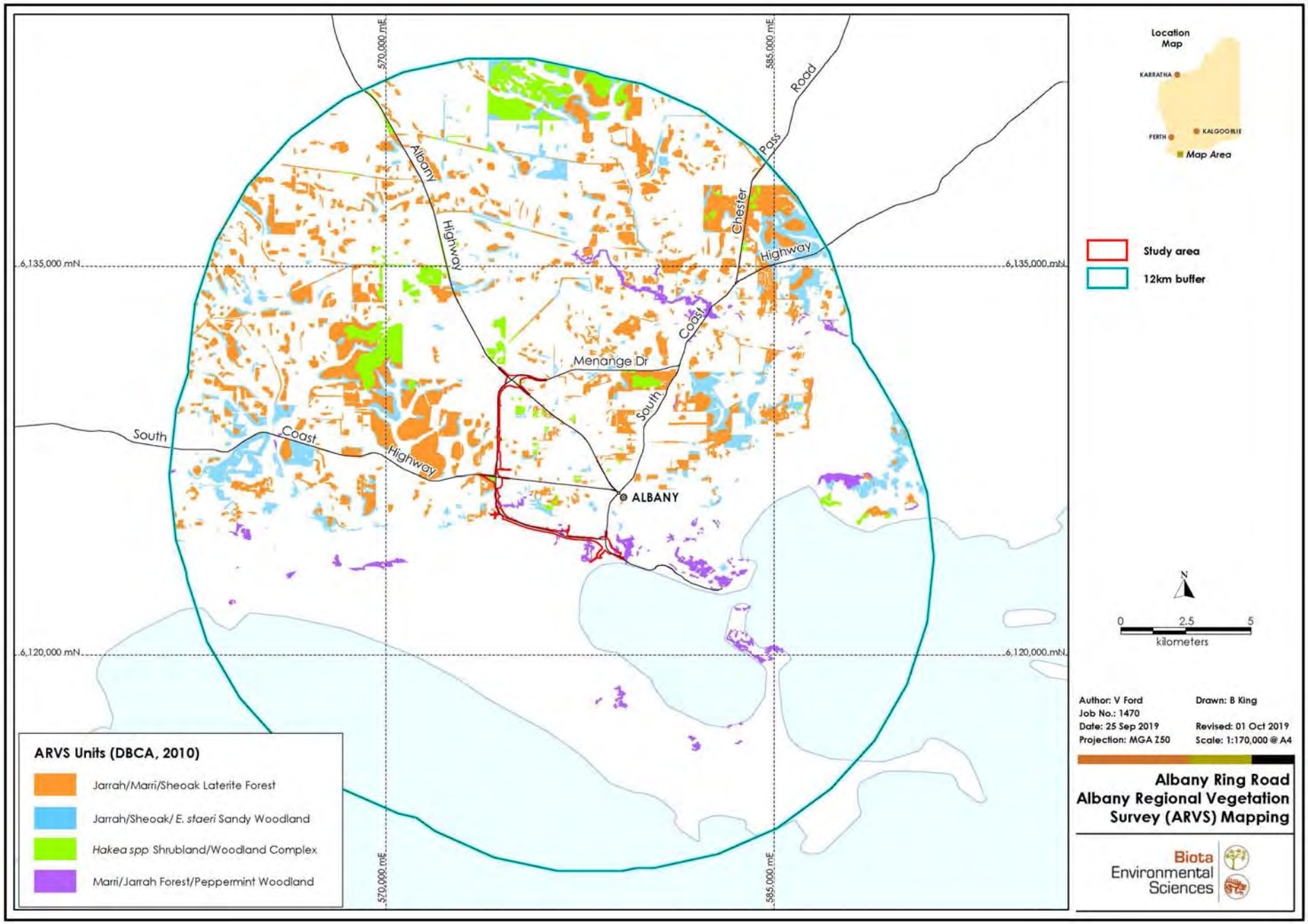

Figure 6.1: Extent of the vegetation units found within the study area in a 12 km radius based on the Albany Regional Vegetation Survey (Sandiford and Barrett 2010).

