total earth care

Biodiversity Management Plan

9 Minkara Road,
Bayview

Total Earth Care Pty Ltd
August 19

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Bayview

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Prepared by:	G Barron, G Teear & W Thurston		
Approved by:	G Teear & W Thurston		
Prepared for:	Joshua Dick		
TEC Job No.	C11463		

37 Irrawong Road,
North Narrabeen, NSW 2101
Telephone 02 9913 1432
Facsimile 02 9913 1434
www.totalearthcare.com.au
ABN: 14 043 484 770

admin@totalearthcare.com.au
bushregen@totalearthcare.com.au

consulting@totalearthcare.com.au
envirorehab@totalearthcare.com.au

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Executive Summary

Total Earth Care was engaged by Joshua Dick to prepare a Biodiversity Management Plan for the proposed residential development at Lot 40 DP 28908 9 Minkara Road, Bayview. The Lot is a large block which consists of fully structured intact remnant bushland. The Lot is zoned as RU2 Rural Landscape. A site survey was conducted on the 8th August 2019 by two (2) qualified Ecologists. A large area has been cleared in the centre of the site since 2015 (approximately 4,717 m^2). This clearing was conducted prior to the installation of appropriate sediment and erosion control measures and without the supervision of a qualified Ecologist during the tree removal. In addition, there is evidence of imported fill and as a result weeds have been brought into the previously weed-free site. Mitigation methods and management actions provided in this report have been designed to address current management issues as a result of this work and offset tree hollows lost to clearing. This report separates the site into four (4) management zones and details management actions and performance criteria for the five (5) years following construction to ensure that the remnant bushland within the site is maintained. Management actions include weed control, delineation of management zones, installation of nest boxes, fencing no-go zones and weed control.

1 Introduction

1.1 Background

Total Earth Care (TEC) has been commissioned by Joshua Dick to prepare this Biodiversity Management Plan (BMP) for this the proposed residential development at 9 Minkara Road, Bayview. The site is within the Northern Beaches LGA and a Biodiversity Management Plan has been requested under the development application review process.

This BMP is written in accordance with the Biodiversity Management Plan Report Guidelines available on the Northern Beaches Council Website titled – "2014 112357 Guideline for preparing a Biodiversity Management Plan April 2014"

Site-specific plans and documents reviewed for this project:

- Development Assessment Memo from Northern Beaches Council, by Julie Edwards, dated 23rd July 2019;
- Flora and Fauna Assessment Report including a BOS threshold test (DRAFT), by GIS Environmental Consultants, dated August 2018;
- Biodiversity Development Assessment Report,), by GIS Environmental Consultants, dated December 2018;
- DA01A Site Plan – Stormwater, by Stephen Crosby & Associates, dated December 2018;
- DA08A Driveway Plan, by Stephen Crosby & Associates, dated December 2018;
- Bushfire Threat Assessment for the Construction of a New Residential Dwelling at Lot 40/-/DP28908, 9 Minkara Road, Bayview 2104 by Australian Bushfire Safety & Planning; and
- Additional documents found on Northern Beaches Council Website under the DA.

1.2 Subject Site

The Subject Site (the Site) comprises the area of land likely to be directly or indirectly impacted by future development. The study area comprises the subject site in addition to the surrounding land that may be potentially indirectly affected by the development or affect the development. The locality encompasses a larger area that includes neighbouring properties and includes areas of native biodiversity values nearby. The subject site details are outlined in Table 1 and the boundaries and simplified plans are shown in Map 1. The architectural drawings are provided in Appendix A.

Table 1. Site Details

Site address	9 Minkara Road, Bayview
Property identifier (Lot and DP)	Lot 40 DP 28908
Local Government Area	Northern Beaches Council
Zoning	RU2 Rural Landscape

1.3 Staff Qualifications

This report has been prepared by suitably qualified personnel. Their qualifications are below:

1.3.1 William Thurston – 13 years experience

- Bachelor Biological Sciences, Ecology - (minor Geomorphology) (2006) The University of NSW
- Accredited Biodiversity Assessor
- BioBanking Accredited Assessor
- Chemical Handling (2009)
- Chainsaw Operation (2009)
- First Aid Certificate (Current)
- OH&S Induction Training for the Construction Industry (White Card) (2010)
- Van Klaphake – Eucalyptus ID Course – 2011
- Manipulate and Analyse data within geographic information systems (2016) – Northern Sydney Institute
- Prepare Reports (2016) - Northern Sydney Institute
- Assess applications for legislative compliances (2015) - Eco Logical Australia PTY LTD

1.3.2 Gillian Teear – 3 years experience

- Bachelor of Environmental Biology – University of Technology Sydney
- White Card (WHS General Construction Induction)
- First Aid and CPR
- Sydney Metropolitan Wildlife Course and Volunteer
- NSW Seabird Rescue First Responders Course
- UNSW Advanced Plant ID Course – 2018
- Van Klaphake – Eucalyptus ID Course – 2018
- Teresa James Cumberland Plain Woodland Plant ID Workshop – 2018
- Teresa James Biodiversity Site Assessment Workshop - 2018

1.3.3 Georgina Barron – 3 years experience

- Bachelor of Science (Biology) (1st Class Honours) The University of Sydney
  Honours project: Ecological benefits of invasive plants in novel ecosystems: does Lantana provide habitat for urban sensitive species?
- White Card (WHS General Construction Induction)
- First Aid and CPR
- Introduction to Animal Research (ITAR), Module 1: Fundamentals of Animal Research
- Introduction to Animal Research (ITAR), Module 3: Wildlife
- WIRES Possum & Glider Course
- WIRES Rescue & Intermediate Care Course

1.4 Relevant Legislation and Planning Instruments

Within the Northern Beaches Council LGA, relevant legislation and policies which apply to this BMP include:

- 10/50 Vegetation Clearing Code of Practice
- Biodiversity Conservation Act 2016 (NSW)
- Biosecurity Act 2015 (NSW)
- Bushfire Environmental Assessment Code 2006
- Environment Protection and Biodiversity Conservation Act 1999 (Cth)
- Environmental Planning and Assessment Act 1979 (NSW)
- Local Government Act 1993 (NSW)
- National Parks and Wildlife Act 1974 (NSW)
- Planning for Bushfire Protection 2006
- Protection of the Environment Operations Act 1999 (NSW)
- Rural Fires Act 1997 (NSW)
- State Environmental Planning Policy (Building Sustainability Index: BASIX) 2004
- State Environmental Planning Policy (Exempt and Complying Development Codes)
- State Environmental Planning Policy No 19-Bushland in Urban Areas

- State Environmental Planning Policy No 1-Development Standards
- State Environmental Planning Policy No 33-Hazardous and Offensive Development
- State Environmental Planning Policy No 55-Remediation of Land
- State Environmental Planning Policy (Concurrences) 2018
- State Environmental Planning Policy (Primary Production and Rural Development) 2019
- State Environmental Planning Policy (Vegetation in Non-Rural Areas) 2017: Subject Land
- Pittwater Development Control Plan 2014
- Pittwater Local Environmental Plan 2014
- Water Management Act 2000 (NSW)

Title: Proposal Footprint

Map No: 1
Site: 9 Minkara Rd, Bayview
Client: Joshua Dick
Date: August 2019
Project No: C11463
Author: G Teear

Legend

- Subject_Site
- Lot

Footprint

- Development Footprint
- Garage
- House, Pool & Deck
- Sewage Disposal

0 15 30 60 Meters

N

Data Source:
Total Earth Care
Nearmap

total earth care

Tel: 02 9913 1432 Fax: 02 9913 1434

2 Methods

2.1 Desktop Research

A preliminary desktop study was conducted to assess the likelihood of the study area to support threatened species, populations or threatened ecological communities, or their habitats. The previous BDAR prepared for the site by GIS Environmental Consultants was reviewed. Additionally, all records of threatened species and populations within 5 kilometres of the subject site (10km locality search) were obtained from the Office of Environment & Heritage (OEH) Wildlife Atlas database (OEH 2019a), and the Federal Environment Department of Environment Protected Matters search tool.

2.2 Site Survey

A diurnal survey was conducted over one day on 8th August 2019. Weather conditions were mild and sunny (around 16-17 ˚C at 9am) with a light wind. The site survey was conducted by Georgina Barron and Gillian Teear. Their qualifications are provided in Section 1.3 of this report.

2.2.1 Botanical Survey

A general botanical survey was conducted with reference to existing vegetation community descriptions and mapping by others for the locality (GIS Consultants 2018, OEH 2016a). Threatened flora likely to occur within the locality were surveyed using the NSW Guide to Surveying Threatened Plants (OEH 2016b). Surveys on the subject site were generally random meanders (DEC 2004), but focused on identifying native vegetation and included;

- The identification of native and exotic plant species according to Field Guide to the Native Plants of Sydney (Robinson, 2003), Flora of NSW, Volumes 1-4 (Harden 1992, 1993, 2000, 2002), Weeds of the south-east: an identification guide for Australia (Richardson et al, 2006) and PlantNET (Botanic Gardens Trust, 2008), with reference to recent taxonomic changes;
- Targeted searches for threatened plant species according to the “random meander” method (Cropper 1993);
- The identification and mapping of plant communities based on current site conditions, soils and species list, and previous vegetation mapping including The Native Vegetation of the Sydney Metropolitan Area Version 3.0 (OEH 2016a);
- An assessment of the natural resilience of the vegetation of the site;
- Identification of previous and current factors threatening the ecological function and survival of native vegetation on the site; and
- Determination of appropriate rehabilitation and bush regeneration techniques for the native vegetation of the site.

2.2.2 Fauna Survey

Incidental fauna observations and fauna habitats were recorded as part of the survey effort. This included noting the GPS locations of hollow bearing trees, describing notable habitat features such as termite mounds, target searches for indirect evidence of fauna such as scats and scratchings and brief targeted searches for associated fauna (Triggs 1984).

2.3 Limitations

The diurnal field survey was conducted over one (1) day during August 2019. The flora and fauna field survey was based on the recommendations of Threatened Biodiversity Survey and Assessment: Guidelines for Developments and Activities - Working Draft (DECC, 2004) with particular reference to the size of the subject site and a relatively homogeneous wider urbanised landscape.

As stated by the DECC (2004) ‘The absence of a species from survey data does not necessarily mean it does not inhabit the survey area. It may simply means that the species was not detected at that time with the survey method adopted and the prevailing seasonal or climatic conditions.’ Therefore, the relative brevity of the survey and its timing mean that the full spectrum of flora and fauna species and ecological processes likely to occur on the site cannot be fully quantified or described in this report. These limitations have been partly addressed by identifying potential habitats for fauna species and assessing the potential for these species to occur on the site based on previous records, the type and condition of habitats present, the land use throughout the subject site, surrounds and the landscape context.

When reviewing maps please note that the hand-held GPS equipment used is only accurate to three (3) metres.

3 Site Description

3.1 Identification and description of the site and surrounds

3.1.1 General

The subject site is located in the suburb of Bayview in the Northern Beaches LGA. The site is zoned as RU2 Rural Landscape, as are the surrounding lots apart from 22 Minkara Road (Lot 51 DP 731366) to the north-east of the site which is zoned as E2 Environment Conservation. The site consists of remnant bushland. A small area (578 m^2) of the lot was cleared more than three (3) years ago by the previous owner. Since 2015, a large area has been cleared in the middle of the site (4,717 m^2). This area was included in the BDAR Assessment by GIS Environmental Consultants as it was cleared as part of this development.

3.1.2 Soils

The south-western corner of the lot is mapped as part of the Oxford Falls soil landscape (OEH 2019b). It is has isolated occurrences throughout the Hawksbury Sandstone and consists of medium to coarse-grained quartz sandstone with minor shale laminate lenses. With regards to erosion of this soil landscape, no erosion occurs where protective vegetation is maintained. Minor gully erosion, often to bedrock, is associated with poorly planned and maintained trails.

The central strip of the lot running north to south is mapped as part of the Gymea soil landscape (OEH 2019b). It is described as occurring extensively throughout the Hornsby Plateau and along the foreshores of Sydney Harbour. It is a medium to coarse-grained quartz sandstone with minor shale and laminate lenses. Severe sheet erosion can occur following bushfires as a result of lost protective vegetation cover. Minor gully erosion can occur along unpaved or poorly maintained roads and fire trails.

Approximately 200 m^2 of the eastern tip of the site is mapped as Hawkesbury soil landscape (OEH 2019b). This occurs on steep rugged Hawkesbury Sandstone slopes and ridges. It consists of medium to coarse-grained quartz sandstone with minor shale and laminate lenses. It can be subject to severe sheet erosion, often during storms and after bushfires resulting in a loss of vegetation.

Refer to Map 2 for the extent of these soil landscapes.

