Bushfire Threat Assessment

Speers Point Quarry, Speers Point

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1	Draft for Client Review	SJ				RD	
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Disclaimers

It is believed that the implementation of the measures and recommendations forwarded within this report would contribute to the amelioration of the potential impact of any bushfire upon the subject lands assessed herein, but they do not and cannot guarantee that the area will not be affected by bushfire at some time.

Executive Summary

RPS Australia East Pty Ltd (RPS) has been commissioned by Lake Macquarie City Council to prepare a Local Environmental Study (LEP) for the old Speers Point Quarry, hereafter to be known as the site. The proposal is to cover rezoning of the site for mixed uses, potentially including industrial, residential, conservation and commercial zones. The site includes Lot 21 DP 790637, Lot 1 DP 557315, Lot 1 DP 321254, Lot 1 210440, and Lots 1 and 2 DP 105845. The old Speers Point Quarry is located between the suburbs of Boolaroo and Lakelands, at the northern end of Lake Macquarie.

This Bushfire Threat Assessment Report (BTA) has been prepared as part of the LES for the site that takes into consideration the surrounding bushfire threats. It is suitable for submission with a rezoning application and provides information on measures that will enable the development to comply with 'Planning for Bushfire Protection' (NSW RFS, 2006) (hereafter referred to as 'PBP'). Refer to Appendix A for Proposed Structure Plan.

This assessment aims to consider and assess the bushfire hazard and associated potential threats relevant to such a proposal, and to outline the minimum mitigative measures which would be required in accordance with the provisions of the *Environmental Planning and Assessment Amendment (Planning for Bush Fire Protection) Regulation 2007* and the *Rural Fires Amendment Regulation 2007 (RF Amendment Regulation, 2007)*.

This assessment has been undertaken in accordance with clause 46 of the RF Regulation 2007. This BTA also addresses the six key Bush Fire Protection Measures (BFPMs) in a development assessment context being:

- The provision of clear separation of buildings and bush fire hazards, in the from of fuel-reduced APZ (and their subsets inner protection areas and defendable space);
- Construction standards and design;
- Appropriate access standards for residents, fire-fighters, emergency workers and those involved in evacuation;
- Adequate water supply and pressure;
- Emergency management arrangements for fire protection and / or evacuation; and
- Suitable landscaping, to limit fire spreading to a building.

This assessment adheres to Chapter 4.1.3 of PBP (RFS, 2006) ‘Standards for Bush Fire Protection Measures for Residential and Rural Residential Subdivision’.

In summary, the following is recommended to enable the proposal to meet the relevant legislative requirements:

- Creation and maintenance of APZs in areas adjacent to retained vegetation that constitute a bushfire risk. Asset Protection Zones of 20 and 35m are provided between future residential dwellings and retained Open Forest.
- An Asset Protection Zones of 10m be established between industrial / commercial buildings and retained Open Forest. This APZ is to be comprised entirely of an Inner

Protection Area.

- Future dwellings will need to comply with the Bush Fire Attack Levels as outlined by the Australian Standard (AS3959 – 1999) construction of buildings in bushfire prone areas. Refer to Section 6 of this report.
- All internal roads be formalised to a width capable of being used by fire fighting vehicles. Attention to surface treatment will also be required to ensure all weather access; gravel surfacing as a minimum is recommended.
- Roads be constructed to the specifications outlined in PBP (RFS, 2006).
- The proposed development is linked to the existing mains pressure water supply and that suitable hydrants be clearly marked and provided for the purposes of bushfire protection. Fire hydrant spacing, sizing and pressure should comply with AS2419.1, 2005.

Terms & Abbreviations

Abbreviation	Meaning
APZ	Asset Protection Zone
AS2419 -2005	Australian Standard – Fire Hydrant Installations
AS3959-1999	Australian Standard – Construction of Buildings in Bush Fire Prone Areas
BCA	Building Code of Australia
BPA	Bush Fire Prone Area (Also Bushfire Prone Land)
BPL Map	Bush Fire Prone Land Map
BPMs	Bush Fire Protection Measures
DECC	NSW Department of Environment and Climate Change
DoP	NSW Department of Planning
EPA Act	*NSW Environmental Planning and Assessment Act 1979*
FDI	Fire Danger Index
FMP	Fuel Management Plan
ha	hectare
IPA	Inner Protection Area
LGA	Local Government Area
LMCC	Lake Macquarie City Council
OPA	Outer Protection Area
PBP	Planning for Bushfire Protection 2006
RF Act	Rural Fires Act 1997
RF Regulation	Rural Fires Regulation
RPS	RPS Group

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1 Introduction

RPS Australia East Pty Ltd (RPS) has been commissioned by Lake Macquarie City Council to prepare a Local Environmental Study (LEP) for the old Speers Point Quarry, hereafter to be known as the site. The proposal is to cover rezoning of the site for mixed uses, potentially including industrial, residential, conservation and commercial zones. The site includes Lot 21 DP 790637, Lot 1 DP 557315, Lot 1 DP 321254, Lot 1 210440, and Lots 1 and 2 DP 105845. The old Speers Point Quarry is located between the suburbs of Boolaroo and Lakelands, at the northern end of Lake Macquarie (Figure 1-1 Site Location).

This BTA has been produced to form part of a Local Environmental Study (LES), for the rezoning of the site. The LES will be used to inform the preparation of a draft Local Environmental Plan (dLEP) and will form part of the public exhibition material.

This assessment aims to consider and assess the bushfire hazard and associated potential threats relevant to future residential development, and to outline the minimum mitigative measures which would be required in accordance with the provisions of the *Environmental Planning And Assessment Amendment (Planning for Bushfire Protection) Regulation 2007* and the *Rural Fires Amendment Regulation 2007 (RF Amendment Regulation 2007)*. This BTA aims to:

- Identify the overall bushfire threats;
- Assess the capability of the site to provide a safe development;
- Review the potential to carry out hazard management over the subject site taking into account environmental / ecological constraints;
- Provide information on measures that will enable development to comply with Planning for Bushfire (PBP) (NSW RFS, 2006); and
- Provide recommendations as to the suitability/compatibility of future zoning of the subject land based on the identified bushfire threat.

1.1 Site Particulars

Locality – The old Speers Point Quarry occurs along the eastern boundary of the suburb of Boolaroo and extends approximately 1.2km east towards the suburbs of Macquarie Hills and Lakelands.

LGA – Lake Macquarie City Council.

Titles – Lot 21 DP 790637, Lot 1 DP 557315, Lot 1 DP 321254, Lot 1 210440, and Lots 1 and 2 DP 105845.

Area – The site comprises an area of approximately 79.4 hectares.