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Appendix 1

Tree Hollow Data

Flora Species	DBH (mm)	Latitude	Longitude	Number of Hollows	Hollow Size/s (mm)	Comment
Corymbia calophylla	500	-35.0176983	117.8421097	2	100,100	Ground assessment: Hollow(s) not suitable for BC nesting
Corymbia calophylla	500	-35.0233359	117.8641153	1	150	Drone result: Unlikely suitable for BC nesting
Corymbia calophylla	550	-35.02327559	117.8636603	1	100	Ground assessment: Hollow(s) not suitable for BC nesting
Corymbia calophylla	550	-34.9914124	117.8145234	1	100	Drone result: Unlikely suitable for BC nesting
Corymbia calophylla	610	-35.0232296	117.8637886	2	100,100	Drone result: Unlikely suitable for BC nesting
Corymbia calophylla	700	-35.0077357	117.8155675	1	100	Drone result: Unlikely suitable for BC nesting
Corymbia calophylla	740	-35.0076863	117.8154499	1	300	Drone result: Unlikely suitable for BC nesting
Corymbia calophylla	750	-35.0077681	117.8154498	1	100	Drone result: Unlikely suitable for BC nesting
Corymbia calophylla	770	-35.0176226	117.8422384	2	100,100	Ground assessment: Hollow(s) not suitable for BC nesting
Corymbia calophylla	850	-35.020017	117.8616057	1	200	Ground assessment: Hollow(s) not suitable for BC nesting
Corymbia calophylla	870	-35.0076482	117.814969	1	150	Drone result: Unlikely suitable for BC nesting
Corymbia calophylla	920	-35.0061519	117.8145263	2	150,100	Drone result: Unlikely suitable for BC nesting
Corymbia calophylla	950	-35.0074739	117.8149892	1	200	Drone result: Unlikely suitable for BC nesting
Corymbia calophylla	1010	-35.0234957	117.8639284	2	100,100	Drone result: Unlikely suitable for BC nesting
Corymbia calophylla	1080	-35.0078189	117.8152168	1	150	Drone result: Unlikely suitable for BC nesting
Eucalyptus marginata	500	-34.9862827	117.8144703	2	100,100	Drone result: Unlikely suitable for BC nesting
Eucalyptus marginata	500	-34.9778163	117.814501	1	120	Drone result: Unlikely suitable for BC nesting
Eucalyptus marginata	520	-34.9772517	117.8144266	2	300,100	Ground assessment: Hollow(s) not suitable for BC nesting
Eucalyptus marginata	530	-34.9777293	117.814756	1	100	Drone result: Unlikely suitable for BC nesting
Eucalyptus marginata	560	-34.9823121	117.8147209	1	100	Drone result: Unlikely suitable for BC nesting
Eucalyptus marginata	570	-34.9823641	117.8145375	1	150	Drone result: Unlikely suitable for BC nesting
Eucalyptus marginata	570	-34.9914377	117.8146041	1	100	Drone result: Unlikely suitable for BC nesting
Eucalyptus marginata	580	-34.9837872	117.8145984	1	100	Ground assessment: Hollow(s) not suitable for BC nesting
Eucalyptus marginata	600	-34.9830831	117.8146528	1	120	Drone result: Unlikely suitable for BC nesting
Eucalyptus marginata	600	-34.9840263	117.8143454	1	100	Ground assessment: Hollow(s) not suitable for BC nesting
Eucalyptus marginata	630	-34.9862442	117.8144751	1	100	Drone result: Unlikely suitable for BC nesting
Eucalyptus marginata	650	-34.98421394	117.8145071	1	100	Ground assessment: Hollow(s) not suitable for BC nesting
Eucalyptus marginata	680	-34.983879	117.8148551	1	120	Drone result: Unlikely suitable for BC nesting
Eucalyptus marginata	720	-34.9914673	117.8142802	1	100	Ground assessment: Hollow(s) not suitable for BC nesting
Eucalyptus marginata	730	-34.99167898	117.8148354	1	100	Ground assessment: Hollow(s) not suitable for BC nesting
Eucalyptus marginata	730	-35.0013403	117.8135289	1	100	Drone result: Unlikely suitable for BC nesting
Eucalyptus marginata	730	-34.9875881	117.8143155	2	100,100	Drone result: Unlikely suitable for BC nesting
Eucalyptus marginata	750	-35.0029378	117.8141212	1	100	Ground assessment: Hollow(s) not suitable for BC nesting
Eucalyptus marginata	770	-34.98421476	117.8146859	1	200	Drone result: Unlikely suitable for BC nesting

Flora Species	DBH (mm)	Latitude	Longitude	Number of Hollows	Hollow Size/s (mm)	Comment
Eucalyptus marginata	820	-35.0034959	117.8144761	2	200,100	Drone result: Unlikely suitable for BC nesting
Eucalyptus marginata	870	-35.0032962	117.8140749	1	120	Drone result: Unlikely suitable for BC nesting
Eucalyptus marginata	910	-34.9872888	117.8145547	1	100	Drone result: Unlikely suitable for BC nesting
Eucalyptus marginata	930	-34.9824702	117.8144144	1	100	Drone result: Unlikely suitable for BC nesting
Eucalyptus marginata	950	-35.0034871	117.8143589	1	100	Drone result: Unlikely suitable for BC nesting

Appendix 2

Foraging Habitat Scoring Tool

Table 3: Foraging habitat scoring tool

Starting Score	Foraging habitat for Carnaby's Cockatoo	Foraging habitat for Baudin's Cockatoo	Foraging habitat for Forest Red-tailed Black cockatoo
10 (Very high quality)	Foraging habitat that is being managed for black cockatoos such as habitat that is the focus of successful **rehabilitation**, and/or has some level of **protection** from clearing, and/or is quality habitat described below with attributes contributing to meet a sore of ≥10.	Foraging habitat that is being managed for black cockatoos such as habitat that is the focus of, successful **rehabilitation**, and/or has some level of **protection** from clearing, and/or is quality habitat described below with attributes contributing to meet a sore of ≥10.	Foraging habitat that is being managed for black cockatoos such as habitat that is the focus of successful **rehabilitation**, and/or has some level of **protection** from clearing, and/or is quality habitat described below with attributes contributing to meet a sore of ≥10.
7 (High quality)	Native shrubland, kwongan heathland and woodland dominated by proteaceous plant species such as *Banksia* spp. (including *Dryandra* spp.), *Hakea* spp. and *Grevillea* spp., as well as native eucalypt woodland and forest that contains foraging species, including along roadsides. Does not include orchards, canola, or areas under a RFA.	Native eucalypt woodlands and forest, and proteaceous woodland and heath, particularly marri, including along roadsides. Does not include orchards or areas under a RFA.	Jarrah and marri woodlands and forest, and edges of karri forests, including wandoo and blackbutt, within the range of the subspecies, including along roadsides. Does not include areas under a RFA.
5 (Quality)	Pine plantation or introduced eucalypts.	Pine plantation or introduced eucalypts.	Introduced eucalypts as well as the introduced Cape lilac (*Melia azedarach*).
1 (Low quality)	Individual foraging plants or small stand of foraging plants.	Individual foraging plants or small stand of foraging plants.	Individual foraging plants or small stand of foraging plants.
Additions	**Context adjustor - attributes improving functionality of foraging habitat**	**Context adjustor - attributes improving functionality of foraging habitat**	**Context adjustor - attributes improving functionality of foraging habitat**
+3	Is within the Swan Coastal Plain (important foraging area).	Is within the known foraging area (see map).	Jarrah and/or marri show good recruitment (i.e. evidence of young trees).
+3	Contains trees with suitable nest hollows.	Contains trees with suitable nest hollows.	Contains trees with suitable nest hollows.
+2	Primarily comprises marri.	Primarily contains marri.	Primarily contains marri and/or jarrah.
+2	Contains trees with potential to be used for breeding (dbh ≥ 500 mm or ≥ 300 mm dbh for salmon gum and wandoo).	Contains trees with potential to be used for breeding (dbh ≥ 500 mm or ≥ 300 mm dbh for salmon gum and wandoo).	Contains trees with potential to be used for breeding (dbh ≥ 500 mm or ≥ 300 mm dbh for salmon gum and wandoo).
+1	Is known to be a roosting site.	Is known to be a roosting site.	Is known to be a roosting site.
Subtractions	**Context adjustor - attributes reducing functionality of foraging habitat**	**Context adjustor - attributes reducing functionality of foraging habitat**	**Context adjustor - attributes reducing functionality of foraging habitat quality**
-2	No clear evidence of feeding debris.	No clear evidence of feeding debris.	No clear evidence of feeding debris.
-2	No other foraging habitat within 6 km.	No other foraging habitat within 6 km.	No other foraging habitat within 6 km.
-1	Is > 12 km from a known breeding location.	Is > 12 km from a known breeding location.	Is > 12 km from a known breeding location.
-1	Is > 12 km from a known roosting site.	Is > 12 km from a known roosting site.	Is > 12 km from a known roosting site.
-1	Is > 2 km from a watering point.	Is > 2 km from a watering point.	Is > 2 km from a watering point.
-1	Disease present (e.g. *Phytophthora cinnamomi* or marri canker).	Disease present (e.g. *Phytophthora cinnamomi* or marri canker).	Disease present (e.g. *Phytophthora cinnamomi* or marri canker).