3.1.3 Topography, Aspect and Hydrology

The site is roughly triangular in shape with the long axis orientated north to south. The site is dominated by remnant bushland although the centre of the site has been cleared. The site has an east facing aspect and slopes towards Minkara Road. The highest point in the site is 142 m above sea level (asl) and the lowest point is 110 m asl. There are large areas of exposed sandstone within the site.

3.1.4 Riparian Lands and Waterways

The site contains three (3) drainage lines which flow east towards Minkara Road. One is to the north of the site, one is in the centre and one is to the south of the site.

3.2 The ecological value of existing bushland and bushland impacted upon by the proposed development.

3.2.1 Flora Habitat.

The ecological value of the existing bushland on the subject site is discussed in greater detail in the Biodiversity Development Assessment Report (GIS Environmental Consultants 2018). The site contains high quality intact remnant vegetation which has good connectivity to the north and south and relatively good connectivity to the east and west, although the landscape is fragmented by Minkara Road and neighbouring cleared properties. The vegetation has previously been mapped as Coastal Sandstone Gully Forest (Sydney Peppermint – Smooth-barked Apple – Red Bloodwood Shrubby Open Forest on Slopes of Moist Sandstone Gullies, Eastern Sydney Basin Bioregion PCT 1250) and Sydney North Exposed Sandstone Woodland (Red Bloodwood - Scribbly Gum / Old-man Banksia Open Forest on Sandstone Ridges of Northern Sydney and the Central Coast PCT 1783) (OEH 2016a) (Map 3). GIS Environmental Consultants ground-truthed the vegetation communities and confirmed these PCTs, however they did alter the community boundaries (Map 4). There are no endangered ecological communities on site and no threatened flora species have been identified on site.

There is no weed cover in the intact areas of bushland and no weeds were recorded in the BDAR by GIS Environmental Consultants (2018). In the large cleared area in the centre of the site there is

evidence of fill being used (Figure 1). As a result weed establishment has commenced with weeds present including but not limited to the following species: Inkweed (*Phytolacca octandra*), Wild Tobacco (*Solanum mauritianum*), Crofton Weed (*Ageratina adenophora*), Fleabane (*Conyza sp.*), Blackberry Nightshade (*Solanum nigrum*), Fireweed (*Senecio madagascariensis*), *Lantana camara*, *Ehrharta erecta*, Asthma Weed (*Parietaria judaica*), Ginger Lily (*Hedychium gardnerianum*) and Castor Oil (*Ricinus communis*). This has started to spread into the adjacent bushland. Refer to Map 5 for the weed density and extent within the site. Two (2) Weeds of National Significance (WONS) were identified on the site; Fireweed (*Senecio madagascariensis*) and *Lantana camara.*

The land holder obligations under the *Biosecurity Act 2016* are listed in Table 9 and Table 10 of Appendix E.

Figure 1. Imported fill and weed establishment [Left] and weeds spreading from cleared area towards intact bushland [Right]

3.2.2 Faunal Habitat

The intact areas of bushland provide significant habitat for fauna species including several threatened species. There are several trees with hollows within the site which are of a variety of sizes with some large enough to support Glossy-black Cockatoos (*Calyptorhynchus lathami*). Just outside the site to the west there were several trees with glider chew marks (Figure 2). It is assumed that the adjacent cleared area would have contained glider sap trees and trees with hollows of a variety of sizes. A termite nest was observed on a Eucalyptus tree within the site during TEC's survey on the 8th August 2019. Whitewash from a roosting bird was also observed under a Eucalyptus tree. A large raptor was also sighted which was likely to be a Grey Goshawk (*Accipiter novaehollandiae*).

The understorey is intact in the untouched bushland areas, with shrubs and ferns providing habitat for small birds such as fairy wrens, which were observed during the BDAR survey (GIS Environmental Consultants 2018). Three drainage lines are present within the site. GIS Environmental Consultants heard Red-crowned Toadlets along the northern drainage line during their 2018 site survey. They also reported the site as containing habitat for the Giant Burrowing Frog.

There is a cliff line with exposed sandstone bedrock which runs north to south in the northern portion of the site. There are some crevices near the base of the cliff face although these were determined to be unsuitable for microbat species due to being accessible by predators such as goannas, foxes and cats. Tree hollows and decorticating bark found on site provide habitat from hollow roosting microbat species. Rock plateaus and boulders are also present throughout the site which provide potential habitat for reptiles. Please refer to Map 6 for fauna habitat features including those previously mapped by GIS Environmental Consultants (2018).

Figure 2. Glider chew marks around tree trunk and branch [Left] and felled tree with hollows [Right]

3.3 Site Constraints including Significant Environmental Features

As discussed the site contains high quality remnant bushland which provides habitat for several fauna species including threatened species. This vegetation has good connectivity to the north and south and also has connectivity to the east and west although this is fragmented by adjoining properties and Minkara Road. There are several trees with hollows within the site which are of a variety of sizes with some large enough to support Glossy-black Cockatoos (*Calyptorhynchus lathami*). Just outside the site to the west there were several trees with glider chew marks. The large cleared area in the centre of the site is assumed to have contained trees with hollows and similar glider sap trees prior to clearing. The site contains three drainage lines – one to the north, one in the centre and one to the south of the site. There is also a cliff line with exposed sandstone bedrock which runs north to south in the northern portion of the site. There are some crevices near the base of the cliff face although these were determined to be unsuitable for microbat species due to being accessible by predators such as goannas, foxes and cats. Rock plateaus and boulders are also present throughout the site which provide potential habitat for reptiles. Refer to Map 6 for the habitat constraints including those previously described by GIS Environmental Consultants (2018).

3.4 Vegetation Condition and Resilience

The intact bushland is of high quality being fully structured and of good resilience. This is evident in the area cleared for the driveway where all the regeneration is of native species from the seed bank with no weeds present. In contrast areas where fill has been brought into the site are now subject to weed establishment with weeds present including but not limited to: Inkweed (*Phytolacca octandra*), Wild Tobacco (*Solanum mauritianum*), Crofton Weed (*Ageratina adenophora*), Fleabane (*Conyza sp.*), Blackberry Nightshade (*Solanum nigrum*), Fireweed (*Senecio madagascariensis*), *Lantana camara*, *Ehrharta erecta*, Asthma Weed (*Parietaria judaica*), Ginger Lily (*Hedychium gardnerianum*) and Castor Oil (*Ricinus communis*) (Figure 1). These weed species are now spreading from the cleared areas into the adjacent bushland. These weeds need to be controlled particularly along the drainage lines to prevent their spread into the areas of resilient bushland. Refer to Map 5 for the weed densities and extent within the site. Of note is a large Lantana thicket adjacent to the western site boundary which could spread into the site if not controlled. The weed species present within the site are detailed in Table 2 and the description of the weed zones displayed in Map 5 are provided in Table 3. See Figure 3 to Figure 5 for photos of the condition of the site.

Table 2. Weed Species Inventory

Family	Scientific Name	Common Name
Asteraceae	*Ageratina adenophora*	Crofton Weed
	Conyza sp.	Fleabane
	Hypochaeris radicata	Catsear
	Senecio madagascariensis	Fireweed
	Taraxacum officinale	Dandelion
Davalliaceae	*Nephrolepis cordifolia*	Fishbone Fern
Euphorbiaceae	*Ricinus communis*	Castor Oil Plant
Fabaceae (Faboideae)	*Trifolium sp.*	Clover
	Trifolium repens	White Clover
Fabaceae (Mimosoideae)	*Acacia saligna*	Golden Wreath Wattle
Malvaceae	*Sida rhombifolia*	Paddy's Lucerne
Phytolaccaceae	*Phytolacca octandra*	Inkweed
Poaceae	*Andropogon virginicus*	Whisky Grass
	Ehrharta erecta	Panic Veldtgrass
	Eragrostis curvula	African Lovegrass
	Pennisetum clandestinum	Kikuyu Grass
	Stenotaphrum secundatum	Buffalo Grass
Solanaceae	*Solanum mauritianum*	Wild Tobacco Bush
	Solanum nigrum	Black-berry Nightshade
Ulmaceae	*Ulmus parvifolia*	Chinese Elm
Urticaceae	*Parietaria judaica*	Asthma Weed
Verbenaceae	*Lantana camara*	Lantana
Zingiberaceae	*Hedychium gardnerianum*	Ginger Lily

Table 3. Description of Weed Zones

Weed Area	Description
A	5-25% weed cover. This area is mostly disturbed with fill, clearing and changes to the soil levels. As a result, scattered weeds are present throughout this area including Inkweed (*Phytolacca octandra*), Fireweed (*Senecio madagascariensis*), Blackberry Nightshade (*Solanum nigrum*), Asthma Weed (*Parietaria Judaica*), Buffalo Grass (*Stenotaphrum secundatum*), *Ehrharta erecta,* Whiskey Grass (*Andropogon virginicus*) and Kikuyu (*Pennisetum clandestinum*). All weed species found on the site and immediately adjacent to the site are listed in Table 2.
B	<5% weed cover. This area is predominantly undisturbed, high quality bushland and is mostly weed free. Lantana (*Lantana Camara*) and African Love Grass (*Eragrostis curvula*) was noted just outside this zone on neighbouring land to the west (Map 5).

Figure 3. Area of intact bushland [Left] and area cleared for driveway [Right]

Figure 4. Area of intact bushland to the west of the proposed driveway [Left] and a Lantana thicket to just outside of the western property boundary [Right]

Figure 5. Area cleared for development [Left] and native regeneration adjacent to the driveway boundary [Right]

Title: Soil Landscape

Map No: 2
Site: 9 Minkara Rd, Bayview
Client: Joshua Dick
Date: August 2019
Project No: C11463
Author: G Teear

Legend

- Subject_Site
- Lot

Footprint

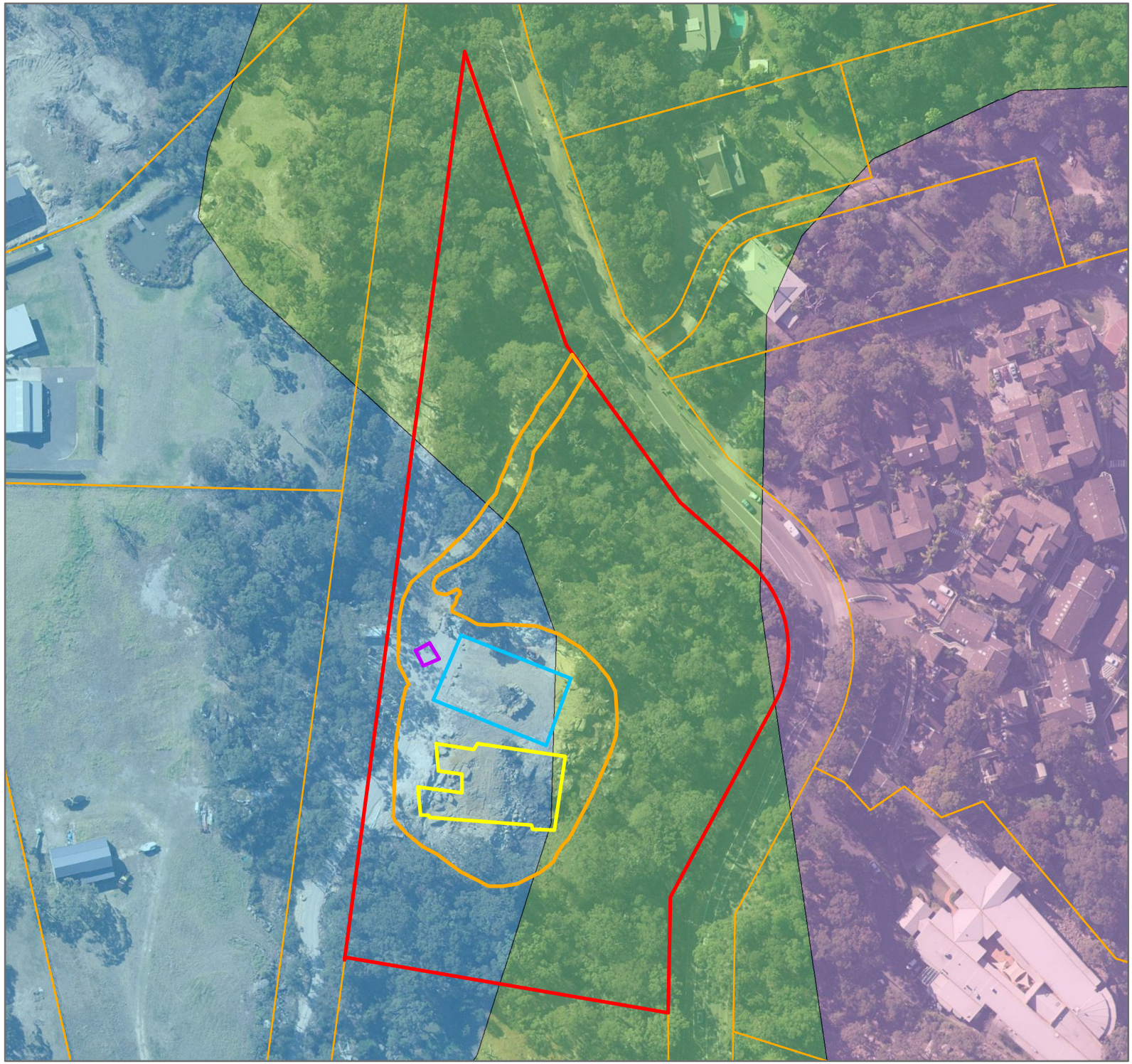
- Development Footprint
- Garage
- House, Pool & Deck
- Sewage Disposal

