Bushfire Protection Assessment - Marsden Park New Primary School

Schools Infrastructure NSW (SINSW)

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1. Property and proposal

Table 1: Subject site summary

Street address or property name:	Northbourne Drive		
Suburb, town or locality:	Marsden Park	Postcode:	2765
Lot/DP no:	Lot 2889 DP 1230906		
Local Government Area:	Blacktown City Council		
Zoning:	R2 – Low Density Residential		
Type of development:	Special Fire Protection Purposes (SFPP)		

1.1 Introduction

This bushfire protection assessment has been prepared by Eco Logical Australia Pty Ltd on behalf of Schools Infrastructure NSW (SINSW) (the Applicant). It accompanies an Environmental Impact Statement (EIS) in support of State Significant Development Application (SSD-9809) for the Marsden Park New Primary School at the corner of Northbourne Drive (to the east) and a proposed future road (to the north) within the Elara Estate, Marsden Park (the site). The site is legally described as Lot 2889 in Deposited Plan 1230906. The development footprint does not include a portion of the site to the west as this is reserved for a future alternative use.

1.2 Description of proposal

The Marsden Park New Primary School will cater for 1,000 primary school students at completion. The proposal seeks consent for:

- Construction Stage 1 (Temporary School): a temporary school facility constructed within the western portion of the development site located on the future sports grounds. This temporary school facility is to accommodate a maximum of 500 students at any given time. Should the permanent school progress as per the program, the temporary school will not be required.
- Construction Stage 2 (Construction of Permanent School Facility): a permanent consolidated two storey courtyard building with capacity to accommodate a maximum of 1,000 students. This new school building is to comprise
  - 40 teaching spaces;
  - A canteen;
  - Library;
  - Multipurpose hall;
  - Office and administration space;
  - Staff and student amenities; and
  - Out of school hours care accommodation.
- Multi-purpose sporting facilities and outdoor play spaces;
- Associated site landscaping and public domain improvements;
- An on-site car park and a drop-off and pick-up area; and
- Construction of ancillary infrastructure and utilities as required.

1.3 Assessment process

Being a Special Fire Protection Purpose (SFPP) development, the development proposal was assessed in accord with 'Planning for Bush Fire Protection 2006' (RFS 2006), herein referred to as PBP as per the Planning Secretary's Environmental Assessment Requirements SEARs (SSD 9809). See **Appendix A** for a summary of the assessment process.

Additionally, a performance-based solution was developed using the Pre-Release version of Planning for Bush Fire Protection 2018 (PBP 2018) to determine the Asset Protection Zones (APZ).

This desktop assessment included a review of background documentation, design team consultation and GIS analysis.

This assessment was prepared by ELA Bushfire Consultant Natalie South, with quality assurance by Bruce Horkings (FPAA BPAD-A Certified Practitioner No. BPAD29962-L3). Bruce is recognised by the NSW Rural Fire Service as a qualified bushfire consultant in bushfire risk assessment (Level 3).

Table 2 identifies the bushfire protection measures assessed and whether these involved acceptable or performance solutions.

Table 2: Summary of bushfire protection measures assessed

Bushfire Protection Measure	Acceptable Solution	Performance Solution	Report Section
Asset Protection Zones	☐	☑	3.1
Construction standard	☑	☐	3.3
Access	☑	☑	3.4
Water supply	☑	☐	3.5
Gas and electrical supplies	☑	☐	3.5

1.4 Bush fire prone land status

Whilst the Blacktown City Council Bush Fire Prone Land (BFPL) map does not identify the subject land as bush fire prone, BFPL mapping is intended as a planning trigger rather than definitive mapping of bushfire hazards. As shown in **Figure 2**, the subject land is within 50 m of the grassland to the north. This grassland has potential to sustain a bushfire and is considered a bushfire hazard in its current state. As future development occurs, this hazard will be removed, and the subject land will not be considered as BFPL.

Figure 1: Subdivision layout

2. Bushfire threat assessment

Figure 2 shows the effective slope and predominant vegetation on transect lines representing the highest bushfire threat potentially posed to the subdivision from various directions.

The effective slope has been determined from 2 m contour data and the predominant vegetation has been determined from Nearmap imagery dated 7 April 2019.

The bushfire hazard identified to the north is defined as 'grassland' under PBP however as this area is designated for future residential development, the hazard is considered temporary in nature and will be removed in the near future as bulk earthworks occur for ongoing development. The effective slope under this temporary hazard falls into the PBP slope category of '>0-5 degrees downslope'.