Appendix 3

Foraging Habitat Scoring

Appendix 3.1: Carnaby's Black-Cockatoo

Vegetation Description	Starting Score	+3: Is within the Swan Coastal Plain (important foraging area).	+3: Contains trees with suitable nest hollows.	+2: Primarily comprises Marri	+2: Contains trees with potential to be used for breeding (DBH ≥ 50 cm)	+1: Is known to be a roosting site	-2: No clear evidence of feeding debris	-2 No other foraging habitat within 6 km	-2: Is >12 km from a known breeding location	-1: Is >12 km from a known roosting site	-1: Is >2 km from a watering point	-1: Disease present (e.g. *Phytophthora cinnamomi* or marri canker)	Final Score
Jarrah/Marri/Sheoak Laterite Forest	7				2								9
Marri/Jarrah Forest/Peppermint Woodland	5			2	2								9
Hakea spp. Shrubland/Woodland Complex	7						-2						5
Jarrah/Sheoak/*E. staeri* Sandy Woodland	1				2								3
Planted *Pinus radiata*	1						-2						0
Planted Jarrah and Marri	1				2								3

Appendix 3.2: Baudin's Black-Cockatoo

Vegetation Description	Starting Score	+3: Is within the known foraging area	+3: Contains trees with suitable nest hollows.	+2: Primarily comprises Marri	+2: Contains trees with potential to be used for breeding (DBH ≥ 50 cm)	+1: Is known to be a roosting site	-2: No clear evidence of feeding debris	-2 No other foraging habitat within 6 km	-2: Is >12 km from a known breeding location	-1: Is >12 km from a known roosting site	-1: Is >2 km from a watering point	-1: Disease present (e.g. *Phytophthora cinnamomi* or marri canker)	Final Score
Jarrah/Marri/Sheoak Laterite Forest	7	3			2								12
Marri/Jarrah Forest/Peppermint Woodland	7	3		2	2								14
Hakea spp. Shrubland/Woodland Complex	1	3					-2						2
Jarrah/Sheoak/*E. staeri* Sandy Woodland	1	3			2								4
Planted *Pinus radiata*	1	3											4
Planted Jarrah and Marri	1	3			2								6

Appendix 3.3: Forest Red-tailed Black-Cockatoo

Vegetation Description	Starting Score	+3: Jarrah shows good recruitment.	+3: Contains trees with suitable nest hollows.	+2: Primarily Contains Marri and/or Jarrah	+2: Contains trees with potential to be used for breeding (DBH ≥ 50 cm)	+1: Is known to be a roosting site	-2: No clear evidence of feeding debris	-2 No other foraging habitat within 6 km	-2: Is >12 km from a known breeding location	-1: Is >12 km from a known roosting site	-1: Is >2 km from a watering point	-1: Disease present (e.g. *Phytophthora cinnamomi* or marri canker)	Final Score
Jarrah/Marri/Sheoak Laterite Forest	7	3		2	2								14
Marri/Jarrah Forest/Peppermint Woodland	7	3		2	2								14
Hakea spp. Shrubland/Woodland Complex	1	3											4
Jarrah/Sheoak/*E. staeri* Sandy Woodland	7	3			2		-2						10
Planted *Pinus radiata*	–												–
Planted Jarrah and Marri	1				2		-2						1

Appendix F: Dieback Assessment and Survey Albany Ring Road (Southern Ecology 2020)

Phytophthora Dieback Management Plan: Albany Ring Road

Report prepared for
Main Roads Western Australia
April 2020

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1 SUMMARY

Main Roads Great Southern Region are proposing to construct stage two and three of the Albany Ring Road Project. Southern Ecology was engaged to assess the development envelope (232.8 ha) for presence of *Phytophthora* species in accordance with regulatory guidelines (Department of Parks and Wildlife 2015) and to recommend management strategies to reduce the spread of soil pathogens during construction.

The proposed soil disturbance activities associated with construction are considered to be complex and will require the use of heavy machinery and the introduction of basic raw materials. Due to the presence of putatively Uninfested areas in the Survey Area that supports Priority Flora that are moderately to highly susceptible, the Risk Rating for spreading of soil pathogens is considered 'High'. All of the roads and tracks within the Survey Area have uncontrolled hygiene and are open to the public, therefore introduction of pathogens may occur at any time.

The field interpretation combined with the soil and root sampling delineated the Survey Area into four disease status categories for the purposes of managing the spread of *Phytophthora cinnamomi*. A total of 1.05 ha was determined to be Uninfested from *Phytophthora cinnamomi* and is considered to be Protectable. However, the Protectability of these areas may change depending on activities undertaken and the extent of vegetation removed prior to construction.