Soil Landscape

- Gymea
- Hawkesbury
- Oxford Falls

0 15 30 60 Meters

N



Data Source:
Total Earth Care
Nearmap
OEH 2019 Soil Landscapes
of Central & Eastern NSW V2

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total earth care

Title: **SMCMA V3 2016 Vegetation Mapping**

Map No: 3

Site: 9 Minkara Rd, Bayview

Client: Joshua Dick

Date: August 2019

Project No: C11463

Author: G Teear

Legend

- Subject_Site
- Lot

Footprint

- Development Footprint
- Garage
- House, Pool & Deck
- Sewage Disposal

Vegetation Community

- S_DSF09: Coastal Sandstone Gully Forest
- S_DSF11: Sydney North Exposed Sandstone Woodland
- S_RF03: Coastal Warm Temperate Rainforest
- S_WSF02: Coastal Enriched Sandstone Moist Forest
- S_WSF11: Pittwater Spotted Gum Forest
- Urban_E/N: Urban Exotic/Native
- Weed_Ex: Weeds and Exotics

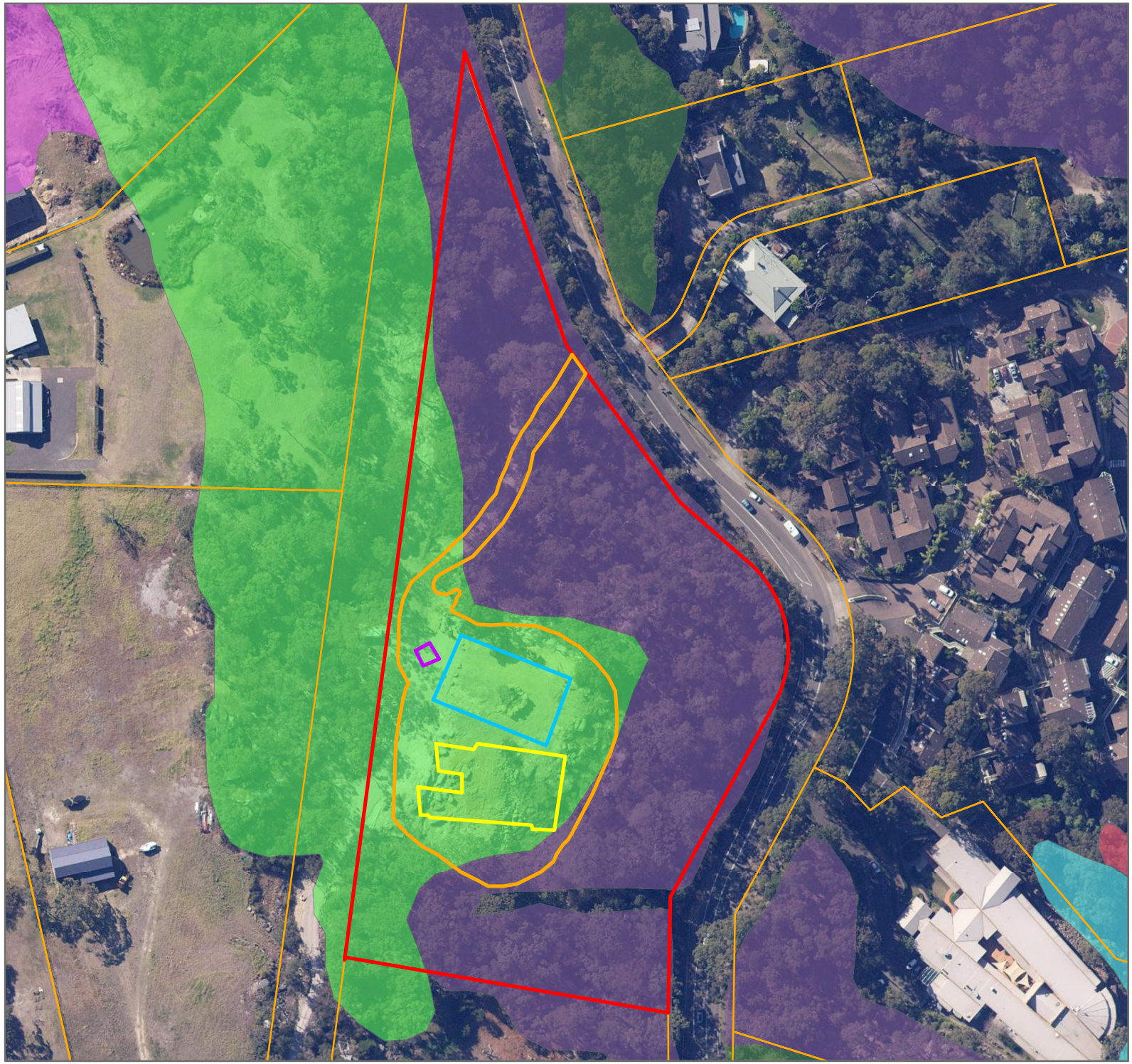
0 15 30 60 Meters

N

Data Source:
Total Earth Care
Nearmap
OEH 2016

total earth care

Tel: 02 9913 1432 Fax: 02 9913 1434



Title: Current Vegetation

Map No: 4
Site: 9 Minkara Rd, Bayview
Client: Joshua Dick
Date: August 2019
Project No: C11463
Author: G Teear

Legend

- Subject_Site
- Lot

Footprint

- Development Footprint
- Garage
- House, Pool & Deck
- Sewage Disposal

Plant Community

- Bloodwood-Scibbly Gum Open Forest (PCT 1783)
- Peppermint-Apple-Shrubby Open Forest (PCT 1250)

0 15 30 60 Meters

N

Data Source:
Total Earth Care
Nearmap
GIS Consulting 2018

Tel: 02 9913 1432 Fax: 02 9913 1434

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Title: Weed Density (% Cover)

Map No: 5
Site: 9 Minkara Rd, Bayview
Client: Joshua Dick
Date: August 2019
Project No: C11463
Author: G Teear

Legend

- Lot
- Subject_Site
- Lantana & African Love Grass

Weed Cover

- 5-25%
- <5%

0 15 30 60 Meters

N

Data Source:
Total Earth Care
Nearmap

Tel: 02 9913 1432 Fax: 02 9913 1434

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Title: Habitat Constraints

Map No: 6
Site: 9 Minkara Rd, Bayview
Client: Joshua Dick
Date: August 2019
Project No: C11463
Author: G Teear

Legend

- Subject_Site
- Lot
- Glider feed trees
- Drainageline
- Cliff
- Giant Burrowing Frog Habitat
- Red-crowned Toadlet Habitat

0 15 30 60 Meters

N

Data Source:
Total Earth Care
Nearmap
GIS Consultants 2018

total earth care

Tel: 02 9913 1432 Fax: 02 9913 1434

4 Identification of Potential Impacts to Biodiversity

4.1 Nature and Extent of Proposed Construction Activities

A small area (578 m^2) of the lot was cleared more than three (3) years ago by the previous owner. Since 2015, a large area has been cleared in the middle of the site and a small strip leading down to Minkara Road (4,717 m^2). This clearing will be the site of the proposed residential development and accompanying driveway. See Appendix A for the proposed plans.

A small area (approximately 216 m^2) of vegetation remains to be cleared at the base of the driveway, adjacent to Minkara Road. This area is mapped as Peppermint-Apple-Shrubby Open Forest (PCT 1250) (GIS Environmental Consultants 2018) and species present include: a Tupentine tree (*Syncarpia glomulifera*) and dense vegetation including *Grevillea sericea, Allocasuarina sp., Banksia ericifolia, Hakea teretifolia* and *Acacia ulicifolia*. Two (2) dreys were sighted in this area during the site survey on the 8th August 2019 (Figure 6).

Figure 6. Drey within area of dense vegetation to be removed for the proposed driveway

4.2 Nature and Extent of any Bushfire Hazard Asset Protection Zones

The area to be managed as an APZ is shown in Figure 7. The Asset Protection Zone (APZ) will be managed as an Inner Protection Area (IPA) (Australian Bushfire Safety & Planning 2018). The areas to be managed as an APZ is already cleared with some weed establishment and regrowth of native species including *Boronia ledifolia* and *Hardenbergia violacea*. As part of the landscape plan this area will be subject to mass planting of suitable ground cover species such as *Lomandra longifolia* and fire retardant species such as *Acmena smithii* (Appendix B).

Planning for Bushfire Protection (NSW RFS 2018) states that the following requirements apply when establishing and maintaining an IPA:

"Trees:

- *canopy cover should be less than 15% (at maturity)*
- *trees (at maturity) should not touch or overhang the building*
- *lower limbs should be removed up to a height of 2m above ground*
- *canopies should be separated by 2 to 5m*
- *preference should be given to smooth barked and evergreen trees.*

Shrubs:

- *create large discontinuities or gaps in the vegetation to slow down or break the progress of fire towards buildings*
- *shrubs should not be located under trees*
- *shrubs should not form more than 10% ground cover*
- *clumps of shrubs should be separated from exposed windows and doors by a distance of at least twice the height of the vegetation.*

Grass:

- *should be kept mown (as a guide grass should be kept to no more than 100mm in height)*
- *leaves and vegetation debris should be removed."*

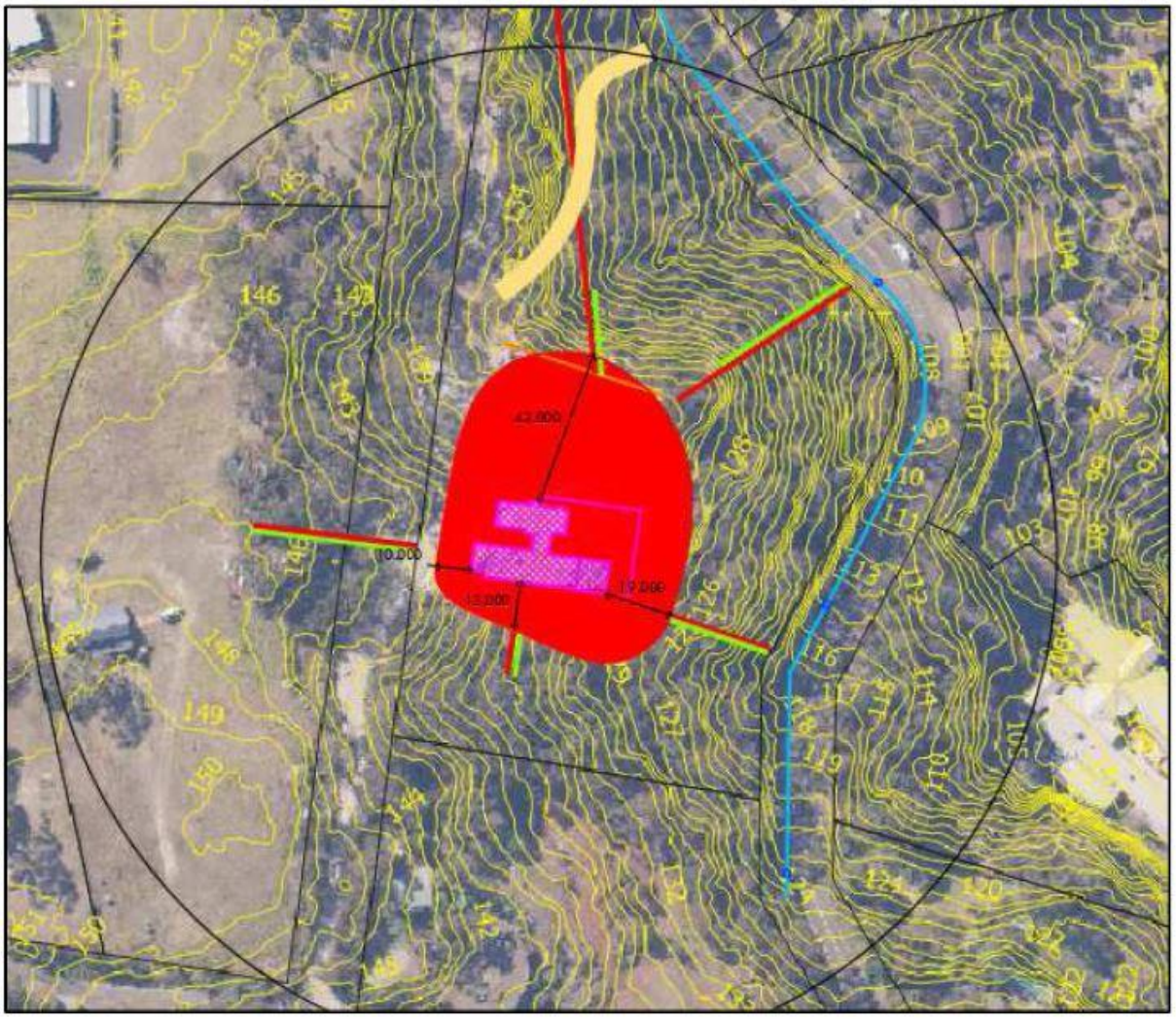

Figure 7. Asset Protection Zones (Australian Bushfire Safety & Planning 2018)

4.3 Nature and Extent of Proposed Operational Activities

The ongoing operational activities for this development includes the use of the residential building, driveway access, stormwater dispersal area and pool. There are few ongoing impacts foreseen during the operational activities. Potential impacts include increased ongoing human presence closer to the bushland area, including some increases to noise and light.

