

Appendix K

Bushfire Protection Assessment

**BUSHFIRE PROTECTION ASSESSMENT
FOR THE CONSTRUCTION OF THE
TERALBA SUSTAINABLE RESOURCE CENTRE**

ON

**LOTS 42, 43, 53 & 54 in DP 16062,
THE WEIR ROAD,
TERALBA**

FOR

LAKE MACQUARIE CITY COUNCIL



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EXECUTIVE SUMMARY

Australian Bushfire Protection Planners Pty Limited has been commissioned by *AECOM*, on behalf of *Lake Macquarie City Council*, to prepare a Bushfire Protection Assessment to provide advice on the bushfire protection measures required for the construction of the proposed Teralba Sustainable Resource Centre on Lots 42, 43, 53 & 54 in DP 16062, The Weir Road, Teralba.

The development site is a parcel of vacant, predominantly cleared land which is located on the northern side of The Weir Road. The site is owned by Lake Macquarie City Council and was previously used as a Night Soil Depot.

Vacant land adjoins all aspects of the proposed Sustainable Resource Centre with access provided for The Weir Road, to the south. A partially cleared unmade road reserve extends along the eastern and northern boundaries of the Sustainable Resource Centre site.

The proposed development includes the construction of an Office Building; two Storage Sheds; a Weigh Bridge; Concrete Batching Plant; Water Storage Ponds, material stockpiles and Product Bins. Earthworks will include the construction of a bund wall around the entire operational site with a perimeter fire access track located on the bund wall, connecting to the existing fire trail within the unmade Road Reserve to the east and north of the site.

The adjoining vacant land and the south-western corner of the development site contains Swamp Forest vegetation which has been recorded on the Lake Macquarie City Council Bushfire Prone Land Map as Category 1 Bushfire Prone Vegetation and therefore the proposed development will be subject to the impact from future bushfires that occur in this vegetation.

Due to the proposed development being located within a bushfire prone area, the Development Application for the proposed development is triggered by the Bushfire Prone Land Map and Section 79BA of the *Environmental Planning & Assessment Act 1979* applies to the construction of the proposed Sustainable Resource Centre.

Section 79BA of the *Environmental Planning and Assessment Act* requires the consent authority, when considering development within a bushfire prone area, to either confirm that the development complies with the requirements of *Planning for Bushfire Protection 2006* or, refer the application to the Rural Fire Service for advice concerning measures to be taken with respect to the development to protect persons, property and the environment from the danger that may arise from a bushfire. Section 79BA states:

Development Consent cannot be granted for the carrying out of development for any purpose on bushfire prone land unless the consent authority:

- (a) *is satisfied that the development conforms to the specifications and requirements of “Planning for Bushfire Protection 2006” that are relevant to the development, OR*
- (b) *the consent authority has consulted with the Commissioner of the NSW Rural Fire Service concerning measures to be taken with respect to the development to protect persons, property and the environment from the danger that may arise from a bushfire.*

Planning for Bushfire Protection 2006 provides specific deemed-to-satisfy provisions on the bushfire protection measures necessary for rural & residential subdivisions, the construction of “*Special Fire Protection Purpose Developments*” and the construction of Class 1, 2, 3 & 4 buildings in Bushfire Prone areas.

The document does not identify specific deemed-to-satisfy protection measures for buildings of Class 5 to 10 of the Building Code of Australia. The document does provide the following advice for these classes of buildings:

“The Building Code of Australia does not provide for any bushfire specific performance requirements and as such A.S. 3959 does not apply as a set of “deemed-to-satisfy” provisions.

The general fire safety construction provisions [of the BCA] are taken as acceptable solutions, but the aim and objectives of Planning for Bushfire Protection 2006 apply in relation to other matters such as access, water and services, emergency planning and landscaping/vegetation management”.

“Where the aim and objectives of PfPFP [Section 1.1] are not met, then the construction requirements for bushfire protection will need to be considered on a case-by-case basis”.

“In many cases, these types of developments will require on-site parking and loading areas. In such cases, it is prudent to place these facilities in the most appropriate location in order to establish defensible space for firefighting purpose”.

The objectives of *Planning for Bushfire Protection 2006* are:

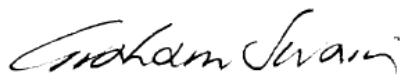
- (i) Afford occupants of any building adequate protection from exposure to a bushfire;
- (ii) Provide for a defensible space to be located around buildings;
- (iii) Provide appropriate separation between a hazard and buildings which, in combination with other measures, prevent direct flame contact and material ignition;

- (iv) Ensure that safe operational access and egress for emergency service personnel and residents is available;
- (v) Provide for ongoing management and maintenance of bushfire protection measures, including fuel loads in the asset protection zones; and
- (vi) Ensure that utility services are adequate to meet the needs of firefighters and others assisting in bushfire fighting.

In accordance with the provisions of Section 117 – Ministerial Directions, Direction Grouping 4 – Hazard & Risk, Sub-section 4.4 – Planning for Bushfire Protection of the *Environmental Planning and Assessment Act 1979*, Lake Macquarie City Council will consult with the Commissioner of the NSW Rural Fire Service, [under Section 62 of the *Environmental Planning and Assessment Act 1979*] and take into account any comments so made.

This Bushfire Protection Assessment undertakes an assessment of the bushfire protection measures required to address bushfire risk to the proposed Sustainable Resource Centre development on the site, consistent with the provisions of Section 79C of the *Environmental Planning and Assessment Act 1979* and examines the adequacy of the setback [defendable space] from the bushfire prone vegetation to the buildings and Resource Stockpiles; fire-fighting access and provision of fire-fighting water supplies, fuel management protocols and other matters considered necessary to mitigate any potential bushfire threat to persons, property and the environment.

The characteristics of the site as discussed in this report, together with the recommendations contained in this assessment, confirms that the site is suitable in terms of its intended use.



Graham Swain
Managing Director,
Australian Bushfire Protection Planners Pty Limited.