Other parts of the Survey Area were Infested (17.3 ha), Uninterpretable (25.93 ha) or Excluded (191.7 ha).

A hygiene management plan has been provided with recommendations to reduce the risk of spreading *P. cinnamomi*, other soil pathogens and weeds during construction.

2 INTRODUCTION

2.1 Background

Main Roads Great Southern Region are proposing to construct a heavy haulage route around the City of Albany for the transport of materials to the City's port, called the Albany Ring Road Project. The project is a staged development to support freight growth and long-term transport needs of the City of Albany in Western Australia. The project will connect Albany Highway, South Western Highway, Lower Denmark Road and Hanrahan Road allowing access to the Southern Ports Authority Albany Port (Figure 1). Stage one of the project, the construction and upgrade of Menang Drive from Chester Pass Road to Albany Highway was completed in 2017. Stages two and three are proposed.

Phytophthora Dieback disease caused by the soil-born pathogen *Phytophthora cinnamomi* is a major threat to the biodiversity of south-western Australia and is recognised as a key threatening process under the Commonwealth *Environment Protection and Biodiversity Conservation Act 1999* (Department of the Environment (DotE) 2014). *Phytophthora cinnamomi* can be spread in water, soil or plant material that contains the pathogen or its spores and dispersal is often favoured under warm and moist conditions (Shearer and Tippett 1989). It can be carried in surface or sub-surface water flow and by the movement of infested soil or organic material by either anthropogenic or natural vectors. Consequently, knowledge of the pathogens occurrence within the landscape is essential to inform suitable hygiene management practices to mitigate its spread during soil-disturbance activities.

Southern Ecology was engaged to assess a Survey Area (232.8 ha) for the presence of *Phytophthora* species in accordance with regulatory guidelines (Department of Parks and Wildlife [DPAW] 2015) and to recommend management strategies to reduce the spread of soil pathogens during construction.

2.2 Scope of Works

The scope of works was to undertake the following:

1. Undertake a desktop assessment of known dieback locations, vegetation condition mapping and vegetation community mapping in the Study Area (5 km radius).
2. Undertake a dieback survey in accordance with relevant Department of Biodiversity, Conservation and Attractions (DBCA) guidelines (DPAW) 2015) to identify the presence (status) of *Phytophthora* dieback where native vegetation occurs within the Survey Area.
3. Prepare a Hygiene Management Plan for the project with details of appropriate management controls to prevent the spread of soil pathogens.

2.3 Physical and Biological Environment

2.3.1 Location and tenure

The Survey Area is located within the Southern Jarrah Forest subregion of the Jarrah Forest Interim Biogeographic Regionalisation of Australia (IBRA) Region (Department of Agriculture, Water and the Environment [DAWE] 2019). It intersects shire reserves, private property and road reserves mainly to the west of the City of Albany and is centred on Link Rd, South Coast Highway, George St, Lower Denmark Rd and Albany Port Rd (Figure 1).

The Survey Area includes one large City of Albany reserve with remnant vegetation (Res 28465, 28466 & 28467; corner of South Coast Highway and George St) that is vested for gravel extraction and rubbish purposes. Several smaller reserves within the Survey Area are vested for railway, drainage, public utilities or other purposes. One gazetted conservation reserve (Gledhow Nature Reserve) and one Public Park (Mt Melville) occur within the vicinity of the Survey Area (Appendix B).

2.3.2 Biological Environment

The Survey Area occurs along the western and southern interface between the urban and agricultural zones of Albany that was largely cleared for agricultural purposes in the 19th and 20th century. Three large patches of remnant vegetation remain within the Survey Area: Eucalypt and She-Oak Woodlands on George St Reserve (~30 ha), Forest and Granites on the lower southern slopes of Mt Melville (~12 ha) and a large wetland on Link Rd (6 ha). Other significant corridors of vegetation occur along Lower Denmark Rd and many narrow road reserves throughout the Survey Area continue to support native species. Large areas between Lower Denmark Rd and the Albany Port Rd have regenerated after clearing and/or have been planted with non-indigenous Eucalypts and Pine Trees.

Broad scale pre-European vegetation mapping (Shepherd *et al.* 2002) that overlies the Survey Area indicates the native vegetation is currently (or was previously) composed of three associations:

- Albany_3 - *"Forest. Mainly jarrah and marri Eucalyptus marginata, Corymbia calophylla.*"
- Albany_51 - *"Sedgeland. Cyperaceae, Restionaceae, Juncaceae.*"
- Albany_978 - *"Low forest, woodland or low woodland with scattered trees Eucalyptus marginata, Banksia spp., Allocasuarina spp.*"

The Survey Area also occurs within the zone mapped during the Albany Regional Vegetation Survey (Sandiford and Barrett 2010), which provides meso-scale vegetation information and provides a context for assessing the regional conservation significance of vegetation associations. Eleven mapping Units have previously been mapped within the Survey Area:

- *Evandra aristata* Sedgeland (Unit 46)
- *Gastrolobium bilobum/Hakea elliptica* Granite Shrubland/Yate Woodland (Unit 23)
- *Hakea* spp Shrubland/Woodland Complex (Unit 31)
- *Homalospermum firmum/Callistemon glaucus* Peat Thicket (Unit 47)
- Jarrah/Marri/Sheoak Laterite Forest (Unit 12)
- Jarrah/Sheoak/*E.staeri* Sandy Woodland (Unit 13)
- Marri/Jarrah Coastal Hills Forest (Unit 17)
- Marri/Jarrah Forest/Peppermint Woodland (Unit 10)
- Peppermint Low Forest (Unit 2)
- *Taxandria juniperina* Closed Forest (Unit 59)
- *Taxandria marginata* Granite Shrubland (Unit 24).

