BUSHFIRE CONSTRAINTS REPORT

for a
Proposed Rezoning and Subdivision

at
Lot 720 as part of the subdivision of
Lot 72 DP106287, Hall Street
Heddon Greta
NSW

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# Proposed Rezoning and Subdivision: Bushfire Constraints Report

Lot 720 DP106287, Hall Street, Heddon Greta, NSW

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1.0 INTRODUCTION
This Bushfire Constraints Report (BCR) is intended to identify suitable protection measures against the potential threat posed by bushfire for a proposed rezoning and subdivision over Lot 72 DP106287 Hall Street, Heddon Greta (Figure 1). This BCR addresses the relevant requirements of the Environmental Planning and Assessment (EPA) Act (1979) and Rural Fires (RF) Act (1997) through the evaluation of such site specific considerations as vegetation assemblages, topographical features, the potential for mitigative measures and actual fire-fighting and evacuation capabilities of the site.

1.1 GENERAL DESCRIPTION OF THE SITE
The study area occupies approximately 60 hectares. The site supports three major vegetation communities, Woodland, a Woodland/Open Forest community with taller mature dominants located along the two intersecting creeklines located and Grassland / Cleared Land (Figure 2). A small proportion of vegetation present on site has been subject to modification in the form of underscrubbing, clearing for access roads, slashing and weed invasion. The site also contains one major waste dumping site as well as sporadic rubbish and green waste dumspites. The site has a variable aspect with slopes of 0-5° increasing to 5-10° in some areas. The immediate surrounds of the site are as described below:

- Adjacent to the northern boundary is an Open Forest community that extends for over 140 metres. This community acts as a buffer to the aluminium smelter located approximately 1.5kms to the west.
- Adjacent to the southern boundary is industrial properties and farmland. This area poses no bushfire risk.
- The majority of the western boundary is adjacent to a Woodland Community with the southern part of the boundary situated next to a power substation. It is planned that approximately 27 ha of this community in the west of the site is to be retained within the scope of any future development on site. This area of Woodland slopes down to the west at 0-5 degrees downslope for most of its extent, however this increases to 5-10 degrees in the centre.
- The eastern boundary adjoins developed residential land that makes up the Heddon Greta township.

1.2 DESCRIPTION OF THE PROPOSAL
It is proposed that Lot 72 is to be subdivided into two lots, with approximately 3.8 hectares in the east forming the proposed Lot 721 and the remainder forming the proposed Lot 720 (Figure 3). It is the intention of the proponent that proposed Lot 721 be further subdivided at a subsequent date for residential purposes. The proponent has signalled that at a subsequent date residential development...
maybe considered in the east of the site and industrial/service development may be considered in the south. It is the proponent’s intention that in such an eventuality approximately 27 hectares west of the old railway (South Maitland Rail Reserve) will be earmarked for exclusion from development.

1.3 PREVIOUS APPROVALS

To the east of the site vacant residential lots (DP 1082561) are approved for construction. This land is still currently for sale and construction has still not begun. As a condition of approval for this site a Section 88B Covenant (Conveyancing Act 1919) detailing the required APZ areas required was established. This APZ is located on this site surrounding the vacant residential lots.

To the south-east of the site a row of residential lots has been approved along Hall Street and built. As a condition of this development a 20 metre APZ was formed along part of the eastern boundary of the site.

To the north of the site Heddon Leigh Estate has been approved and is under construction.

Stage 2 DP 1030161 has approval for a residential subdivision. Construction is yet to commence.
Figure 1: Location of the site
Figure 3: Plan of proposal
2.0 LEGISLATIVE REQUIREMENTS

This report is specifically aimed at addressing the proposed rezoning in terms of protection from the threat of bushfire under the Environmental Planning and Assessment (EPA) Act (1979) and the Rural Fires (RF) Act (1997), particularly with regard to the following:

- **Section 63(2) of the RF Act (1997)**
  
  It is the duty of the owner or occupier of land to take the notified steps (if any) and any other particular steps to prevent the occurrences of fires on, and to minimise the danger of the spread of fires on and from that land.