Zoning – A mixture of 4(1) Industrial (Core), 7(2) Conservation (Secondary), and 1(1) Rural (Production).

Boundaries – The site is bounded by private residences and properties in the east from Macquarie Hills to Speers Point coming off Fairfax Rd. To the west is bounded by private residences from First St. through to Farm St., to the south is bounded by private residences off Thompson Rd. The northern boundary is a rail corridor and industrial estate coming off Munibung and Mitchell Rd's.

Current Land Use – The site is currently disused, and was used for a gravel quarry. The associated lands are vacant land containing disturbed areas of forest and grassy woodland.

Topography – The site is located on the south-western slopes of Munibung Hill ranging in altitude from 30m ADSL to 140m ADSL. Slopes are predominately moderate however some steep slopes occur, particularly around Munibung Hill. Numerous drainage lines and gullies traverse the site.

Soils and Geology – Three soil types comprise the site (Matthei 1995). The central pit areas are mapped as disturbed highly variable soils. The surrounding soils down to an approximate elevation of 80m to 100m ADSL are Stockrington Soil Landscapes, characterised by moderately deep to deep rapidly drained Earthy Loams and Friable Loams on upper slopes, with deep well drained Red Podzolic Soils, red Soloths, brown Soloths, and yellow Soloths on midslopes and benches. Soils below approximately 100m ADSL are Cedar Hill Soil Landscapes, characterised by moderately deep to deep, well to imperfectly drained Brown Podzolic Soils and Yellow Podzolic Soils, some deep well-drained Non-calic Groan Soils and moderately deep, well-drained Structured Loams.

Forest Danger Index - The Site has a Forest Danger Index (FDI) of 100.

Climate / Fire History The site lies within a geographical area with a FDI rating of 100. Extreme bushfire weather is therefore associated with long periods of drought, high temperatures, low humidity and gusty often north-westerly winds.

TITLE: FIGURE 1-1 SITE LOCATION MAP | LOCATION: SPEERS POINT | DATUM: DATUM | PROJECTION: MGA ZONE 56 (GDA 94) | DATE: 5/7/2010 | PURPOSE: REPORT FIGURE | LAYOUT REF: J:\JOBS\26K\26292 -Speers Point \10- Drafting\MapInfo\Report Figures\26292 Figure 1-1 Site Location Map A-A4 270110.wor | VERSION (PLAN BY): A-A4 (SC/SC)

CLIENT: LAKE MACQUARIE CITY COUNCIL
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1.2 Description of Proposal

The existing quarry, comprising two main pit areas, ceased operation in 2007. Lake Macquarie City Council (LMCC) is considering alternative land uses of the site. Such alternative uses include a wide range of sustainable uses capable of meeting the needs of the community for housing, access to services and facilities, as well as maintaining ecological valuable land, and links between conservation areas.

1.3 Scope and Purpose

The scope and purpose of this BTA is to review the overall bushfire threat to the subject land and to review the capability of the subject land to provide a safe environment. This assessment will include information on ability of the subject land to comply with the requirements of PBP (RFS, 2006).

This will be achieved by providing/undertaking:

- An assessment of all vegetation on and adjacent to the subject land within 140 metres from all elevations from the development estate boundary;
- An assessment of topography (slope) on and adjacent to the subject property to a distance of 140 metres from the development estate boundary;
- Adequacy of public roads in the vicinity to handle increased traffic in a bushfire emergency;
- Recommendations for appropriate setback (APZ) distances from the identified bushfire hazards; and
- Information on water supply for fire fighting purposes.

1.4 Objectives of Assessment

This assessment has been undertaken in accordance with Clause 46 of the RF Regulation 2007. This BTA provides an assessment of the bushfire requirements for future urban development and provides recommendations on the provisions of Bush Fire Protection Measures (BFPMs). There are six key BFPMs in a development assessment context being:

1. The provision of clear separation of buildings and bushfire hazards, in the form of fuel-reduced Asset Protection Zones (and their components being Inner Protection Areas and Outer Protection Areas);
2. Construction standards and design;
3. Appropriate access standards for residents, fire-fighters, emergency workers and those involved in evacuation;
4. Adequate water supply and pressure;

5. Emergency management arrangements for fire protection and / or evacuation; and
6. Suitable landscaping to limit fire spreading to a building.

This assessment will address the six key BFPMs and provide recommendations to the suitability/compatibility of future zoning of the subject land based on the identified ecological constraints of the land (RPS, 2010) that may a bushfire threat.

2 Methodology

2.1 Vegetation Assessment

Vegetation surveys and vegetation mapping carried out on the study area have been undertaken as follows:

- Aerial Photograph Interpretation to map vegetation cover and extent.
- Confirmation of the vegetation assemblage typology present via a site inspection.
- Review of the findings of the Ecological Constraints and Opportunities Report for the Speers Point Quarry, Speers Point (July 2010).

2.2 Slope Assessment

Slope assessment has been undertaken as follows:

- Aerial Photograph Interpretation in conjunction with analysis of electronic contour maps with a contour interval of 10m.

3 Vegetation Assessment

The vegetation in and around the subject land, to a distance of 140m, has been assessed in accordance with PBP 2006. This assessment has been made via a combination of aerial photo interpretation and ground truthing exercises.

Vegetation communities were identified within the subject land and within 140m of the development land These vegetation communities have been classified for bushfire purposes into structure and formation using the system adopted by Keith (2004) and using Table A2.1 within PBP (RFS, 2006). Vegetation communities identified within the site and within 140m of the site are contained In Table 3-1 Vegetation Assessment. Refer to Figure 3-1 for Vegetation Map.