2.3.3 Surface Water and Hydrology

The northern section of the Survey Area (Link Rd) intersects a broad drainage channel that supports a large area of seasonally wet or inundated wetland vegetation, which sheds water westward into Five Mile Creek and eventually into Lake Powell. The hydrology of the southern section of the Survey Area (Lower George St, Lower Denmark Rd) is largely altered by artificial channels installed early in the late 19th to make the peaty swaps more suitable for agriculture. These drains divert water south of the Survey Area into Robinson and eventually empty into Princess Royal Harbour.

2.3.4 Soil-Landscapes

Seven soil-landscapes (Department of Primary Industries and Regional Development [DPIRD] 2019) are mapped within the Survey Area:

- Collis yellow duplex - *"Gravelly yellow duplex soils; Jarrah-Marri forest."*
- Dempster crest - *"Sands and laterite on elongate crests; Jarrah-Albany Blackbutt-Marri forest."*
- Dempster slope - *"Sands and gravels on smooth slopes; Albany blackbutt-sheoak low forest."*
- Gardner granite - *"Granite outcrop."*
- Mattaband yellow duplex - *"Gravelly yellow and yellow duplex soils; Jarrah-Marri-Yellow Tingle forest."*
- Minor Valleys S7 slope - *"Broad valleys in sedimentary rocks; 30 m relief; smooth slopes. Deep sands and iron podzols on slopes; Albany Blackbutt-jarrah-sheoak woodland. Podzols and yellow duplex soils on floors; paperbark woodland, teatree heath."*
- Owingup Subsystem - *"Plains with swamps, lunettes and dunes. Yellow solonetzic soils, organic loams and diatomaceous earth. Wattle-Paperbark thickets, Teatree heath and reeds. Podzols on dunes; Banksia-Sheoak woodland."*

2.3.5 Flora

A previous biological survey covering part of the Survey Area (Rathbone and Gilfillan 2020) determined that five conservation significant flora occur within or closely adjacent to the Survey Area that are 'Priority'-listed by the Department of Biodiversity Conservation and Attractions (DBCA):

- *Synaphea incurva* (P1),
- *Boronia crassipes* (P3),
- *Andersonia* sp. Jamesii (J. Liddelow 84) (P4)
- *Thysanotus isantherus* (P4).
- *Prasophyllum paulinae* (P1) (A previously recorded population of is known from the Survey Area; the potential exists for it to re- emerge following fire).

The susceptibility of these species to *Phytophthora cinnamomi* is considered in this hygiene management plan.

2.3.6 Weeds

Five Declared Pests and/or Weeds of National Significance (WONS) were previously recorded from the Survey Area: - Blackberry (**Rubus* species complex), Bridal Creeper (**Asparagus asparagoides*), Gorse (**Ulex europaeus*), Arum Lily (**Zantedeschia aethiopica*) and Lantana (**Lantana camara*).

2.3.7 Existing Dieback Information

No previous comprehensive Phytophthora Dieback mapping or sampling has been conducted within the Survey Area (Dieback Information Delivery System (DIDMS) (GAIA 2019). *Phytophthora cinnamomi* has been recovered from eighteen soil and root samples within the Study Area, collected between 1994

to 2018. One sample of *Phytophthora pseudocryptogea* is known from the Study Area. All *Phytophthora* records are greater than one km from the Survey Area and are hydrologically separated, therefore have a limited contribution to the disease interpretation in this assessment.

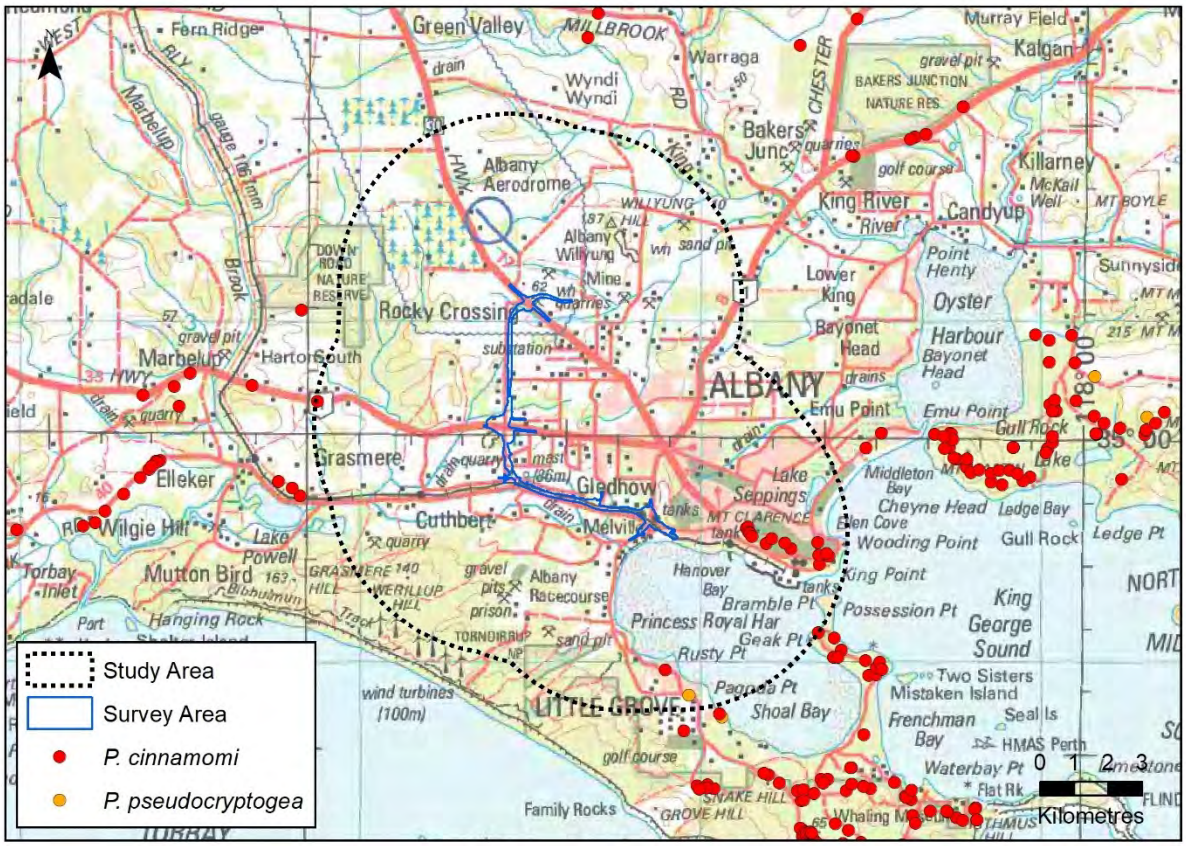

Figure 1. *Phytophthora* species record in the Study Area (5 km buffer around survey Area) derived from the Dieback Information Delivery System (DIDMS) (GAIA 2019).

