



AUS-SPEC

Infrastructure Specifications

0013 Bushfire Protection (Design)



0013 BUSHFIRE PROTECTION (DESIGN)

IMPORTANT: This document has been adapted from the NATSPEC suite of specification templates for use in the MidCoast Council area by both Council and industry. NATSPEC regularly updates the base templates (currently in April and October each year), and Council may incorporate changes into its version of AUS-SPEC from time to time. To assist in highlighting any changes made by Council to the NATSPEC templates, the following conventions are used.

- See ANNEXURE M at the end of this document which contains (where practical) MidCoast Council customisations (also known as 'office master' text). References to the Annexure are to also be inserted at relevant clauses in the main body of the document.
- Where content is added to the main body of the document, it is to be shown **in brown text like this**.
- Where content is deleted or excluded from the main body of the document, it is to be shown ~~struck through like this~~. Such clauses are to have no effect.

Where there is a conflict between main body text and MidCoast Council specific clauses, Council's specific clauses shall prevail.

1 GENERAL

1.1 INTRODUCTION

Worksection application

This worksection is applicable to the design and documentation requirements for bushfire protection facilities for urban and rural subdivisions.

1.2 RESPONSIBILITIES

General

Requirement: Provide design and documentation for subdivision road layouts and bushfire protection zones on bushfire prone land to the requirements of **NSW legislation, Rural Fire Service Planning for Bushfire Protection, and MidCoast Council specifications**.

1.3 CROSS REFERENCES

General

Requirement: This is not a self-contained document, conform to the following worksections:

- 0010 Quality requirements for design.
- **0281 Fire access and fire trails**.
- **NSW Rural Fire Service – Planning for Bushfire Protection**

1.4 INTERPRETATION

Definitions

General: For the purposes of this worksection the following definitions apply:

- Asset protection zone (APZ)/Defendable space: A fuel-reduced area surrounding a built asset or structure which provides a buffer zone between a bushfire hazard and an asset. The APZ includes a defendable space within which firefighting operations can be carried out. The size of the required asset protection zone varies with slope, vegetation and Fire Danger Index (FDI).
- Bushfire attack levels (BAL): A method of measuring a site's potential exposure to ember attack, radiant heat and direct flame contact as defined in AS 3959. It takes into consideration Fire danger index (FDI), the slope of the land, types of surrounding vegetation and the site's proximity to any building.
- Bushfire prone area: An area declared as likely to be subject to bushfire attack by the local council or a state government.
- Crossfall drainage: Drainage which occurs when the surface of a track has sufficient cross slope to cause water to flow across and off the surface, rather than along it. Stormwater drainage for unsealed tracks can be classified as follows:
 - . Crown: Where water sheds from both sides.

- . Infall: Where water flows into the hillside.
- . Outfall: Where flow is away from the hillside.
- Defendable space: An area adjoining an asset that is managed to reduce combustible elements and is free from constructed impediments. It is a safe working environment in which active firefighting can be undertaken to defend the structure, before and after the passage of a bushfire.
- Emergency access way: Access used to connect roads and provide alternative access and egress during emergencies where the traffic flow design does not allow two-way access.
- Fire access route: A designated route established to separate bushfire hazard areas from developed areas and to provide access within and around the edge of the subdivision. It may be used during firefighting but may also be used for fire prevention.
- Fire access track: A track constructed and/or maintained expressly for fire management purposes.
- Fire trail: A trail constructed to ensure firefighters can access fires and safely contain them. They are also used to assist with management of bush fire risk across the landscape and for the protection of the community and its assets.
- Fire break: A gap in vegetation or other combustible material (or fuel) that acts as a barrier to slow or stop the progress of a bushfire. A fire break may also serve as a public road.
- Perimeter roads: Part of the asset protection zone. They provide a separation between the building and the bushfire hazard by acting as a wide, permanent and low maintenance fire break.
- Property access: Access from a public road system to private land and habitable buildings for firefighting.
- Public roads: Includes the perimeter road and internal road system of any urban or rural subdivision.
- Setback: The distance required, through planning provisions, to separate a building from the bushfire hazard, street frontage or adjacent buildings or property boundary.
- State fire authority: An organisation authorised to manage fire and emergency services within a state. It is also responsible for providing development guidelines and controls in bushfire prone land for that state.

