

# A fresh approach to development assessment in Bushfire Protection Areas

*Meryl Sherrah describes the on-line website tools developed by the Department of Planning and Local Government in South Australia to assist with development assessment in Bushfire Protection Areas.*

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## Abstract

In late 2006 and 2007, changes were made to the planning and building requirements for new dwellings to be built in certain identified bushfire risk areas of South Australia.

The changes affected 39 councils located throughout SA, including Eyre Peninsula, Yorke Peninsula, Kangaroo Island, the South-East, the Riverland, Murray Bridge, mid-North, Mt Lofty Ranges and parts of the metropolitan Adelaide region.

Under the changes, parts of these councils have now been designated as Bushfire Protection Areas. Each of these Areas has been thoroughly assessed and categorised into one of three bushfire risk levels – high bushfire risk, medium bushfire risk or general bushfire risk. There are also areas which are 'excluded'.

Different planning and building requirements now apply depending on the designated level of bushfire risk. The Department of Planning and Local Government has prepared an online search tool to assist people in identifying whether a particular property in the 39 councils is in a Bushfire Protection Area and the property's assigned bushfire risk.

A web mapping application to assist in development assessment in Bushfire Protection Areas has also been produced for Country Fire Service and council staff involved in development assessment.

The development of the online search tool and the web mapping application was funded under the Natural Disaster Mitigation Programme and has received Australian and State Government financial support.

## Introduction

Following the serious bushfires in Eastern Australia in the Summer of 2002 / 2003, the South Australian Premier convened a Bushfire Summit which recommended, amongst other things, that there be: "A review of bushfire policy framework and development plans (including land use and infrastructure) to update Development Controls in designated Bushfire Prone Areas and to consider extending the number of Bushfire Prone Areas."

A Ministerial Planning Amendment report was introduced in three stages between December 2006 and December 2007 which established consistent Bushfire Protection Areas (formerly known as Bushfire Prone Areas) and policies across South Australia. Previously the Bushfire Protection Areas had been confined to the Mount Lofty Ranges. Extension of the Bushfire Protection Areas was based on calculations of the potential bushfire hazard which used a spatially based implementation of the McArthur Grassland and Forest Fire Danger Meters. These changes affected 39 councils located throughout SA, including Eyre Peninsula, Yorke Peninsula, Kangaroo Island, the South-East, the Riverland, Murray Bridge, mid-North, Mount Lofty Ranges and parts of the Metropolitan Adelaide region.

Under the new Bushfire Planning conditions, all proposed new habitable buildings in the defined Bushfire Protection Areas must be assessed to determine the level of bushfire risk as part of the development application. In High and Medium Risk Bushfire Protection Areas this will help to determine the appropriate construction standard. The assessment is based on Australian Standard "AS3959 – Construction of Buildings in Bushfire-Prone Areas" which sets out the minimum construction requirements for each of four levels of defined Bushfire Hazard and the methodology required to undertake the site assessment. The actual hazard for the building site is determined by completing a threat matrix that considers a combination of the classification of vegetation type, its proximity to the building and the slope leading to the building.

The Department of Planning and Local Government Bushfire Protection Areas website includes a Bushfire Risk Level Online Search tool which allows people to identify bushfire risk for any property in Bushfire Protection Areas. A web mapping application allowing development assessment in Bushfire Protection Areas has also been developed. This has been made available to the Country Fire Service (CFS) and local councils to assist them in undertaking the site assessments. The application enables the user to investigate a proposed building site for the presence and proximity of vegetation to a proposed building site and the slope and aspect of the land relative to the building site. The information supplied will enable the user to quickly undertake the assessments and ascertain whether a more detailed site assessment will be required. It enables all those involved with the assessment process to view and share a consistent set of information regardless of their individual locations.