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SECTION 1

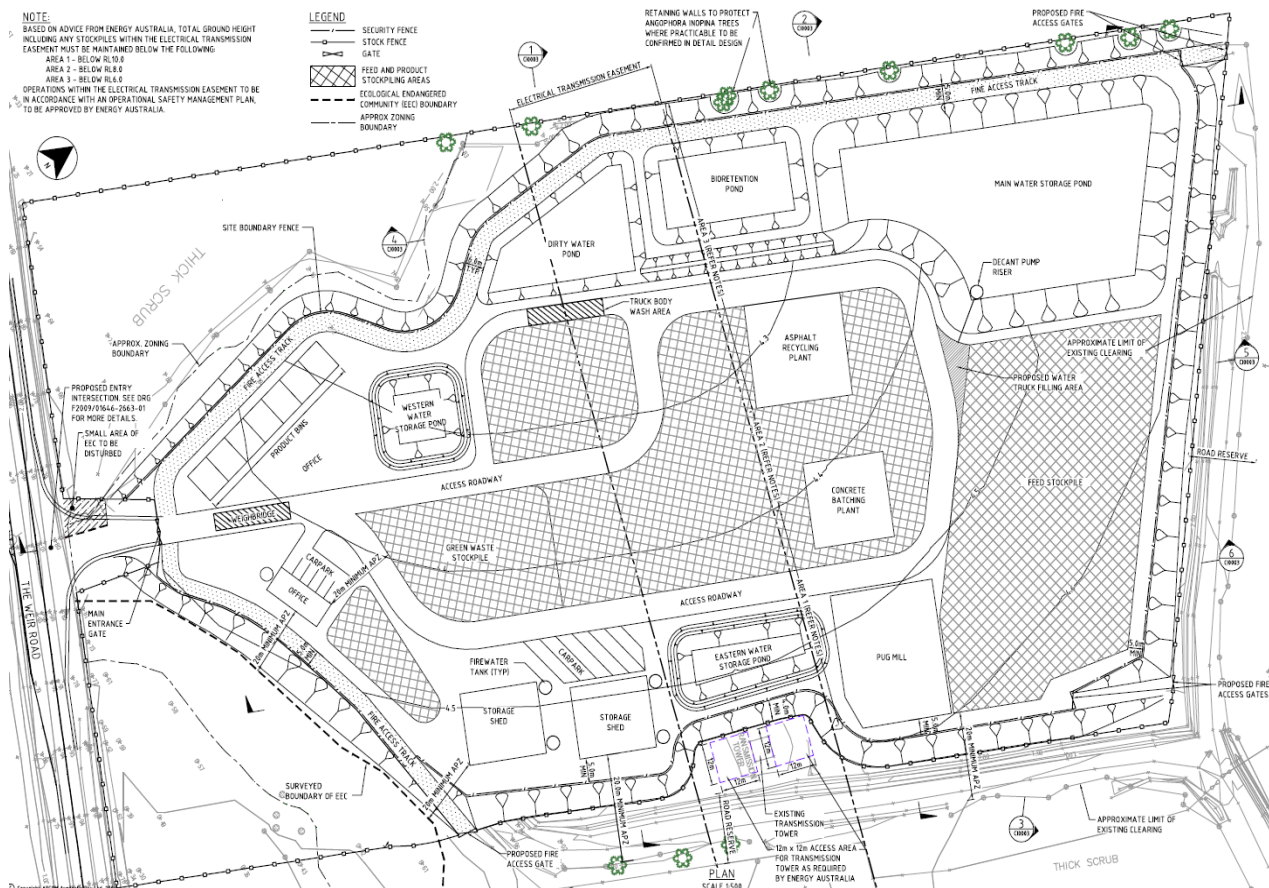
INTRODUCTION

1.1 Development Proposal.

This Bushfire Protection Assessment has been prepared, at the request of *AECOM*, on behalf of *Lake Macquarie City Council*, for the construction of the proposed Teralba Sustainable Resource Centre on Lots 42, 43, 53 & 54 in DP 16062, The Weir Road, Teralba.

The proposed development includes the construction of an Office Building; two Storage Sheds; a Weigh Bridge; Concrete Batching Plant; Water Storage Ponds, material stockpiles and Product Bins. Earthworks will include the construction of a bund wall around the entire operational site with a perimeter fire access track located on the bund wall, connecting to the existing fire trail within the unmade Road Reserve to the east and north of the site.

Figure 1 – Plan of Proposed Sustainable Resource Centre.



1.2 Aim of this Assessment.

The aim of this Bushfire Protection Assessment is to address the aim & objectives of *Planning for Bushfire Protection 2006* including:

- Determine the classification of the vegetation on and surrounding the site in accordance with the vegetation classification system contained in *Planning for Bushfire Protection 2006*;
- Undertake an assessment to determine the slope of the land on and surrounding the development site;
- Undertake a Bushfire Protection Assessment to determine bushfire protection strategies for the proposed development that address the following matters:
 - (i) The provision of building setbacks (Defendable Space) from vegetated areas and the siting of buildings to minimize the impact of radiant heat and direct flame contact;
 - (ii) Fire fighting water supplies;
 - (iii) Access requirements for emergency service vehicles;
 - (iv) Construction standards to be used for the future buildings within the proposed development to minimize the vulnerability of buildings to ignition from radiation and ember attack;
 - (v) Land management responsibilities; and
 - (vi) Evacuation management.

1.3 Statutory Requirements.

This assessment has been prepared having regard to the following legislative and planning requirements:

1.3.1 Legislation.

(a) *Environmental Planning and Assessment Act - 1979 (EPA Act)*

Planning and development within NSW is regulated by the *Environmental Planning & Assessment Act, 1997* (EPA Act).

In relation to bushfire planning for new developments (including Industrial Development) in bushfire prone areas in NSW, the following sections of the EPA Act apply:

- (i) Section 79C(1) states *“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 (e.g. natural hazards such as bushfire threat);*
 - *The suitability of a site for development (e.g. bushfires)*
- (ii) Section 79BA requires a consent authority to determine if a proposed development that is located within a designated Bushfire Prone Area or the buffer zone to the Bushfire Prone Land:
- *Complies with Planning for Bushfire Protection 2006, or the consent authority; or has*
 - *Consulted with the Rural Fire Service concerning measures to be taken with respect to the development to protect persons and property from danger that may arise from a bushfire.*

(b) Rural Fires Act 1997

The objectives of the *Rural Fires Act* are to provide:

- The prevention, mitigation and suppression of fires;
- Coordination of bushfire fighting and prevention;
- Protection of people and property from fires; and
- Protection of the environment.

In relation to the management of bushfire fuels on public and private lands within NSW, Sections 63(1) and 63(2) require public authorities and owners / occupiers of land to take all practicable steps to prevent the occurrence of bushfires on, and to minimize the danger of the spread of bushfires.

(c) Threatened Species Conservation Act 1995 (TSC Act).

The TSC Act aims to protect and encourage the recovery of threatened species, populations and communities as listed under the Act. The TSC Act is integrated with the EP&A Act and requires consideration of whether a development or an activity (such as the implementation of hazard reduction and asset protection) is likely to significantly affect threatened species, populations and ecological communities or their habitat.

(d) Native Vegetation Act 2003 (NV Act).

The *N.V. Act* states indigenous vegetation within 20 metres of the bed or bank of a river or lake, or on slopes over 18 degrees, requires clearing consent under the *NV Act*, unless during an emergency fire event as authorized under the *Rural Fires Act 1997*.

1.3.2 Planning Policies.

Planning for Bushfire Protection – 2006. (NSW Rural Fire Service)

This document provides guidance on the planning and development control processes in relation to bushfire protection measures for residential subdivision, “Special Fire Protection” and Industrial Developments in bushfire prone areas.

1.4 Documentation Reviewed.

The following documents were reviewed in the preparation of this assessment:

- Site Plan of proposed development prepared by AECOM – Drawing No.60101141-DWG-10-C10002, Revision 03, Dated 11.06.2010;
- Aerial Photograph of the site;
- Lake Macquarie City Council Certified Bushfire Prone Land Map;
- *Planning for Bushfire Protection 2006* prepared by the NSW Rural Fire Service.

1.5 Site Inspection.

Graham Swain of *Australian Bushfire Protection Planners Pty. Limited* inspected the development property on the 8th July 2009 to assess the topography, slopes, vegetation classification and land use within and adjoining the development site.

Visual assessment was undertaken to determine likely fire runs, influence of terrain on wind patterns within the bushfire prone vegetation and an assessment of access and egress to the development site. Adjoining properties were also inspected to determine the surrounding land use / land management.