- **Section 79C(1) of the EPA Act 1979**
  
  In determining a development application, a consent authority is to take into consideration such of the following matters as are of relevance to the development the subject of the development application:
  - the likely impacts of the development (eg. natural hazards such as bushfire threat)
  - the suitability of a site for development (eg. bushfires)

- **Section 91 of the EPA Act 1979**
  
  What is Integrated Development?


  In this case the proposal is a residential rezoning and subdivision and accordingly qualifies as integrated development, requiring a Bushfire Safety Authority from the Rural Fire Service.
3.0 METHODOLOGY

3.1 VEGETATION ASSEMBLAGES
The initial determination of the basic vegetation community boundaries was undertaken through the review of an orthophoto covering the site. Following this, a detailed ground survey was conducted. The ground survey was undertaken on 27th May 2005, and involved a foot traverse of the site and the vegetation communities within 140 metres of the site. During this traverse the species observed were recorded as well as the physical attributes of the surrounding area, taking into account the height of each primary structural layer and relative cover abundance of the species within. The vegetation communities identified were classed according to Specht’s ‘Pictorial Key to the Structural Forms of Australian Vegetation’, as reproduced in Figure A2.2 of ‘Planning for Bushfire Protection’ (NSW Rural Fire Service, 2001).

Through the identification of the dominant vegetation features present, a basis is provided for an evaluation of the occurrence of combustible plant species on the site.

3.2 TOPOGRAPHY
The slopes within the site were calculated from a LDS Surveyors topographic map of the subject site and verified during the site inspection using an inclinometer. The slopes on site and within the immediate vicinity were grouped into slope classes: 0-5°, 5-10°, 10-15°, 15-18° and >18° down slope and >5° and 5-0° upslope.

3.3 BUSHFIRE PROTECTION ASSESSMENT
The Bushfire Protection Assessment undertaken for the proposed development follows the methodology contained in Appendix 2 of ‘Planning for Bushfire Protection’ (NSW Rural Fire Service, 2001). The principal aim of this assessment is to determine the minimum protection zones required for the proposed development based on the vegetation assemblages present and the topography of the site. Bushfire risk is believed to be primarily from the wooded areas within the site.

3.4 BUSHFIRE ATTACK ASSESSMENT
The Bushfire Attack Assessment undertaken for the proposed development follows the methodology contained in Appendix 3 of ‘Planning for Bushfire Protection’ (NSW Rural Fire Service, 2001). The principle aim of this assessment is to determine the minimum building construction standards for the proposed development. The Bushfire Attack Assessment is based on the distance of proposed buildings from vegetation assemblages and the topography of the site and immediate surrounds.
4.0 RESULTS

4.1 VEGETATION SURVEY

A general description of the flora assemblages identified on site and 140m around the site is given below. Figures 4-7 illustrate the vegetation assemblages found on site.

The distribution of the vegetation communities denoted is shown in Figure 8*.

*Note on Vegetation Community Distribution Map. A map of vegetation of any area seeks to describe the distribution of the plant species in that area by defining a number of vegetation units (assemblages or communities) which are relatively internally homogenous. Whilst such mapping is a convenient tool, it greatly oversimplifies the real situation. Plants rarely occur in defined communities with distinct boundaries. Accordingly vegetation units used for the accompanying map should be viewed as indicative of their extent rather than being precise edges of communities.

4.1.1 FLORA ASSEMBLAGES

Table 1: Vegetation assemblages within 140 metres of the site

<table>
<thead>
<tr>
<th>Direction</th>
<th>Vegetation community description</th>
<th>Distance from site boundary</th>
<th>Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>North</td>
<td>Open Forest</td>
<td>0m - &gt;140m</td>
<td>Regenerating, tall thin stand of trees with dense understorey.</td>
</tr>
<tr>
<td></td>
<td>Grassland</td>
<td>0m - &gt;140m</td>
<td>Grazed paddock</td>
</tr>
<tr>
<td>South</td>
<td>Road Frontage with developed industrial and agricultural land</td>
<td>0m - &gt;140m</td>
<td>No Fire Risk</td>
</tr>
<tr>
<td>East</td>
<td>Developed residential land</td>
<td>0m - &gt;140m</td>
<td>Heddon Greta township No Fire Risk</td>
</tr>
<tr>
<td>West</td>
<td>Kurri Sand Swamp Woodland</td>
<td>4m - 30m</td>
<td>Primarily woodland. The substation adjacent to the south of the boundary poses no bushfire risk.</td>
</tr>
</tbody>
</table>

