trails, gravel paths, rows of trees, dams, creeks, swimming pools, tennis courts, and vegetable gardens are permitted in an APZ | | |

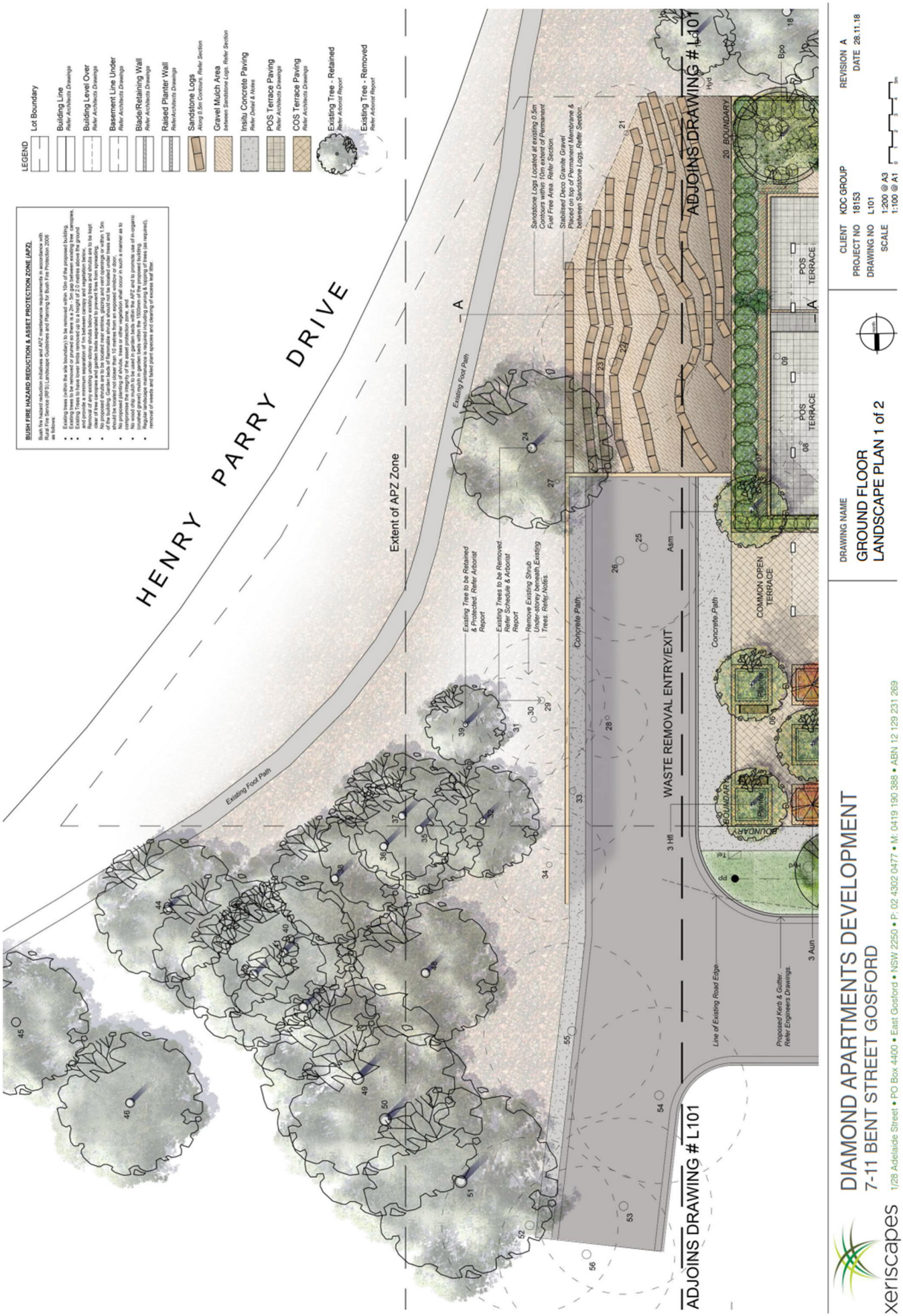
# Appendix C – Site photos

View of vegetation in the crown land to the northeast

View north along path adjacent of Henry Parry Drive.  Site is to the left

# Appendix D – Gutrude St landscaping and access design




LEGEND
Lot Boundary
Building Line
Refer Architects Drawings
Building Level Over
Refer Architects Drawings
Basement Line Under
Refer Architects Drawings
Blade/Retaining Wall
Refer Architects Drawings
Raised Planter Wall
Refer Architects Drawings
Sandstone Logs
Along 0.5m Contours, Refer Section
Gravel Mulch Area
between Sandstone Logs, Refer Section
Insitu Concrete Paving
Refer Detail & Notes
POS Terrace Paving
Refer Architects Drawings
COS Terrace Paving
Refer Architects Drawings
Existing Tree - Retained
Refer Arborist Report
Existing Tree - Removed
Refer Arborist Report
BUSH FIRE HAZARD REDUCTION & ASSET PROTECTION ZONE (APZ)
HENRY PARRY DRIVE
Extent of APZ Zone
Existing Foot Path
Existing Tree to be Retained & Protected. Refer Arborist Report
Existing Trees to be Removed Refer Schedule & Arborist Report
Remove Existing Shrub Under-storey beneath Existing Trees. Refer Notes.
Concrete Path
WASTE REMOVAL ENTRY/EXIT
Line of Existing Road Edge
Proposed Kerb & Gutter. Refer Engineers Drawings.
ADJOINS DRAWING # L101
COMMON OPEN TERRACE
POS TERRACE
BOUNDARY
Sandstone Logs Located at existing 0.5m Contours within 10m extent of Permanent Fuel Free Area. Refer Section.
Stabilised Deco Granite Gravel Placed on top of Permanent Membrane & between Sandstone Logs. Refer Section.
DRAWING NAME
GROUND FLOOR LANDSCAPE PLAN 1 of 2
CLIENT KDC GROUP
PROJECT NO 18153
DRAWING NO L101
SCALE 1:200 @ A3 1:100 @ A1
REVISION A
DATE 28.11.18
xeriscapes
DIAMOND APARTMENTS DEVELOPMENT
7-11 BENT STREET GOSFORD
1/28 Adelaide Street • PO Box 4400 • East Gosford • NSW 2250 • P: 02 4302 0477 • M: 0419 190 388 • ABN 12 129 231 269