4.4 Potential Indirect Impacts to Any Vegetation in Areas Adjoining the Development

Potential indirect impacts to vegetation include the potential encroachment of exotic plants into bushland by gardening activities and as a result of the introduction of fill to the site. The appropriate selection of landscaping species can minimise this risk.

Increased rate of run-off from hard surfaces of the proposal may alter water flow within the site and lead to increases in sediment or nutrient loads. There are potential impacts from erosion and sediment run-off which can be minimised with standard control techniques.

5 Impact Mitigation Pre-clearing and During Clearing Works

5.1 Pre-clearing

The clearing for this site has largely already been conducted. As such a Construction Environment Management Plan (CEMP) which includes the following mitigation measures should be prepared and implemented now to prevent further erosion and weed spread issues. These mitigation measures must also be implemented prior to the clearing of the remaining area of vegetation to be removed at the base of the driveway adjoining Minkara Road:

- All Environmental Subplans (e.g. Soil & and Water MP, Flora and Fauna MP etc.) within the CEMP must include Scope, Project Compliance Requirements, Project Targets, Control Measures Used, and Monitoring details.
- Erosion and sediment control must be detailed in an Erosions and Sediment Management Plan, including types of control, method of installation, locations, maintenance regime, responsibilities, and stockpile storage. These may include, but are not limited to, silt fencing, vehicle shake-down, floating silt boom, and stabilisation access for machinery.
- Prior to works commencing a pre-clearance survey must be conducted by a qualified Ecologist to determine the presence of any nests, dreys or fauna using hollows. A report of findings for any required supervision of clearing works to be submitted to council.
- Areas determined not to be cleared must be marked and flagged off as “no-go” zones prior and during construction.
- Any trees marked within no-go zones are to be retained and protected. Any impacts to these trees has not been assessed in this current impact assessment. AS 4970-2009 Protection of trees on development sites, is to be followed. This is critical as there is evidence of recent damage from machinery to a large *Eucalyptus umbra* adjacent to the area cleared for the driveway (Figure 8).
- Any trees within close proximity to the works zones must be examined by an arborist prior to works to identify the Tree Protection Zone (TPZ) and the Structural Root Zone (SRZ).
- All environmentally sensitive areas must be permanently delineated from clearance areas with fencing and signage. Delineation must allow for passage of native fauna.
- All personnel must undertake environmental site inductions to highlight any and all environmental and ecological constraints within the site.
- Hygiene controls must be implemented for all vehicles and personnel entering the site. Phytophthora hygiene controls are provided in Appendix C.
- The APZ which is to be managed as an IPA has already been cleared. The boundaries should marked and flagged to protect the surrounding remnant intact bushland.

Figure 8. *Eucalytpus umbra* with recent damage from machinery to the side of the trunk

5.2 During Clearing

As previously discussed the clearing for the site has largely been conducted. As such, the following mitigation measures should be implemented now to prevent further erosion and weed spread issues. These mitigation measures should also be implemented during the clearing of the remaining area of vegetation to be removed at the base of the driveway adjoining Minkara Road:

- Erosion and sediment controls should be implemented and maintained as per the Erosions and Sediment Management Plan.
- Areas which are marked and flagged off as “no-go” zones should be maintained during construction.
- Any trees marked within no-go zones are to be retained and protected. Any impacts to these trees has not been assessed in this current impact assessment. AS 4970-2009 Protection of trees on development sites, is to be followed. This is critical as there is evidence of recent damage from machinery to a large *Eucalyptus umbra* adjacent to the area cleared for the driveway (Figure 8).
- TPZs and the SRZs should be maintained for trees within proximity of the works zones.
- All environmentally sensitive areas must be permanently delineated from impacted areas with fencing and signage. Delineation must allow for passage of native fauna.
- All personnel should undertake environmental site inductions to highlight any and all environmental and ecological constraints within the site.
- Hygiene controls should be implemented for all vehicles and personnel entering the site. Phytophthora hygiene controls are provided in Appendix C.

- The APZ which is to be managed as an IPA has already been cleared. The marking and flagging of the APZ boundaries should be maintained to protect the surrounding remnant intact bushland.
- Felled trees are be placed within the remnant bushland within the site, particularly those with hollows.
- Any hollows which are removed should be replaced with nest boxes at a ratio of 2:1 (two nest boxes for every hollow removed). The size of these should be determined by the size of the hollow removed. For example, large hollows should be replaced with large nest boxes at a 2:1 ratio.
- The vegetation which has already been cleared included trees with hollows as evidenced by the remaining wood which is piled up on site (Figure 2 and Figure 9). Any hollow sections of wood which have already been removed should be salvaged and either placed in the remaining areas of bushland or used to make natural nest boxes which can be installed within the site. Looking at historical aerial photography it is estimated that thirty (30) mature trees have been cleared as part of this development. Of these trees it is estimated that 25% were likely to contain hollows. These should be replaced at a ratio of 2:1 with a variety of nest box sizes which target larger owls, parrots, microbats, gliders and pygmy possums.
- During tree clearing works of the remaining area of vegetation on the driveway adjacent to Minkara Road, a qualified Ecologist should be on present on site. If an animal is identified and at risk during construction works, works should not continue until the animal has been rescued. If the animal is injured a qualified carer should be contacted by either ringing Sydney Metro Wildlife on 02 9413 4300 or WIRES on 1300 094 737. The area at the base of the driveway contained dreys during the survey on the 8th August 2019 and so there is a high likelihood of fauna presence including Ring-tailed Possums (*Pseudocheirus peregrinus*).

Figure 9. Section of trunk which contained a hollow (indicated by the red arrow) and several other trunks which are hollowed internally and likely contained external hollow access points

5.3 Construction

As previously discussed the clearing for the site has largely been conducted. As such the following mitigation measures should be implemented now to prevent further erosion and weed spread issues. These mitigation measures should also be implemented prior to the commencement of construction works for the proposed development:

- Erosion and sediment controls should be implemented and maintained as per the Erosions and Sediment Management Plan.
- Areas which are marked and flagged off as “no-go” zones should be maintained during construction.
- Any trees marked within no-go zones are to be retained and protected. Any impacts to these trees has not been assessed in this current impact assessment. AS 4970-2009 Protection of trees on development sites, is to be followed. This is critical as there is evidence of recent damage from machinery to a large *Eucalyptus umbra* adjacent to the area cleared for the driveway (Figure 8).
- TPZs and the SRZs should be maintained for trees within proximity of the works zones.
- All environmentally sensitive areas must be permanently delineated from construction areas with fencing and signage. Delineation must allow for passage of native fauna.
- All personnel should undertake environmental site inductions to highlight any and all environmental and ecological constraints within the site.
- Hygiene controls should be implemented for all vehicles and personnel entering the site. Phytophthora hygiene controls are provided in Appendix C.

- The APZ which is to be managed as an IPA has already been cleared. The marking and flagging of the APZ boundaries should be maintained to protect the surrounding remnant intact bushland.
- Any trees removed must be replaced at a ratio of 3:1. Three (3) trees must be planted in a suitable area (determined by a qualified ecologist or bush regenerator) for every one (1) tree removed. The tree species used must be part of the existing plant communities on the site.

5.4 Post-construction

The following mitigation measures should be implemented post construction:

- Bush regeneration within the adjacent remnant bushland is recommended to increase habitat quality for native ground cover species and address the existing problem weeds at the edges which include but are not limited to: Inkweed (*Phytolacca octandra*), Wild Tobacco (*Solanum mauritianum*), Crofton Weed (*Ageratina adenophora*), Fleabane (*Conyza sp.*), Blackberry Nightshade (*Solanum nigrum*), Fireweed (*Senecio madagascariensis*), *Lantana camara*, *Ehrharta erecta*, Asthma Weed (*Parietaria judaica*), Ginger Lily (*Hedychium gardnerianum*) and Castor Oil (*Ricinus communis*). Bush regeneration is also required to address new weed infestations that are likely to arise after construction.
- Bush regeneration should utilise locally occurring species suitable for the vegetation communities present on site. A planting list of suitable species is included in Appendix D.
- Bush regeneration and management of the retained bushland should be conducted as per the management zones detailed in Section 6 of this report.
- All environmentally sensitive areas must be permanently delineated from the residential area. Delineation must allow for passage of native fauna.
- Domestic animals are to be restricted from entering the bushland (Pittwater DCP 2014 Section B4.11).
- Development shall ensure that at least 80% of any new planting incorporates native vegetation (Pittwater DCP 2014 Section B4.11).
- Landscaping works are to be outside areas of bushland and do not include Environmental Weeds (Pittwater DCP 2014 Section B4.11).

Title: Erosion Controls

Map No: 7
Site: 9 Minkara Rd, Bayview
Client: Joshua Dick
Date: August 2019
Project No: C11463
Author: G Teear

Legend

- Subject_Site
- Lot
- Sand Bags
- Development

Erosion control type

- Hay bale control
- Sediment fencing

0 10 20 40 Meters

N

Data Source:
Total Earth Care
Nearmap

total earth care

Tel: 02 9913 1432 Fax: 02 9913 1434

6 Management of Retained Vegetation and Rehabilitation Areas

The areas to be retained and revegetated following development are described in Table 4 below. The boundaries for these zones are shown in Map 8 with photo-monitoring points for each zone. Photos taken during the field survey on the 8th August 2019 at these photo-monitoring points are provided in Table 5. The management actions, timing, duration and performance indicators for these zones are provided in Table 6. A Gantt Chart with the timing of works is provided in Table 7.

Table 4. Management Zones

Management Zone	Management Issues
1	Cleared levelled area designated to the wastewater dispersal area. A buffalo grass lawn is planned for this area as per the Landscape Plan (Burton 2019). This must be delineated from natural bushland areas to prevent encroachment. Weeds including *Ehrharta erecta*, Clover, Kikuyu and Catsear are appearing in areas of fill and disturbance. Weeds must be managed and prevented from encroaching into bushland. Run-off during the construction phase poses a risk to the areas of good quality bushland to the north and east, downhill from the wastewater dispersal area.
2	Rocky slopes below the area designated for the house and wastewater dispersal area. This area constitutes the APZ and will be managed as an IPA as described in Section 4.2 of this report. Weeds are present in areas of disturbance within this zone. Erosion is limited due to the rocky slopes present. Weeds must be prevented from encroaching into bushland.
3	Sloped areas below driveway and north of Zone 1. These are high risk erosion areas. Some erosion fences have been installed along the driveway and native species are self-regenerating from the seed bank on these slopes. A natural drainage line commences in this western section of this zone (Map 6) and runs east towards Minkara Rd. The sloped area to the north of Zone 1 does not have any erosion control and the fill is encroaching on the bushland and the bases of trees. The Gymea, Hawkesbury and Oxford Falls soils on the site are highly erodible and must be controlled prior to further construction (OEH 2019b).
4	This zone contains the remaining bushland which is relatively undisturbed and of high quality. The greatest proportion of this zone is downhill to the east of the development area, therefore prone to sediment runoff and weed invasion. An area to the north-west of the site within this zone has been cleared but has started to regenerate with native plant species. Areas within this zone to the west of the development footprint are vulnerable to weed invasion from the “paper road” and neighbouring property to the west where a large thicket of Lantana and African Love Grass is present. This zone is also vulnerable to weed invasion from the road edges along Minkara Road. Prevention of weed invasion is paramount to protect the high quality bushland and habitat in this zone.