2 PRE-DESIGN PLANNING

2.1 PLANNING

Site hazard assessment

Hazard assessment method: Determine the site hazard and associated requirements using the following assessment process:

- Area to be assessed: Determine the area to be assessed, including all land within 100 to 150 m (outside) of lot boundary or within 100 to 150 m of vegetation change, where vegetation is not homogenous.
- Classification criteria: Assess site hazard to AS 3959, using the following criteria:
 - . Classification and location of vegetation.
 - . Distance from classified vegetation.
 - . Effective slope under the classified vegetation.
- Determine the asset protection zone and bushfire attack level (BAL).
- Determine the appropriate construction requirements.

Bushfire attack level: To AS 3959.

2.2 CONSULTATION

Council and other authorities

Council consultation: Liaise with the Council's officer(s) for the following:

- Roads and traffic management.
- Landscaping.
- Stormwater drainage.
- Subdivision and planning.
- **Public land (including managed crown land) under care or control of Council.**

State fire authorities: Consult the state fire authorities, relevant to the location of the subdivision, to confirm planning requirements for bushfire prone areas:

- NSW: NSW Rural Fire Service www.rfs.nsw.gov.au

Other authorities: Consult with and seek approval for the subdivision design from the following state government authorities:

- Department of Industry (Crown Lands) for any work within crown land or a crown road reserve.
- Transport for NSW (formerly Roads and Maritime Services) for any work within classified (State or Regional) roads.
- Other State authorities or utilities that own, have care or control of land or easements affected by proposed bushfire protection works or changes to vegetation.

Public consultation

Public engagement: Once a basic scheme has been developed, undertake public consultation to the Council’s requirements.

Utilities services plans

Existing services in the development area/precinct: Liaise with the utility authorities affected by the subdivision design and if required, obtain service plans from the authorities of the proposed development area for above ground and below ground services.

3 DESIGN CRITERIA

3.1 GENERAL

Design objective

Requirement: Incorporate requirements for minimising bushfire hazards in the development design. The requirements are applicable to rural and urban developments in bushfire prone areas.

3.2 ACCESS ROADS

Requirements

Fire access tracks: If a subdivision abuts bushland in a bushfire prone area, locate fire access tracks/perimeter roads designed to 0041 Geometric sealed road design worksection (for urban areas) or fire access tracks (for rural areas) immediately between the created allotment and the bushland. In accordance with PBP, fire access tracks or trails are not to be used on the perimeter of urban areas.

Property access: Provide at least one alternative property access road for developments that are located more than 200 m from a public through road. See Clause M4.

Road reservations and easements: Provide as follows:

- Road or easement width: See Clause M5.
- Access to road reservation or easement: Provide access to the road reservation or easement from the local road system at regular intervals, in a system of loops. If an easement is created, do not fence to allow free access as if a public road.

Site conditions: When laying out facilities, include vegetation classifications and ground slope effects to AS 3959.

Fire hydrants: If the subdivisions have reticulated water, locate fire hydrants at appropriate intervals or near potential fire hazard areas to AS 2419.1 or as determined by the Council. Provide posts to indicate the location of reticulated water supply.

Mapping: Determine asset protection zones, fire access tracks, erosion control features and revegetation requirements.

Access requirements table

Access type	Minimum trafficable surface (m)	Horizontal clearance (m)	Vertical clearance (m)	Minimum weight capacity	Maximum grades	Maximum grades < 50 m	Maximum average grade	Maximum crossfall	Minimum inner and outer radii (m)
Fire access track ¹ (road)	6	6	4	15 tonnes	To Fire access track design.				

