Armidale
Regional Council

# ENGINEERING DESIGN CODE SPECIFICATION D10

# BUSHFIRE PROTECTION

## Amendment Record for this Specification Part

This Specification is the Armidale Regional Council version of the AUS-SPEC generic specification D10 and includes Council's primary amendments to the specification.

Details are provided below outlining the clauses amended from the Council edition of this AUS-SPEC Specification Part D10. The clause numbering and context of each clause are preserved. New clauses are added towards the rear of the specification part as special requirements clauses. Project specific additional script is shown in the specification as italic font.

The amendment code indicated below is 'A' for additional script 'M' for modification to script and 'O' for omission of script. An additional code 'P' is included when the amendment is project specific.

| Amendment Sequence No. | Key Topic addressed in amendment | Clause No. | Amendment Code | Author Initials | Amendment Date |
|---|---|---|---|---|---|
| 1 | Major Revision of specifications for adoption by Armidale Regional Council | All | AMO | SPM | 21/07/16 |
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# CONTENTS

**CLAUSE** **PAGE**

# DEVELOPMENT DESIGN SPECIFICATION D10
# BUSHFIRE PROTECTION

## GENERAL

### D10.01 SCOPE

1. The work to be executed under this Specification consists of the design of bushfire protection facilities to protect life and property and bring a fire to a halt.

2. The specification contains procedures for the design of fire protection facilities. Designs shall be carried out to satisfy requirements of Council and the guidelines published by the Department of Bushfire Services (December 2006) and addendum (April 2010). Consultation with Council's Fire Control Officer will be required in actioning this specification.

***FCO Consultation***

### D10.02 OBJECTIVES

1. This specification aims to outline the requirements that will minimise bushfire hazard in developments. The requirements are particularly pertinent to rural developments but should be an integral part of urbanised development as well. The concepts proposed need to be incorporated at an early stage of development design.

***Rural Development, Urban Development***

### D10.03 REFERENCE AND SOURCE DOCUMENTS

**(a) Council Specifications**

C501- Bushfire Protection (Perimeter Tracks)

**(b) NSW Government Legislation**

Environment Planning and Assessment Act 1979 - Section 94

**(c) NSW Government Department Publications**

Department of Bushfire Services (2006)
- Planning for Bushfire Protection (December 2006) including Addendum (April 2010).

Department of Land and Water Conservation (1994)
- Guidelines for Planning, Construction and Maintenance of Tracks.

**(d) Other**

Luke, R.H. - "Before the Fires Start."

# DESIGN CRITERIA

## D10.04 GENERAL

*Perimeter Tracks*

1. Where a subdivision will abut unimproved timber in a bushfire prone area (as classified by Council), perimeter tracks are to be located immediately between the created allotment and the bushland within a minimum cleared width of 6m, and have a minimum formed gravel width of 4m. Roads shall be adequately drained to provide all weather access for fire fighting vehicles. The gravel pavement shall be constructed in material which has a CBR of at least 20% and shall have a PI not exceeding 10 and shall be compacted to a depth of 150mm with a minimum compaction of 95% Standard Compaction.

*20m Reservation*

2. The perimeter track shall be contained within a 20m reservation or easement which borders those allotments abutting the bushfire prone area. The reserve shall serve as a basis for fire protection measures to be undertaken and will not be considered as part of the public reserve dedication applicable to the subdivision.

*Access Loops*

3. Access is to be provided from the perimeter track reservation from the local road system at regular intervals in a system of 'loops'.

*Fire Hydrants*

4. For those subdivisions receiving reticulated water, fire hydrants shall be situated at appropriate intervals or near where potential fire hazard areas exist as determined by Council.

*FCO Consultation*

5. Council's Fire Control Officer shall be consulted for technical advice in relation to bushfire protection of subdivisions.

6. Asset Protection Zones (APZs) access tracks and perimeter tracks shall be clearly indicated on the subdivision plan. Erosion control features and revegetation requirements shall also be indicated on the subdivision plan.