SECTION 2

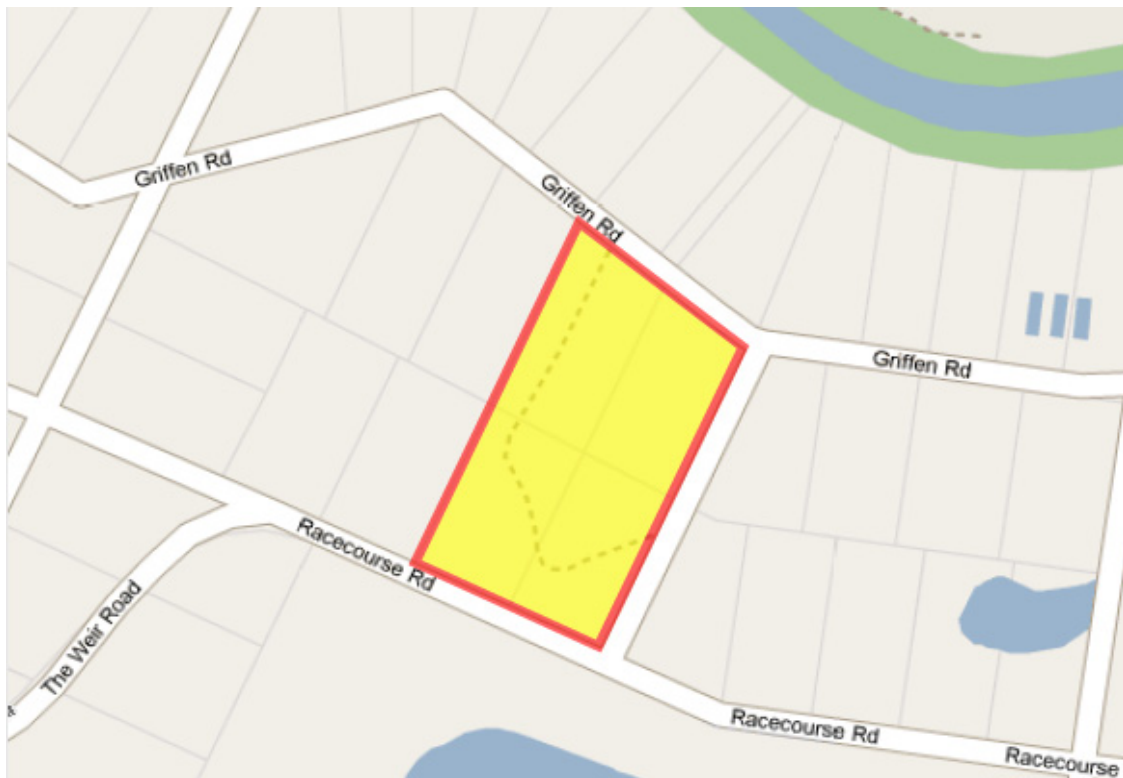
DESCRIPTION OF DEVELOPMENT SITE

2.1 Location & Description.

The land within the development site consists of Lots 42, 43, 53 & 54 in DP 16062, The Weir Road, Teralba.

The development site consists of vacant land located on the northern of side of The Weir Road.

Figure 2 – Location of the Development Site.



Source – Google Maps

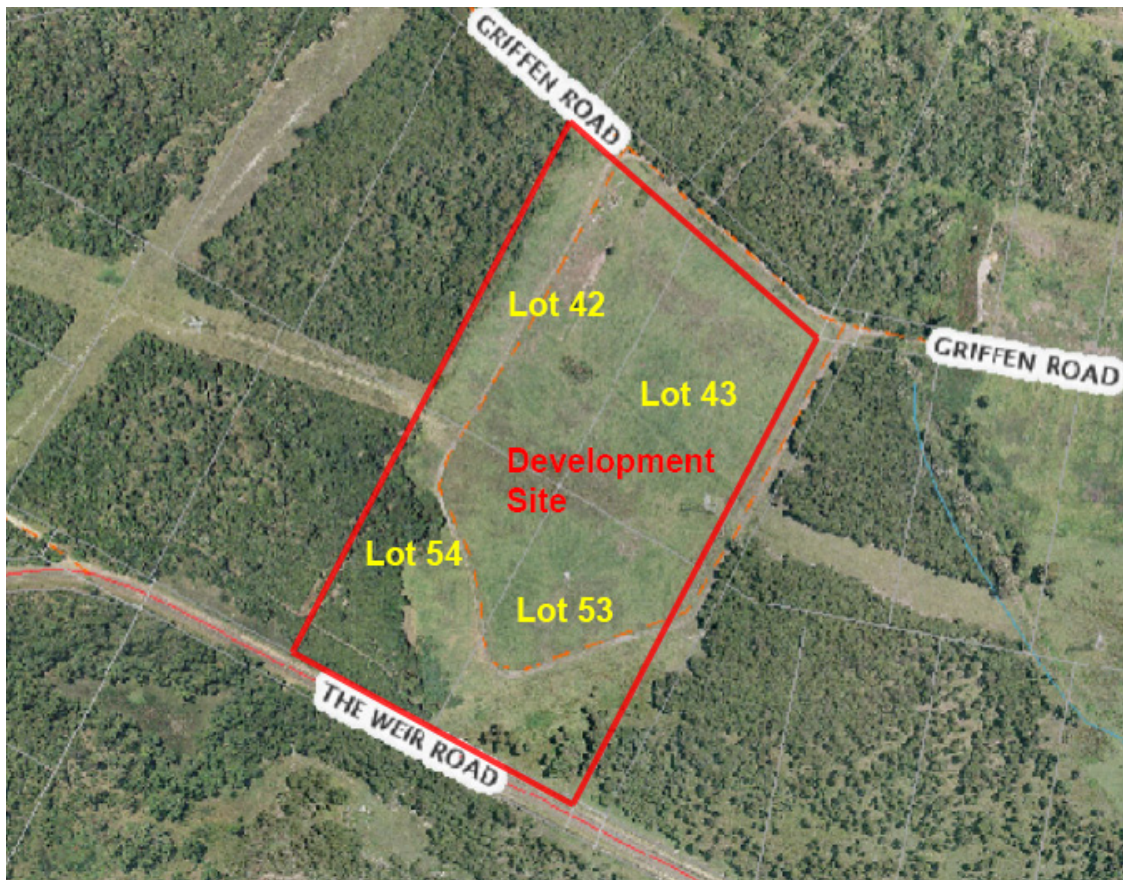
2.2 Existing Land Use.

The development site is vacant land which was previously used as a Night Soil Depot.

2.3 Adjoining Land Use.

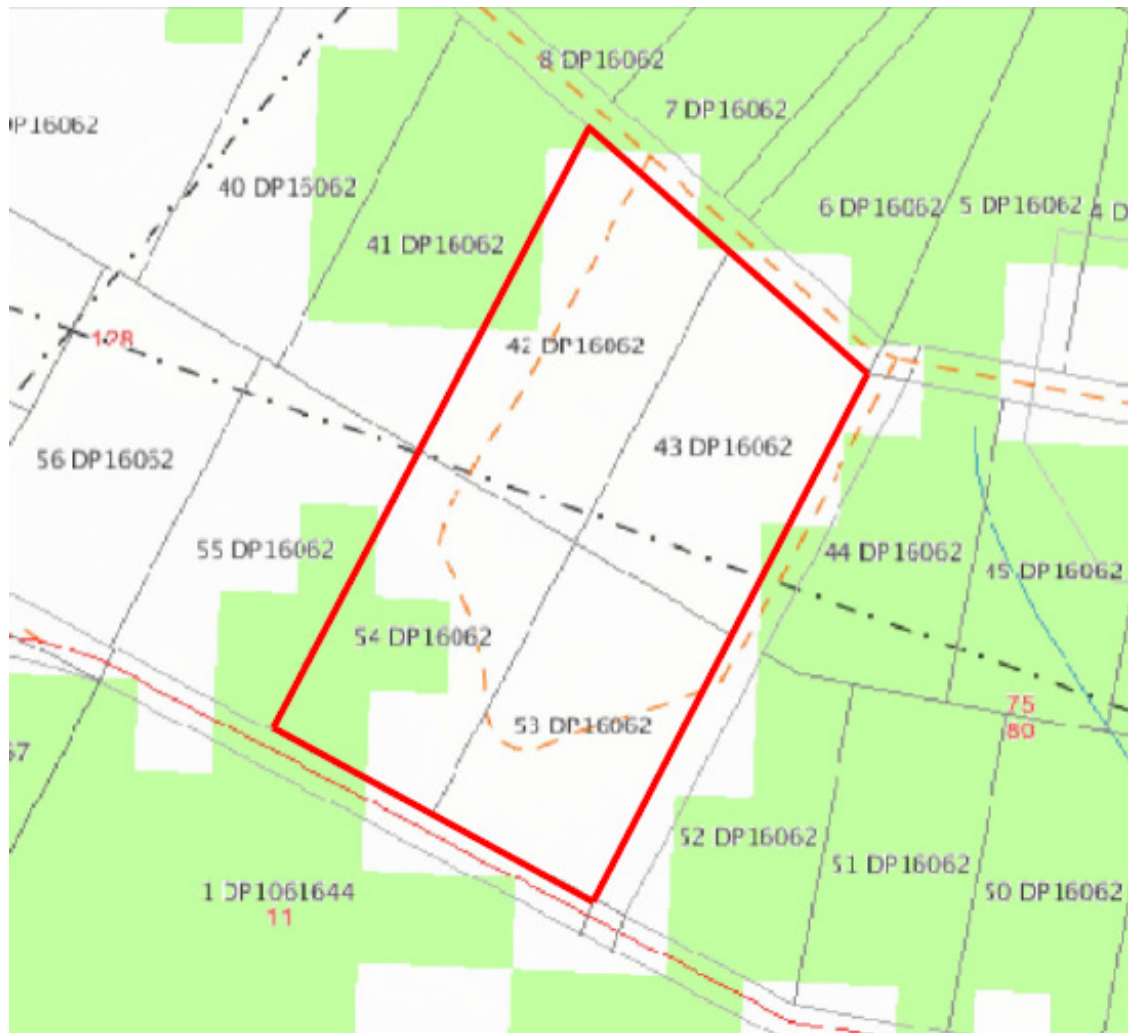
Vacant land adjoins all aspects of the development site. The Weir Road adjoins the southern boundary of the site and an unmade road reserve extends along the eastern boundary and unmade Griffen Road extends along the northern boundary.