Table 3-1 Vegetation Assessment

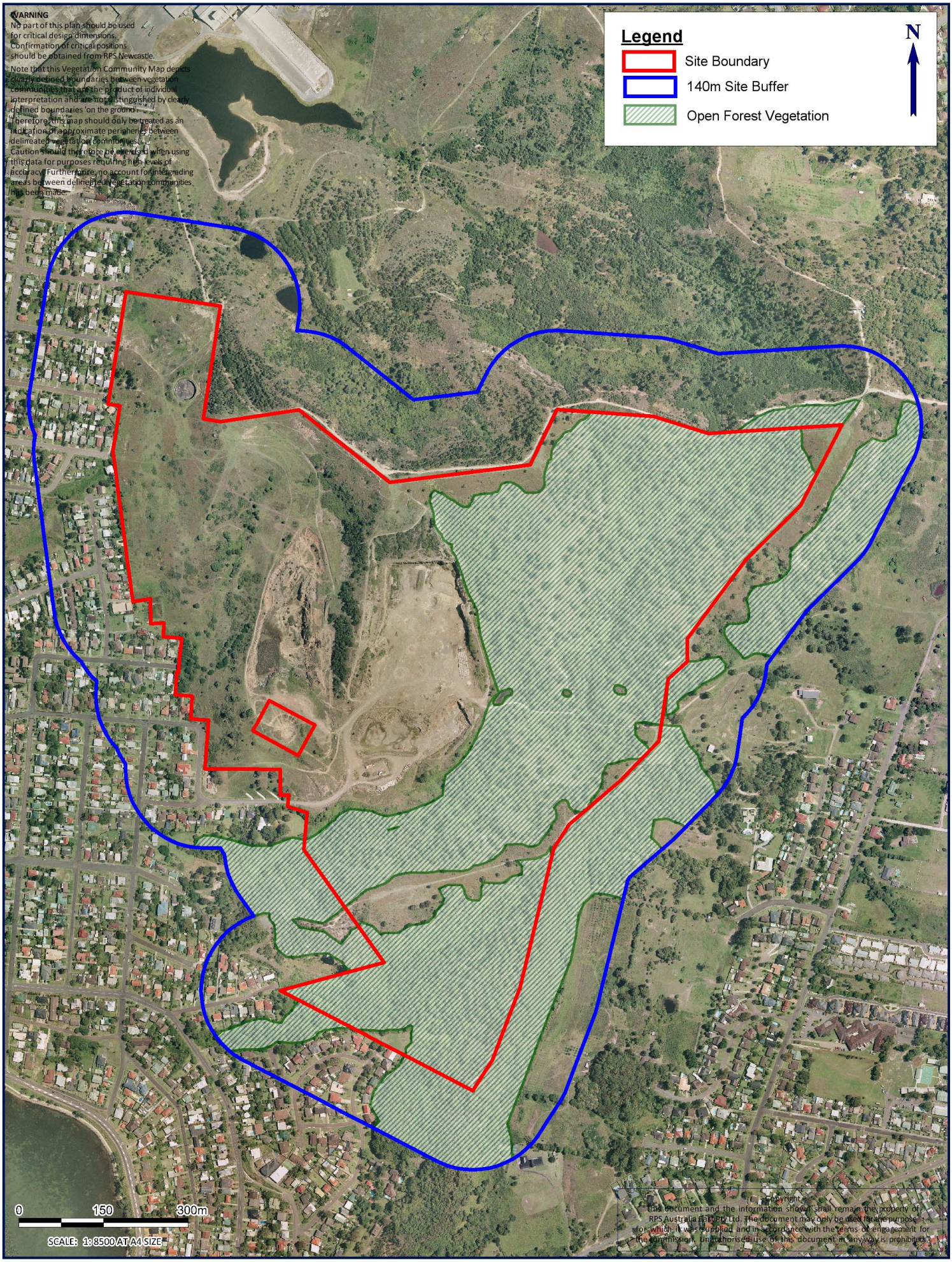
Direction of Vegetation	Vegetation Type
North	Open Forest and woodland
East	Open Forest and Woodland
South	Open Forest
West	Open Forest and Woodland
Within Site	Open Forest and Woodland

The vegetation type to the north is currently cleared land and degraded woodland, however, this area has been earmarked for the Munibung Hill Reserve & Angothora Inopina Reserve (Umwelt, 2009). Therefore, for the purposes of this assessment the vegetation to the north of the site has been classified as Open Forest in accordance with PBP (RFS, 2006). A small part of the land to the north is proposed for Residential Development, this area has not been classified as a Bushfire Hazard. Refer to Figure 3-1 for Vegetation Map.

The onsite creeks runs east and west through the subject site and has been assessed as “first order” and “second order” watercourses occur. Under the WM Act 2000 rezoning within the site would require that a Core Riparian Zone (CRZ) and Vegetated Buffer (VB) from top of bank be first established that would be negotiated with the NSW Office of Water (NOW – previously DWE). The guidelines recommend a CRZ of 10m either side of any ‘first’ order stream and a CRZ of 20m either side of any ‘second’ and ‘third’ order stream onsite The width of the Vegetated Buffer (VB) on top of the CRZ is recommended to be 10m; however consultation between the proponent and DWE is required to establish the appropriate riparian corridors necessary.

Note: Under this assessment, retained vegetation within the site has been based on the findings of the Ecological Constraints and Opportunities Report by RPS (July, 2010).

Specifically, Figure 4-1 Constraints Map (RPS, 2010). Refer to Appendix 1 for Constraints Map for the Site. Retained vegetation to the north of the site has been determined by the outcome of the Masterplan Environmental Assessment for the former Pasminco Cockle Creek Smelter Site prepared for Paclib Management Pty Ltd (Umwelt, August 2009). Refer to Appendix 2 showing Figure 1-2 Proposed Development for land to the north.



TITLE: FIGURE 3-1
VEGETATION CLASSIFICATION

LOCATION: SPEERS POINT

DATUM: DATUM
PROJECTION: MGA ZONE 56 (GDA 94)

DATE: 1/7/2010
PURPOSE: BTA FIGURE

LAYOUT REF: 26292 Figure 3-1 BTA Vegetation Classification Map A-A4.wor
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4 Effective Slope Assessment

In accordance with PBP (RFS 2006), an assessment of the slope affecting the bushfire behaviour was undertaken for a distance of 100m from the edge of the site boundary in the direction of the bushfire hazard.

The slopes leading away from the site have been evaluated to identify both the average slope and by identifying the maximum slope present. These values help determine the level of gradient which will most significantly influence the fire behaviour of the site.

The slope of vegetation surrounding the site to 140m and retained vegetation within the site is documented in Table 4 -1 below.

Table 4-1: Slope Assessment

Slope Classes
Various slopes occurs to the north. However, as there is no concept plan for the site for the purposes of this assessment a slope of 6 degrees down-slope has been used.
Upslope
Upslope
N/A – residential development

5 Determining Appropriate Setbacks

5.1 Asset Protection Zones

An Asset Protection Zone (APZ) is an area surrounding a development that is managed to reduce the bushfire hazard to an acceptable level to mitigate the risk to life and property. The required width of the APZ varies with slope and the type of hazard. An APZ can consist of both an Inner Protection Area (IPA) and an Outer Protection Area (OPA).

5.2 Inner Protection Area

The IPA extends from the edge of the OPA to the development. The IPA aims to ensure that the presence of fuels which could contribute to a fire event / intensity, are minimised close to the development. The performance of the IPA must be such that:

- There is minimal fine fuel at ground level which could be set alight by a bushfire; and
- Any vegetation in the IPA does not provide a path for the transfer of fire to the development – that is, the fuels are discontinuous.