In all other directions, there are managed lands in the form of land cleared for future development and road reserves.

Figure 2 and **Table 3** show the vegetation and slope information assessed. Where required additional information is provided within **Table 3** on why and how the chosen slope and vegetation has been calculated.

The site is located within the Local Government Area (LGA) of Blacktown City Council and has a Fire Danger Index (FDI) of 100.

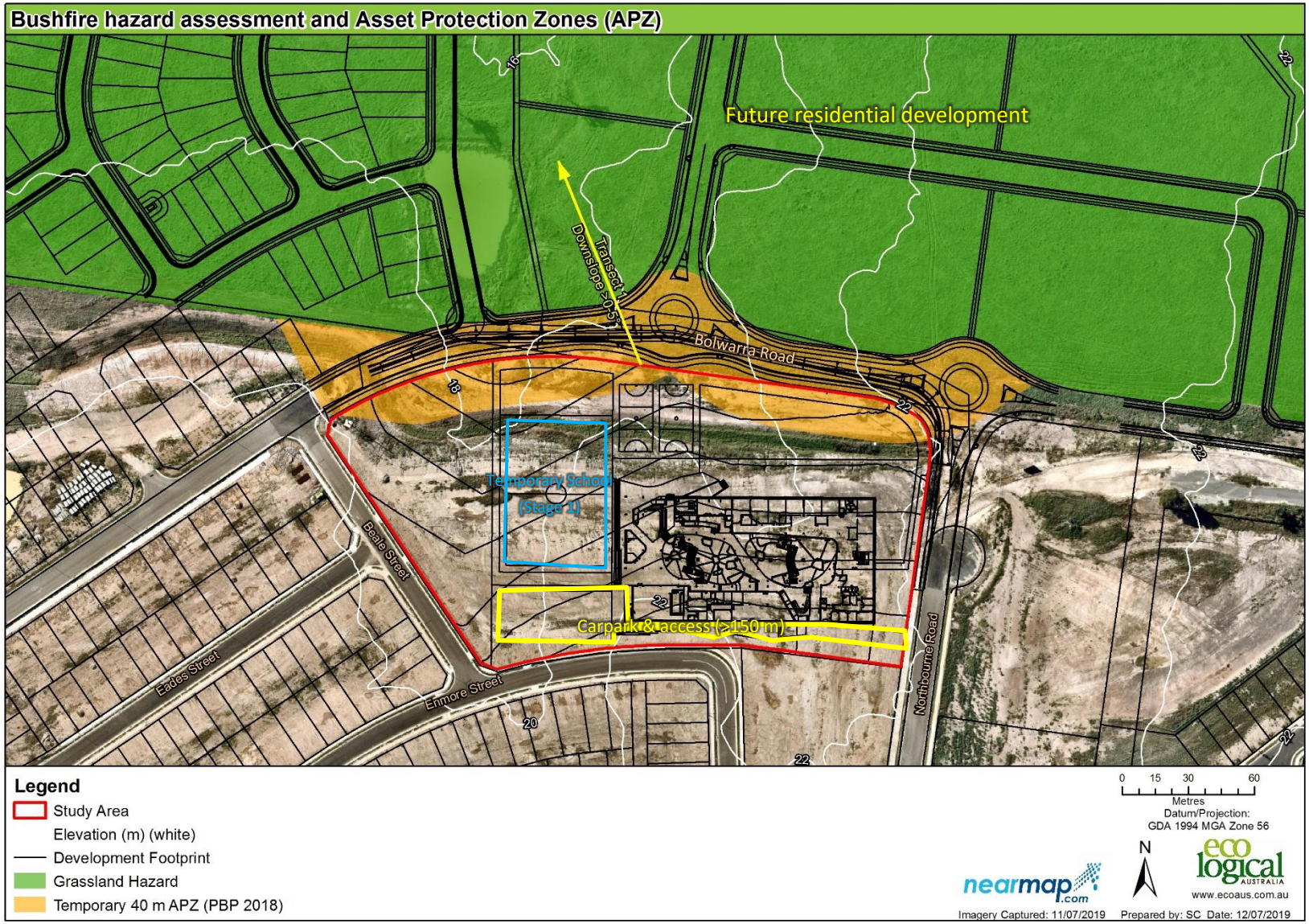

Figure 2: Bushfire hazard assessment and Asset Protection Zones (APZ)

3. Bushfire protection measures

3.1 Asset Protection Zones (APZ)

Special Fire Protection Purpose (SFPP) developments are required to achieve the APZ performance criteria of '*radiant heat levels not greater than 10kW/m^2 to be experienced by occupants or emergency services workers entering or exiting the building'.* This has been achieved using the acceptable solution APZ dimension found in Table A1.12.1 of PBP 2018 (see **Table 3**).