2.3.8 Weather

Daily weather observations recorded from Albany were used to describe local rainfall and temperatures preceding the survey (Figure 2). Overall rainfall prior to the survey period was below average, counteracted by a closer to mean rainfall in the two months preceding the survey.

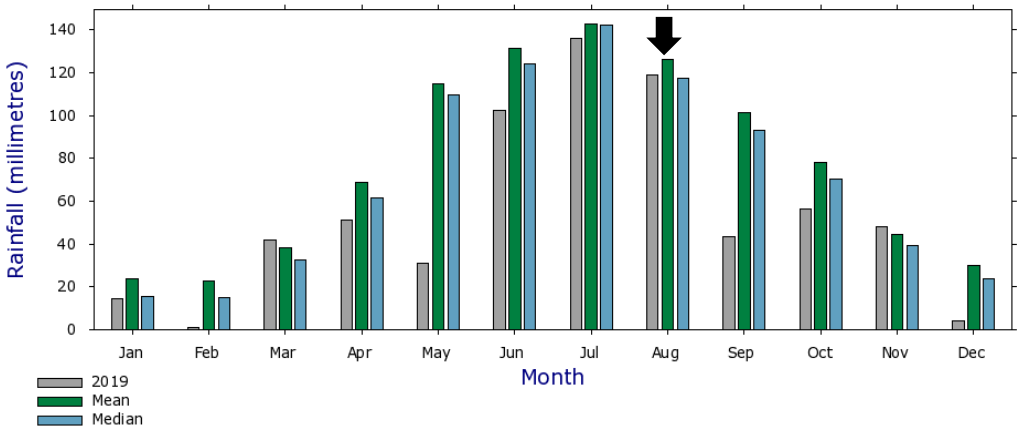

Figure 2. Rainfall statistics for 8 months prior to the assessment period compared with historical averages (all years available) from the nearest weather station (Albany 9500) (BOM 2020). Arrow indicates timing of field survey.

3 METHODS

3.1 Personnel

The survey (desktop and field assessment) was conducted by Damien Rathbone (BScHons Plant Science, Scientific License FB2000229). Damien has over 14 years of experience conducting biological surveys in southern Western Australia. Within the south coast region, he has previously undertaken DBCA regional surveys (Albany Regional Vegetation Survey, Fitzgerald River National Park Flora Survey, Ravensthorpe Range Flora Survey, Western Stirling Range Dieback Survey), threatened species survey and recovery implementation and has 10 scientific publications. Damien is also an accredited interpreter for dieback assessments on DBCA estate (Accreditation PDI-032).

3.2 Desktop Assessment

A desktop assessment of existing *Phytophthora* occurrence information and contextual vegetation and flora values within the Study Area (5 km radius of the Survey Area) was undertaken using the following sources:

- Dieback Information Delivery System (DIDMS) (GAIA 2019).
- NatureMap (Department of Biodiversity Conservations and Attractions [DBCA] 2007-).
- Previous biological reports (Rathbone and Gilfillan 2020, Sandiford and Barrett 2010).

3.3 Field Assessment

3.3.1 Schedule

The field assessment was undertaken over three days in 2019 (August 8, 9 and 13 2019).

3.3.2 Interpretation

Field interpretation was conducted following the standard operating procedures as described in the "*Phytophthora Dieback Interpreters Manual for Lands Managed by the Department*" (DPAW 2015). Most of the area was interpreted by foot or vehicle traverse, with particular emphasis on sites where pathogen vector pathways were present. The condition of the remnant vegetation was also considered using categories defined for Environmental Impact Assessments in Western Australia (Table 1, Environmental Protection Authority [EPA] 2016).

The potential occurrence of *Phytophthora* species in remnant vegetation was determined through observation of the symptomatic evidence of disease and supported by sampling of soil and roots of recently dead susceptible host plants. Areas were defined into six potential disease status categories relevant to *Phytophthora cinnamomi*:

- *infested* (disease symptoms present).
- *uninfested* (disease symptoms absent).
- *uninterpretable* (undisturbed areas where susceptible host plants are absent, or sparse).
- *temporarily uninterpretable* (indeterminate due to disturbance with anticipated short to medium term recovery e.g. fire or rehabilitation).
- *not yet resolved* (indeterminate due to inconsistent or incomplete evidence in low interpretability climatic zones (400mm to 600mm rainfall range).

- *disease risk roads* (potential incipient disease on road with apparent recent use under unknown hygiene conditions).

3.3.3 Project Specific Considerations

Large sections of the Survey Area are water gaining areas that are composed of Uninterpretable vegetation or Excluded areas with weeds and pasture. Inherently, these are sites where incipient pathogens are likely to occur and generally no indicator species for the detection of *Phytophthora* are present (i.e. pathogens can be present and asymptomatic). Due to the high level of historic disturbance and frequent incidence of *Phytophthora* in the Albany region, it is anticipated that many Uninterpretable or Excluded areas are likely to be infested with *Phytophthora* species.

All roads and tracks within the Survey Area are open to the public under all soil moisture conditions, therefore new introductions of *Phytophthora* (and other pathogens) may occur at any time. Many unauthorised tracks on the lower slopes of Mt Melville are frequented by 4WD vehicles, therefore vector pathways are present in some locations without gazetted roads.