The presence of a few shrubs or trees in the IPA is acceptable provided that they:

- Do not touch or overhang any buildings;
- Are well spread out and do not form a continuous canopy;
- Are not species that retain dead material or deposit excessive quantities of ground fuel in a short period or in a danger period; and
- Are located far enough away from any dwelling so that they will not ignite the dwelling by direct flame contact or radiant heat emission.

5.3 Outer Protection Area

The OPA is located adjacent to the hazard. Within the OPA any trees and shrubs should be maintained in a manner such that the vegetation is not continuous. Fine fuel loadings should be kept to a level where the fire intensity expected will not impact on adjacent developments.

5.4 Determining Appropriate Setbacks

5.4.1 Recommended APZs for Residential Development

The site lies within the LMCC LGA and therefore is assessed under a FDI rating of 100. In accordance with Table A2.6 within PBP (RFS, 2006), the appropriate width setbacks

have been calculated based on the topography and the vegetation present in and around the site. Table 5-1 details the required APZs and Figure 5-1 shows the location.

Table 5-1: Recommended APZs

Vegetation Type	Direction of vegetation from site or development	Slope Classes	APZ in accordance with Table A2.6 of PBP	APZ Components
Forest	North	6 degrees Downslope	35m	To be comprised of a 20m IPA and a 15m OPA
Open Forest (to be retained within the site)	East (within site)	upslope	20m	To be comprised of a 10m IPA and a 10mOPA.
Open Forest (to be retained within the site)	South (within site)	upslope	20m	To be comprised of a 10m IPA and a 10mOPA.
N/A – Residential Development	N/A	N/A	N/A	N/A

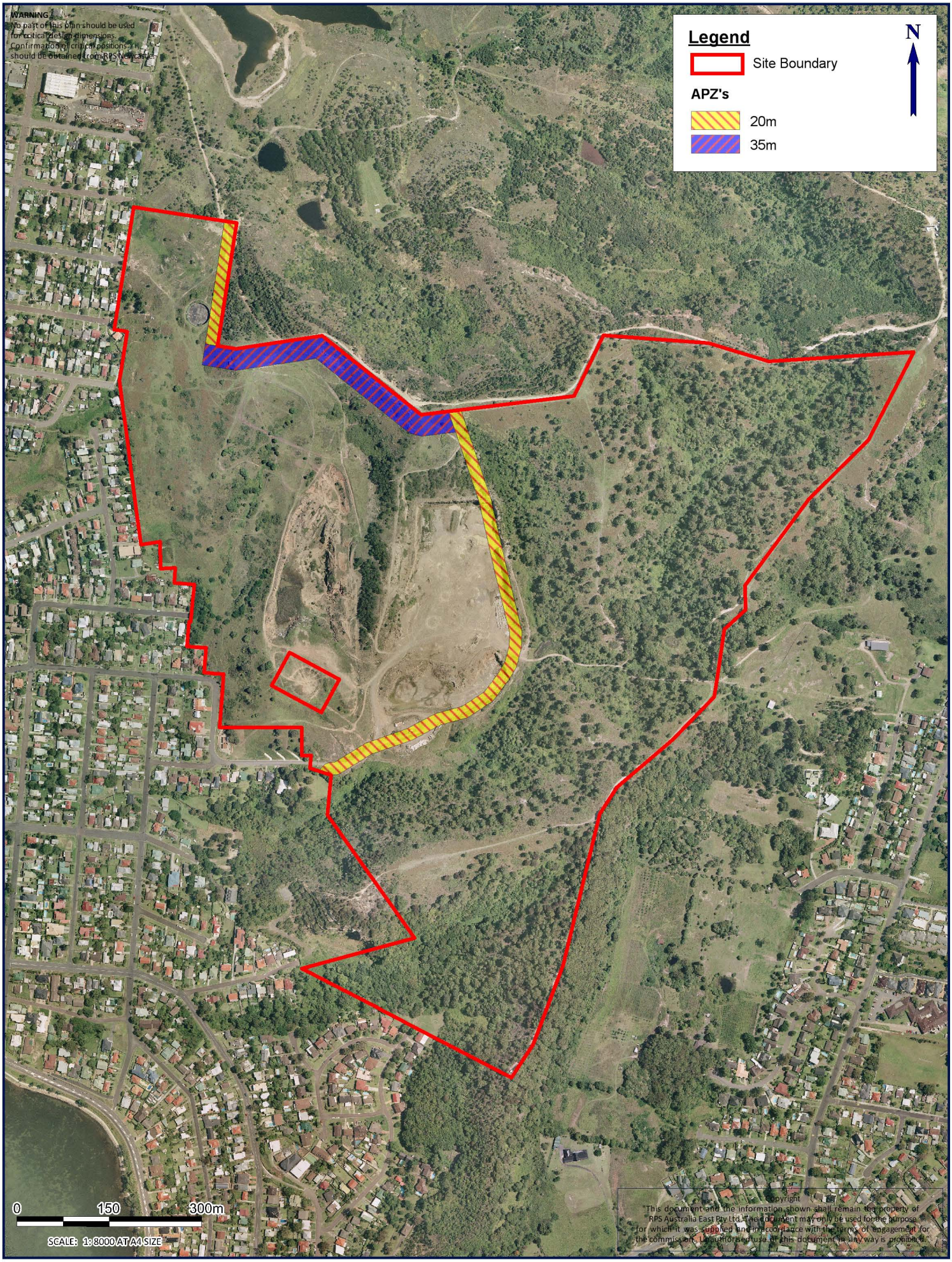
Note: The land to the north of the site varies depending on the location of any future dwelling. Future dwellings can occur cross-slope or down-slope from the Open Forest, however, for the purposes of this assessment due to there being no concept plan for the site, the Open Forest has been assessed as occurring downslope from the site on a slope of 6 degrees. Once a concept plan for the site has been undertaken reassessment of this slope depending on location of dwellings can be undertaken.

5.4.2 Recommended APZs for Industrial and Commercial Developments

Industrial and Commercial development is not captured under Section 79BA of the *Environmental Planning and Assessment Act 1979* (EP&A Act) or Section 100B of the *Rural Fires Acts 1997* (RFS Act 1997). Planning for Bushfire Protection (RFS, 2006) is primarily concerned with the protection of various types of dwellings (e.g residential, tourist, nursing homes, motels, mobile homes, estates). Therefore, the provisions of PBP 2006 do not strictly apply to these types of developments. However, as part of the site has been mapped as BPL, the aims and objectives of PBP (RFS, 2006) apply to the proposal.

As a precautionary approach a setback of 10m is recommended between industrial development and retained vegetation. This setback is to be comprised of an Inner

Protection Area (IPA). Refer to Figure 5-2 for APZ Map for Industrial / Commercial Development.