Access type	Minimum trafficable surface (m)	Horizontal clearance (m)	Vertical clearance (m)	Minimum weight capacity	Maximum grades	Maximum grades < 50 m	Maximum average grade	Maximum crossfall	Minimum inner and outer radii (m)
Public road	6 ⁶ 8 if perimeter road	6	4	15 tonnes	1V:8H	1V:5H	1V:7H	1V:33H	To Planning for Bushfire Protection
Emergency access way ²	6	6	4	15 tonnes	1V:8H	1V:5H	1V:7H	1V:33H	
Fire access route ³	6	6	4	15 tonnes	1V:7H	1V:4H	1V:5H	1V:33H	
Cul-de-sac ⁴ ⁷ (road)	6	6	4	15 tonnes	1V:8H	1V:5H	1V:7H	1V:33H	
Battle axe ⁵ (road)	4	6	-4	15 tonnes	1V:8H	1V:5H	1V:7H	1V:33H	
Notes:									
1 The requirements may vary depending on site hazard classification and state variations.									
2 Allow for signpost in compliance with requirements by Council and the Rural Fire Service.									
3 No dead end permitted and access surface is to be all weather.									
4 Maximum length = 200 m.									
5 Maximum length = 600 m, minimum width = 6 m.									
6 Where the distance of the most external part of the proposed building to the nearest hydrant is greater than 70 m.									
7 As part of DA approval, the consent authority (and / or RFS if referral is required) may accept down to an absolute minimum 8.5m outer turn radius for the turning head of cul-de-sacs. An outer radius less than 12m must demonstrate a truck can safely make a 3-point turn using only the carriageway (show swept paths for a Medium Rigid 8.8m vehicle).									

Internal access from perimeter road

As per Access requirements table above.

Subdivision design: Provide internal access incorporating the following requirements in the subdivision design:

- Width, vertical clearances, dips and crests: To allow two-way movement of firefighting appliances.
- Road surfaces and bridges carrying capacity:
 - 15 tonnes in reticulated areas.
 - 28 tonnes or 9 tonnes per axle in non-reticulated areas.
- Curves:
 - Number: Minimise.
 - Minimum inner radius: 6 m.
- Sealed roads:
 - Maximum grade: 15% (1V:7H).
 - Maximum average grade: 10% (1V:10H).
- Clearly signpost roads.
- Dead end roads:
 - Maximum road length: 100 m.
 - Turning circle: 12 m outer radius at the head.
- Wetland or subject to periodic inundation (other than a flood or storm surge): Do not traverse.

~~— Parking bays: Minimum 2.6 m wide from kerb edge to the road pavement.~~

Fire access track design

Requirement: Plan tracks to the following requirements:

- Form: Gradient of 1 to 4% and following the land contour.
- Drainage: Provide so that track is trafficable under all weather conditions.
- Crossfall: Maximum 4% generally and 10%, if evidence can be provided that 4% is not achievable.
- Widening: Provide as required by PBP for fire vehicle passing.

Location: Locate track as follows:

- Do not locate: Along the centre of a valley or at the centre of an overland flow path.
- Flood level: Above the 1 in 2 year flood level and above the low bank of streams.
- Waterways: Avoid disturbing riparian zones and use the vegetation as a buffer zone (between track and stream). Allow for a minimum width of 30 m or the width of the stream (whichever is the lesser) between the stream and track.

Unsealed track drainage

Requirement: Design track so that stormwater sheds from the track at regular intervals into a sediment trap or is released as sheet flow into adjacent grassland or bushland via a level spreader. Provide drainage as follows:

- Outfall: Do not use when the following conditions exist:
 - . Where down-slope fill batters are unconsolidated and likely to erode.
 - . Where down-slope fill batters exceed 1.5 m in height.
 - . Where maintenance procedures are likely to create earth windrows along the outside edge of the track.
 - . Where runoff is sediment laden.
- Infall: Provide where the outer road embankment is of unstable or poor soils and where it is unsuitable to use outfall drainage.
- Crown: Provide where the track is a permanent road with high traffic volume or where constructed along a ridge.

Tracks following fence lines: If located on a long, steep slope, deviate track every 60 to 80 m to divert runoff at regular intervals.

Elevation: Allow regular rise and fall so that stormwater will drain from the track at regular intervals.

3.3 ASSET PROTECTION ZONES/DEFENDABLE SPACE (APZ)

Requirements

Defendable space: Provide an appropriate defendable space based on the size of the development. Keep the defendable space free from vegetation, combustible items or obstructions.

Primary purpose: Design the APZ to provide progressive reduction of fuel, and to reduce potential radiant heat levels, and flame, ember and smoke attacks between the bushfire hazard and the buildings.

Secondary purpose: Design the APZ to provide the following:

- Maximum separation between high intensity fire and any building, to reduce heat radiation and direct flame contact.
- An area free of combustible material where embers can fall, to minimise further fire outbreaks.
- Safe access to a building for firefighters by reducing the heat level from the main fire.
- Safe retreat for firefighters.
- A clear control line from which back burning or hazard reduction operations can begin.