Title: Management Zones

Map No: 8
Site: 9 Minkara Rd, Bayview
Client: Joshua Dick
Date: August 2019
Project No: C11463
Author: G Teear

Legend

- Photo Monitoring Points
- Subject_Site
- Lot

Footprint

- Garage
- House, Pool & Deck
- Sewage Disposal

Management Zone

- Zone 1
- Zone 2
- Zone 3
- Zone 4

0 15 30 60 Meters

N

Data Source:
Total Earth Care
Nearmap

Tel: 02 9913 1432 Fax: 02 9913 1434

total earth care

Table 5. Photo-monitoring point images

Photo Point	Direction	Photo
1	East	

Photo Point	Direction	Photo
2	North-east	

Photo Point	Direction	Photo
3a	South-west	

Photo Point	Direction	Photo
3b	North-east	

Photo Point	Direction	Photo
4a	North	

Photo Point	Direction	Photo
4b	South	

Photo Point	Direction	Photo
5	North-east	

Table 6. Schedule of Works

Management Action	Management Zones	Task	Specifications	Timing	Estimated Duration	Responsibility	Performance Indicators/ deliverables
Site Meeting, Induction and WH&S	All zones	Project meeting with client, construction contractors and bush regeneration contractor	Meeting on site with all concerned parties prior to commencement of works. Induction, including environmental inductions undertaken. Review and implementation of site specific WH&S and CEMP Discussion, review and induction for protocols for prevention of pathogen and weed spread.	Preconstruction	Half a (0.5) day	Property owner and Contractors	WH&S documentation Inductions, including environmental inductions completed by all staff Wash down area designated All staff inducted into work site safety and protocols
Baseline Survey	All zones	Begin establishment of baseline monitoring photo points Begin baseline weed mapping of all zones	Establish baseline monitoring photo points and weed density mapping for each management zone. Conduct weed density mapping. An overall assessment of the density of weeds on site is to be conducted by an ecologist or qualified bush regenerator	Start of BMP implementation	One (1) day	Ecologist or qualified bush regenerator	Baseline photo points, signs of dieback in vegetation and weed densities established, to be collated into first progress report (at 6 months from implementation of BMP)

Management Action	Management Zones	Task	Specifications	Timing	Estimated Duration	Responsibility	Performance Indicators/ deliverables
Install Nest Boxes	Zone 4	Install 15 nest boxes	Install 15 nest boxes designed for a variety of species: - 1x large owl box - 3x pygmy-possum boxes - 4x parrot boxes - 4x microbat boxes - 3x glider (squirrel/sugar gliders) boxes Where possible existing hollow logs from the trees which have already been felled should be repurposed into natural hollows.	Preconstruction	One (1) day	Ecologist	Next box installation report including map of nest box locations, photos and box details. To be monitored for occupancy, use and functionality annually and reported in annual BMP monitoring reports.
Fence of "no-go" zones	Zone 4	Protection of conservation areas.	Zone 4 (except areas already cleared west of the development footprint) must be fence off as "no-go" zones prior to construction. High-vis flagging is recommended to flag off the "no-go" zones. No equipment or fill is to be stored in these areas. No machinery or construction contractors must not enter the "no-go" areas.	Preconstruction and maintained until post construction	One (1) day	Construction constructor	Photos provided in monitoring report and flagging maintained throughout the construction period.

Management Action	Management Zones	Task	Specifications	Timing	Estimated Duration	Responsibility	Performance Indicators/ deliverables
Permanent delineation between the APZ and Zone 4	Zone 4	Delineation of conservation areas from APZ	Zone 4 must be permanently delineated from the APZ area to provide a clear management line. As a minimum, a 3 strand wire fence with post at 2-5 m intervals must be installed. Sandstone blocks or other fencing options can be used provided they are fauna friendly (no barbed wire and allow fauna to pass through).	During construction and must be maintained indefinitely.	Two (2) to three (3) days	Construction contractor	Photos provided in monitoring report. Fence maintained and functional for the life of the BMP.
Permanent delineation between the wastewater turfed area and bushland	Zones 1, 2 and 3	Delineation of conservation areas from turf	The turfed area in Zone 1 must be permanently delineated from the bushland to prevent encroachment of exotic grass. The Landscape Plan (Burton 2019) shows sandstone logs which will provide a barrier between the turf and the bushland. Any encroachments beyond the sandstone must be managed during weed control visits by bush regenerators.	During construction and must be maintained indefinitely.	Two (2) weeks	Landscaper or qualified bush regenerator	Photos provided in monitoring report. Boundary maintained and functional for the life of the BMP.
Sediment Fencing	Zone 3	Installation of sediment fencing and maintenance of existing sediment fencing	Sediment fencing to be installed down slope of any earthworks. Sediment fencing to be built according the specifications in the design provided in the construction plan. Specifications included in Appendix F. Three (3) spaced rows of sand bags must be used in the street gutter or table drain to prevent sediment entering stormwater.	Before construction works begin. Must be maintained during the entire construction period until the	One (1) day, two (2) staff	Construction contractor or bush regeneration contractor	No sediment flow into bushland or drainage lines. Sediment fence functional throughout the period of construction. Performance of fence

Management Action	Management Zones	Task	Specifications	Timing	Estimated Duration	Responsibility	Performance Indicators/ deliverables
			Fences to be maintained and functional throughout period of construction.	erosion risk is eliminated.			noted in monitoring BMP reporting.
	Zone 1		Due to the rocky slope on the eastern side of zone 1, straw bales should be used along the western boundary of this zone to prevent sediment run off downhill. Where possible the hay bales must be secured by stacking them into the ground.				
Initial Weed Control	Zones 1, 2 and 3	Weed Control	Weed treatment including hand removal, cut and paint and herbicide spraying where relevant. See Appendix E for species specific treatment techniques.	Prior to construction work	Two (2) days, team of four (4).	Bush Regeneration Contractor	Before and after monitoring photographs. Waste removed off-site.
Initial Weed Control	Zone 4	Weed Control	Control weeds along all zone 4 boundaries including road edges to prevent spread of weeds into high quality bushland. See Appendix E for species specific treatment techniques.	Prior to construction work	One (1) days, team of four (4).	Bush Regeneration Contractor	Before and after monitoring photographs. Waste removed off-site.
Secondary Weed control	All zones	Weed Control	Secondary weed treatment including hand removal, cut and paint and herbicide spraying where relevant. See Appendix E for species specific treatment techniques.	6 months after initial weed control	Two (2) days, team of four (4).	Bush Regeneration Contractor	Before and after monitoring photographs. Waste removed off-site.
Natural Regeneration or Planting and Watering	Zone 2	Planting	Zone 2 can be left to regenerate naturally with weed management and maintained as an APZ as per the RFS specifications. If planting is desired in Zone 2 the following is recommended. **Plant Provenance**	During or post construction	All years	Landscaper or qualified bush regeneration contractor	Before and after monitoring photographs

Management Action	Management Zones	Task	Specifications	Timing	Estimated Duration	Responsibility	Performance Indicators/ deliverables
			Planting to be done using native species using locally sourced provenance species. Tube stock is recommended. See Appendix D for a list of recommended species. **Method** Plantings are best planted in early Autumn to maximise plant survival rates. Plants are to be planted with added water crystals to increase survival rates. Plants to be watered one week after installation and then as required. Watering events to be skipped if there are heavy rain events during scheduled watering periods. Plant guards only if required. Plastic based guards must avoided. **Planting Densities** As per the Landscape Plan (Burton 2019) and APZ RFS requirements. **Mulching** Native mulch must be used to suppress weeds if a soil mix is used. A minimum mulch depth of 75mm and up to 100mm is required.				

Management Action	Management Zones	Task	Specifications	Timing	Estimated Duration	Responsibility	Performance Indicators/ deliverables
Run-off controls	Zone 3	Delineate and control surface run-off	A barrier between the driveway and the slopes to the east of the driveway are required to protect the bushland from sediment and surface run-off. The barrier can be in the form of a gutter on the driveway, garden bed designed to catch run off or a swale. This must be implemented on any slope edge where there is run off from a hard surface.	Install during construction and must be maintained indefinitely.	All years and ongoing	Property Owner and Construction Contractor.	Before and after photos and performance reported in the monitoring reports
Bank stability	Zone 3	Slope stabilization	Slopes along driveway and north of Zone 1 must be stabilised using coir logs and natural regeneration or rip-rap sandstone with geotextile where the rip-rap meets the garden bed.	Install during construction and must be maintained indefinitely.	All years and ongoing	Property Owner and Construction Contractor.	Before and after photos and performance reported in the monitoring reports
Year 1 maintenance	All Zones	Secondary Weed Maintenance	Minimum two visits. Maintenance works to prevent re-establishment of weeds. Weed control methods that can be undertaken include hand weeding and spraying if necessary. Maintenance of APZ following RFS specifications for an IPA as outlined in Section 4.2.	4 weeks after primary weed control, then, 6 months after the secondary weed control	One (1) day, team of four (4) each visit	Qualified bush regeneration contractor	Reduce weeds to less than 10% cover within Year 1. APZ meets RFS specifications for maintenance of an IPA.
Year 2 maintenance	All Zones	Maintenance weeding	Minimum of one (1) annual maintenance visit. Maintenance works to prevent re-establishment of weeds.	During the summer months to target the flush	One (1) day, team of four (4) each visit	Qualified bush regeneration contractor	Reduce weeds to less than 5% cover within Year 2.

Management Action	Management Zones	Task	Specifications	Timing	Estimated Duration	Responsibility	Performance Indicators/ deliverables
			Weed control methods that can be undertaken include hand weeding and spraying if necessary. Maintence of APZ following RFS specifications for an IPA as outlined in Section 4.2.	of annual species.			APZ meets RFS specifications for maintenance of an IPA.
Year 3 maintenance	All Zones	Maintenance weeding	Minimum of one (1) annual maintenance visit. Maintenance works to prevent re-establishment of weeds. Weed control methods that can be undertaken include hand weeding and spraying if necessary. Maintenance of APZ following RFS specifications for an IPA as outlined in Section 4.2.	During the summer months to target the flush of annual species.	One (1) day, team of four (4) each visit	Qualified bush regeneration contractor	Maintain weeds to less than 5% cover within Year 3. APZ meets RFS specifications for maintenance of an IPA.
Year 4 maintenance	All Zones	Maintenance weeding	Minimum of one (1) annual maintenance visit. Maintenance works to prevent re-establishment of weeds. Weed control methods that can be undertaken include hand weeding and spraying if necessary. Maintenance of APZ following RFS specifications for an IPA as outlined in Section 4.2.	During the summer months to target the flush of annual species.	One (1) day, team of four (4) each visit	Qualified bush regeneration contractor	Maintain weeds to less than 5% cover within Year 4. APZ meets RFS specifications for maintenance of an IPA.

Management Action	Management Zones	Task	Specifications	Timing	Estimated Duration	Responsibility	Performance Indicators/ deliverables
Year 5 maintenance	All Zones	Maintenance weeding	Minimum of one (1) annual maintenance visit. Maintenance works to prevent re-establishment of weeds. Weed control methods that can be undertaken include hand weeding and spraying if necessary. Maintenance of APZ following RFS specifications for an IPA as outlined in Section 4.2.	During the summer months to target the flush of annual species.	One (1) day, team of four (4) each visit	Qualified bush regeneration contractor	Maintain weeds to less than 5% cover within in Year 5.
Monitoring and Reporting	All Zones	Conduct annual monitoring, surveys and progress reports	Assess and present progress and monitoring reports on a six-monthly basis to Council to show whether KPIs have been satisfactorily met to Council guidelines.	Every six months	All years	Property owner, Ecological Consultant or qualified bush regeneration contractor	Weeds are to be reduced to less than 10% cover within Year 1 and to less than 5% by Year 5. Planting survival rates are to be at 80% or higher at the end of Year 1 and Year 5. Nest boxes to be monitored for use, occupancy and functionality. Repairs must be implemented when required.
Final Monitoring Report	All Zones	Conduct final monitoring, surveys and	Assess and present a final report to Council to show whether KPIs have been satisfactorily met to Council guidelines	End of Year 5 after practical completion	All years	Property owner, Ecological Consultant or	Planting survival rates at 80% or higher at the end of Year 5

Management Action	Management Zones	Task	Specifications	Timing	Estimated Duration	Responsibility	Performance Indicators/ deliverables
		progress report.				qualified bush regeneration contractor	Weeds to be reduced to less than 10% cover within Year 1 and to less than 5% by Year 5

Table 7. Implementation Schedule

Management Zone	ACTION	Construction				OPERATION / MAINTENANCE																				Responsibility
		2020				YEAR 1				YEAR 2				YEAR 3				YEAR 4				YEAR 5				
		1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	
ALL ZONES	Engage Bush Regenerator and/or Landscaper																									Property Owner/Project Manager
	Site Meeting & Inductions - address WH&S issues																									Property Owner/Project Manager
	Erect sediment fencing and hay bale sediment coontrols																									Landscaper or Construction contractor
	Baseline Survey																									Bush Regenerator or Ecologist
	Year 1 Maintenance																									Bush Regenerator
	Year 2 Maintenance																									Bush Regenerator
	Year 3 Maintenance																									Bush Regenerator
	Year 4 Maintenance																									Bush Regenerator
	Year 5 Maintenance																									Bush Regenerator
	Monitoring Reports																									Bush Regenerator or Ecologist
MANAGEMENT ZONE 1	Primary Weed Control																									Bush Regenerator
	Secondary Weed Control																									Bush Regenerator
MANAGEMENT ZONE 2	Primary Weed Control																									Bush Regenerator
	Secondary Weed Control																									Bush Regenerator
	Planting (if required)																									Landscaper or Bush Regenerator
MANAGEMENT ZONE 3	Primary Weed Control																									Bush Regenerator
	Secondary Weed Control																									Bush Regenerator
	Run-off Controls																									Landscaper or Construction contractor
	Bank Stability																									Landscaper or Construction contractor
MANAGEMENT ZONE 4	Erect temporary exclusion fencing																									Landscaper or Construction contractor
	Permanent delineation of Zone 4 & APZ																									Landscaper or Construction contractor
	Primary Weed Control																									Bush Regen
	Secondary Weed Control																									Bush Regen
	Install Nest Boxes																									Ecologist

7 Monitoring Guidelines

A program of monitoring and inspection is to be carried out by a qualified bushland management consultant (qualified ecologist or bush regeneration supervisor) to ensure the measures outlined in this BMP are implemented and that performance criteria have been satisfied. The monitoring programme will commence prior to any works to gather baseline data and continue for the duration of the maintenance period.