TITLE: FIGURE 5-1 RECOMENDED APZ FOR RESIDENTIAL PURPOSES

LOCATION: SPEERS POINT

DATUM: DATUM
PROJECTION: MGA ZONE 56 (GDA 94)

DATE: 1/7/2010
PURPOSE: BTA FIGURE

LAYOUT REF: 26292 Figure 5-1 BTA Residential APZ Map A-A4.wor
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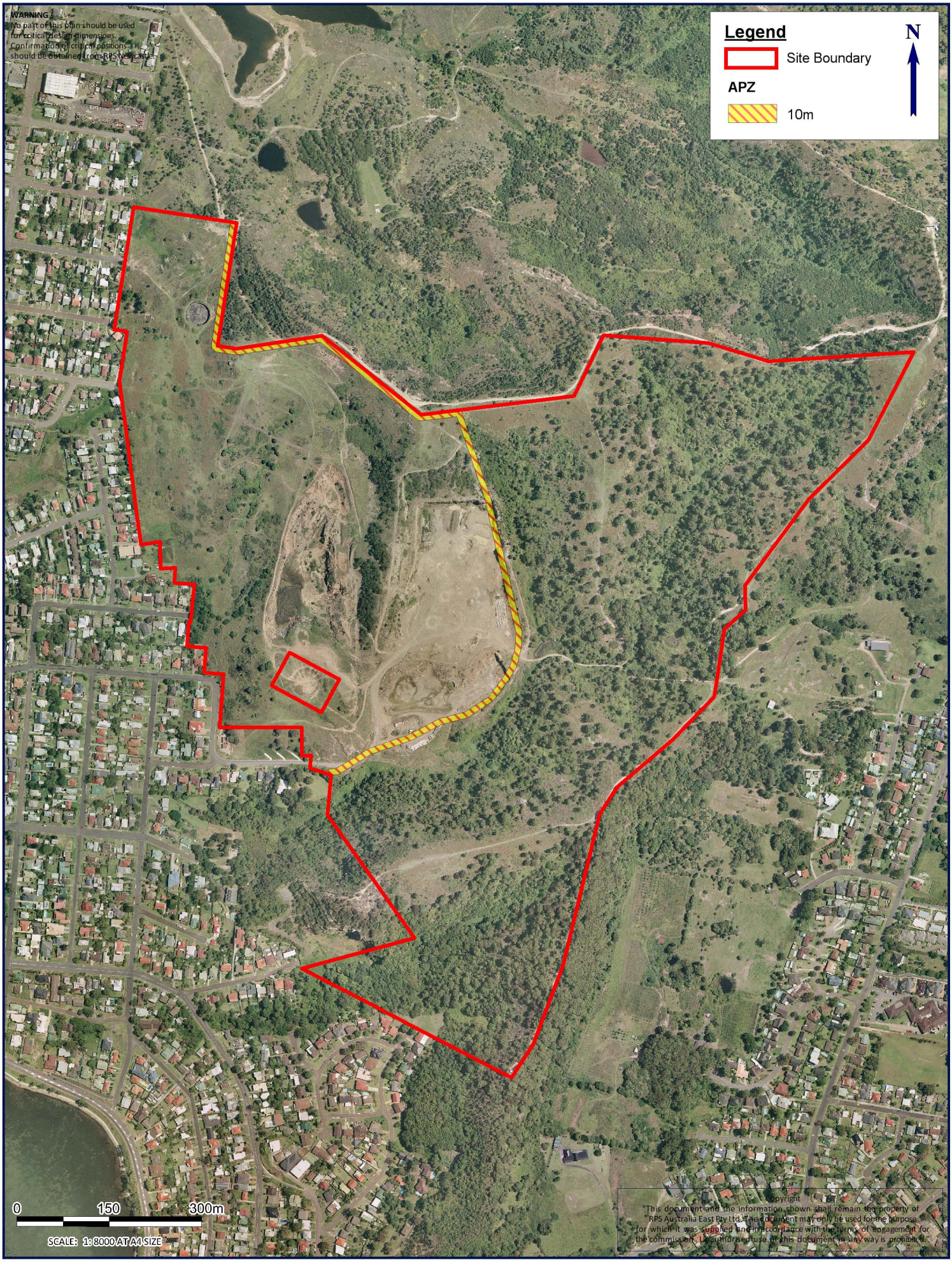

TITLE: FIGURE 5-2 RECOMENDED APZ FOR INDUSTRIAL/COMMERCIAL PURPOSES | LOCATION: SPEERS POINT | DATUM: DATUM | PROJECTION: MGA ZONE 56 (GDA 94) | DATE: 1/7/2010 | PURPOSE: BTA FIGURE | LAYOUT REF: 26292 Figure 5-2 BTA Industrial APZ Map A-A4.wor | VERSION (PLAN BY): A-A3 (S.C)

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6 Construction Standards and Design

The design of the proposed residential buildings within the site should have due regard to the specific considerations given within the Building Code of Australia (BCA), which makes specific reference to Australian Standard 3959 (AS 3959-2009) 'Construction of Buildings in Bushfire-prone Areas'. This standard aims to provide ways to improve the design and construction of a building by minimising the likelihood of the consequences of bushfire attack.

Building design and the materials used for construction should be chosen based on the information contained within this standard, and accordingly the designer/architect should be made aware of this recommendation. It may be necessary to have building plans checked by the architect involved to ensure that the proposed building meets the relevant construction level criteria. If it becomes apparent that appropriate criteria is not being met, then either the design will have to be amended or the APZ setback distances may have to increase accordingly.

The determinations of the appropriate BAL are based upon parameters such as weather modelling, fire-line intensity, flame length calculations, as well as vegetation and fuel load analysis. The determination of the construction level is derived by assessing the:

- Relevant FDI = 100
- Flame temperature
- Slope
- Vegetation classification; and
- Building location.

The following BAL, based on heat flux exposure thresholds, are used in the standard:

(a) **BAL – LOW** The risk is considered to be **VERY LOW**

There is insufficient risk to warrant any specific construction requirements but there is still some risks.

(b) **BAL – 12.5** The risk is considered to be **LOW**

There is a risk of ember attack.

The construction elements are expected to be exposed to a heat flux not greater than 12.5 k/m^2.

(c) **BAL – 19** The risk is considered to be **MODERATE**

There is a risk of ember attack and burning debris ignited by wind borne embers and a likelihood of exposure to radiant heat.

The construction elements are expected to be exposed to a heat flux not greater than 19 kW/m^2.