Table 3 shows the dimensions of the temporary APZ required and where relevant, information on how is to be provided. The footprint of the required temporary APZ is also shown in **Figure 2**. As the surrounding land is developed and the vegetation hazard removed, the identified temporary APZ requirements can be removed.

Part of the temporary APZ is provided by Bolwarra Drive which will commence construction shortly.

3.2 APZ maintenance plan

Where the temporary APZ is to be established within the subject land, it is to be managed to Inner Protection Area standards as follows:

- No tree or tree canopy is to occur within 2 m of the future building rooflines;
- The presence of a few shrubs or trees in the APZ is acceptable provided they:
  - Are well spread out and do not form a continuous canopy;
  - Are not species that retain dead material or deposit excessive quantities of ground fuel in a short period or in a danger period; and
  - Are located far enough away from the building so that they will not ignite future buildings by direct flame contact or radiant heat emission.
- Any landscaping or plantings should preferably be local endemic mesic species or other low flammability species;
- A minimal ground fuel is to be maintained to include less than 4 tonnes per hectare of fine fuel (fine fuel means ANY dead or living vegetation of <6 mm in diameter e.g. twigs less than a pencil in thickness. 4 t/ha is equivalent to a 1 cm thick layer of leaf litter); and
- Any structures storing combustible materials such as firewood (e.g. sheds) must be sealed to prevent entry of burning debris.

Further details on APZ implementation and management can be found on the NSW RFS website including:

https://www.rfs.nsw.gov.au/__data/assets/pdf_file/0010/13321/Standards-for-Asset-Protection-Zones.pdf.

Table 3: Bushfire hazard assessment and APZ requirements

Direction from development boundary	Transect	Slope[1]	Vegetation[2]	PBP required APZ (PBP 2018)[3]	Available APZ	Comment
North	1	Downslope >0 to 5 degrees	Grassland	40 m	≥40 m	Temporary APZ provided by proposed Bolwarra Road and managed lands within the subject land.

[1] Slope most significantly influencing the fire behaviour of the site having regard to vegetation found. Slope classes are according to PBP.

[2] Predominant vegetation is identified, according to PBP and "Where a mix of vegetation types exist the type providing the greater hazard is said to be predominate".

[3] Assessment according to table A1.12.1 of PBP (2018).

3.3 Construction standard

The building construction standard is based on the determination of the Bushfire Attack Level (BAL) in accordance with Method 1 of AS 3959-2009 'Construction of buildings in bushfire-prone areas'. The BAL is based on known vegetation type, effective slope and managed separation distance between the development and the bushfire hazard.

As demonstrated in **Figure 2** a maximum of **BAL-12.5** is attained for the proposed development. If the current hazard is removed prior to the construction of these buildings, BAL-LOW will apply.

It is important that the most recent and current version of AS 3959-2009 is consulted. Additionally, the ember proofing measures as outlined in PBP (within the 2010 Appendix 3 Addendum) are to be implemented as applicable to the proposed development.

3.4 Access

The proposed development is a staged construction with temporary access for Stage 1 provided off Enmore Street. Once construction of Stage 2 has commenced, the development will be accessed via a proposed driveway off Northbourne Drive. The access is capable of complying with all of the PBP design specifications outlined in **Table 4** aside from the requirement for a dead-end road to be less than 100 m in length.

The relevant PBP performance criterion for internal roads less than 100 m in length is as follows:

> *"internal road widths and design enable safe access for emergency services and allow crews to work with equipment about the vehicle."*

The following attributes of the site are considered adequate to meet this performance criterion:

1. The 150 m access road does not traverse a hazard, is on relatively level ground through managed lands and greater than 100 m from the bushfire hazard, therefore unlikely to be cut in the event of bushfire;

2. The hazard to the north is temporary only, once development of this area commences the proposed development will be surrounded entirely by managed land;

3. Furthermore, travelling at only 20 kph, which is a considerably conservative speed even considering the smoke hazards associated with a bushfire in the vicinity, would take less than 30 seconds to travel from the carpark to Northbourne Road.