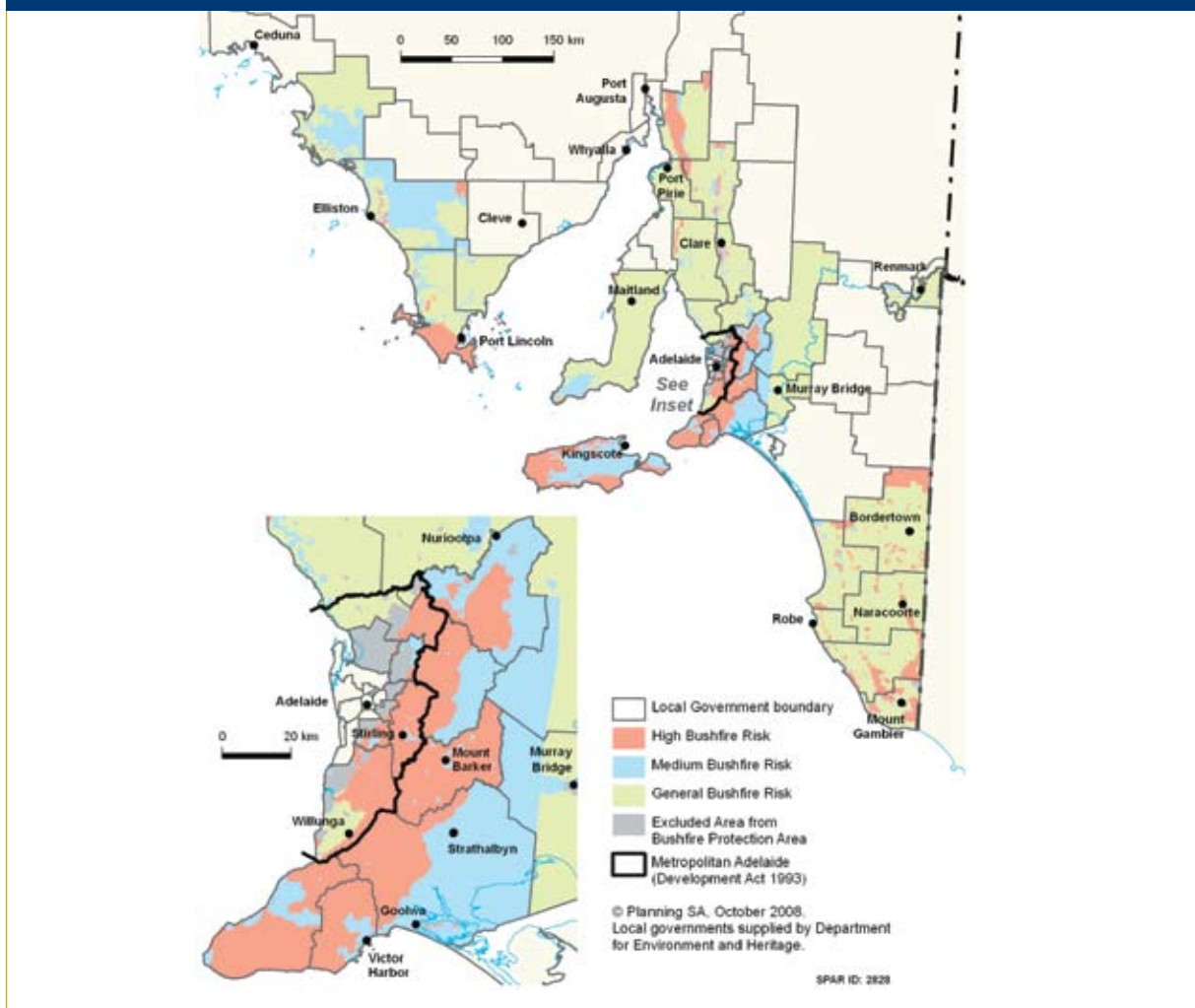
The Development Assessment in Bushfire Protection Area web application has been funded under the Natural Disaster Mitigation Programme by the Commonwealth and South Australian governments.

## Bushfire Protection Areas – planning requirements

The Ministerial Plan Amendment established Bushfire Protection Areas in some parts of the 39 Councils mentioned above. Each of these Areas has been thoroughly assessed and categorised into one of three bushfire risk levels – high bushfire risk, medium bushfire risk or general bushfire risk. There are also areas which are ‘excluded’. Figure 1 shows the extent of the Bushfire Protection Areas in South Australia.