Figure 3 – Aerial Photograph of Development Site and adjoining lands.



Source – SIX Viewer

Figure 4 – Cadastre Plan.



Source – Six Viewer

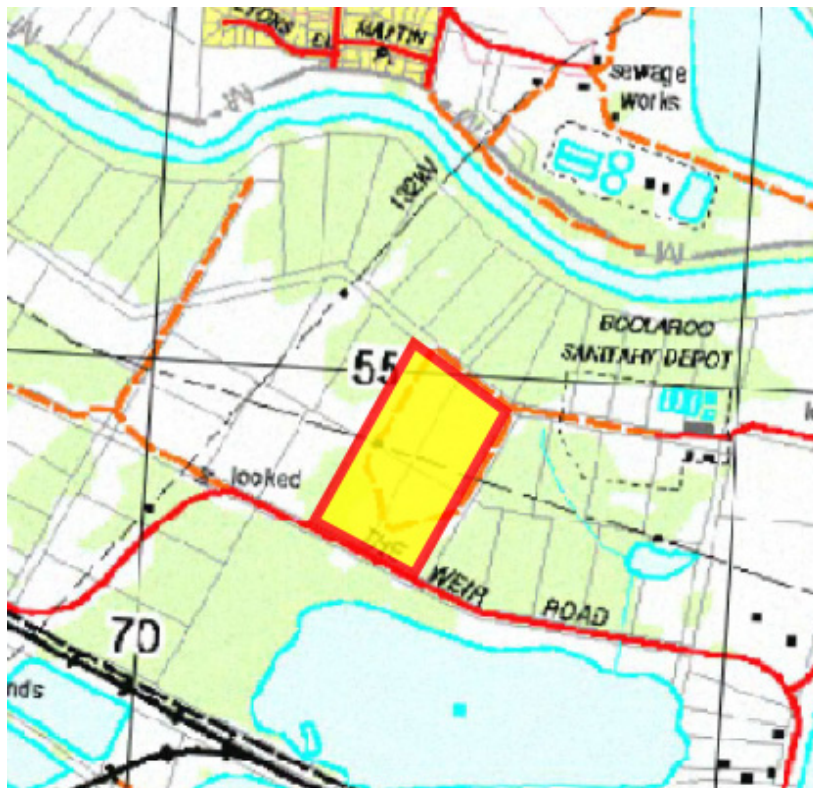
2.4 Topography.

Appendix 2 of *Planning for Bushfire Protection 2006* states that slopes should be assessed, over a distance of at least 100m from a development site and that the gradient of the land should be determined which will most significantly influence the fire behaviour on the site.

The land within development site is level, having been previously filled with a catch drain around the perimeter of the filled area.

The land adjoining all aspects of the development site is level.

Figure 5 – Topographic Map of Development Site and adjoining lands.



Source – SIX Viewer

2.5 Vegetation Communities on the land within the Development Site.

Appendix A2.3 of *Planning for Bushfire Protection 2006* provides a methodology for determining the predominant bushfire prone vegetation for at least 140 metres in all directions from the proposed building. Vegetation is classified using Table A2.1 of *Planning for Bushfire Protection 2006*, which classifies vegetation types into the following groups:

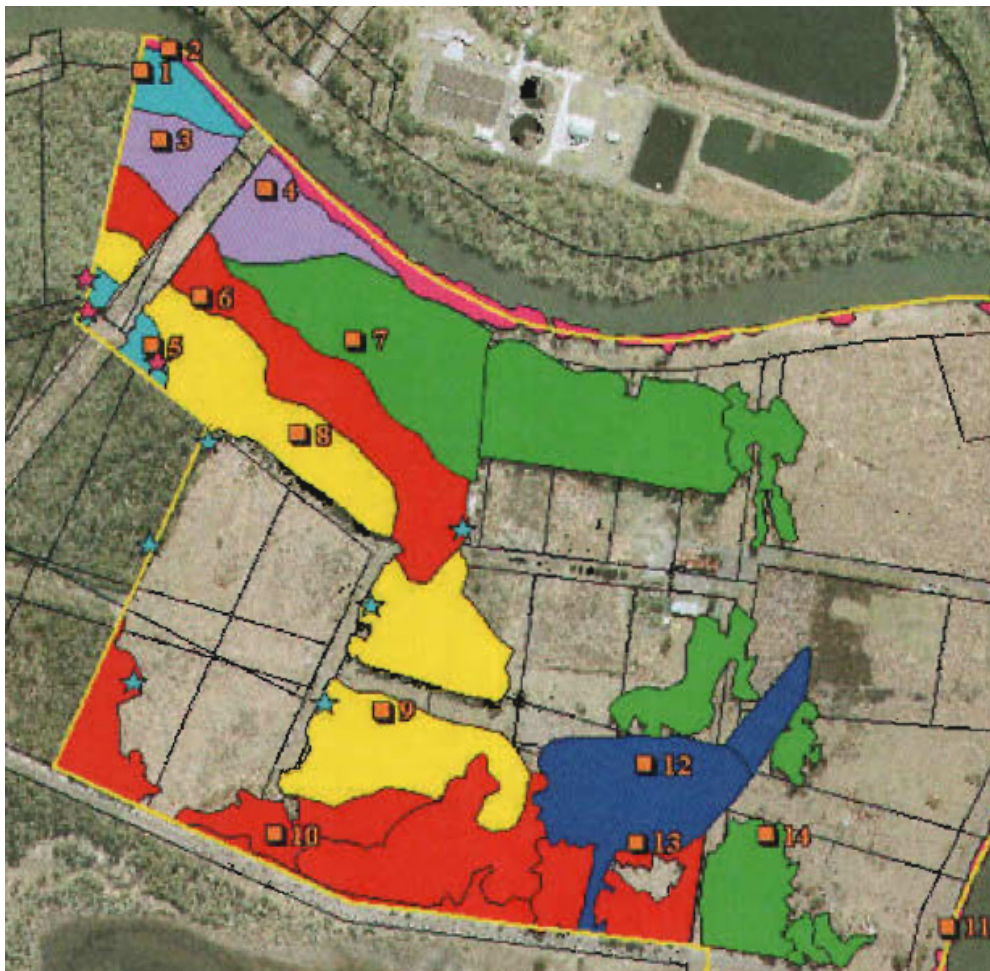
- (a) Forests [wet & dry sclerophyll forests];
- (b) Woodlands;
- (c) Plantations – being pine plantations not native plantations;
- (d) Forested Wetlands;
- (e) Tall Heaths;
- (f) Freshwater Heaths;
- (g) Short Heaths;
- (h) Alpine Complex;
- (i) Semi – arid Woodlands;
- (j) Arid Woodlands; and
- (k) Rainforests.