To comply with the performance criteria of **Table 4** the proposed development will be required to incorporate a turning circle with a minimum 12 m outer radius within the carpark (See **Appendix B**).

It is recommended secondary access be provided from the proposed carpark onto Enmore Street that could be used for emergency access/egress.

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Table 4: Performance criteria for internal roads

Performance Criteria	Acceptable solutions	Complies
The intent may be achieved where:		
• internal road widths and design enable safe access for emergency services and allow crews to work with equipment about the vehicle.	• internal roads are two-wheel drive, sealed, all-weather roads;	Complies
	• internal perimeter roads are provided with at least two traffic lane widths (carriageway 8 metres minimum kerb to kerb) and shoulders on each side, allowing traffic to pass in opposite directions;	N/A – not internal perimeter road required for development.
	• roads are through roads. Dead end roads are not more than 100 metres in length from a through road, incorporate a minimum 12 metres outer radius turning circle, and are clearly sign posted as a dead end;	Refer Performance solution in Section 3.4.
	• traffic management devices are constructed to facilitate access by emergency services vehicles.	Can comply
	• a minimum vertical clearance of four metres to any overhanging obstructions, including tree branches, is provided.	Can comply
	• curves have a minimum inner radius of six metres and are minimal in number to allow for rapid access and egress.	Can comply
	• the minimum distance between inner and outer curves is six metres.	Can comply
	• maximum grades do not exceed 15 degrees and average grades are not more than 10 degrees.	Can comply
	• crossfall of the pavement is not more than 10 degrees.	Can comply
	• roads do not traverse through a wetland or other land potentially subject to periodic inundation (other than flood or storm surge).	Complies
	• roads are clearly sign-posted and bridges clearly indicate load ratings.	Can comply
	• the internal road surfaces and bridges have a capacity to carry fully-loaded firefighting vehicles (15 tonnes).	Can comply

3.5 Services – Water, electricity and gas

3.5.1 Water

The proposal will be serviced by a reticulated water supply. **Table 5** identifies the acceptable solution requirements of Section 4.2.7 of PBP for which the proposal is compliant with, subject to the following specifications:

Table 5: Performance criteria for reticulated water supplies (PBP page 37)

Performance Criteria	Acceptable Solutions	complies
The intent may be achieved where:		
• water supplies are easily accessible and located at regular intervals	• access points for reticulated water supply to SFPP developments incorporate a ring main system for all internal roads.	Can comply
	• fire hydrant spacing, sizing and pressures comply with AS 2419.1 – 2005. Where this cannot be met, the RFS will require a test report of the water pressures anticipated by the relevant water supply authority. In such cases, the location, number and sizing of hydrants shall be determined using fire engineering principles.	Can comply
	• the provisions of public roads in section 4.1.3 in relation to parking are met.	Can comply

3.5.2 Electricity services

Electricity supply to the subject land is located underground and therefore complies with Section 4.2.7 of PBP.

3.5.3 Gas services

Gas services (reticulated or bottle gas) are compliant with Section 4.2.7 of PBP, subject to the following specifications:

- Any gas services are to be installed and maintained in accordance with Australian Standard AS/NZS 1596 *The storage and handling of LP Gas* (SA 2014). Metal piping is to be used;
- All fixed gas cylinders are kept clear of all flammable materials to a distance of 10 metres and shielded on the hazard side of the installation;
- If gas cylinders need to be kept close to the building, the release valves are directed away from the building and at least 2 metres away from any combustible material, so that they do not act as a catalyst to combustion. Connections to and from gas cylinders are metal; and
- Polymer sheathed flexible gas supply lines to gas meters adjacent to buildings are not used.

4. Emergency and Evacuation Planning

The preparation of bushfire emergency procedures is the responsibility of SINSW. As such, an emergency/evacuation plan is required consistent with the NSW Rural Fire Service 'Guide to developing a Bush Fire Emergency Management and Evacuation Plan' (RFS 2014).