Different planning and building requirements now apply depending on the designated level of bushfire risk. The requirements may include features such as having dedicated water supplies for fire fighting; buffer zones between homes and flammable or combustible vegetation; appropriate access roads; and building features which increase bushfire protection (e.g. spark and ember protection).

**Figure 1: Bushfire Protection Areas in South Australia.**



### **Requirements for high bushfire risk areas**

Where the selected property falls within an area described as high bushfire risk, all new habitable buildings (e.g. a dwelling or tourist accommodation) will be assessed for compliance with the following criteria:

- have a dedicated fire fighting water supply of at least 22,000 litres;
- ensure that gaps between the dwelling floor and the ground are enclosed to prevent burning debris from entering;
- be set back 20 metres from flammable/combustible vegetation;
- Be located and designed to minimise risk from bushfires; and
- have access roads and tracks that are appropriately designed and built for entry and exit of vehicles, including fire fighting vehicles, during a fire.

In addition, proposed new habitable buildings in *High Bushfire Risk Areas* are assessed against the bushfire protection requirements in the **Building Code of Australia** and the **South Australian Housing Code**, and Minister's Specification SA78. The building must be designed to provide protection from sparks and embers. The determination of the level of protection required will require a site assessment of the bushfire hazard as part of the application for building rules consent. From this site assessment, the appropriate construction standard will be determined in accordance with Australian Standard AS 3959-1999 - for High and Extreme categories of bushfire hazard.

### **Requirements for medium bushfire risk areas**

Dwellings proposed for properties within medium bushfire risk areas must meet the following criteria:

- have a dedicated fire fighting water supply of at least 5,000 litres;
- ensure that gaps between the dwelling floor and the ground are enclosed to prevent burning debris from entering;
- be set back 20 metres from flammable/combustible vegetation;
- be located and designed to minimise risk from bushfires; and
- have access roads and tracks that are appropriately designed and built for entry and exit of vehicles, including fire fighting vehicles, during a fire.

In addition, new habitable buildings in *Medium Bushfire Risk Areas* are assessed against the bushfire protection requirements in the **Building Code of Australia** and the **South Australian Housing Code**, and Minister's Specification SA78. The building must be designed to provide protection from sparks and embers, including

such measures as covers under eaves, metal fly wire screens and steel shoes for posts (as required by Australian Standard AS 3959-1999 – for Medium Construction). No specific assessment of the bushfire hazard for the site is required in these areas.

### **Requirements for general bushfire risk areas**

The criteria for dwellings proposed for properties within general bushfire risk areas are the same as those for medium bushfire risk areas. There are no mandatory construction requirements for new buildings in these areas.

### **Requirements for excluded bushfire risk areas**

'Excluded' areas generally include existing townships and other settlements that have an adequate water supply for fighting fires and suitable emergency vehicle access and egress.

The need to have regard to matters that specifically seek to reduce risk to life or property from bushfires in such areas is generally considered lower than other areas which have been assigned to a Bushfire Risk category, and where considerations about the siting of buildings, vehicles access and availability of a dedicated fire fighting water supply are more important. As such, proposals to construct a house or to subdivide land for residential purposes within an 'excluded' area are not assessed against the Bushfire Protection provisions of the Development Plan.

There are, however, other requirements that need to be taken into account when applying to develop land in 'excluded' areas. This includes the need to ensure the layout and design of land division proposals takes into account the Bushfire Risk assigned to adjoining land.

There are no mandatory construction requirements for new buildings in these areas.

## **Bushfire risk level online search tool**

Department of Planning and Local Government has prepared an online search tool to assist people in identifying whether a particular property in the 39 councils:

- is located within a Bushfire Protection Area;
- the property's assigned level of bushfire risk (high, medium or general risk); and
- what minimum bushfire-related planning and building requirements may apply.