Vegetation currently on site

Kurri Sand Swamp Woodland

The canopy layer of the Woodland identified across the site was found to be most consistent with a representation of Kurri Sand Swamp Woodland as described by NPWS (2003). This community was characterised by *Eucalyptus parramattensis* ssp. *decadens* (Drooping Red Gum), *Angophora bakeri* (Narrow-leaved Apple) and *Eucalyptus agglomerata* (Blue-leaved Stringybark). The canopy projective coverage ranged from 20-40%, reaching an average height of 10-15m. Lower stratum species included *Melaleuca nodosa* (Ball Honeymyrtle), *Leptospermum polygalifolium* (Lemon-scented Teatree) and *Banksia spinulosa* (Hair-pin Banksia). Shrub species were diverse including species of *Lambertia formosa* (Mountain Devil), *Dillwynia retorta* ssp. *retorta* (Heathy Parrot Pea),
Figure 4: The Woodland community in the east of the site on the boundary of the proposed Lot 721

Figure 5: The Grassland community off the western corner of the proposed Lot 721
Figure 6: The Woodland and Open Forest communities in the centre of the site taken looking north along the eastern edge of the intended retention area

Figure 7: The Woodland community in the centre of the site taken looking south along the eastern edge of the intended retention area
Figure 8: Vegetation assemblages within 140m of the site
Acacia ulicifolia (Prickly Moses), Hakea dactyloides (Broad-leaved Hakea) and Isopogon anemonifolius.

Kurri Sand Melaleuca Scrub-Forest
The canopy layer of the Low Forest identified along major creeklines was found to be most consistent with a representation of Kurri Sand Melaleuca Scrub-Forest as described by Bell (2001). The community was characterised by a dominance of Melaleuca decora (White Feather Honey-myrtle) with dense lower stratum stands of Melaleuca nodosa (Ball Honey-myrtle). The canopy also consisted of Eucalyptus parramattensis ssp. decadens (Drooping Red Gum), Eucalyptus amplifolia (Cabbage Gum) and Eucalyptus aggregata (Blue-leaved Stringybark). The canopy projective coverage was approximately 40%, reaching an average height of 10-15m. The ground layer consisted of ferns such as Adiantum aethiopicum (Common Maidenhair Fern), Pteridium esculentum (Bracken) and Cheilanthes sieberi ssp. sieberi (Mulga Fern). Sedges within the community included Phragmites australis (Native Reed) and Gahnia radula.

Cleared Land/Grassland
The ground layer included the small shrub Melaleuca thymifolia and grass species of Themeda triandra (Kangaroo Grass), Eragrostis brownii (Brown’s Love Grass), Cynodon dactylon (Common Couch), Aristida vagans (Three-awn Speargrass), Senecio madagascariensis (Fireweed), Andropogon virginicus (Whisky Grass) and the fern Cheilanthes sieberi ssp. sieberi (Mulga Fern).

4.2 TOPOGRAPHY
The topography of the study area and the surrounding 140m was predominantly 0-5° (Figure 9). A small section of creek line in the centre of the site is banked by steeper land, being in the 5-10° range.

4.3 BUSHFIRE PROTECTION ASSESSMENT
Table 2 shows the recommended Asset Protection Zones pertinent to the proposed Lot 721 in the east of the site. It is the proponents stated intention that in the event of future development on the proposed Lot 720, approximately 27ha in the west of the site will be excluded from any such development. Table 3 shows the Asset Protection Zones that would apply to such a retention.