A template for an Emergency Management and Evacuation Plan is available on the NSW Rural Fire Service website http://www.rfs.nsw.gov.au/__data/assets/pdf_file/0003/29271/Bush-Fire-Emergency-Management-and-Evacuation-Plan.pdf

5. Assessment of environmental issues

An assessment of significant environmental features, threatened species or Aboriginal relics identified under the *Biodiversity Conservation Act 2016* or the *National Parks Act 1974* that will affect or be affected by the bushfire protection proposals in this report has not been undertaken as it is covered by other parts of the DA process. However, site impacts have been minimised by carefully selected bushfire protection measures. The impact footprint of these measures e.g. APZ is clearly identified within this report and therefore capable of being clearly assessed by suitably qualified persons as required.

The Department of Planning Industry and Environment is the determining authority for this development; they will assess more thoroughly any potential environmental and heritage issues.

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6. Conclusion

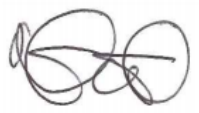
The proposed development complies with either the acceptable solutions or performance criteria within 'Planning for Bush Fire Protection 2006', (see **Table 2**).

Table 6: Summary of bushfire mitigation measures

Bushfire Mitigation Measures	Complies	Requirements	Acceptable Solution	Performance Solution	Report Section
Asset Protection Zones	☑	APZ dimensions are detailed in **Table 3** and **Figure 2**.	☐	☑	3.1
APZ Maintenance plan	☑	Identified APZ of 40 m to be maintained in perpetuity to the detailed specifications in **Section 3.2**.	☑	☐	3.2
Construction standard	☑	Minimum SFPP requirement of BAL-12.5 construction is achieved by the proposed development.	☑	☐	3.3
Access	☑	Access to meet standards detailed in **Table 4**. A performance solution (Section 3.4) addresses the requirement for dead end road less than 100 m long. The proposed development will be required to incorporate a turning circle with a minimum 12 m outer radius within the carpark.	☑	☑	3.4
Water supply	☑	Reticulated water supply to meet PBP acceptable solution specifications for a subdivision.	☑	☐	3.5.1
Electricity service	☑	Electricity supply located underground.	☑	☐	3.5.2
Gas service	☑	Gas services are to be installed and maintained in accordance with AS/NZS 1596:2014.	☑	☐	3.5.3
Evacuation and Emergency Response Plan	☑	An Evacuation and Emergency Response Plan compliant with the requirements of the NSW RFS guidelines is required prior to occupation.	☑	☐	4

7. Recommendations

It is recommended that the Special Fire Protection Purpose development be approved.



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8. References

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Standards Australia (SA). 2009. Construction of buildings in bushfire-prone areas (including Amendments 1 – 3), AS 3959-2009. SAI Global, Sydney.

Standards Australia (SA). 2014. *The storage and handling of LP Gas*, AS/NZS 1596:2014. SAI Global, Sydney.

Standards Australia (SA). 2017. *Fire hydrant installations - System design, installation and commissioning*, AS 2419.1, Fifth edition 2017, SAI Global, Sydney.

Appendix A – Assessment process

Vegetation types

In accord with PBP the predominant vegetation class has been assessed for a distance of at least 140 m from the subject land in all directions.

Effective slope

In accord with PBP, the slope that would most significantly influence fire behaviour was determined over a distance of 100 m from the boundary of the proposed development where the vegetation was found.