Users are able to identify bushfire risk level by using a map to navigate to the area in question. Alternatively they can enter a plan parcel, certificate of title or assessment number to locate the property. Users are then able to view a map showing the property boundary

and the surrounding bushfire risk level. A link to the relevant council's development plan is also provided.

The Bushfire Risk Level Online Search Tool can be accessed via the following URL:

<http://www.planning.sa.gov.au/go/development-plans/bushfire-protection-areas/bushfire-risk-level-online-search-tool/>

## Web mapping application – Development Assessment in Bushfire Protection Areas

This application was designed to assist the Country Fire Service and Councils to undertake the assessments required for proposed developments in Bushfire Protection Areas. It is only available to Council and CFS staff who must supply a login and password to access the site.

A range of information and factors relevant to the assessment of the potential bushfire risk for a specific site are provided to enable users to undertake a desktop investigation of a particular development application. This information, both spatial and textual, should be useful in evaluating and documenting risks at proposed development sites prior to an on-site inspection.

Users of the web site are also encouraged to read the Department of Planning and Local Government Guide titled “Undertaking development in Bushfire Protection Areas” which outlines the planning and building requirements in areas of bushfire risk in conjunction with the Council's Development Plan.

This application was developed using ESRI's ArcIMS web mapping software.

### Search Tools

The application has several search options which allow bushfire risk areas be identified by searching on property details or suburb or alternatively to browse bushfire risk areas via a map.

The property details search option is recommended if you know any property identifying information such as plan parcel, certificate of title or valuation assessment number. Property details may be obtained via an address search of the Property Location Browser on the Land Services Group (Department for Transport Energy and Infrastructure) website.

It is also possible to search for bushfire risk areas via a map interface which allows searching by using the pan and zoom tools. A pull down list of local councils can be used to restrict the search to a council area. A separate option exists to search by suburb in a similar manner.

An example of a Plan Parcel search is shown below:

**Sample Plan Parcel Search.**

A plan parcel identifier is defined by a letter/number sequence, for example:  
**H170600 S1793**

This sequence is made up of three parts:

<b>Plan Type (H)</b>	Choices of plan type are available in the drop down list in the search tool.
<b>Plan Number (170600)</b>	User will need to enter this number.
<b>Parcel Number (1793)</b>	User does not need to enter the letter next to this number (S in the example above), just the number.

Select the Plan Type from the drop down list and type the Plan Number and Parcel Number in the appropriate boxes as shown below.

Select the search button and the results will be displayed as shown below. It is possible to get multiple selected records.

2 Records Found

Map	Plan Parcel	Title	Assessment Number	Bushfire Risk Level	Development Plan Name
Show Map	H170600 S1793 CT	5210/36	5832672005	High	Mount Barker (DC)
Show Map	H170600 S1793 CT	5210/37	5832672005	High	Mount Barker (DC)

Upon making a successful Plan Parcel search, selecting “Show Map” will display a map zoomed in to the selected land parcel. The selected land parcel is identified on the map by a red cross-hatch ( ). Clicking on the relevant Council under the Development Plan Name Heading will display the Development Plan for that Council.

## **Data Layers**

A wide range of data, sourced from a number of State Government Departments is available for display in maps on the Bushfire Protection Area's web mapping application.

Administrative data layers include place names, suburbs, local government areas, digital cadastral database, reserves, National Parks and Wildlife SA (NPWSA) reserves, CFS stations, roads and railways.

Topographic data consists of contours, spot heights, water bodies and water courses. These are available at 1:10,000 capture scale in the Mount Lofty Ranges, River Murray and large country towns and at 1:50,000 in other areas. There is also raster data of elevation, slope and aspect with a 25m cell resolution.

There is a vegetation structure dataset which combines all the regional vegetation mapping datasets produced as part of the Biological Survey of SA program within the Department of Environment and Heritage that contributes to the National Vegetation Information System (NVIS). Vegetation mapping descriptions follow NVIS standards and an attribute *vegetation\_class* has been added that equates to the relevant vegetation class in the "Picture Key to the Forms of Australian Vegetation", Figure 2.1, and Table 2.1 in the Australian Standard AS3959-1999.