The vegetation on the development site consists of grazed grassland across the filled area with a triangular area of Swamp Mahogany/Paperbark/Woollybutt Swamp Forest located in the southwestern and south-eastern corner of the site.

2.6 Vegetation Communities adjoining the land within the Development Site.

Ecotone Ecological Consultants Pty Ltd undertook an Ecological Study as part of the preparation of the Local Environmental Study [LES] for the rezoning of the site and adjoining land owned by Lake Macquarie City Council. The study found that the vegetation to the north and east of the development site consists of Ball Honeymyrtle Swamp Forest. The study did not identify the vegetation on the land to the west of the site [Lot 41 & 55 in DP 16062] however this vegetation consists of Ball Honeymyrtle Swamp Forest and Swamp Mahogany/Paperbark/Woollybutt Swamp Forest.









Figure 6 – Plan of Vegetation Communities.



Source – Ecotone Ecological Consultants Pty Ltd

LEGEND:

Vegetation Communities

- | | |
|---|---|
|  | 1 - Forest Red Gum/Woollybutt/Mahogany Floodplain Forest |
|  | 2 - Ball Honeymyrtle Swamp Forest |
|  | 3 - Swamp Mahogany/Paperbark/Woollybutt Swamp Forest |
|  | 4 - Ironbark/Rough-barked Apple/Mahogany Forest/Open Forest |
|  | 5 - Scribbly Gum/Red Bloodwood/Smooth-barked Apple Open Forest |
|  | 6 - Freshwater Wetland |
|  | 7 - Saltwater Riparian Mangrove/Swamp Oak Forest/Open Forest |
|  | 8 - Cleared/weedy open pasture with scattered remnant or planted trees. |

2.7 Significant Environmental Features on the land within the Development Site.

The development site does not contain any significant environmental features such as SEPP 14 – Coastal Wetlands; SEPP 26 Littoral Rainforests; SEPP 44 – Koala Habitat; Areas of Geological interest; Steep Lands [>18 degrees]; Land slip areas or National Parks Estate.

2.8 Known Threatened Species, Populations, Endangered Ecological Communities or Critical Habitat on the land within the Development Site.

The Swamp Mahogany/Paperbark/Woollybutt Swamp Forest community in the south-western and south-eastern corners of the site qualifies as the Endangered Ecological Community '*Swamp Sclerophyll Forest on Coastal Floodplains*'. This vegetation will be retained and protected by the construction of a perimeter fence and the perimeter bunding of the facilities on the site.

2.9 Details of Aboriginal/European Heritage within the Development Site.

The studies undertaken for the preparation of the LES found that there were no known Aboriginal sites, relics or European heritage within the development site.

SECTION 3

FIRE MANAGEMENT RESPONSIBILITIES

Fire management within the development site is the responsibility of:

3.1 Lake Macquarie City Council.

Lake Macquarie City Council has responsibility, under Section 66 of the *Rural Fires Act*, to issue a notice in writing requiring an owner / occupier of any land within the Local Government Area [LGA] to carry out bushfire hazard reduction works on that land. Section 100E of the *Rural Fires Act* requires Council to issue bushfire hazard reduction certificates for hazard reduction to be undertaken on private lands.

3.2 New South Wales Rural Fire Service.

The NSW Rural Fire Service (RFS) has the responsibility for undertaking fire suppression activities, hazard management activities and other functions relative to emergency management, within its areas of operation. *Section 73* of the *Rural Fires Act (1997)* enables the Commissioner to carry out bush fire hazard reduction works on any land as required by a bush fire risk management plan if the work has not been carried out satisfactorily. Incurred costs can be recovered as a debt owed to the Crown.

3.3 New South Wales Fire Brigade.

The NSW Fire Brigade has the responsibility for undertaking fire suppression activities, and other functions relative to emergency management, within its area of operation and through Mutual Aid Agreements, provide assistance to the NSW Rural Fire Service, particularly for structural fire operations within the NSW Rural Fire Brigade Districts. Hazmat management within New South Wales is the responsibility of the NSW Fire Brigade.

3.4 Lake Macquarie Bush Fire Management Committee.

The Lake Macquarie Bushfire Management Committee has the responsibility for planning for coordinated fire fighting activities / hazard management activities on a local government level. It is not an operational organization, a fire fighting organization or a funding source for fire management activities.

The Bush Fire Management Committee is supported by the following provisions of the *Rural Fires Act 1997*:

- **Section 52** requires each Bush Fire Management Committee to prepare a draft bush fire management plan for their local areas which includes a plan of operations and a bush fire risk management plan.

- **Section 54** of the Act specifies that a draft bush fire risk management plan is to 'set out schemes for the reduction of bush fire hazards in the rural fire district or other part of the State'.

A draft bush fire risk management plan may also restrict or prohibit the use of fire or other fire hazard reduction activities in all or specified circumstances or places to which the plan applies.

3.5 Public Authorities & owners/occupiers of land.

The Rural Fires Act, 1997 provides several legislative opportunities to require Public Authorities, land owners and occupiers to manage hazardous fuels. These are listed below:

- **Section 63(1)** states that it is the duty of a public authority to take any practicable steps to prevent the occurrence of bushfires on, and to minimise the danger of the spread of a bushfire on or from:
 - (a) any land vested in or under its control or management, or
 - (b) any highway, road, street, land or thoroughfare, the maintenance of which is charged on the authority.
- **Section 63(2)** states that 'it is the duty of the owner or occupier of land to take the notified steps (if any) and any other practicable steps to prevent the occurrence of fires on, and to minimise the danger of the spread of fires on or from that land'.
- **Section 65A** states that the 'Commissioner may nominate a member of the Service as a hazard management officer'.
- **Section 65(2)** states that 'an authorised person may, with the permission of the fire fighting authority or other authority responsible for unoccupied Crown land or managed land or a person nominated by the authority to give such permission, enter the land and carry out bushfire hazard reduction work with the assistance of such other persons as the authorised person considers to be necessary for the purpose'.
- **Section 65(3)** states that 'the authority responsible for unoccupied Crown land or managed land is to be taken to have given the permission under this section to the extent necessary to give effect to a bushfire risk management plan'.
- **Section 65(4)** states that 'if permission under this section is given subject to conditions, the conditions must be complied with'.

- **Section 66(1)** states that ‘a hazard management officer may, by notice in writing, require the owner or occupier [not being a public authority] of any land to carry out bushfire hazard reduction work specified in the notice on the land’.
- **Section 66(2)** states that ‘a hazard management officer must serve a notice under this section if required to do so by a bushfire risk management plan applicable to the land that is in force’.
- **Section 66(3)** states that ‘a hazard management officer must issue a bushfire hazard reduction certificate in respect of any bushfire hazard reduction work required by a notice issued in accordance within section (2)’.
- **Section 66(6)** states that ‘the requirements and conditions so specified must include any requirements in a bushfire risk management plan that is applicable to the land and is in force and may include a requirement or condition that the burning of fire breaks or of combustible material;
 - (a) must in fire district constituted under the Fire Brigades Act 1989 be carried out by or under the supervision of the fire brigade or an officer in charge of the fire brigade;
 - (b) must outside a fire district, be carried out by or under the supervision of the rural fire brigade specified in the notice or an appropriate officer of the rural fire brigade or any hazard management officer.
- **Section 66(7)** states that ‘a notice requiring the establishment of a firebreak cannot require an occupier or owner to kill or remove any trees that are reasonably necessary for shade, shelter, windbreak or fodder purposes or the protection of threatened species, populations, ecological communities or critical habitats within the meaning of the ‘Threatened Species Conservation Act 1995’.
- **Section 66(8)** states that ‘an occupier or owner to whom a bushfire hazard reduction notice is given must, despite the fact that a fire permit has not been granted under Division 5, comply with the requirements specified in the notice’.
- **Section 70(2)** states that ‘if within the time specified in the relevant notice the owner or occupier to whom it is given fails to comply with any requirement of the notice, the Commissioner may, without prejudice to liability of the owner or occupier, enter on the land and carry out the bushfire hazard reduction work the owner or occupier was required to do under the notice’.