## D10.05 ASSET PROTECTION ZONES AND DEFENDANBLE SPACE

*Part of Development*

1. The APZ is a buffer zone between a bush fire hazard and buildings which is managed progressively to minimise fuel loads and reduce potential radiant heat levels, flame, ember and smoke attack. Provision of Asset Protection Zones (APZs) shall occur as part of the development of the subdivision layout. Each individual allotment shall have adequate space for the main building (usually a dwelling), an area of open space (front, back or side yard) and the APZ (which may include part of the yard area and/or neighbouring properties). Figure 10.1 illustrates the fuel zone areas for protected and un-protected dwellings and Figure D10.2 illustrates a typical APZ.

*Buffer Zone*

2. APZs shall be required for any development fronting a bush fire hazard area, whether a single dwelling, a group of isolated dwellings or in an urban subdivision. APZs act as a buffer zone between the development and the fuel.

*Reduction of Fuel*

3. The primary purpose of APZs is to ensure that a progressive reduction of fuel occurs between the bush fire hazard and any combustible structures within the development.

*Other APZ Purposes*

4. Apart from its primary purpose the APZ serves a number of other important purposes, dependent upon local fire fighting policy. The APZ shall be designed to:

   (a) maximise the separation distance between high intensity fire and any structure, thereby reducing the radiation and direct flame contact;

   (b) provide an area where embers can fall with minimal opportunity to create further fire outbreaks

(c) provide a safe access to a structure for fire fighters by reducing the heat level from the main fire;

(d) provide a safe retreat for fire fighters; and

(e) provide a clear control line from which to begin back burning or hazard reduction operations.

Safety requirements sometimes dictate that fires are fought from the property itself rather than along the perimeter track.

5. For forest and woodland area the APZ consists of two areas:

***Separate Components***

a) Inner Protection Area (IPA)

This is the area closest to the buildings, incorporating the defendable space and for managing heat intensities at the building surface.

***IPA***

b) Outer Protection Area (OPA)

This is the area for reducing the potential length of flames by slowing the rate of spread, filtering embers and supressing the crown fire and may include:

***OPA***

(i) a perimeter road or reserve (which incorporates an access track); and

(ii) a set-back (currently defined by minimum lot depths), which is usually part of the allotment.

## D10.06 OUTER PROTECTION AREA (OPA)

1. The OPA is located adjacent to the hazard:

***OPA Location***

***Reduced Fuel Loadings***

Originally the OPA would have been part of the bush fire hazard but has become an area where the fuel loadings have been reduced through thinning of vegetation, mechanical clearing, hazard reduction burning or location of suitable developments such as playing fields or car parks (provided it is wide enough).

***Minimum Fuel Loadings***

2. Fuel loadings within the OPA shall be kept to a level where the fire intensity expected will not impact on adjacent developments. In the absence of any policy to the contrary, 8 tonnes per hectare of total fuel is commonly used.

***Part of the Development***

3. The OPA should always be part of the development so that dedication of land or monetary contribution through Section 94 of the EP and A Act ensures that the cost of fire protection is met by the developer, not by the general community.

***Clearing Steep Slopes >20$^{o}$***

4. For slopes greater than 20 degrees (36.4% or 1:2.7), the environmental consequences of ground clearing (erosion) may not be acceptable. Developments abutting such slopes shall avoid both the ridge and the slope.

## D10.07 INNER PROTECTION AREA (IPA)

1. The inner protection area (IPA) shall be located adjacent to, or shall be part of the development and comprises a perimeter road and a set-back.

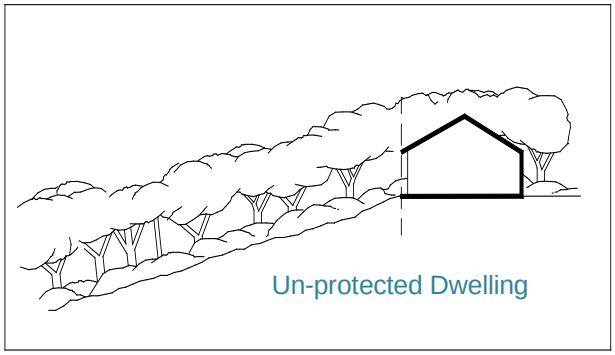
***Location***

(a) Perimeter Road

(i) The perimeter road or access trail lies between the IPA and the boundary of the allotments.