The implementation of the recommended APZs is discussed in Section 5.1
<table>
<thead>
<tr>
<th>DIRECTION</th>
<th>SLOPE CLASS</th>
<th>VEGETATION CLASS</th>
<th>APZ REQUIRED (note A)</th>
<th>APZ AVAILABLE</th>
<th>CATEGORY OF BUSHFIRE ATTACK</th>
<th>COMMENTS</th>
</tr>
</thead>
<tbody>
<tr>
<td>North</td>
<td>0-5° downslope</td>
<td>1</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
<td>Open Forest is present adjacent to boundary.</td>
</tr>
<tr>
<td>East</td>
<td>0-5° upslope</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
<td>Developed residential land.</td>
</tr>
<tr>
<td>South</td>
<td>0-5° upslope</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
<td>N/A</td>
<td>Developed residential and industrial land.</td>
</tr>
<tr>
<td>West</td>
<td>0-5° downslope</td>
<td>2</td>
<td>35</td>
<td>35</td>
<td>Low</td>
<td>Beyond proposed area to be subdivided is woodland with a small amount of forest located along creeklines. The southern part of the western boundary is adjacent to a large power substation. No bushfire risk exists along this part of the boundary.</td>
</tr>
<tr>
<td></td>
<td>5-10° downslope</td>
<td>3</td>
<td>50</td>
<td>50</td>
<td>Extreme</td>
<td></td>
</tr>
</tbody>
</table>

Notes
A: APZ required for Residential Purposes based on Planning for Bushfire Protection
4.4 BUSHFIRE ATTACK ASSESSMENT

This Bushfire Attack Assessment identifies categories of bushfire threat to the proposed development. The assessment is based on slope and distance from the vegetation. As given in Table A3.3 in Appendix 3 of ‘Planning for Bushfire Protection’ (NSW RFS, 2001) potential attack categories include Flame Zone, Extreme, High, Medium and Low. Associated with these categories are building level classifications recommended for asset protection.

As represented in Table 2, an APZ of 35m (25m IPA and 10m OPA) has been recommended along the majority of the area to be retained in the west of the site. This would result in development greater than 30m, but not greater than 50m from areas of Woodland and as such the bushfire category of ‘Low’ applies. There is insufficient threat to warrant specific construction requirements.

An APZ of 50m (40m IPA and 10m OPA) has also been recommended in the centre of the proposed area to be retained. This would result in development greater than 50m, but not greater than 80m from areas of Forest at 5-10° downslope and as such the bushfire category of ‘Extreme’ applies. The expected fire behaviour for this category is ‘attack by burning debris is significant and radiant heat levels and flame could threaten building integrity’ Level 3 AS3959 Construction Standards are therefore warranted.

Construction standards are discussed further in Section 5.2.
5.0 RECOMMENDATIONS

The following recommendations are based on the results of the Bushfire Protection and Attack Assessment and are specifically aimed at providing the proposed development with adequate protection from bushfires. These recommendations relate to the ongoing management of the threat of bushfire to the proposed development.

5.1 ASSET PROTECTION ZONES

The primary purpose of an APZ is to ensure that a progressive reduction of bushfire fuel occurs between the bushfire hazard and any development. It incorporates two recognised zones, these being the Outer Protection Area (OPA) and the Inner Protection Area (IPA).

The Inner Protection Area is an area directly surrounding a building in which there is minimum fine fuel at ground level. Scattered trees can remain within the IPA, provided none of the trees have canopies that touch or that are immediately adjacent. The IPA can include lawns, gardens, swimming pools and driveways, as well as access roads such as perimeter fire trails. The Outer Protection Area is an area outside the IPA in which the fine fuels have been reduced such that the IPA is effectively isolated from the majority of the flames and heat and protected from airborne sparks, ash and incendiaries. These areas can be cleared by mechanical means or by controlled slow burning.

As calculated in Section 4.3 of this report, in the event of any future development on the proposed Lot 720, an APZ of 35m (25m IPA & 10m OPA) and 50m (40m IPA & 10m OPA) has been recommended along the eastern side of the area expected to be retained in the west of the site (Figure 10).

5.2 BUILDINGS

As stated in Section 4.4 of this report, the category of Bushfire Attack ‘Low’ applies to the proposed subdivision. In the event of any future development on the proposed Lot 720 the category of Bushfire Attack ‘Extreme’ will apply to the small area adjacent to the steeper slope along the eastern side of the area expected to be retained. For the ‘Low’ Bushfire Attack category no construction standards are warranted. The construction requirements relate to the specifications given in the Australian Standards AS3959 – 1999 and relate to flooring systems; support posts, columns, stumps, piers and poles; external walls; windows; external doors; vents and weepholes; roofs; eaves; fascias; gutters and downpipes; verandas and sundecks; and service pipes (water and gas). For example, the requirements in regards to windows as per the Australian Standards AS3959 – 1999 are as follows:

Level 1 construction: All operable windows, including louvres shall be screened with a corrosion-resistant steel, bronze or aluminium mesh with a maximum aperture size of 1.8mm in such a way that the entire opening remains screened when window is open.
Level 2 construction: As for Level 1 except that aluminium mesh shall not be used. In addition, where timber is used it shall be of fire retardant-treated timber except where protected by non-combustible shutters. Where leadlight windows are used, they shall be protected by shutters constructed of non-combustible material or made of toughened glass.