- **Section 70(3)** states that ‘any costs incurred by the Commissioner in carrying out such work may be recovered from the owner or occupier of the land as a debt due to the Crown in a court of competent jurisdiction’.
- **Section 87** allows the removal of hazards in the bush fire danger period by the provision of a permit system. The permits are valid for 21 days, excluding TOBAN days.

Section 10 permits are not required to adhere to Part V provisions of the EPA Act 1979 in the assessment of impact, except for public authorities. An owner/occupier of private land must obtain from the NSW Rural Fire Service, a bushfire hazard reduction certificate before undertaking hazard reduction works on that land (Section 100E of the Rural Fires Act 1997).

3.6 Management of the Defendable Spaces to the Development.

The management of the Defendable Spaces within the development site shall remain the responsibility of Lake Macquarie City Council through its operational wing ‘Civilake’.

SECTION 4

BUSHFIRE HAZARD ASSESSMENT

4.1 Definitions.

Planning for Bushfire Protection 1991 defines *Bushfire Hazard* as the “availability of fuel”. The document also defines threat as being a “measure of the scale of impact or significance in terms of hazard and risk”.

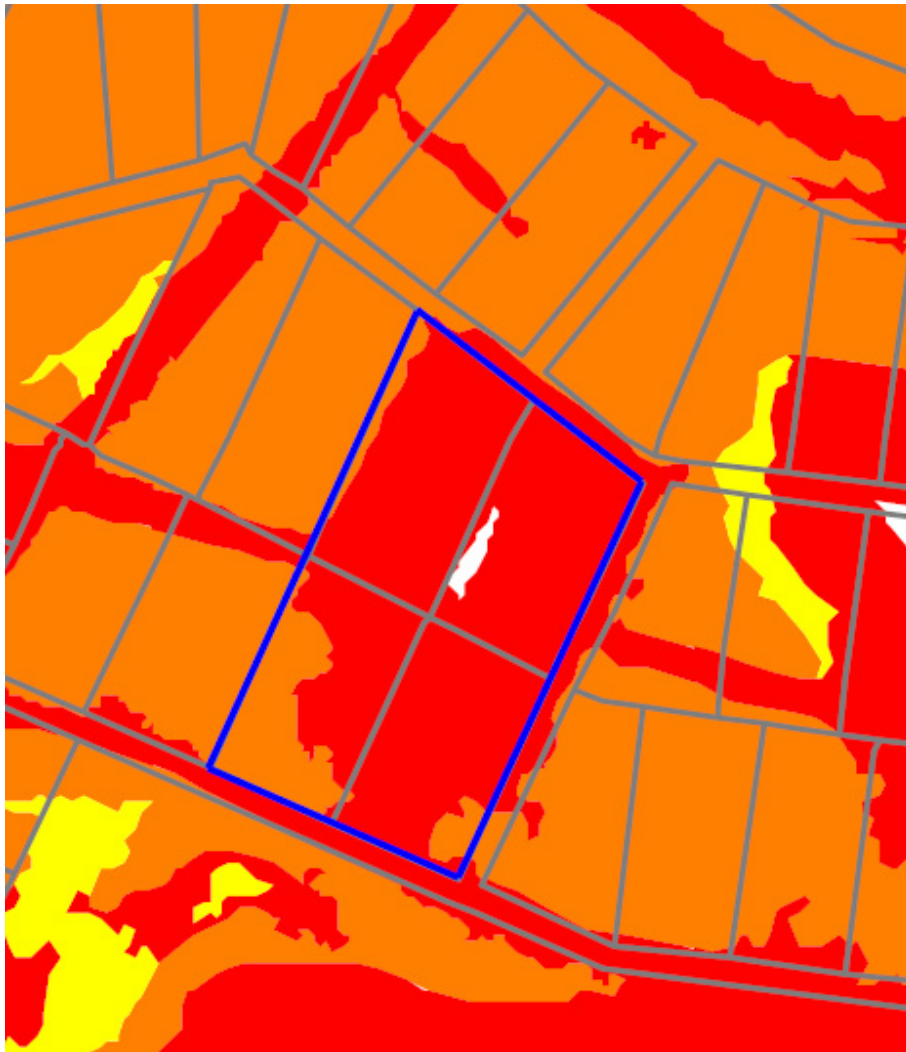
Planning for Bushfire Protection 2006 defines bushfire risk as “the chance of a bushfire igniting, spreading and causing damage to assets of value to the community. Risk may be rated as extreme, major, moderate, minor or insignificant and is related to the vulnerability of the asset”.

4.2 Bushfire Prone Land Map.

Lake Macquarie has prepared a Bushfire Prone Land Map under the provisions of Section 146 of the *Environmental Planning & Assessment Act 1979*. An extract of this map is provided as Figure 7 below and shows that the development site contains Category 1 Bushfire Prone Vegetation and is impacted by the 100 metre wide buffer zone to the Category 1 Bushfire Prone Vegetation on the site and on land surrounding the site.

The site inspection undertaken on the 8th July 2009 confirmed the accuracy of the Bushfire Prone Land Map.

Figure 7 – Extract of the Lake Macquarie Bushfire Prone Land Map.



Legend: Orange – Category 1 Bushfire Prone Vegetation; Yellow – Category 2 Bushfire Prone Vegetation; Red – Buffer Zone to Bushfire Prone Vegetation

4.3 Bushfire Hazard Assessment.

Planning for Bushfire Protection 2006 does not provide a methodology for determining bushfire hazard – it defers instead to Bushfire Prone Land determined in accordance with the “*Bushfire Prone Land Mapping Guideline*”, issued by the Rural Fire Service on the 7th April 2004.

To be able to undertake a bushfire hazard assessment the *Department of Planning* document *Circular C10 (1983)* provides a suitable methodology. This methodology rates the vegetation and slope and provides an index value to each.

The overall Bushfire Hazard Score is determined by multiplying the Vegetation Index by the Slope Index.

4.3.1 Assessment to Determine the Bushfire Hazard to the Development.

The vegetation that presents the potential bushfire threat to the development is the Swamp Forest on the development site and on the adjoining land.

The Swamp Forest vegetation has a vegetation index score of 0.95. The effective slope is level to all aspects of the development site. The slope index score for level land is 1.0. Therefore the Bushfire Hazard Score for the Swamp Forest vegetation is $0.95 \times 1.0 = 0.95$, which equates to a numerical bushfire hazard rating of low.

4.4 Assessment of Bushfire Threat.

Bushfire Threat is the “*measure of scale of impact or significance in terms of hazard and risk*”.

The bushfire hazard to the proposed Sustainable Resource Centre, from the Swamp Forest bushfire prone vegetation on the land adjoining the development site has been determined to be low, using the methodology provided by *Circular No. C10* prepared by the Department of Planning [1983].

However, the bushfire risk to the proposed facility is high as the Swamp Forest vegetation has the potential to produce high intensity fires that will develop into crown fires which will impact upon the development by producing levels of radiant heat which may cause injury to workers and ignite stored materials and unprotected buildings and equipment.

This vegetation also gives off excessive amounts of burning embers due to the fibrous nature of the bark on species such as the Ball Honeymyrtle Swamp Forest, potentially resulting in burning ember ignition of combustible materials, equipment and unprotected buildings.

The bushfire threat to the proposed facility is therefore high.

SECTION 5

BUSH FIRE PROTECTION ASSESSMENT

5.1 Introduction.

Chapter 1 of *Planning for Bushfire Protection 2006* states that the aim of the document is to use the NSW development assessment system to provide for protection of human life [including firefighters] and to minimize impacts on property from the threat of bushfire, while having due regard to development potential, onsite amenity and protection of the environment.