3.3.4 Protectable Areas

Protectable Areas are generally defined as areas that will not be invaded by *Phytophthora* via autonomous spread in the short term (10 to 20 years) and anthropogenic spread can be mitigated by soil hygiene management. Regulatory guidance indicates the minimum patch size threshold for Protectable Areas is > 4 ha. However, where other high conservation or social values are present this threshold may be reduced (DPAW 2015).

All Protectable areas in this report are considered preliminary and may be subject to review depending on the activities proposed and the extent of vegetation remaining after disturbance activities.

3.3.5 Soil and Root Sampling

Soil and root samples associated with dead or dying susceptible host plants were taken to confirm the presence of *Phytophthora* species. Diagnostic baiting of the samples was conducted by the Department of Biodiversity Conservation and Attractions (DBCA), Vegetation Health Service (VHS), Kensington, Perth, which determined the potential presence and species identity of any *Phytophthora* isolated.

3.3.6 Demarcation

Any Protectable Areas were demarcated with management stop/start points to guide construction activities and temporarily marked with 25 mm fluorescent pink tape at the road edge with the knot facing into the infested area. Buffers applied to Infested areas were located 15 m upslope or 25 m (or greater) downslope from the active disease edge. The Clean on Entry management points, disease status boundaries (including buffers), soil and root samples and field observations were recorded with a non-differential, hand-held global positioning system (GPS) (Garmin Oregon 7000, ± 5 m accuracy) (MGA zone 50, GDA94).

Table 1. Vegetation condition scale (EPA 2016).

Condition	Description
Pristine	Pristine or nearly so, no obvious signs of disturbance or damage caused by human activities since European settlement.
Excellent	Vegetation structure intact, disturbance affecting individual species and weeds are non-aggressive species. Damage to trees caused by fire, the presence of non-aggressive weeds and occasional vehicle tracks.
Very Good	Vegetation structure altered, obvious signs of disturbance. Disturbance to vegetation structure caused by repeated fires, the presence of some more aggressive weeds, dieback, logging and grazing.
Good	Vegetation structure significantly altered by very obvious signs of multiple disturbances. Retains basic vegetation structure or ability to regenerate it. Disturbance to vegetation structure caused by very frequent fires, the presence of very aggressive weeds, partial clearing, dieback and grazing.
Degraded	Basic vegetation structure severely impacted by disturbance. Scope for regeneration but not to a state approaching good condition without intensive management. Disturbance to vegetation structure caused by very frequent fires, the presence of very aggressive weeds at high density, partial clearing, dieback and grazing.
Completely Degraded	The structure of the vegetation is no longer intact and the area is completely or almost completely without native species. These areas are often described as 'parkland cleared' with the flora comprising weed or crop species with isolated native trees and shrubs.

3.3.7 Survey Limitations

A consideration of potential limitations of the *Phytophthora* Dieback Survey was undertaken by adapting the regulatory guidance outlined in the document "*Technical Guidance - Flora and Vegetation Surveys for Environmental Impact Assessment"* (EPA (2016). No avoidable limitations were identified that can be expected to have affected the reliability of the results of the field survey (Table 2).

Table 2. Assessment of potential survey limitations (EPA 2016).

Potential for Limitation	Assessment
Availability of contextual information	No positive root and soil samples have previously been collected within the Survey Area. However, it was assumed that *Phytophthora* species would more widespread than records indicated. Some positive records occur within the Study Area. Regional vegetation mapping was available to allow for an appropriate level of contextual information prior to the field survey. The Albany Regional Vegetation Survey (Sandiford and Barret 2010) covers the Survey Area. Rathbone and Gilfillan (2020) have previously assessed the vegetation, flora and fauna values of the Survey Area.
Personnel experience	All personnel undertaking the survey have in excess of 10 years' experience within southern bioregions of WA.
Extent of survey and site access	The area of survey was adequately covered with sufficient intensity over multiple field days.
Seasonal conditions	Whilst below average rainfall has occurred for the year to date, this was counteracted by close to average rainfall preceding the survey, such that the seasonal conditions were considered ideal for dieback interpretation and recovery from soil and root samples (Figure 2).
Disturbances	The time since previous fire or disturbance within the majority of the Survey Area is considered suitable for interpretation. Some areas were very long unburnt (mapped as Uninterpretable), therefore were difficult to detect recent pathogen impacts.

4 RESULTS & DISCUSSION

4.1 Vegetation Type and Condition

The remnant vegetation within the Survey Area was composed of thirteen vegetation types (Rathbone and Gilfillan 2020) that closely align with Albany Regional Vegetation Survey regional mapping Units (Sandiford and Barrett 2010). Four occur exclusively in wetland habitats, three are associated with granite outcrops and six generally occur on uplands of sand or predominantly laterite. Vegetation condition graded from Completely Degraded (native understory very sparse or absent) to Excellent (no obvious disturbance). The condition of the majority of the remnant vegetation was classified as Very Good or Excellent.

The ability to detect *Phytophthora* through symptomatic evidence (interpretability) was highest in vegetation in upland or granite communities in Good to Excellent condition. This graded to low interpretability in Degraded native vegetation and to Uninterpretable in most wetland vegetation types (Plate 1-3). A list of susceptible host species present across the Survey Area is provided (Table 3). The incidence and pattern of disease symptoms in these taxa were considered an indication of the potential presence of *Phytophthora cinnamomi*.

Table 3. Susceptible species from the Survey Area considered useful indicators (likely to shown disease symptoms) for the presence of *Phytophthora cinnamomi*.