Asset Protection Zone determination

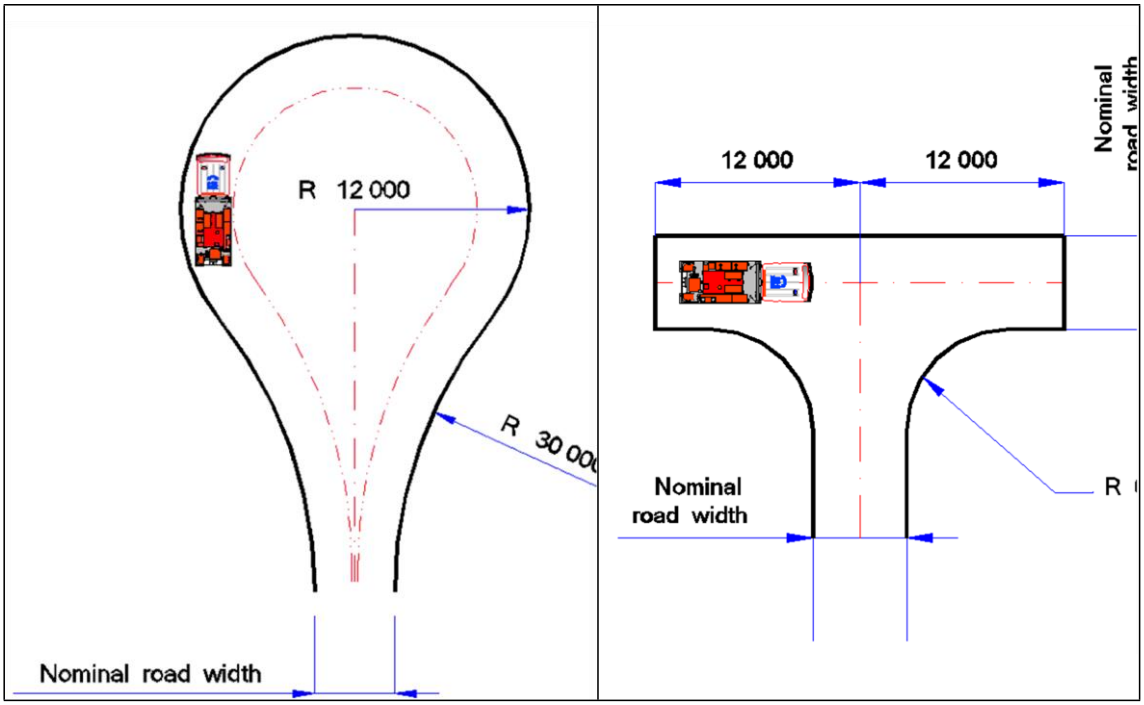
A performance solution using Table A1.12.1 of PBP 2018 has been used to determine the width of required Asset Protection Zone (APZ) for the proposed development using the vegetation and slope data identified in **Section 2**.

Special Fire Protection Purpose

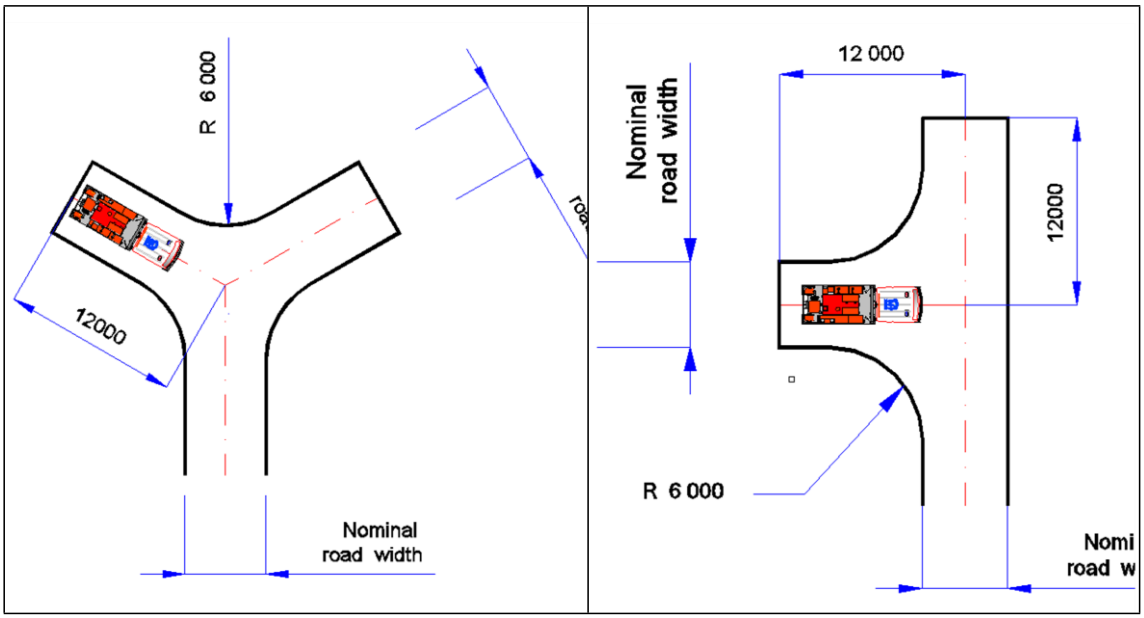
In accord with PBP, the proposed SFPP has been assessed in accordance with section 4.2.7 for Special Fire Protection Purpose (SFPP) developments.

Appendix B - Vehicle Turning Requirements.

The RFS requires that any dead ends should be provided with a turn-around area which preferably avoids multipoint turns. The minimum turning radius should be no less than the respective outer radius given in Type A. Where multipoint turning is proposed the RFS will consider the following types:



Type A *Type B*



Type C *Type D*

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