Level 3 construction: as for Level 2 except that where windows are not protected by non-combustible shutters, they shall be glazed with toughened glass.

5.3 ROADS & ACCESS

Given that the proposal is for a residential subdivision it is expected that the roads on site will be bitumen sealed suburban roads and will therefore fulfil the criteria as detailed by the Rural Fire Service (2001), however no plan of proposal detailing roads is available at this time.

5.4 FURTHER RECOMMENDATIONS

Water supply for the fighting of bushfires is an important consideration for all developments in bushfire prone areas. It is envisaged that in the event of a bushfire nearing the site, water would be sourced from Fire Brigade tankers and a reticulated water supply. HWC Reticulated Water Mains with fire hydrants currently exist in Hall and Young Streets and will be extended into the proposed rezoning and subdivision subdivision. Hydrants will be clearly marked and placed at suitable spacings.

In the event of a bushfire occurring in the vicinity of the site first response would most likely be from Kurri Kurri NSW Fire Brigade located approximately 3.5km from the site or Louth Park Rural Fire Brigade located approximately 6km from the site.
Figure 9: Slope classes within 140m of the site
6.0 CONCLUSION

A Bushfire Constraints Report has been undertaken for a proposed residential subdivision on Lot 72 DP106287, Hall Street, Heddon Greta, NSW. The study area occupies approximately 60 hectares. The site supports three major vegetation communities, Woodland, a Woodland/Open Forest community with taller mature dominants located along the two intersecting creeklines on site and Grassland / Cleared Land. A small proportion of vegetation present on site has been subject to modification in the form of underscrubbing, clearing for access roads, slashing and weed invasion. The site also contains one major waste dumping site as well as sporadic rubbish and green waste dumpsites. The site has a variable aspect with slopes of 0-5° increasing to 5-10° in some areas.

It is proposed that the study area be rezoned and subdivided for residential development.

As calculated in the results section of this report, the APZ’s applicable to the proposed subdivision are as follows:

- An APZ of 35 metres (25m IPA & 10m OPA) along the eastern side of the proposed area to be retained in the west of the site.
- An APZ of 40 metres (30m IPA & 10m OPA) along a small section of the centre of the eastern side of the proposed area to be retained in the west.

As stated in Section 4.4 of this report, the category of Bushfire Attack ‘Low’ applies to the majority of the eastern side of the proposed area to be retained in the west of the site and as such no construction standards under AS3959 are warranted in this area. The bushfire category of ‘Extreme’ will apply to the small area adjacent to the steeper slope along the eastern side of the area to be retained. Level 3 AS3959 Construction Standards would apply to this area.

In the event of a bushfire occurring in the vicinity of the site first response would be from Kurri Kurri NSW Fire Brigade located approximately 3.5km from the site or Louth Park Rural Fire Brigade located approximately 6km from the site. It is assumed that water supply in a bush fire situation would be sourced primarily from Fire Brigade tankers and a reticulated mains supply. HWC Reticulated Water Mains with fire hydrants currently exist in Hall and Young Streets and will be extended into the proposed subdivision. Hydrants will be clearly marked and placed at suitable spacings.

It is believed that with the implementation of the bushfire protection measures recommended in this report that the potential threat of bushfire to the proposed development will be managed in accordance with the guidelines contained in the document ‘Planning for Bushfire Protection’ (NSW RFS, 2001).
7.0 BIBLIOGRAPHY

LPI (2001), *Topographic & Orthophoto Map 1:25000: Beresfield 9232-3N*, LPI, Bathurst, NSW


Wildthing Environmental Consultants (2005), *8-Part Test for a Proposed Subdivision at Lot 72 DP1069287, Hall St, Heddon Greta NSW*. 