The monitoring programme will involve:

- assessment of weed control works, native regeneration and revegetation success via permanent repeatable photographic monitoring points, and surveys of whole management zones by a suitably qualified person (ecologist or bush regeneration supervisor) to measure percentage cover of native and exotic species for each zone. Monitoring point locations are shown in Map 8;
- mapping of weed density per zone for the site to assess the progress of the works towards the final requirement of maximum <5% weed cover;
- monitoring and assessment to work towards the final requirement of 80% survival rates of plantings;
- certifying that the planting stock (including initial and replacement plantings) are of local provenance as evidenced by the supplying nursery or bush regeneration contractor;
- estimates of the success rate of plantings and assessment of plant replacement requirements;
- assessment of evidence of herbivory, and recommendations to counteract;
- assessment of evidence of erosion, and recommendations to mitigate;
- installation and monitoring of nest boxes for signs of disrepair and usage;
- recommendations for corrective measures and/or specific vegetation management required; and,
- provision of regular reports outlining data collected and tracking of works towards final Key Performance Indicators (KPIs).

Monitoring events and reporting are to follow the following schedule:

- Baseline Survey – Prior to commencement of bushland management works. No report required, but this information must be added to initial progress report;
- Surveys and Progress Report at Six (6) Monthly Intervals– following every 6 months of management activities. Report to include baseline from previous report, commencement and continuation of works, and survey results;
- Final monitoring report after five (5) years from practical completion is required which will report as to whether KPIs have been achieved, and if not, include recommendation on further works required.

All reports should be prepared by suitably qualified professionals and submitted to Council. Council defines a qualified person for supervision of on ground bush regeneration works such as weed removal, bush regeneration and revegetation as having:

- a minimum two years supervising experience of on–ground bush regeneration work and TAFE Certificate III in Conservation and Land Management - Natural Area Restoration or equivalent.

And for undertaking the bush regeneration works:

- a minimum of a TAFE Certificate II in Conservation and Land Management-Natural Area Restoration or equivalent.

8 Corrective Actions

Based on the monitoring report results corrective actions must be implemented where performance targets are not on track. Table 8 details corrective actions for potential management issues which may be identified during the monitoring stage. Corrective actions must be provided in the monitoring report when required:

Table 8. Potential management issues and corrective actions

Management Issue	Corrective Action
Weed cover exceeding targets by 10% or more.	Increase weed control visits by a qualified bush regenerator. Frequency of visits to be determined by a qualified ecologist or bush regenerator to meet KPI's.
Ineffective sediment fencing or in disrepair	Repair existing fencing. Add additional fencing where required to ensure no sediment is entering drainage lines, bushland or stormwater.
Nest boxes in disrepair	Repair required parts of nest boxes or replace.
Planting survival rate below 80%	Replacement planting to increase survival rate to 80% or higher.

9 References

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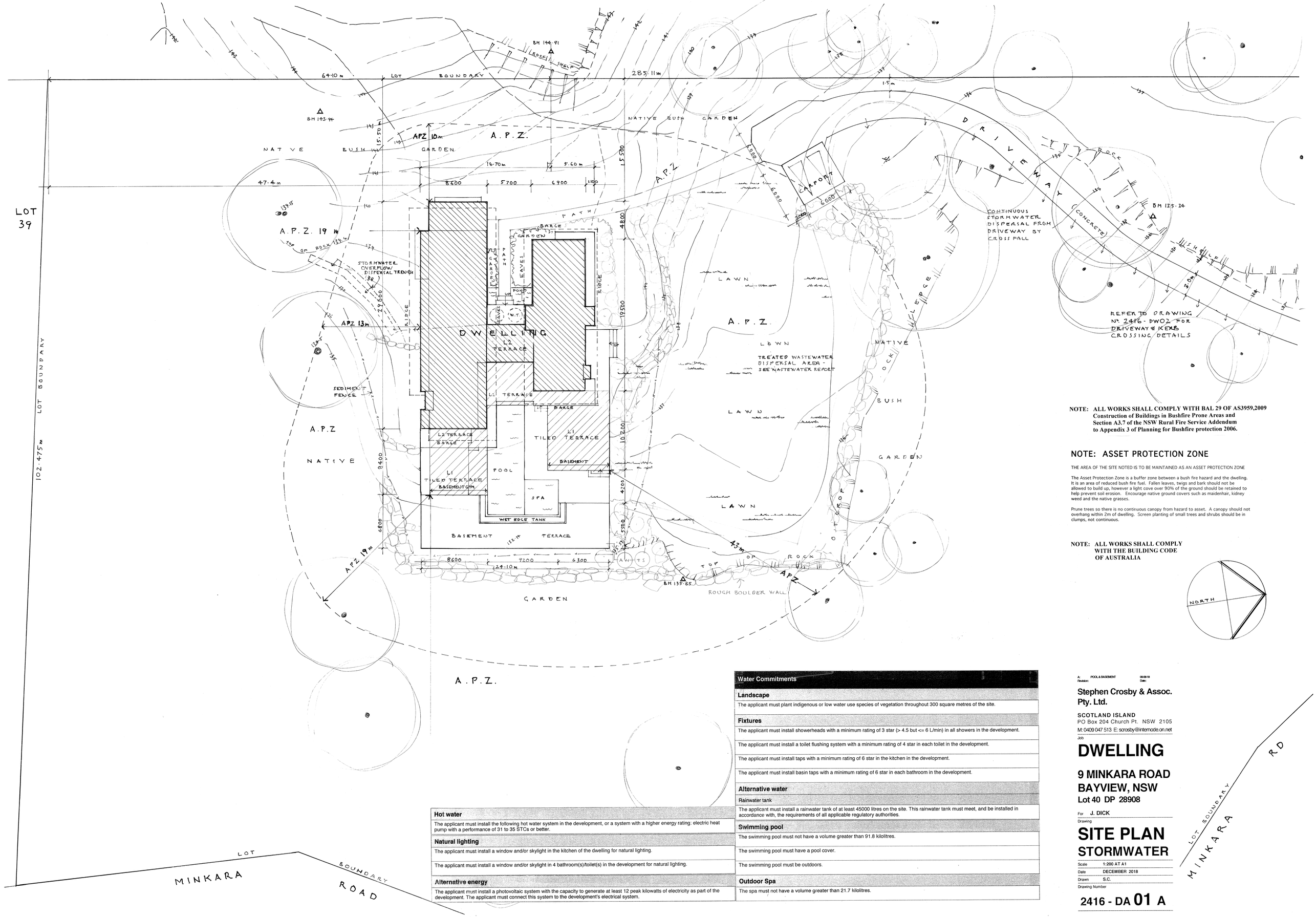
Appendix A. Proposed Plans



NOTE: ALL WORKS SHALL COMPLY WITH BAL 29 OF AS3959,2009 Construction of Buildings in Bushfire Prone Areas and Section A3.7 of the NSW Rural Fire Service Addendum to Appendix 3 of Planning for Bushfire protection 2006.

NOTE: ASSET PROTECTION ZONE

THE AREA OF THE SITE NOTED IS TO BE MAINTAINED AS AN ASSET PROTECTION ZONE

The Asset Protection Zone is a buffer zone between a bush fire hazard and the dwelling. It is an area of reduced bush fire fuel. Fallen leaves, twigs and bark should not be allowed to build up, however a light cove over 90% of the ground should be retained to help prevent soil erosion. Encourage native ground covers such as maidenhair, kidney weed and the native grasses.

Prune trees so there is no continuous canopy from hazard to asset. A canopy should not overhang within 2m of dwelling. Screen planting of small trees and shrubs should be in clumps, not continuous.

NOTE: ALL WORKS SHALL COMPLY WITH THE BUILDING CODE OF AUSTRALIA

Water Commitments
Landscape
The applicant must plant indigenous or low water use species of vegetation throughout 300 square metres of the site.
Fixtures
The applicant must install showerheads with a minimum rating of 3 star (> 4.5 but <= 6 L/min) in all showers in the development.
The applicant must install a toilet flushing system with a minimum rating of 4 star in each toilet in the development.
The applicant must install taps with a minimum rating of 6 star in the kitchen in the development.
The applicant must install basin taps with a minimum rating of 6 star in each bathroom in the development.
Alternative water
Rainwater tank
The applicant must install a rainwater tank of at least 45000 litres on the site. This rainwater tank must meet, and be installed in accordance with, the requirements of all applicable regulatory authorities.
Swimming pool
The swimming pool must not have a volume greater than 91.8 kilolitres.
The swimming pool must have a pool cover.
The swimming pool must be outdoors.
Outdoor Spa
The spa must not have a volume greater than 21.7 kilolitres.

Hot water
The applicant must install the following hot water system in the development, or a system with a higher energy rating: electric heat pump with a performance of 31 to 35 STCs or better.
Natural lighting
The applicant must install a window and/or skylight in the kitchen of the dwelling for natural lighting.
The applicant must install a window and/or skylight in 4 bathroom(s)/toilet(s) in the development for natural lighting.
Alternative energy
The applicant must install a photovoltaic system with the capacity to generate at least 12 peak kilowatts of electricity as part of the development. The applicant must connect this system to the development's electrical system.