***Concept***

(ii) The concept of a perimeter road requires that one side of the road has no fuel. Perimeter roads are not fire breaks in the same sense as used in fire fighting operations. Their main purpose relates to reduction of radiation and provision of access. Without a fuel source on the other side, perimeter roads can however prove very effective fire breaks.



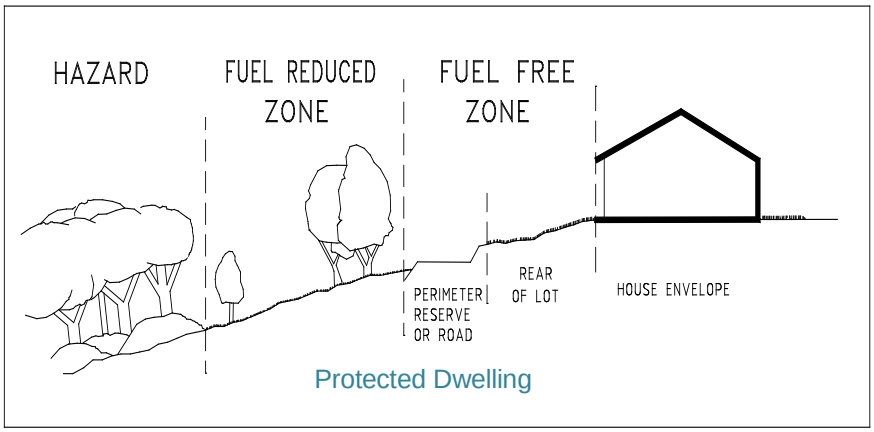




**Figure D10.1 – Dwelling fuel zone areas**

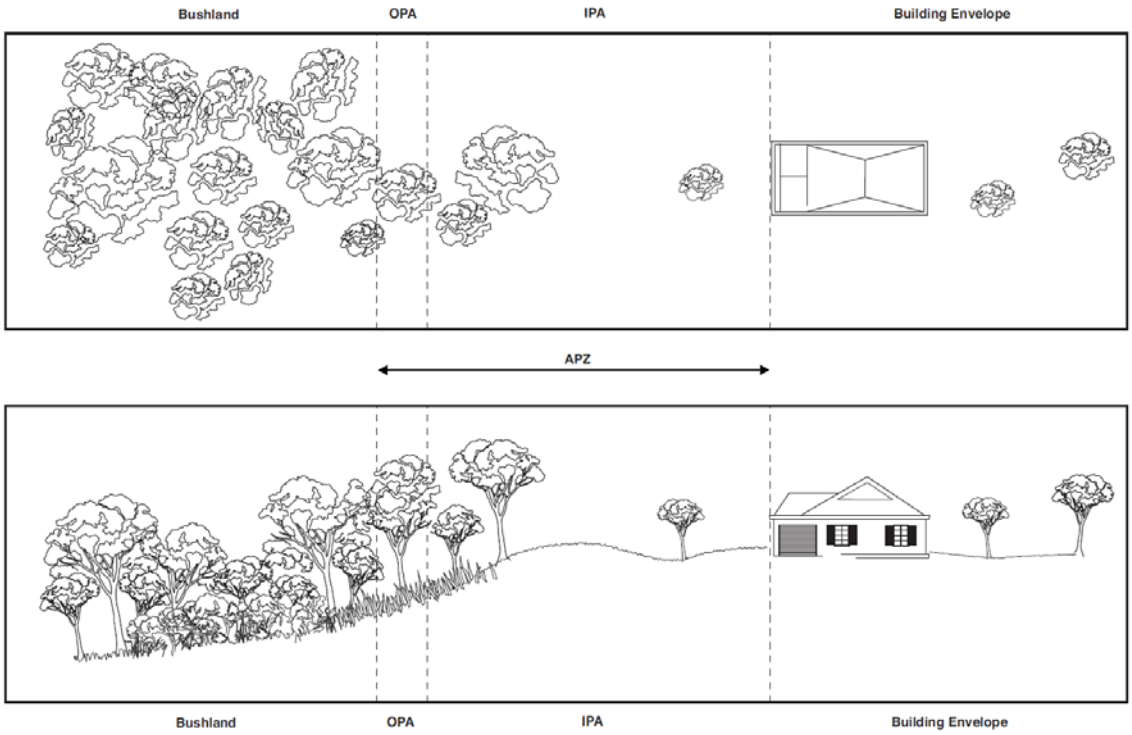



**Figure D10.2 - Asset Protection Zone and component areas**

(iii) The form that the perimeter road or track takes will depend on local policy in regard to both road construction and fire fighting. In some cases, a perimeter reserve will be preferred due to cost. The reserve should be a minimum of 20m wide, with a 6m wide access track formation with 4m wide gravel pavement and passing bays for vehicles every 200m.

***Form***

(iv) In designing for a perimeter road or track, the distance required may not seem substantial. Given that the probability of fire jumping a fire break increases as the width decreases, it follows that areas where the highest intensity fires are likely should have fire breaks of greatest width.

***Design***

(v) Perimeter roads can be less economic than roads which service two frontages unless some innovative designs are incorporated into the subdivision. Figure D10.3 illustrates a possible arrangement of perimeter roads and perimeter tracks.

***Innovative Design***

(vi) Perimeter roads that do not require clearing or maintenance (compared to tracks), can be cheapest in the long term. Ultimately the decision between a road or track depends on the Council's subdivision and bush fire fighting policies.

***No Clearance or Maintenance***

(vii) Tracks shall be constructed in accordance with Construction Specification C501 - Bushfire Protection (Perimeter Tracks) and shall be built to the following minimum standard:

***C501***

- Minimum cleared width of 6m;
- Minimum formed gravel width of 4m;
- Roads shall be adequately drained to provide all weather access for fire fighting vehicles;
- The gravel pavement shall be constructed in material which has a CBR of at least 20% and shall have a PI not exceeding 10; and
- Shall be compacted to a depth of 150mm with a minimum compaction of 95% Standard Compaction.