(d) **BAL-29** The risk is considered to be **HIGH**

There is an increased risk of ember attack and burning debris ignited by windborne embers and a likelihood of exposure to an increased level of radiant heat.

The construction elements are expected to be exposed to a heat flux no greater than 29 kW/m^2.

(e) **BAL-40** The risk is considered to be **VERV HIGH**

There is much increased risk of ember attack and burning debris ignited by windborne embers, a likelihood of exposure to a high level of radiant heat and some likelihood of direct exposure to flames from the fire front.

The construction elements are expected to be exposed to a heat flux no greater than 40 kW/m^2.

(f) **BAL-FZ** The risk is considered to be **EXTREME**

There is a extremely high risk of ember attack and burning debris ignited by windborne embers, a likelihood of exposure to an extreme level of radiant heat and direct exposure to flames from the fire front.

The construction elements are expected to be exposed to a heat flux greater than 40 kW/m^2.

6.1.1 Construction Standards for Future Dwellings

Using the information relating to vegetation, slope and according to Table 2.4.2 of AS3959-2009 Table 6-1 details the Deemed to Satisfy (DTS) requirements for any future dwellings within the site any lessening of these BAL will require a Performance Based Assessment to be undertaken.

Table 6-1 Required BAL for Future Dwellings

Vegetation Type	Direction from Future Dwelling	Slope Classes	Separation distance building is from vegetation	Bushfire Attack Level (BAL)	Construction Section
Open Forest	North	6 degrees Downslope	35 -<39m	BAL - 40	Sect 3 & 8 of AS3959 and Sect A3.7 of PBP Addendum Appendix 3
			39-<53m	BAL – 29	Sect 3 & 7 of AS3959 and Sect A3.7 of PBP Addendum Appendix 3
			53-<69m	BAL - 19	Sect 3 & 6 of AS3959 and Sect A3.7 of PBP Addendum Appendix 3
			69-<100m	BAL – 12.5	Sect 3 & 5 of AS3959 and Sect A3.7 of PBP Addendum Appendix 3
Open Forest (within site)	East	Upslope	20-<25m	BAL - 40	Sect 3 & 8 of AS3959 and Sect A3.7 of PBP Addendum Appendix 3
			25-<35m	BAL – 29	Sect 3 & 7 of AS3959 and Sect A3.7 of PBP Addendum Appendix 3
			35 - <48m	BAL -19	Sect 3 & 6 of AS3959 and Sect A3.7 of PBP Addendum Appendix 3
			48-<100m	BAL – 12.5	Sect 3 & 5 of

Vegetation Type	Direction from Future Dwelling	Slope Classes	Separation distance building is from vegetation	Bushfire Attack Level (BAL)	Construction Section
					AS3959 and Sect A3.7 of PBP Addendum Appendix 3
Open Forest (within site)	South	Upslope	20-<25m	BAL - 40	Sect 3 & 8 of AS3959 and Sect A3.7 of PBP Addendum Appendix 3
			25-<35m	BAL – 29	Sect 3 & 7 of AS3959 and Sect A3.7 of PBP Addendum Appendix 3
			35 - <48m	BAL -19	Sect 3 & 6 of AS3959 and Sect A3.7 of PBP Addendum Appendix 3
			48-<100m	BAL – 12.5	Sect 3 & 5 of AS3959 and Sect A3.7 of PBP Addendum Appendix 3

To Note: The façade of the dwelling that is exposed to the hazard (i.e. the forest to the east), is to be built to the above BAL requirements. All other facades may be reduced by one level.

6.1.2 Construction Standard for Industrial / Commercial Development

Commercial and Industrial Buildings are classified as Class 5 - 8 within the Building Code of Australia (BCA). The BCA does not provide for any bush fire specific performance requirements and as such AS 3959 does not apply as a set of 'deemed to satisfy' provisions. The general fire safety construction provisions are taken as acceptable solutions, but the aim and objectives of PBP apply in relation to other matters such as access, water and services, emergency planning and landscaping/ vegetation management.

7 Access

PBP (RFS, 2006) recommends a perimeter road be designed for any future residential development. A perimeter road forms part of the APZ and will provide a separation between the building and the boundary of the bush fire hazard.

Any **perimeter road** should be fully sealed and have a minimum road reserve width of 8m minimum kerb to kerb with the following design specifications:

- roads should be two wheel drive, all weather roads;
- roads should be two-way: i.e. at least two traffic lane widths with shoulders on each side, allowing traffic to pass in opposite directions;
- roads should be through roads where possible, any dead end roads should not be more than 200m in length with a 12m radius turning circle and clearly sign posted as such;
- the capacity of road surfaces and bridges should be sufficient to carry fully loaded fire fighting vehicles (approximately 28 tonnes or 8 tonnes per axle); and
- roads should be clearly sign posted and buildings clearly numbered.
- According to PBP (2006), the design specifications for **internal public road** require that roads:
- be two-wheel drive all weather roads;
- non perimeter roads comply with Table 6-1 (below) – Road widths for Category 1 Tanker;

Table 7-1 Minimum widths for fire fighting access of non-perimeter public roads

Curve radius (inside edge metres)	Swept Path (metres width)	Single land (metres width)	Two way (metres width)
<40	3.5	4.5	8.0
40 – 69	3.0	3.9	7.5
70 – 100	2.7	3.6	6.9
>100	2.5	3.5	6.5

- the perimeter road is linked to the internal road system at an interval of no greater than 500m in urban areas;
- not be hindered by an overuse of traffic calming devices such as speed humps and chicanes;
- public roads do not have a cross fall not exceeding 3 degrees;
- all roads are through roads, but if unavoidable then dead ends should be not more than 200m in length, incorporate a minimum 12m turning circle and should be clearly sign posted as dead ends;
- curves of roads (other than perimeter roads) are a minimum inner radius of 6 metres

and minimal in number, to allow for rapid access and egress;

- the minimum distance between inner and outer curves is 6m;
- maximum grade for sealed roads do not exceed 15o and an average grade of not more than 10 degrees of other gradient specified by road design standards, whichever is the lesser gradient;
- there is a minimum vertical clearance to a height of 4m above the road at all times;
- the capacity of road surfaces and bridges is sufficient to carry fully loaded fire fighting vehicles (approximately 15 tonnes for areas with reticulated water, 28 tonnes or 9 tonnes per axle for all other areas). Bridges clearly indicate load rating;
- public roads between 6.5m and 8m wide are no parking on one side with the services (hydrants) located on the side to ensure accessibility to reticulated water for suppression;
- one way public access roads are no less than 3.5m wide and provide parking within parking bays and locate services outside of the parking bays to ensure accessibility to reticulated water for fire suppression;
- parking bays are a minimum of 2.6m wide from kerb edge to road pavement. No services or hydrants are located within the parking bays; and
- public roads directly interfacing the bush fire hazard vegetation should provide roll top kerbing to the hazard side of the road.