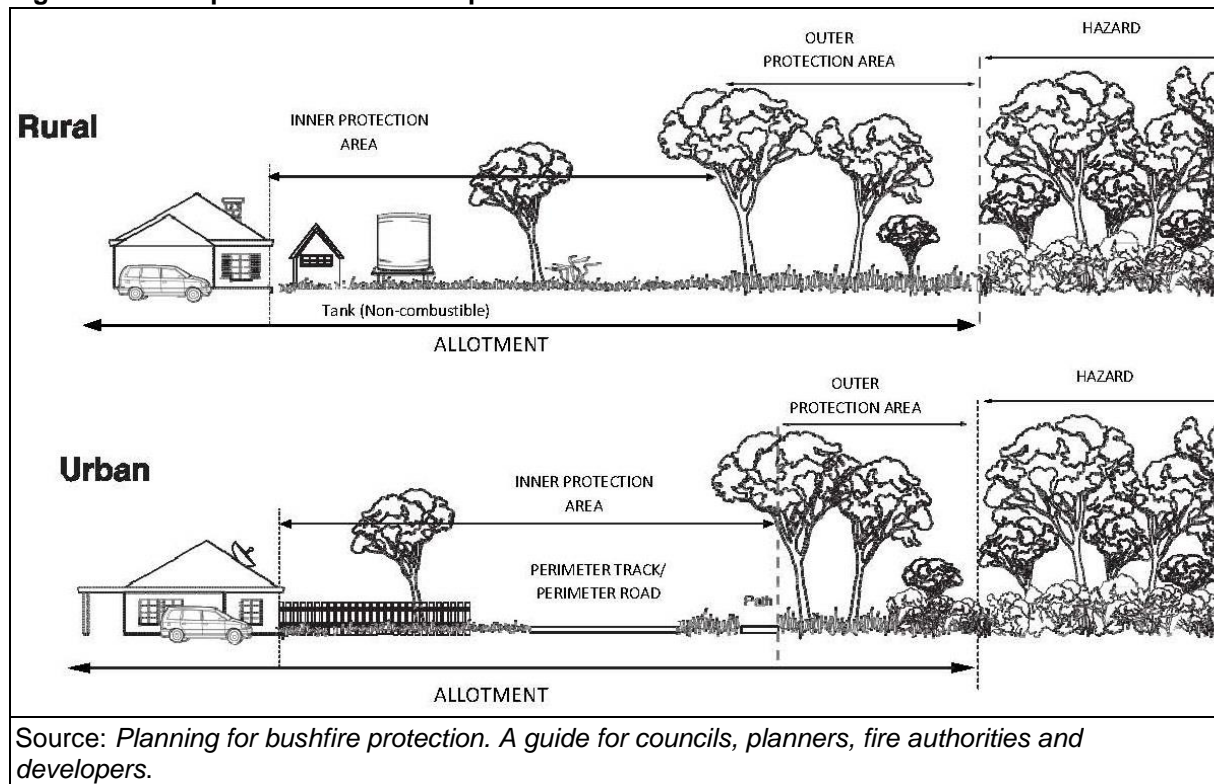
Subdivision design: As part of the subdivision planning, provide an APZ for any development fronting a bushfire hazard area, to act as a buffer zone between the development and the fuel comprising:

- Outer Protection Area.
- Inner Protection Area incorporating the following:
 - . A perimeter road or reserve (which incorporates an access track).
 - . A setback (currently defined by minimum lot depths), which is usually part of the allotment.

Allotment design: For each individual allotment, allow adequate space for the main building (usually a dwelling), an area of open space and the APZ (which may include part of the allotment open space and/or the neighbouring allotment). Figure 3.1 illustrates a typical APZ.

Vegetation: Provide vegetation control plans to minimise fuel loads.

Figure 3.1: Components of an asset protection zone



Firefighting: If fires are fought from the property and not along the fire access track, provide access to a public road from the property for emergency and other vehicles at all times.

3.4 OUTER PROTECTION AREA (OPA)

Planning

Location: Adjacent to the hazard or unmodified fuel source.

Objective: Conform to the following objectives:

- Fire behaviour control: To moderate fire behaviour coming from an unmodified fuel source and to reduce radiant heat on a building.
- Flame and ember attack: To draw the fire out of the canopy to a level where ember attack and flame contact with the building is reduced.

Width of OPA: To PBP requirements.