Bushfire data includes the Bushfire Protection Areas dataset showing the spatial extent of the bushfire protection provisions brought in under the Ministerial Bushfire Plan Amendment in 2006/2007. Other fire data includes the date of last fire, number of fires and fire history. This mapping is for major fires that have burnt largely within or adjacent to NPWSA reserves. A raster dataset of calculated bushfire hazard with 50m cell size is also provided. This was calculated from a model based on the McArthur Forest and Grassland meters using the worst case scenarios for fuel loads, winds, humidity and temperature. The major inputs to the model included slope, aspect and estimated fuel loads based on the native vegetation dataset mentioned above.

Aerial Photography available on the website currently covers the Mt Lofty Ranges and Fleurieu Peninsula also Yorke Peninsula, the Mid North and South East regions of South Australia. Pixel resolution ranges from 35 to 90 cm.

Maps on the website have raster data (which includes aerial photography) at the bottom of the table of contents, then polygon layers and finally line and point layers (e.g. roads and localities) at the top.

The draw order (bottom to top) then ensures that the polygon, line and point data is not overdrawn by the solid-fill raster layers. Users must be aware of which layers are checked on in the table of contents otherwise

it is possible to accidentally over draw data, for example the Bushfire Protection Areas are checked on by default and hence may draw over any checked aerial photography which is lower down in the table of contents.

To reduce the time taken to draw maps, the aerial photography will only draw at scales less than 1:500,000. Scale dependencies have also been set for some other layers, in particular the cadastre.

## **Using the web application as part of the Assessment Process**

To undertake a typical site assessment for a proposed new development in Bushfire Protection Areas, the user must first locate the property in question using one of the search methods outlined above.

It is suggested the user then displays the following layers for the assessment – land parcel labels, contours, spot heights, lakes, reservoirs and dams, watercourses and native vegetation structure. Any vegetation areas close to the proposed development can then be identified by selecting the identify tool and clicking on this area. A pop-up window will appear and display the attributes of the vegetation selected.

The measure tool can be used to indicate distances from a proposed development to a vegetated area or a road.

Slope gradient and site aspect can also be investigated by displaying these layers.

Further information about the site can be obtained by progressively displaying other data layers such as fire history, and aerial photography. The actual calculated bushfire hazard for the site can be determined from the "Calculated Bushfire Hazard – 50m Cells" layer. This layer contains the results of the original calculations of the bushfire hazard based on slope, aspect and predicted fuel loads from the vegetation mapping.