According to PBP (2006), the design specifications for **property access roads** require that roads:

- where possible at least one alternative property access is provided for individual dwellings (or group of dwellings) that are located more than 200m from a public through road;
- a minimum carriageway width of four metres for rural-residential areas, rural landholdings or urban area with a distance greater than 70 metres from the nearest hydrant point to the most external part of the proposed building;

Note: No specific access requirements apply in a urban area where a 70m unobstructed path can be demonstrated between the most distant part of the proposed dwelling and the nearest part of the public access road (where the road speed limit is not greater than 70kph) that supports the operational use of emergency fighting vehicles (i.e. a hydrant or water supply).

- a minimum vertical clearance of four metres to any overhanging obstructions, including tree branches;
- on forest, woodland and heath situations, rural property access roads have passing bays every 200m that are 20 metres long by two metres wide;
- internal roads for rural properties have a loop road around any dwelling or incorporate a turning circle with a minimum 12 metre outer radius;

- curves have a minimum inner radius of six metres and are minimal in number to allow for rapid access and egress;
- the crossfall is not more than 10 degrees;
- maximum grades for sealed roads do not exceed 15 degrees and not more than 10 degrees for unsealed roads; and
- access to a development comprising more than three dwellings have formalised access by dedication of a road and not by right of way. In the case of a right of way, unconstrained access to the NSW Rural Fire Service must be provided for at all times.

The above road specifications are the acceptable solutions as detailed within PBP (RFS, 2006). Deviations from the above acceptable solutions for access may be considered (depending on the situation) through a performance-based assessment.

8 Water Supply

Associated with any kind of development upon the land, it is expected that water mains will be extended into the subject land. Provision of access to this supply should be provided for fire-crews in the form of readily accessible and easily located fire hydrants. Fire hydrant spacing, sizing and pressure should comply with AS 2419.1 – 2005. Where this cannot be met, the RFS will require a test report of the water pressures anticipated by the relevant water supply authority. In such cases, the location, number and sizing of hydrants shall be determined using fire engineering principles. Hydrants are not to be located within any road carriageway. All above ground water and gas service pipes external to the building are metal, including and up to any taps.

9 Fire Fighting Capability

Any future urban development of the land will need to provide firefighters easy access to structures, adequate turning circles, a safe retreat for firefighters and a clear control line from which to conduct hazard reduction

10 Conclusion and Recommendations

It is clear from this investigation and assessment that the study area, in part constitutes BFPL. Therefore the proposed development will have to be carried out in accordance with the specifications contained within PBP (RFS 2006) as assessed and presented within this report.

If the recommendations contained within this report are duly considered and incorporated, it is considered that the fire hazard present is containable to a level necessary to provide an adequate level of protection to life and property on the site.

In summary, the following is recommended to enable the proposal to meet the relevant legislative requirements:

- Creation and maintenance of APZs in areas adjacent to retained vegetation that constitute a bushfire risk. APZs of between 20m and 35m is provided between future dwellings and retained Open Forest.
- An APZ of 10m is provided between future industrial / commercial building and retained Open Forest. This APZ is to be comprised entirely of an Inner Protection Area.
- Future dwellings will need to comply with the Bush Fire Attack Levels as outlined by the Australian Standard (AS3959 – 1999) construction of buildings in bushfire prone areas. Refer to Section 6 of this report.
- All internal roads be formalised to a width capable of being used by fire fighting vehicles. Attention to surface treatment will also be required to ensure all weather access; gravel surfacing as a minimum is recommended.
- Roads be constructed to the specifications outlined in PBP (RFS, 2006).
- The proposed development is linked to the existing mains pressure water supply and that suitable hydrants be clearly marked and provided for the purposes of bushfire protection. Fire hydrant spacing, sizing and pressure should comply with AS2419.1, 2005.

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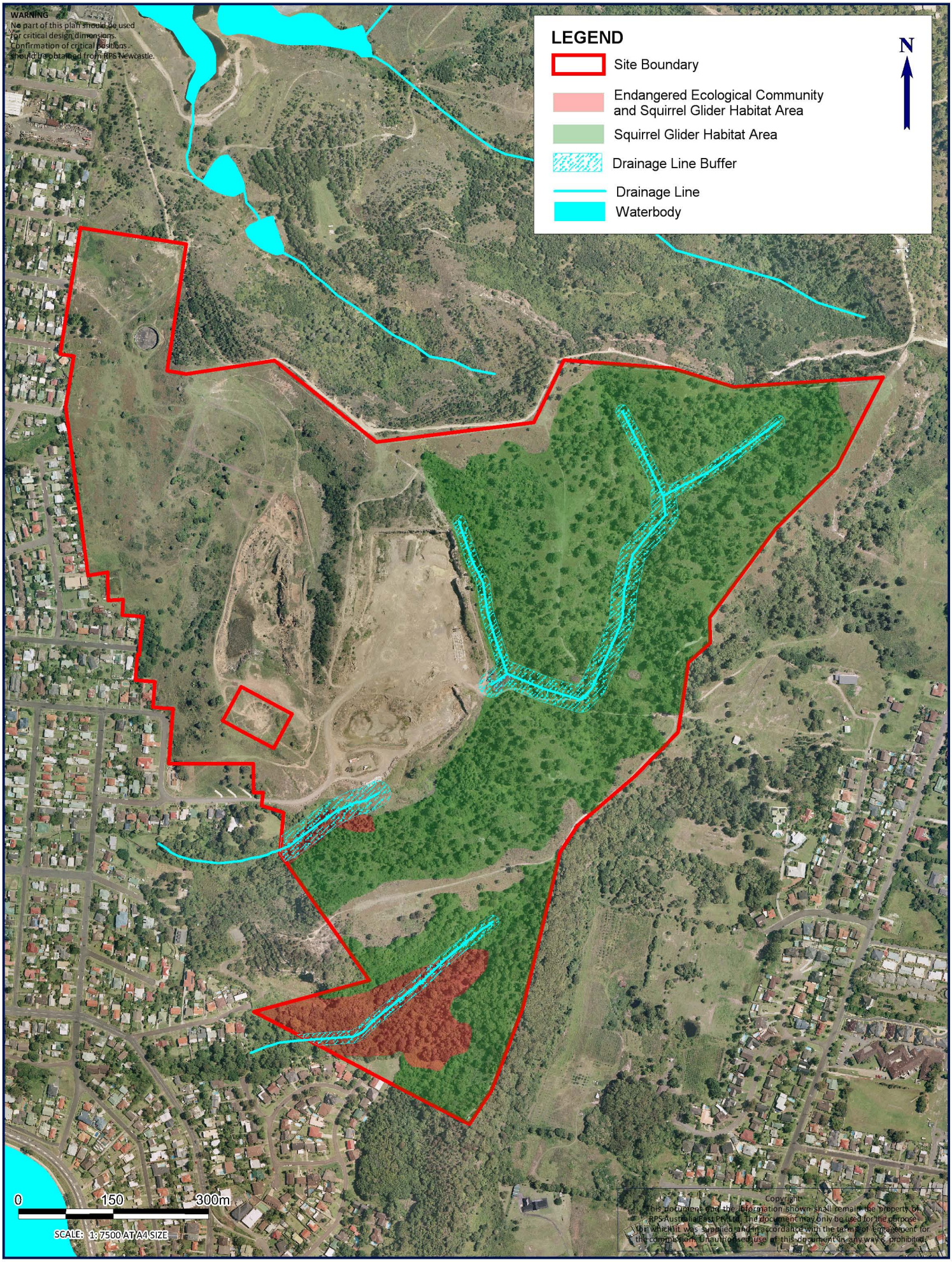
Appendix 1