A: POOL & BASEMENT 09-09-18
Revision: Date:

Stephen Crosby & Assoc. Pty. Ltd.
SCOTLAND ISLAND
PO Box 204 Church Pt. NSW 2105
M: 0409 047 513 E: scrosby@internode.on.net

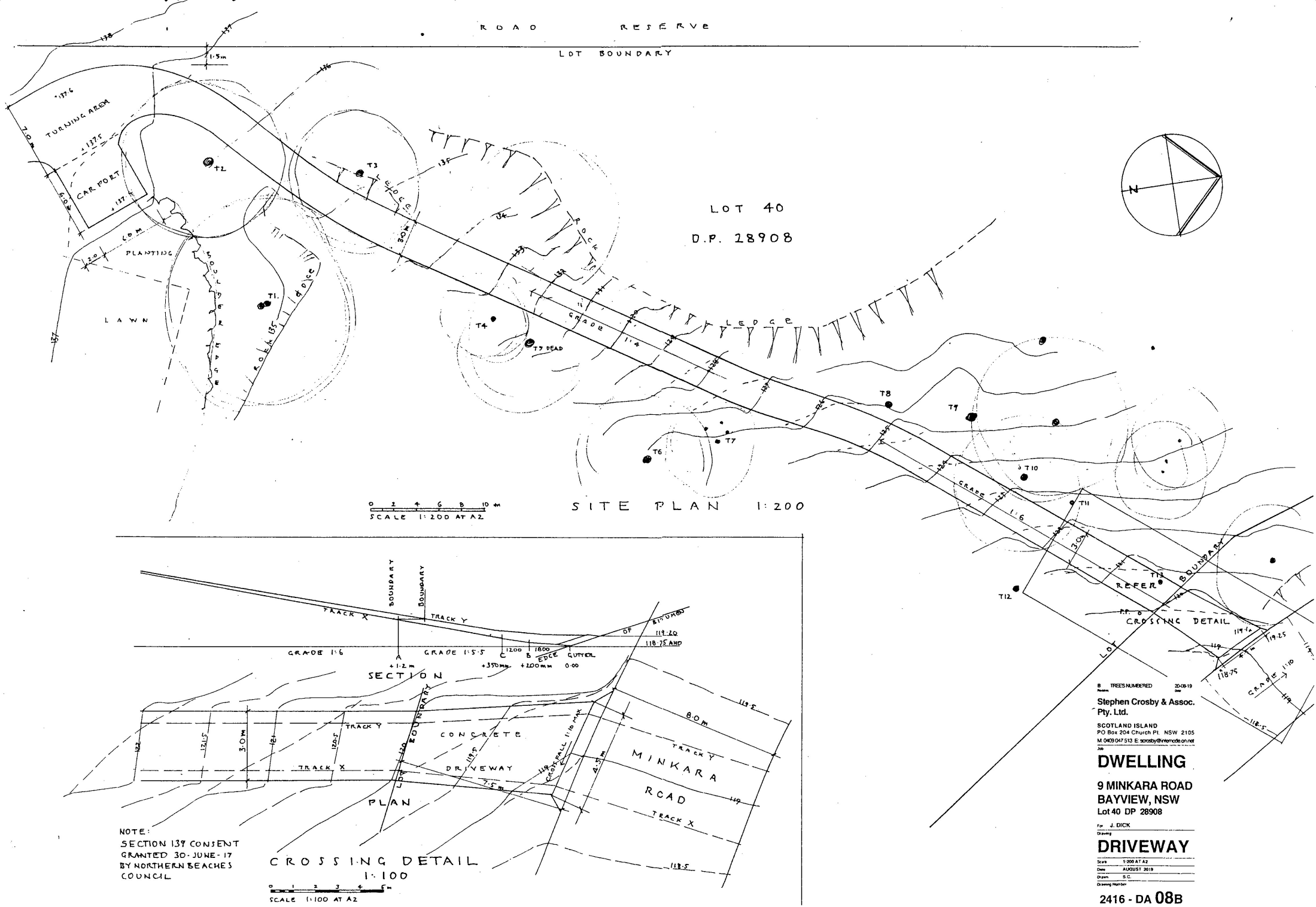
Job
DWELLING
9 MINKARA ROAD BAYVIEW, NSW
Lot 40 DP 28908

For J. DICK

Drawing
SITE PLAN STORMWATER

Scale	1:200 AT A1
Date	DECEMBER 2018
Drawn	S.C.

Drawing Number
2416 - DA 01 A



B TREES NUMBERED 20-08-19

Stephen Crosby & Assoc. Pty. Ltd.
SCOTLAND ISLAND
PO Box 204 Church Pt. NSW 2105
M 0409 047 513 E: scrosby@internode.on.net

Job

DWELLING

9 MINKARA ROAD
BAYVIEW, NSW
Lot 40 DP 28908

For J. DICK

Drawing

DRIVEWAY

Scale	1:200 AT A2
Date	AUGUST 2019
Drawn	S.C.

Drawing Number

2416 - DA 08B

Appendix B. Landscape Plans

LEGEND:

- MASS PLANTING AREAS
- GRASSING SELECTED SOFT BUFFALO SPECIES
- APZ AREA VEGETATION TO BE MAINTAINED AS RECOMMENDED
- CONSERVATION & REHABILITATION AREA: INDIGENOUS LANDSCAPE CHARACTER
- SANDSTONE BOULDERS & RIP RAP SANDSTONE
- SELECTED SANDSTONE LOGS: 500 X 500 X 2000 mm UNITS
- STEEL EDGING 70mm X 70mm X 7mm STEEL STRAIGHT ANGLE
- EXISTING TREES TO BE CONSERVED
- A — PROPOSED EVERGREEN VEGETATION
  HEDGE FORM: ACMENA smithii 'Minor' Fire retardant vegetation
- M — PROPOSED DECIDUOUS TREES
  Melia azederach inflamable rated vegetation

ROAD RESERVE

CONCRETE DRIVE TO ENGINEER'S DETAILS

CARPORT

EXISTING SANDSTONE LEDGE

EXISTING SANDSTONE LEDGE

CONSERVE EXISTING SANDSTONE LEDGE

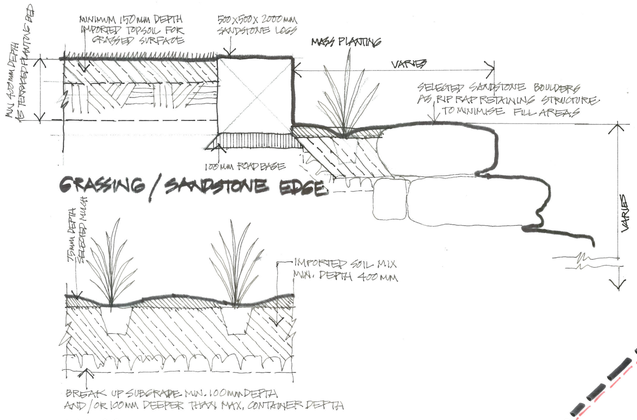
POOL

LOT A0 DP 28908

MINKARA ROAD

PLANT SCHEDULE

Symbol	Name	Number/ Density	Size	Anticipated Height
A	Anggphora costata	5	50 litre	20000 mm
Y	Cyathea cooperi	2	50 litre	12000 mm
M	Melia azederach	3	100 litre	10000 mm
C	Allocasuarina littoralis	12	tube	10000 mm
ER	Elaeocarpus reticulatus	2	50 litre	8000 mm
S	Acmena smithii 'Sublime'	13	50 litre	5000 mm
+	Acmena smithii 'Minor'	39	50 litre	3000 mm
X	Xanthorrhoea arborea	13	50 litre	1500 mm
Z	Macrozammia communis	13	100 litre	900 mm
L	Lomandra longifolia	2 per m2	200 mm pot	900 mm
T	Lomandra 'Tanika'	4 per m2	200 mm pot	900 mm
D	Dianella caerulea	3 per m2	200 mm pot	600 mm
R	Rhagodia spinescens 'Flat Bush'	2 per m2	200 mm pot	500 mm
H	Eremophila glabra prostrate 'Eremi'	2 per m2	200mm pot	250 mm
SH	Scaevola humilis	3 per m2	200 mm pot	200 mm
U	Myoporum parvifolium 'Yareena'	2 per m2	200 mm pot	100 mm
V	Viola hederacea	4 per m2	200 mm pot	50 mm



GRASSING / SANDSTONE EDGE

MASS PLANTING DETAILS SCALE 1:20

LANDSCAPE PLAN
RESIDENCE AT 9 MINKARA ROAD BAYVIEW NSW FOR J. DICK

CAB CONSULTING PTY LTD
ABN: 48076670990
Heritage Urban Design
Landscape and Architecture
CRAIG BURTON AAIA FAILA AAA
BArch.MA.DipLD.DipEnv.S.Hort.Cert
PO Box 277
CHURCH POINT N.S.W.2105
Tel/Fax: 02-99971085 Scot. Island
02-99971050 Church Pt.
e-mail: craigburton@cabconsulting.com.au
website: www.cabconsulting.com.au

SCALE : 1:200 & 1:20
DATE : AUGUST 2019
DWG NO : DA:LA-02

0 2 4 6 8 10

Appendix C. Phytophthora Hygiene Protocols

Task	Action
Timing	When possible/practical, the development should be completed in dry soil conditions and postponed following significant rainfall. Working in dry soil conditions will reduce the need for cleaning vehicles and equipment. If it is necessary to work in wet or damp areas then greater attention will need to be spent on vehicle and equipment cleaning.
Staff	Contractors and staff involved in the development are to be made aware that fungus has / has not been recorded on site, and provided with information regarding management protocols and its threat to native vegetation.
Drainage and Water	Alterations to drainage that may result in the spread of *Phytophthora* into new areas are to be avoided as highest priority. Water used during construction should be minimised. When water is necessary, it should be from a reticulated mains system, bore supply or sterilised source. Surface water collected from infected areas should not be used. Water draining from the site should not to enter bushland areas. The use of water for dust suppression should be kept to a minimum.
Landscaping and Bush Regeneration	Plants used in landscaping should be purchased from a nursery with accreditation from the Nursery Industry Association, or from a nursery with excellent hygiene conditions. Species selected for landscaping should preferably be resistant to *Phytophthora cinnamomi*. Any gravel/sand/topsoil to be bought onto site should be purchased from a Nursery Industry Association accredited supplier, or should be certified (through testing) to be free of *Phytophthora cinnamomi*. Any infected soil/sand/gravel/vegetation moved on the site, or removed from the site should be stored at in area that is also infected with *Phytophthora cinnamomi*, or a site where the pathogen will not have any impact. Storage of gravel/sand/topsoil on site should preferably be on a dry well drained surface. Construction materials such as pipes, rocks, timber, bricks etc, should be free of mud and soil when arriving at the site. Staff should not enter infected areas unless necessary, movement within these areas should be kept to a minimum.
Vehicles and Machinery	All machinery, vehicles and equipment should arrive at the site free of uncontained mud and soil, particularly on tyres, mudflaps and the underbody. Vehicles and machinery exiting the site to be free of all uncontained mud and soil, particularly on the tyres, mudflaps and the underbody. Minimise the amount of water used. Try to remove soil and mud when it is dry (a stiff brush or stick maybe useful). Cleaning will be easier and more effective if it is completed at a depot or a permanent/designated cleaning area (it is acceptable for vehicles and machinery to be taken to a cleaning facility on sealed roads). If cleaning is to occur in the field select a site with a hard, well-drained surface (eg. a road) that is well away from remnant vegetation. If possible, wash down in an area that is close to the area you have been operating in. Wash down on ramps if possible. Do not allow mud and wash-down effluent to drain into bushland. Do not drive through wash-down effluent.
Footwear and Tools	Try to remove as much mud and soil as possible when it is dry with a stiff brush or stick. Minimise the amount of water used to initially clean footwear and tools. Footwear and tools should be scrubbed with a sterile solution (see below). All mud and soil should be collected (including in liquid) and removed in a bag or bucket. This material is to be disposed of at a site that is already infected with Cinnamon Fungus, or a site that contains no bushland.
Sterilising	Equipment can be sterilised by soaking in a disinfectant such as bleach (containing sodium hypochlorite). The bleach should be diluted (1 part bleach to 10 parts water), soak the tools for a few minutes, and then rinse. Alternatively methylated spirits can also be used for sterilising small hand tools and footwear in the field. A spray bottle containing methylated spirits can be used to cover all surfaces, allowing time for it to soak into all soil material (a couple of minutes is sufficient). A sterile water solution suitable for spraying down vehicles and machinery can be made by mixing 6mL of sodium hypochlorite (eg. pool chlorine or bleach) to every 10L of water.

Appendix D. Native Species Planting List

Family	Species Name	Common Name	Form
Apiaceae	Platysace linearifolia		Shrub
Apiaceae	Actinotus helianthi	Flannel Flower	Herb
Apiaceae	Actinotus minor	Lesser Flannel Flower	Herb
Asteraceae	Ozothamnus diosmifolius	White Dogwood	Shrub
Casuarinaceae	Allocasuarina distyla		Shrub
Casuarinaceae	Allocasuarina littoralis	Black She-Oak	Tree
Cunoniaceae	Ceratopetalum gummiferum	Christmas Bush	Tree
Cyperaceae	Baumea acuta		Grass
Cyperaceae	Caustis flexuosa	Curly Wig	Grass
Cyperaceae	Gahnia sieberiana	Red-fruit Saw-sedge	Grass
Dilleniaceae	Hibbertia bracteata		Shrub
Dilleniaceae	Hibbertia linearis		Shrub
Elaeocarpaceae	Elaeocarpus reticulatus	Blueberry Ash	Tree
Ericaceae	Woollsia pungens		Shrub
Ericaceae	Epacris longiflora	Fuchsia Heath	Shrub
Ericaceae	Leucopogon juniperinus	Prickly Beard-heath	Shrub
Ericaceae	Epacris pulchella	Wallum Heath	Shrub
Fabaceae (Faboideae)	Dillwynia floribunda		Shrub
Fabaceae (Faboideae)	Dillwynia retorta		Shrub
Fabaceae (Faboideae)	Pultenaea elliptica	Bush Pea	Shrub
Fabaceae (Faboideae)	Pultenaea daphnoides	Large-leaf Bush-pea	Shrub
Fabaceae (Mimosoideae)	Acacia ulicifolia	Prickly Moses	Shrub
Fabaceae (Mimosoideae)	Acacia suaveolens	Sweet Wattle	Shrub
Fabaceae (Mimosoideae)	Acacia linifolia	White Wattle	Shrub
Lamiaceae	Hemigenia purpurea		Shrub
Lomandraceae	Lomandra obliqua		Grass
Lomandraceae	Lomandra longifolia	Spiny-headed Mat-rush	Grass
Lomandraceae	Lomandra filiformis	Wattle Matt-rush	Grass
Malvaceae	Lasiopetalum ferrugineum ssp. Ferrugineum		Shrub
Myrtaceae	Eucalyptus haemastoma	Broad-leaved Scribbly Gum	Tree
Myrtaceae	Eucalyptus umbra	Broad-leaved White Mahogany	Tree
Myrtaceae	Eucalyptus punctata	Grey Gum	Tree
Myrtaceae	Corymbia gummifera	Red Bloodwood	Tree