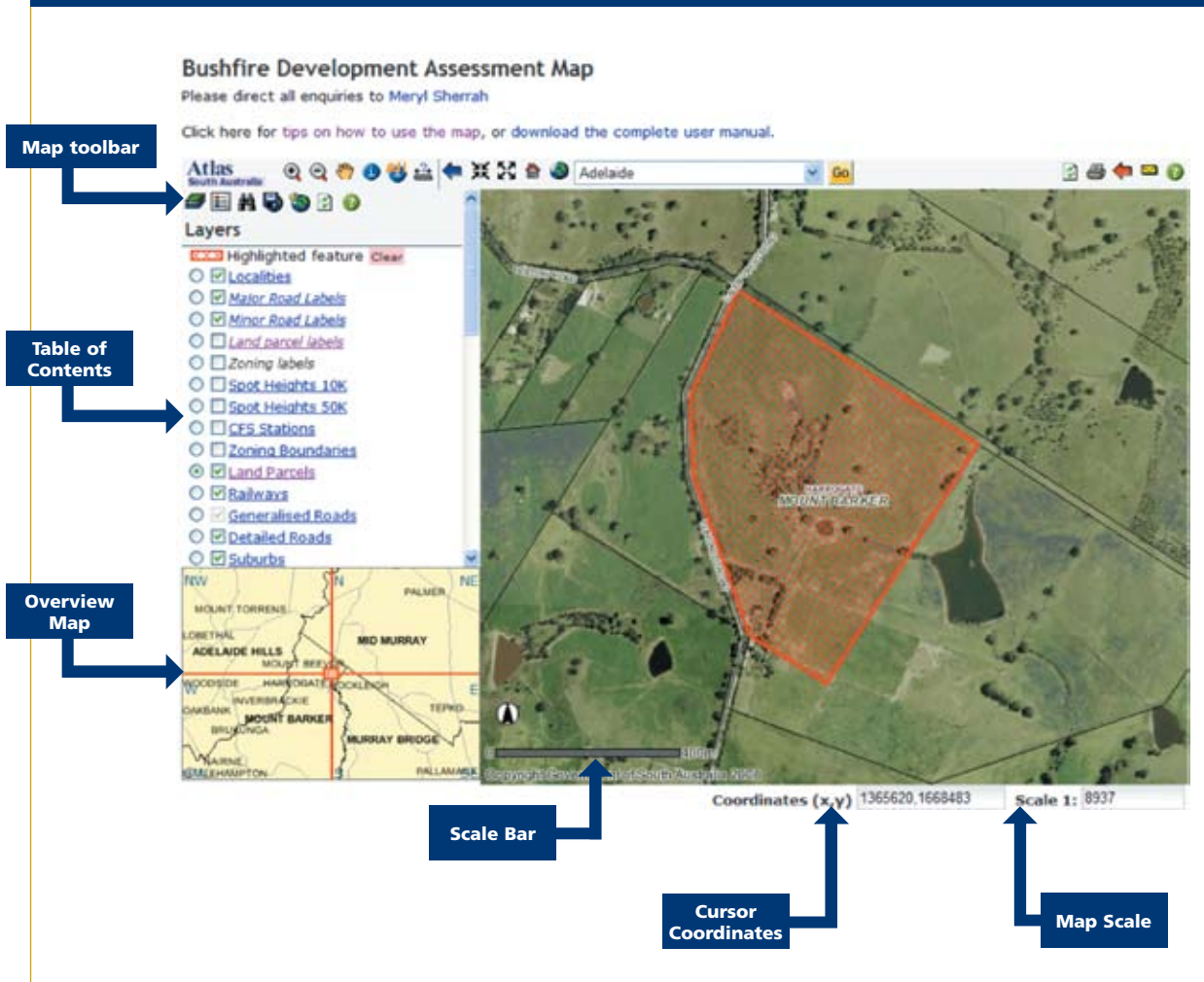
At any stage of the assessment the user can create a PDF image of the map, including a legend. This can then be saved or printed.

The layout of a typical Bushfire Development Assessment Map is shown over the page.

## **User system requirements**

A minimum monitor size of 17" with a minimum resolution of 1024 by 768 is recommended to run this application. Users must have Microsoft Internet Explorer 6 or 7 or Mozilla Firefox installed as their web browser. Adobe Acrobat Reader is also required to allow printing and to read the User Manual. Finally, to display the selection boxes that are used for the Plan Parcel, Certificate of Title and other selection options, Adobe Flash Player must be installed and enabled.

**Figure 2: Bushfire Development Assessment Map.**



## Conclusions

The development of a website for bushfire hazard and development planning information, including planning and building assessment tools has helped to streamline the development assessment process for Councils in Bushfire Protection Areas in South Australia. As well as detailing Bushfire Risk Areas and the appropriate planning and building controls, it has allowed Council and CFS officers to examine proposed developments at the land parcel level through a web mapping application, including contributory factors to bushfire hazard such as vegetation type, slope and aspect.

I would like to acknowledge Peter Brooke-Smith for his contribution to the Bushfire Mitigation and Development Control GIS Project from its initiation, including the establishment of the Bushfire Protection Areas website.

Thanks also to Jason Phillips for producing the maps and diagrams in this paper.

## About the author

**Meryl Sherrah** is a GIS Analyst in the Department of Planning and Local Government, South Australia. She has been working with Geographical Information Systems since 1991.

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