Fuel loadings

Reduction: Reduce fuel loadings by thinning vegetation, mechanical clearing, hazard reduction burning or location of suitable developments such as playing fields or carpark.

Maximum fuel loading: 8 tonnes/hectare of total fuel.

Vegetation

Shrubs and trees: Not to form a continuous canopy.

- Shrubs where grouped, to be 10 m² maximum with minimum 10 m separation.
- Overall tree canopy cover to be 30% maximum at maturity.

3.5 INNER PROTECTION AREA (IPA)

Planning

Location: Locate IPA between the building and OPA.

Objective: To reduce radiant heat on a building through the reduction of fire intensity, to a level where the building is unlikely to be ignited during a fire.

Width of IPA: Conform to **PBP** requirements.

Perimeter roads, fire access tracks and reserve

Location: Locate the perimeter road, track or reserve between the OPA and the boundary of the allotments. Figure 3.2 illustrates perimeter roads and fire access tracks.

Requirement: No fuel to one side of the perimeter road, fire access track or reserve.

Form: Conform to the council's policy for road construction and firefighting and as follows:

- Road reserve: **As per Access requirements table under Clause 3.2.**
- Track: To **Fire access track design.**

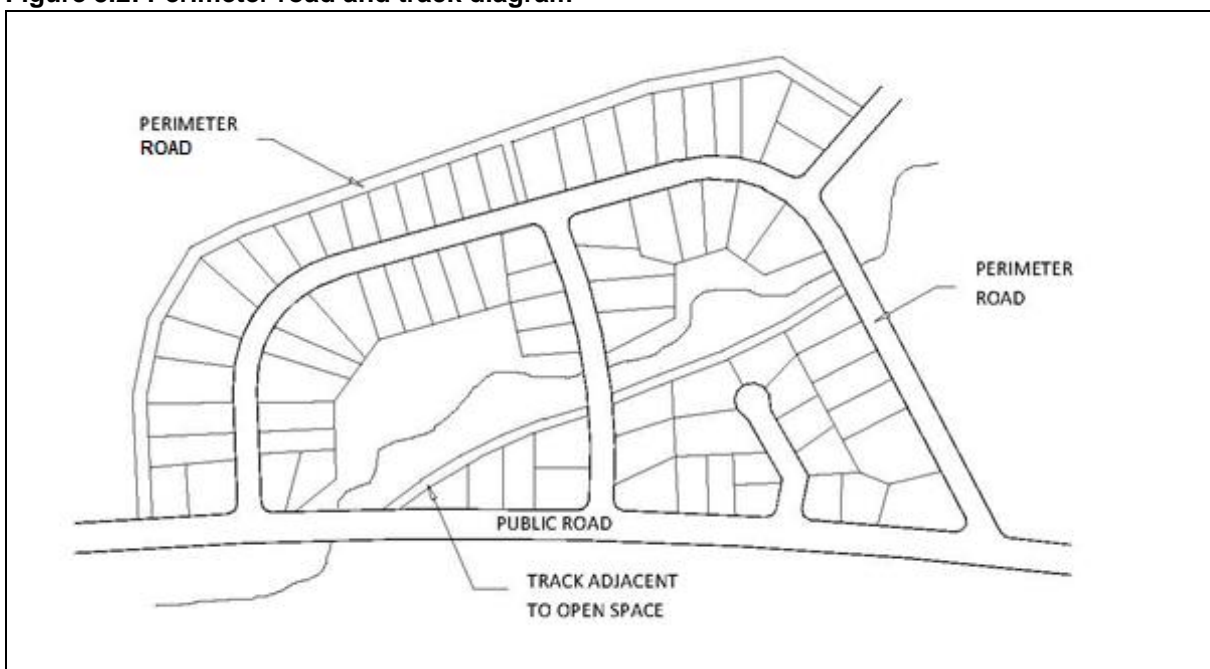
Width of fire break: **Minimum road reserve width. Any area required for additional APZ width should be provided within private property.**

Vegetation

Shrubs: Do not plant under trees. Allow for a separation of 1.5 times their mature height.

Tree canopy: Allow for a separation of 2 m minimum and overall canopy cover of 15% maximum, at maturity.

Figure 3.2: Perimeter road and track diagram



Allotment size

Minimum lot depth: 30 to 35 m minimum.

Rear setback: Set minimum depth to allow for required IPA width.