Family	Species Name	Common Name	Form
Myrtaceae	Leptospermum trinervium	Slender Tea-tree	Shrub
Myrtaceae	Eucalyptus piperita	Sydney Peppermint	Tree
Myrtaceae	Angophora costata	Sydney Red Gum	Tree
Myrtaceae	Kunzea ambigua	Tick Bush	Shrub
Myrtaceae	Syncarpia glomulifera	Turpentine	Tree
Phormiaceae	Dianelle caerulea var. producta	Blue Flax-lily	Herb
Pittosporaceae	Billardiera scandens	Hairy Apple Berry	Shrub
Pittosporaceae	Pittosporum revolutum	Rough Fruit Pittosporum	Shrub
Poaceae	Entolasia marginata	Bordered Panic	Grass
Poaceae	Entolasia stricta	Wiry Panic	Grass
Proteaceae	Hakea bakeriana		Shrub
Proteaceae	Grevillea buxifolia ssp. buxifolia	Grey Spider Flower	Shrub
Proteaceae	Banksia spinulosa	Hairpin Banksia	Shrub
Proteaceae	Banksia ericifolia	Heath-leaved Banksia	Shrub
Proteaceae	Persoonia lanceolata	Lance Leaf Geebung	Shrub
Proteaceae	Grevillea linearifolia	Linear-leaf Grevillea	Shrub
Proteaceae	Lambertia formosa	Mountain Devil	Shrub
Proteaceae	Isopogon anethifolius	Narrow-leaf Drumsticks	Shrub
Proteaceae	Hakea teretifolia	Needlebush	Shrub
Proteaceae	Banksia serrata	Old-man Banksia	Tree
Proteaceae	Grevillea sericea	Pink Spider Flower	Shrub
Restionaceae	Empodisma minus		Grass
Restionaceae	Lepyrodia scariosa		Grass
Rutaceae	Zieria pilosa	Pilose-leafed Zieria	Shrub
Rutaceae	Boronia ledifolia	Sydney Boronia	Shrub
Rutaceae	Eriostemon australasius spp. australasius	Wax plant	Shrub
Smilacaceae	Smilax glyciphylla	Sweet Sarsparilla	Vine
Thymelaeaceae	Pimelea linifolia	Slender Rice Flower	Shrub
Xanthorrhoeaceae	Xanthorrhoea media		Grass Tree

Appendix E. Weed Species listed as a Biosecurity Risk

Table 9. Categories of Management under the Greater Sydney Regional Strategic Weed Management Plan 2017-2022 under the NSW Biosecurity Act 2015

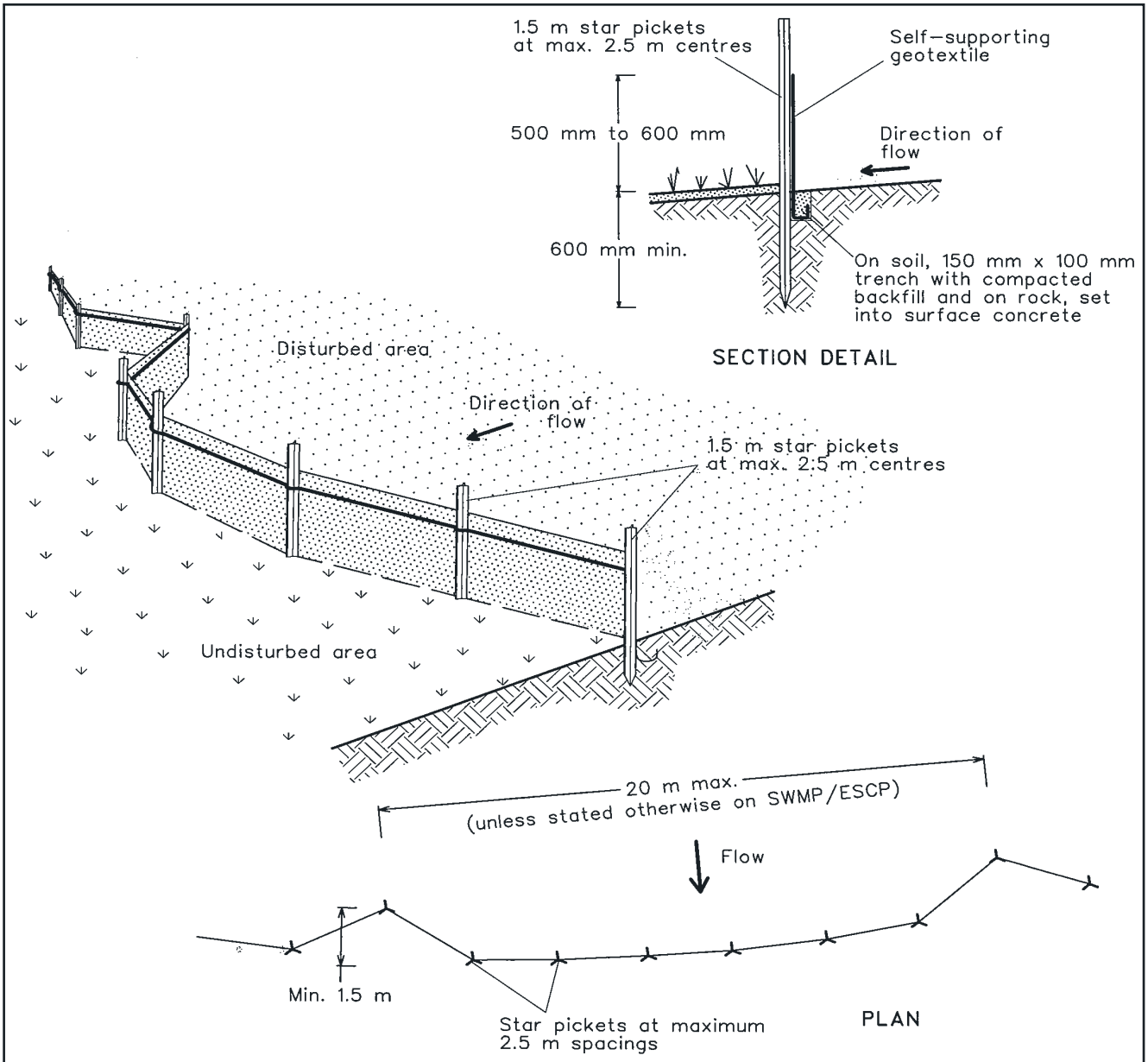
Category	Management Action
Prevention (Prevent)	To prevent the weed species arriving and establishing in the Region.
Eradication (Eliminate)	To permanently remove the species and its propagules from the Region, OR to destroy infestations to reduce the extent of the weed in the region with the aim of local eradication.
Containment (Minimise)	To prevent the ongoing spread of the species in all or part of the Region.
Asset Protection (Manage)	To prevent the spread of weeds to key sites/ assets of high economic, environmental and social value, or to reduce their impact on these sites if spread.
GBD (General Biosecurity Duty)	All plants are regulated with a general biosecurity duty to prevent, eliminate or minimise any biosecurity risk they may pose. Any person who deals with any plant, who knows (or ought to know) of any biosecurity risk, has a duty to ensure the risk is prevented, eliminated or minimised, so far as is reasonably practicable."
RRM (Regional Recommended Measure)	Specific details for each species included in table.
PoD (Prohibition on Dealings)	Must not be imported into the State or sold.
B Zone (Biosecurity Zone)	Specific details for each species included in table.
PM (Prohibited Matter)	A person who deals with prohibited matter or a carrier of prohibited matter is guilty of an offence. A person who becomes aware of or suspects the presence of prohibited matter must immediately notify the Department of Primary Industries.

Table 10. Biosecurity Risk & Management Actions

Common Name	Botanical Name	WONS	State Priority Weed-Mgmt. Actions	Regional Priority Weeds-Mgmt. Actions	Other Regional Weeds-Asset/value at risk	Weeding Technique	Herbicide Application
African Lovegrass	*Eragrostis curvula*				Environment	Hand pulled or brush cut and foliar sprayed with Glyphosate	Glyphosate 360g/L
Asthma Weed	*Parietaria judaica*					Hand pulled or spot sprayed with Glyphosate	Glyphosate 360g/L
Blackberry Night Shade	*Solanum nigrum*					Foliar spraying with Glyphosate, hand pulled and brush cut	Glyphosate 360g/L
Castor Oil Plant	*Ricinus communis*					Hand pulled and cut & painted with neat Glyphosate	Glyphosate 360g/L
Chinese Elm	*Ulmus parvifolia*				Environment	<80mm cut & painted; >80mm will be drilled/frilled with neat Glyphosate	Glyphosate 360g/L
Crofton Weed	*Ageratina adenophora*				Environment, Agriculture	Hand removal, brush cut and foliar sprayed with Glyphosate	Glyphosate 360g/L
Fireweed	*Senecio madagascariensis*	Yes	Asset Protection			Foliar spraying with Glyphosate, hand pulled and brush cut	Glyphosate 360g/L
Fishbone Fern	*Nephrolepis cordifolia*				Environment	Hand removal. Brush cut then sprayed with Glyphosate.	Glyphosate 360g/L
Flatweed	*Hypochoaris radiata*					Removed manually or spot sprayed where applicable.	Glyphosate 360g/L
Fleabane	*Conyza bonariensis*					Foliar spraying with Glyphosate, hand pulled and brush cut	Glyphosate 360g/L
Ginger Lily	*Hedychium gardnerianum*				Environment	Physical removal. Large stands cut and painted with Glyphosate/Metsulfuron-Methyl.	Glyphosate 360g/L & Metsulfuron-Methyl 600 g/kg
Golden Wreath Wattle	*Acacia saligna*				Environment		
Inkweed	*Phytolacca octandra*					Foliar spraying with Glyphosate, hand pulled and brush cut	Glyphosate 360g/L
Kikuyu	*Pennisetum clandestinum*				Environment	Foliar spraying with Glyphosate	Glyphosate 360g/L

Common Name	Botanical Name	WONS	State Priority Weed-Mgmt. Actions	Regional Priority Weeds-Mgmt. Actions	Other Regional Weeds-Asset/value at risk	Weeding Technique	Herbicide Application
Lantana	*Lantana camara*	Yes	Asset Protection			Cut and paint, sprayed or splattered with Glyphosate	Glyphosate 360g/L
Paddy's Lucerne	*Sida rhombifolia*					Foliar spraying with Glyphosate, hand pulled and brush cut	Glyphosate 360g/L
Panic Veldgrass	*Ehrharta erecta*					Foliar spraying with Glyphosate	Glyphosate 360g/L
Pellitory, Asthma Weed	*Parietaria judaica*				Environment, Human health		
Tobacco Bush/ Wild Tobacco	*Solanum mauritianum*				Environment, Agriculture	Cut & paint with Glyphosate	Glyphosate 360g/L
Whisky Grass	*Andropogon virginicus*				Environment	Remove seed and crown out with knife or spot spray	Glyphosate 360g/L
White Clover	*Trifolium repens*					Foliar spraying with Glyphosate, hand pulled and brush cut	Glyphosate 360g/L

Appendix F. Sediment Fence Specifications (Landcom 2004)



Construction Notes

1. Construct sediment fences as close as possible to being parallel to the contours of the site, but with small returns as shown in the drawing to limit the catchment area of any one section. The catchment area should be small enough to limit water flow if concentrated at one point to 50 litres per second in the design storm event, usually the 10-year event.
2. Cut a 150-mm deep trench along the upslope line of the fence for the bottom of the fabric to be entrenched.
3. Drive 1.5 metre long star pickets into ground at 2.5 metre intervals (max) at the downslope edge of the trench. Ensure any star pickets are fitted with safety caps.
4. Fix self-supporting geotextile to the upslope side of the posts ensuring it goes to the base of the trench. Fix the geotextile with wire ties or as recommended by the manufacturer. Only use geotextile specifically produced for sediment fencing. The use of shade cloth for this purpose is not satisfactory.
5. Join sections of fabric at a support post with a 150-mm overlap.
6. Backfill the trench over the base of the fabric and compact it thoroughly over the geotextile.

SEDIMENT FENCE — SD 6-8