The objectives of the document are:

- Afford occupants of any building adequate protection from exposure to the impacts of a bushfire;
- Provide for a defensible space to be located around buildings;
- Provide appropriate separation between a hazard and buildings which, in combination with other measures, prevent direct flame contact and material ignition;
- Ensure that safe operational access/egress for emergency service personnel and occupants relocating is provided and/or available;
- Provide for ongoing management and maintenance of bushfire protection measures, including fuel loads within the Asset Protection Zone/s; and
- Ensure that utility services are adequate to meet the needs of firefighters [and others assisting in bushfire fighting operations].

Chapter 1, Section 1.3 of *Planning for Bushfire Protection 2006* states that the construction of Class 5 – 10 buildings on bushfire prone land, or land impacted by bushfire prone land, must meet the aim and objectives of the document.

Chapter 4, Section 4.3.6(f) discusses the bushfire protection to buildings of Class 5 to 8 and 10b of the Building Code of Australia and states:

“The BCA does not provide for any bushfire specific performance requirements and as such A.S. 3959 does not apply as a set of ‘deemed to satisfy provisions’.

The general fire safety construction provisions for this class of building are taken as acceptable solutions, but the aim and objective of Planning for Bushfire Protection 2006 apply in relation to access and water supply for firefighting operations, emergency planning [evacuation] and landscaping / vegetation management”.

*Planning for Bushfire Protection 2006 provides a methodology to determine the Asset Protection Zones [defendable space] and Bushfire Attack [Construction Standards] required for **habitable buildings** in development for **residential purposes** that are designated as bushfire prone. The document does not provide deemed to satisfy solutions for Class 5 – 8 buildings constructed in bushfire prone areas but states that where the aim and objectives of the document are not met, then the construction requirements for bushfire protection will need to be considered on a case by case basis.*

Sections 5.2 and 5.3 of this report examine the layout of the development in relation to the provision of a suitable “defendable space” between the bushfire hazard and the facility and the protection against the potential impacts of a future fire occurrence in the bushfire prone vegetation adjoining the development site and provides recommendations on the bushfire protection measures required to be implemented to the mitigate the potential bushfire threat.

The provision of access and water supplies for firefighting operations; management of the defendable space [Asset Protection Zone] and evacuation planning are examined in Sections 5.4 – 5.9 of this report.

5.2 The provision of Defendable Space/s [Asset Protection Zones].

Appendix 2 of *Planning for Bushfire Protection 2006* provides the following procedure for determining setback distances (Asset Protection Zones) for **residential development** in bushfire prone areas:

- (a) *Determine vegetation formations as follows:*
 - Identify vegetation in all directions from the site for a distance of 140 metres;
 - Consult Table A2.1 to determine the predominant vegetation type; and
 - Select the predominant vegetation formation as described in Table A2.1.
- (b) *Determine the effective slope of the land under the predominant vegetation Class.*
- (c) *Determine the appropriate fire [weather] area in Table A2.2.*

- (d) Consult Table A2.3 and determine the appropriate setback [APZ] for the assessed land use, vegetation formation and slope range.

The methodology does not determine the requisite Defendable Space requirements for Class 5 – 10, non-residential and 'Special Fire Protection Purpose' development.

Table 1 examines the width of defendable space requirements based on the widths required to provide a separation distance which is sufficient to minimise flame contact with the building/s and to provide a fire-fighting platform wide enough to permit the safe extinguishment of the fire after the fire front has passed.

Table 1. Determination of Defendable Space to the proposed buildings constructed within the Sustainable Resource Facility.

Aspect	Vegetation within 140m of development	Predominant Vegetation Formation Class [Table A2.1 Planning for Bushfire Protection 2006]	Effective Slope of Land	Flame Zone Width determined by calculation	Recommended width of Defendable Space
South of Office Building & Storage Shed	Swamp Mahogany / Paperbark / Woollybutt Swamp Forest within and adjoining the site	Swamp Forest	Level	16 metres flame length for Forested Wetland vegetation on level ground	20 metres for Level 3 construction to the Office Building
South east of Storage Sheds	Ball Honeymyrtle Swamp Forest within and adjoining the site	Swamp Forest	Level	16 metres flame length for Forested Wetland vegetation on level ground	20 metres

Review of Defendable Space Provisions and construction standards to the Office building & Storage Sheds:

The assessment provided in Table 2 identifies the minimum widths of Defendable Space widths required to the buildings on the site to minimise flame contact. The recommended width of 20 metres for the Defendable Space reduces the likelihood of flame contact on the structures and also the level of radiant heat on the office building and sheds to 22kW/m².

This level of radiant heat necessitates the application of BAL 29 construction standards to the external walls of the Office and Storage Sheds which are exposed to the radiant heat whilst the remaining walls and the roof of these buildings shall be constructed to comply with BAL 12.5 of A.S. 3959 – 2009 – ‘*Construction of Buildings in Bushfire Prone Areas*’.

5.2.1 Additional Construction Measures to Buildings.

The following additional building construction standards shall apply to the Office and Storage Sheds:

- The Roof gutters shall be fitted with a non-combustible leaf/gutter guard;
- Access doors [PA and Vehicle] to the Storage Sheds shall be fitted with weather seals that seal the bottom, stiles and head of the door against the opening/frame to prevent the entry of embers into the building. Particular attention shall be paid to the gap at the head of the door curtain;
- Any external vents or grilles shall have stainless steel mesh with a maximum aperture of 2mm square fitted to prevent the entry of embers through the opening;
- Ventilation louvres shall be screened with stainless steel flymesh with a maximum aperture of 2mm;
- Roof ventilators shall be fitted with stainless steel flymesh to prevent the entry of embers into the building.

5.3 Access Standards for Firefighting Operations.

Chapter 4, Section 4.2 “Access” of *Planning for Bushfire Protection 2006* provides specifications on the access provisions for firefighting operations within developments which are subject to bushfire attack.

Vehicular access to the proposed Sustainable Resource Centre is from The Weir Road via a single entry road and Entrance Gate. This access and the internal access roadway will be designed and constructed to accommodate rigid and articulated heavy vehicles and will therefore provide suitable access for fire-fighting appliances similar to NSW Rural Fire Service Category 1 Tankers and NSW FB Composite Appliances.

A network of perimeter fire trails [proposed & existing] will provide fire-fighting access between the buildings and storage facilities within the site and the adjacent bushfire prone vegetation.

The new fire trails will be located on top of the low bund wall and designed and constructed to comply with the standards required by Section 4.11.3(3) of *Planning for Bushfire Protection 2006* – [road width of 4.0m within a managed corridor 6.0m wide x 4.0m high and capable of carrying 15 tonne GVM].

These new fire access trails will connect, through locked security gates on the boundary of the site, to the existing fire access trails within the road reserves along the eastern and northern boundaries of the site. These existing access tracks are constructed to a standard which permits access for Category 1 NSW Rural Fire Service Tankers and connect to the existing gravel formation within the Griffen Road reserve which provides emergency access to the east.

5.4 Water Supplies for Firefighting Operations.

A reticulated water supply for potable water supply is only proposed for the site.

Fire-fighting water supply is proposed to be supplied from onsite storage tanks and water storage ponds.

The water storage tanks shall feed a pump which supplies fire hose reels fitted to the exterior of the Office Building and Storage Shed buildings. The number of hose reels shall be determined so that all points of the exterior of the buildings are covered by a 30.0 metre hose line length and the water stream from the end of the hose.

5.5 Emergency Management for Fire Protection / Evacuation.

The facility will be exposed to radiant heat, ember attack and smoke from bushfires occurring in the vegetation surrounding the site. Whilst the siting of the buildings has been determined so as to minimise direct flame attack on the structures, high levels of radiant heat may still impact the buildings with ember attack likely to ignite combustible materials stored in the product stockpiles.