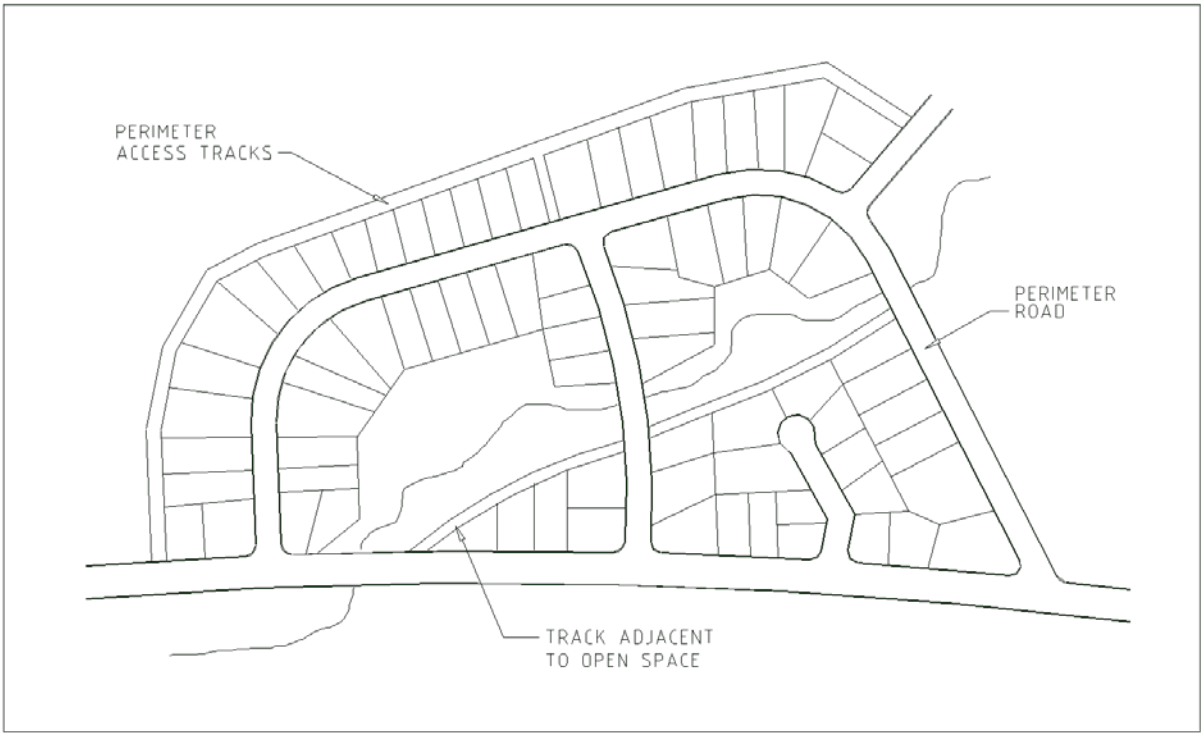



**Figure D10.2 - Perimeter Road Track**

(b) Set-back

*Minimum Lot Depth*

(i) Part of the allotment can be used as a section of the buffer by setting a minimum lot depth and rear setback. This can ensure that sufficient room (30m to 35m) is available to allow for erection of a dwelling that does not encroach upon the rear of the allotment.

(ii) Bushfire policy previously required a minimum of 40m lot depth in order to be consistent with the average minimum lot depth in bushland residential developments. Based on the requirement to maximise the distance between hazard and structures on reasonable grounds (as developed above) and a 30m wide building envelope which includes the surrounding yard, there is no justification for a 40m minimum lot depth in some instances.

*Previous Policy*

## D10.08 MODIFICATIONS TO FUEL REDUCED AND FUEL FREE ZONES

*Approval of Fire Authorities*

1. Modifications to the width of either the IPA or the OPA shall only be made with the written approval of Council's Fire Control Authority and based on the specific case rather than according to any formula.

*Adjacent Development*

2. Modifications would need to take account of adjacent or proposed development. Some difficulties arise where new development abuts existing development that is a fire hazard because of the nature of its usage (e.g. forests, parks etc.). The general principle is that fire protection should be shared by both users which may require a level of negotiation outside the planning system.

3. Even without an extensive area of fuel outside the APZ, intense fires can develop if the APZ has not been hazard-reduced and if the fire begins as a line ignition from spotting embers.

4. Under adverse conditions fires moving up a slope may not be slowed by the presence of rocky outcrops and ledges, even though the continuity of the fuel bed may be broken.