3.6 MODIFICATIONS TO OPA AND IPA

Approval criteria

Requirement: If modifications to the width of the OPA or IPA are proposed, obtain written approval from the Council **or RFS if referral is required.**

3.7 SERVICES

Reticulated water supply areas

Requirement: Provide a ring main system for urban subdivisions as follows:

- Reticulated water supply above ground and external to the building: Non-corrodible metal components.
- Fire hydrant spacing, sizing and pressures: To AS 2419.1.
- Do not locate hydrants within any road carriageway or parking reserves.

Supplementary supply: If the reticulated supply is insufficient, supplement with a dedicated static source, in the form of a non-corrodible and non-combustible tank storage. Do not use swimming pools, creeks and dams as a substitute for a dedicated static supply.

Non-reticulated water supply areas

Requirement: Provide a water supply reserve dedicated to firefighting purposes for all developments in bushfire prone areas.

Where these sources are to be used, a pump will be required.

Connections: Provide a 65 mm Storz outlet with gate or ball valves, or as required by the state fire authority, located within the IPA away from the building.

Tanks: Provide the following facilities:

- Underground tanks: Provide a 200 x 200 mm access hole to allow tankers to refill directly from the tank. Provide a hardened ground surface within 4 m of the access hole. Protect the tanks from loads.
 - Below ground pipelines: Provide minimum soil cover over pipes as follows:
 - . Subject to vehicle traffic: 300 mm.
 - . Under buildings or concrete slabs: 75 mm.
 - . Other locations: 225 mm.
 - Above ground tanks: Provide concrete or metal tanks and supports. Protect stands for raised tanks. Provide adequate shielding for the protection of firefighters for tanks located on the hazard side of the building.
 - Tank location: Between 5 and 60 m to the outer edge of the building.
 - Pipework between the water supply and the outlets: 64 mm (minimum) nominal bore.
- Lots > 500 m²: Install and locate water supply as follows:
- To allow firefighting vehicle to get within 4 m of the water supply outlet.
 - Face outlet away from the building, if located less than 20 m away from the building.

Minimum dedicated water supply for firefighting table

Development type	Water requirement
Lot size less than 500 m ²	2,500 litres/lot
Residential lots (< 1,000 m ²)	5,000 litres/lot
Rural-residential lots (1,000 – 10,000 m ²)	10,000 litres/lot
Large rural/Lifestyle lots (> 10,000 m ²)	20,000 litres/lot
Residential units	5,000 litres/unit to 20,000 litres maximum

Electricity services

Location: Locate electricity services to minimise potential ignition of surrounding bushland or the fabric of the building.

Underground transmission lines: Provide underground transmission lines where practical.

Overhead transmission lines: If proposed, provide lines with short pole spacing of 30 m, except where crossing gullies, gorges or riparian areas.

Clearance between trees and powerlines: Provide at least the minimum distance recommended by the electricity distributor.

Note: See [Guideline for the Management of Private Overhead Lines](#) for safety clearances of power lines up to and including 300 m in length. For spans greater than 300 m but less than 400 m, an additional 0.5 m is to be added to the applicable clearance for up to 300 m, and an additional 2 m for each 100 m thereafter until the easement limit is reached.

Gas services

Location: Locate gas services to minimise potential ignition of surrounding bushland or the fabric of the building.

Reticulated gas or LP storage systems: To AS/NZS 5601.1 or AS/NZS 1596 as appropriate.

Material: Use metal piping.

LP storage systems: Locate fixed cylinders minimum 10 m from flammable materials and shield from the hazard side. If cylinders are located close to the building, direct the release valve at least 2 m away from the building.

Sheathing: Do not use polymer sheathed flexible gas supply lines to gas meters adjacent to buildings.

4 DOCUMENTATION

4.1 STATUTORY DOCUMENTATION REQUIREMENTS

Approvals

Requirement: Document any prerequisite for approval of the development advised by the following authorities:

- Council's officer for road layout and traffic management, landscaping, stormwater drainage, and subdivision planning.
- **Authorities listed at Clause 2.2.**
- ~~— State road authority for any roads not under Council's jurisdiction affected by the development.~~
- ~~— State planning department for general land use and layout proposals.~~
- Utilities authority for any public or private utility affected by the development.

4.2 DRAWINGS

General

Requirement: Provide drawings defining the works and assumed operating and maintenance procedures.