Spontaneous combustion can also occur in some types of waste, particularly green waste.

Therefore, Lake Macquarie City Council shall undertake a 'risk assessment' which identifies the external and internal threats to the facility. From this risk assessment there shall be prepared an 'Operations/Emergency Procedures Manual' which identifies operational/emergency procedures required in order to address the management of the identified risk.

An Evacuation Plan shall also be prepared for the Facility.

The Evacuation Plan shall address the protocols for the timely relocation of staff/visitors in the event that an emergency occurs, both within the site or within the local area. A copy of the Evacuation Plan shall be provided to the Local Emergency Management Committee/Police, NSW Fire Brigade and NSW Rural Fire Service.

The Evacuation Plan shall comply with AS 3745 - 2002 *"Emergency Control Organisation and Procedures for Buildings, Structures and Workplaces"*.

5.6 Bushfire Hazard Management.

The intention of bushfire hazard management is to prevent flame contact with a structure, reduce radiant heat to below the ignition thresholds for various elements of a building, to minimize the potential for wind driven embers to cause ignition and to reduce the effects of smoke on occupants and firefighters.

Careful attention shall be given to species selection within the landscaping on the bund wall and within the Defendable Space, their location relative to their flammability, avoidance of continuity of vegetation [separation horizontally and vertically] and ongoing maintenance to remove flammable fuels.

Management of the Defendable Spaces and the site generally shall comply with the recommendations of Appendix A5.4 & Appendix A5.5 of *Planning for Bushfire Protection 2006* and *Standards for Asset Protection Zones*.

Management of the Defendable Spaces within the development shall comply with the following:

- Maintain a clear area of low cut lawn or pavement adjacent to the buildings; Utilise non-flammable materials such as Scoria, pebbles and recycled crushed bricks as ground cover to landscaped gardens in close proximity to building;
- Keep areas under shrubs and trees raked and clear of combustible fuels;
- Trees and shrubs should be maintained in such a manner that tree canopies are separated by 2 metres and understorey vegetation is not continuous [retained as clumps].

SECTION 6

BUSHFIRE MANAGEMENT STRATEGIES

Strategies to mitigate the potential bushfire risk to the proposed Sustainable Resource Centre are as follows:

6.1 Strategy 1 – Provision of Defendable Space to the Office Building and Storage Sheds:

A minimum 20 metre wide Defendable Space [building setback] shall be provided between the bushfire hazard and the building. The defendable space shall be maintained as an Inner Protection Area in accordance with the specifications of Appendix A2.5 of *Planning for Bushfire Protection 2006*.

6.2 Strategy 2 – Landscape Management:

Management of the defendable spaces/landscaped areas within the development site shall comply with the following:

- Maintain a clear area of low cut lawn or pavement adjacent to the building;
- Keep areas under shrubs and trees raked and clear of combustible fuels;
- Utilise non-flammable materials such as Scoria, pebbles and recycled crushed bricks as ground cover to landscaped gardens in close proximity to building;
- Trees and shrubs should be maintained in such a manner that tree canopies are separated by 2 metres and understorey vegetation is not continuous [retained as clumps].

6.3 Strategy 3 – Construction Standards to the Office Building and Storage Sheds:

The Office Building and Storage Sheds shall be constructed to comply with BAL 12.5 specifications as defined by A.S. 3959 – 2009 – *Construction of Buildings in Bushfire Prone Areas* except for those elevations which are exposed to the bushfire hazard. These elevations shall be constructed to comply with BAL 29 specifications as defined by A.S. 3959 – 2009 – *Construction of Buildings in Bushfire Prone Areas*.

The following additional construction standards shall be implemented to the Office Building and Storage Sheds:

- The Roof gutters shall be fitted with a non-combustible leaf/gutter guard;
- Access doors [PA and Vehicle] to the Storage Sheds shall be fitted with weather seals that seal the bottom, stiles and head of the door against the opening/frame to prevent the entry of embers into the building. Particular attention shall be paid to the gap at the head of the roller door curtain;
- Any external vents or grilles shall have stainless steel mesh with a maximum aperture of 2mm square fitted to prevent the entry of embers through the opening;
- Ventilation louvres shall be screened with stainless steel flymesh with a maximum aperture of 2mm;
- Roof ventilators shall be fitted with stainless steel flymesh to prevent the entry of embers into the building.
- External doors to the southern elevation of the Office Building shall be protected against the entry of embers – threshold, stile and head seals shall be fitted to doors;

6.4 Strategy 4 – Water Supplies for Firefighting Operations:

The water storage tanks shall feed a pump which supplies fire hose reels fitted to the exterior of the Office Building and Storage Sheds. The number of hose reels shall be determined so that all points of the exterior of the buildings are covered by a 30.0 metre hose line length and the water stream from the end of the hose.

6.5 Strategy 5 – Emergency & Evacuation Planning:

Lake Macquarie City Council shall undertake a 'risk assessment' which identifies the external and internal threats to the facility. From this risk assessment there shall be prepared an 'Operations/Emergency Procedures Manual' which identifies operational/emergency procedures required in order to address the management of the identified risk.

An Evacuation Plan shall also be prepared for the Facility. The Evacuation Plan shall address the protocols for the timely relocation of staff/visitors in the event that an emergency occurs, both within the site or within the local area.

A copy of the Evacuation Plan shall be provided to the Local Emergency Management Committee/Police, NSW Fire Brigade and NSW Rural Fire Service.

The Evacuation Plan shall comply with AS 3745 - 2002 *“Emergency Control Organisation and Procedures for Buildings, Structures and Workplaces”*.

SECTION 7

CONCLUSION

The development proposal is for the construction of a new Sustainable Resource Centre for Lake Macquarie City Council on land within Lots 42 & 43 and Lots 53 & 54 in DP 16062, The Weir Road, Teralba.

The development site is located on the northern side of The Weir Road and is surrounded by vacant land that contains unmanaged vegetation which is bushfire prone.

The proposed development is therefore triggered by this vegetation and must comply with the provisions of Section 79BA of the *Environmental Planning & Assessment Act 1979* and *Planning for Bushfire Protection 2006*.

This assessment has reviewed the bushfire threat to the proposed facility and made recommendations on the provision of a defendable space to the proposed buildings in order to reduce the chance of flame attack on the structures and the provision of construction measures to these buildings so as to increase the protection of the buildings against the potential impact of high levels of radiant heat and burning ember attack.

The report also examines the potential for ignition of the material stored on site and the need for Lake Macquarie City Council to undertake a risk assessment to determine those measures and operational procedures necessary to address the identified risks.

Implementation of the strategies provided in Section 6 of this report are considered necessary to provide the level of protection required to the future development and to ensure compliance with legislative requirements in respect to the provision of Defendable Spaces between the Bushfire Prone Vegetation and the proposed buildings; access for fire-fighting operations and recommendations on the provision of water supplies for fire protection of the buildings and the resources stored within the facility.

The assessment of the bushfire protection requirements and potential levels of bushfire attack on the proposed facility indicates that the development of the site can be undertaken in a manner that balances development opportunities and the protection of life, property and the environment.

REFERENCES:

- N.S.W Rural Fire Service – *Planning for Bushfire Protection* 2006;
- *Environmental Planning & Assessment Act* – 1979;
- *Rural Fires Act* – 1997;
- *Rural Fires and Environmental Assessment Legislation Amendment Act* 2002;
- *Rural Fires Regulation* 2002;
- NSW Rural Fire Service – *Guideline for Bushfire Prone Land Mapping* 2002;
- *Threatened Species Conservation Act* 1995;
- *Native Vegetation Act*;
- *Bushfire Environmental Assessment Code* 2003;
- Building Code of Australia;
- Australian Standard A.S 3959 - 2009 “*Construction of Buildings in Bushfire Prone Areas*”.
- *Lake Macquarie Bushfire Prone Land Map*.

SECTION 8 – Plan of Defendable Spaces.