## D10.09 INTERNAL ACCESS FROM SUBDIVISION ROADS

*Incorporated in Subdivision Design*

1. The provision of adequate internal access is also controlled by subdivision design. Subdivision roads shall incorporate the following features:

- adequate width, vertical clearances and any dips and crests must allow the two way movement of firefighting vehicles;
- construction standards of roads and any bridges which allow for the carrying of fully loaded fire appliances (28 tonnes or 8 tones per axle);
- curves which have a minimum inner radius of 12m and are avoided in design as much as possible;
- maximum grades which do not exceed $8.5^{o}$ (15% or 1:7) and preferably not more than $5.7^{o}$ (10% or 1:10);
- clearly signposted roads;
- avoidance of dead end roads which exceed 200 metres in length;
- dead ends which incorporate a minimum turning circle of 12.5m diameter; and
- a road network which connects at multiple points to fire access tracks.

### D10.10 STAGING WORKS

1. When considering the rate of development, planners shall provide for initial development to occur on the hazard perimeter of the development. A line of dwellings will tend to minimise the threat to the entire subdivision by limiting the hazard interface.

***Initial Development on Hazard Perimeter***

2. Scattered developments will allow a continuous network of fuel to threaten individual buildings until development is substantially underway.

***Scattered Developments***

3. New developments should be 'tacked' onto existing developments to minimise the hazard perimeter.

***Minimise Hazard Perimeter***

4. It is important that bush fire protection is incorporated into the design of the overall development, rather than into individual allotments.

***Incorporated in Subdivision Design***

## SPECIAL REQUIREMENTS

### D10.11 RESERVED

### D10.12 RESERVED

### D10.13 RESERVED