Drawing content

Requirements: Provide design drawings to include the following:

- Subdivision/property access.
- Easements
- Fire hydrants.
- Asset protection zones, fire access tracks, and erosion control features.
- Internal access from perimeter road.
- Fire access track design.
- Asset protection zones (APZ)/Defendable space.

~~Design drawing format~~

4.3 SUPPORTING DESIGN DOCUMENTS

Design reports

Requirement: Provide a design report covering the following:

- Design criteria adopted for the development design.
- Site investigation reports supporting the design.

Specifications

Construction documentation: Prepare technical specifications using the AUS-SPEC Construction worksection templates from the National Classification System workgroups 02, 03, 11 and 13.

Design certification

Certificate: Provide a signed and dated design certificate **from AUS-SPEC 0010 Quality requirements for design** as evidence that a suitably qualified professional has reviewed all the design documents, including program and plans for the development, and can verify that the designed bushfire protection requirements for the development site meet the Council and statutory requirements.

4.4 WORK-AS-EXECUTED

Work-as-executed documents

Drawings: Provide an additional set of final construction drawings for the purpose of recording the work completed by the Contractor. **See Clause M8 in regard to the completion and handover process.**

Drawing format

Work-as-executed drawing format: **open digital (not requiring specific software) LandXML or CAD format (e.g. DXF), and PDF copies.**

5 ANNEXURE A

5.1 REFERENCED DOCUMENTS

The following documents are incorporated into this worksection by reference:

AS/NZS 1596	2014	The storage and handling of LP Gas
AS 2419		Fire hydrant installations
AS 2419.1	2017	System design, installation and commissioning
AS 3959	2018	Construction of buildings in bushfire prone areas
AS/NZS 5601		Gas installations
AS/NZS 5601.1	2013	General installations
MidCoast Council		Development Engineering Handbook
MidCoast Council		AUS-SPEC Infrastructure Specifications
NSW RFS PBP	2019	Planning for bush fire protection: a guide for councils, planners, fire authorities and developers

6 ANNEXURE M – MIDCOAST COUNCIL SPECIFIC CLAUSES

M1.	Variations to or non-conformances with Council's AUS-SPEC are to be evaluated with reference to the procedure in Council's <i>Development Engineering Handbook</i> . Acceptance is to be obtained in writing from: <ul style="list-style-type: none"> a) an authorised representative of Council's Director of Infrastructure and Engineering Services, or b) an accredited certifier where they are the Principal Certifier and hold the relevant accreditation category for the type of work. 	Variation procedure
M2.	This specification applies in addition to any development consent (DA) conditions. If there is any inconsistency, the conditions of consent shall prevail.	DA conditions
M3.	Where the requirements of this specification conflict with the RFS' <i>Planning for Bushfire Protection</i> (PBP), the more conservative (safer) requirement from both documents shall be taken as the minimum.	Conflict with PBP
M4.	(See Clause 3.2) For developments greater than 200m from a public through road, an alternative access road is to be dedicated as a public road or a private right of way benefitting no more than three (3) properties, with provision of legal rights for each owner to maintain the road and vegetation within the right of way.	Alternative road
M5.	(See Clause 3.2) Public perimeter roads may be used as part of an APZ, but only up to a maximum distance which is equal to the minimum width required in Council's specifications for the roadway type.	Subdivision perimeter trails
M6.	Asset Protection Zones conflict with the purposes of public land such as nature reserve land, public parkland, and vegetated drainage basins, so land for these purposes are not to be burdened by any APZ required as a result of nearby development.	APZs in public reserves
M7.	Fire trails are required as follows for all vegetated public reserves to enable firefighters and regular maintenance vehicles to access the interior and perimeter of the reserve: <ul style="list-style-type: none"> a) Legal ability to use fire trails on private land shall be provided by registering a right of access in favour of the Rural Fire Service or Council, but without obligating these authorities to maintain the trail in any way, b) Fire trails are to meet the requirements of the current version of Fire Trail Standards published by the Rural Fire Service, and c) Requirements as set out in PBP also apply. 	Fire trails
M8.	Refer to the MidCoast Council <i>Development Engineering Handbook</i> for final inspection, works-as-executed and handover requirements.	Completion

7 AMENDMENT HISTORY

0	30/11/2020	First Published
1	18/1/2021	Section 3.4 – minor amendment