Ecological Constraints Map for the Site - (RPS, 2010)



TITLE: FIGURE 4-1 CONSTRAINTS MAP

LOCATION: SPEERS POINT

DATUM: DATUM
PROJECTION: MGA ZONE 56 (GDA 94)

DATE: 1/7/2010
PURPOSE: REPORT FIGURE

J:\JOBS\26K\26292-Speers Point\10-Drafting\Mapinfo\Report Figures\26292 Figure 4-1 Constraints Map.wor
LAYOUT REF:
VERSION (PLAN BY): A-A4 (SC/SC)

CLIENT: LAKE MCQUARIE CITY COUNCIL
JOB REF: 26292

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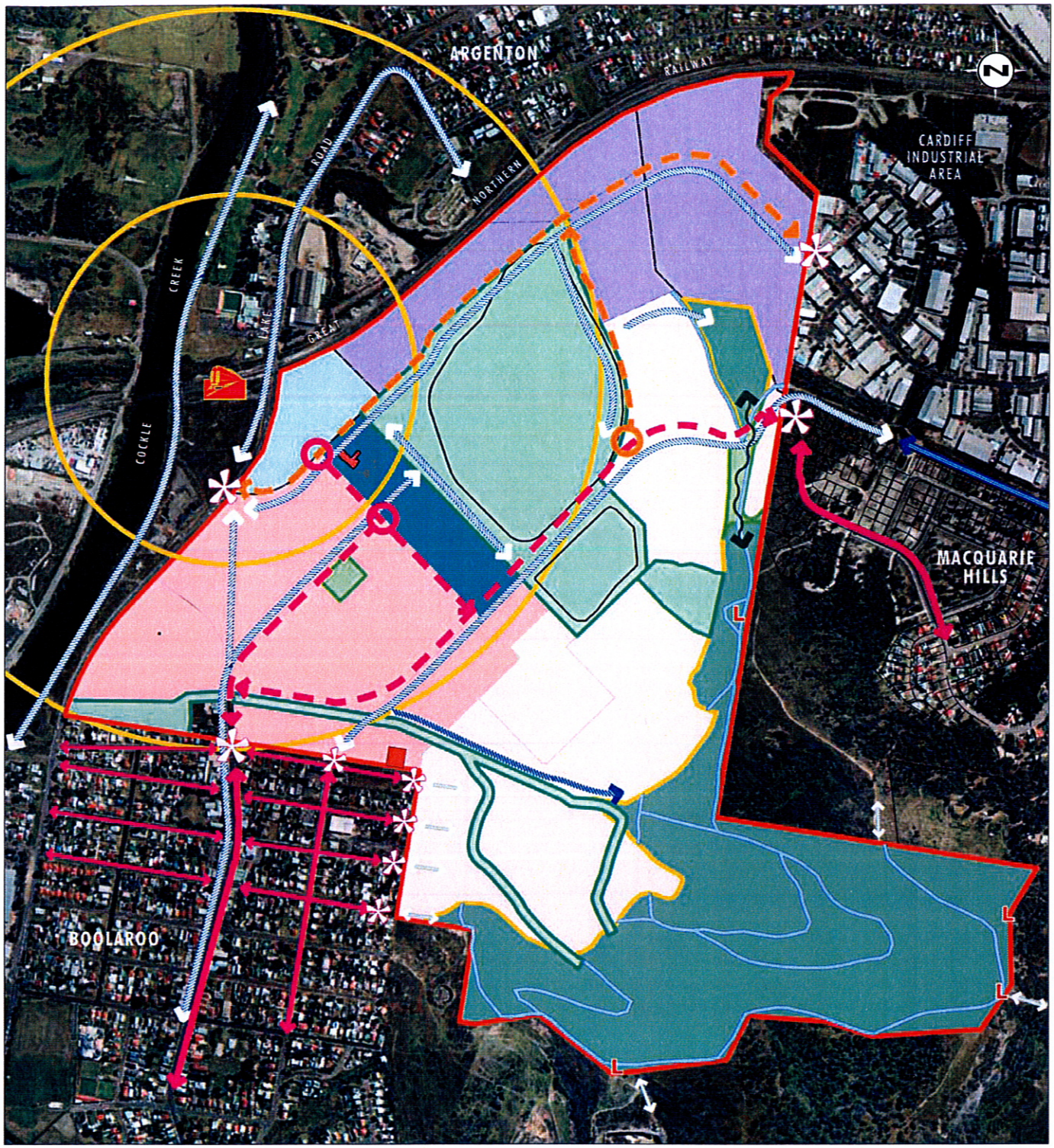
RPS

Appendix 2

Development Plan for Land to the North - (Umwelt, 2009)



Source: Morrisbray Architects

0 150 300 600m
1:12 000

Legend

- Pasminco Cockle Creek Smelter Site (Study Area)
- Residential
- Residential (Urban Living)
- Light Industrial
- Mixed use / Redevelopment
- Urban Centre
- Containment Cells & Riparian links
- Munibung Hill Reserve & Angophora Inopina reserve
- Parks
- Fire trails (pedestrian connectivity)
- Proposed Road Intersection
- Proposed Industrial Main Road /Link
- Proposed Residential Main Road /Link
- Potential Pedestrian / Cycleway Link
- Existing Pedestrian / Cycleway Link
- Proposed Ridge Vegetation Regeneration link
- Cockle Creek Train Station
- Major Site Access / Egress Points

FIGURE 1.2

Proposed Development

File Name (A4): R01_V1/2486_002.dgn