FAMILY	TAXON
Dasypogonaceae	*Dasypogon bromeliifolius*
Ericaceae	*Andersonia caerulea* subsp. *caerulea*
Ericaceae	*Leucopogon glabellus*
Ericaceae	*Leucopogon verticillatus*
Fabaceae	*Bossiaea linophylla*
Fabaceae	*Hovea chorizemifolia*
Fabaceae	*Hovea elliptica*
Fabaceae	*Jacksonia spinosa*
Fabaceae	*Sphaerolobium grandiflorum*
Iridaceae	*Patersonia umbrosa* var. *umbrosa*
Iridaceae	*Patersonia occidentalis*
Myrtaceae	*Melaleuca thymoides*
Proteaceae	*Adenanthos cuneatus*
Proteaceae	*Adenanthos obovatus*
Proteaceae	*Banksia grandis*
Proteaceae	*Grevillea occidentalis*
Proteaceae	*Hakea amplexicaulis*
Proteaceae	*Hakea ferruginea*
Proteaceae	*Hakea prostrata*
Proteaceae	*Persoonia elliptica*
Proteaceae	*Persoonia graminea*
Proteaceae	*Persoonia longifolia*
Xanthorrhoeaceae	*Xanthorrhoea platyphylla*

Plate 1. Upland forest (Marri/Jarrah Coastal Hills Forest) on Mt Melville, with sufficeint indicator species for interpreatation through symptomatic evidence of *Phytophthora*.

Plate 2. Wetland vegetation (*Homalospermum firmum/Callistemon glaucus Peat Thicket*) dominated by species from the Myrtaceae and Cyperaceae that do not display obvious disease symtoms.

Plate 3. Degraded vegetation (Uninterpretable) in water gaining site where incipient pathogens are likely to occur but are asymptomatic.

4.2 Soil and Root Sampling

Soil and root samples were collected to provide empirical evidence to support the disease interpretation of the Survey Area. Samples were taken from recently dead or dying susceptible plant species at eight locations. (Table 4., mapped in Appendix A).

Analysis by the Vegetation Health Service determined that of the eight samples taken, four samples returned positive for *Phytophthora cinnamomi*. The positive recoveries were strongly correlated with locations where multiple indicators species showed symptomatic evidence of *Phytophthora* pathogens.

Two of the samples that returned negative results occurred where *Phytophthora* impacts were observable (Samples 1 and 7), therefore are considered likely to be false negatives. False negatives are a relatively common occurrence using standard field sampling and laboratory techniques employed by the Vegetation Health Service. This can occur where diseased plant material may be too old (i.e. becomes infected with other fungi) or the baiting technique fails to beak the dormancy of resting spores in the plant of soil sample. These samples occurred in areas rationalised as Infested due to the observed symptomatic evidence.

The two other negative samples were associated with isolated unhealthy indicator species, which may be attributable as non-*Phytophthora* related.

Table 4. Results of soil and root samples from Vegetation Health Service (VHS). Sample locations are mapped in Appendix A: Map 1-8.

Sample No.	Result	Comment	Collection ID	Host	Latitude	Longitude	Date
1	Negative	Potential false negative. Collected in site with very obvious disease symptoms. Dead *Xanthorrhoea, Banksia* and *Patersonia*.	Dar161	*Patersonia umbrosa*	-35.024082	117.865068	13/08/2019
2	*P. cinnamomi*	Subtle disease symptoms present. Vegetation is generally highly degraded.	Dar162	*Patersonia occidentalis*	-35.018033	117.840364	13/08/2019
3	*P. cinnamomi*	Obvious disease symptoms present that extend along tracks leading into the vegetation.	Dar163	*Patersonia umbrosa*	-35.000171	117.81327	13/08/2019
4	*P. cinnamomi*	Obvious disease symptoms present that extend along the edge of South Coast Highway.	Dar164	*Patersonia umbrosa*	-34.998081	117.81252	13/08/2019
5	Negative	Single unhealthy *Patersonia umbrosa*, potentially non-*Phytophthora* related.	Dar165	*Patersonia umbrosa*	-34.991253	117.814281	13/08/2019
6	*P. cinnamomi*	Obvious disease symptoms present that extend into wetland vegetation below.	Dar166	*Patersonia umbrosa*	-34.992121	117.814186	13/08/2019
7	Negative	Potential false negative. Collected in site with obvious disease symptoms. Dead *Xanthorrhoea, Andersonia* and *Persoonia*.	Dar167	*Xanthorrhoea platyphylla*	-34.96537	117.821931	13/08/2019
8	Negative	Single unhealthy *Patersonia occidentalis*, potentially non-*Phytophthora* related.	Dar168	*Patersonia occidentalis*	-34.966311	117.822699	13/08/2019

4.3 Disease Status and Protectability

The field interpretation combined with the soil and root sampling delineated the Survey Area into four disease status categories for the purposes of managing the spread of *Phytophthora cinnamomi* (Table 5, Plates 4 and 5). A total of 1.05 ha was determined to be Uninfested with *Phytophthora cinnamomi,* which occurred in three separate areas in the Survey Area. All Uninfested areas in the Survey Area are considered to be preliminary Protectable Areas. The Protectability of these areas may change depending on project activities and their recommended management is discussed in section 4.4.2.

A large proportion of the Survey Area was determined to be Infested (17.3 ha), which included areas with symptomatic disease evidence or where soil and roots samples returned positive for *Phytophthora cinnamomi* and includes all roadside drains and/or vegetated areas downslope of these locations (i.e. where water would naturally facilitate the dispersal of pathogens).

Areas were determined to be Uninterpretable (25.93 ha) either due to a low natural incidence of indicator species (i.e. very long unburnt or wetland type vegetation) or was where native vegetation was in Degraded to Good Condition (i.e. other disturbances may have removed indicator species). No Uninterpretable areas were considered as Protectable due the water gaining hydrology and high-level soil historic disturbance. Excluded areas (191.7 ha) consisted mainly of paddocks, agricultural areas or plantations, where *Phytophthora* species may be present but are asymptomatic.

Table 5. Extent of disease status categories and protectability within the Survey Area.

	Area (ha)	
Status	Unprotectable	Protectable
Infested	17.3	
Uninfested		1.05
Uninterpretable	22.8	
Excluded	191.7	
Total:	231.8	1.05

Plate 4. Uninfested and Protectable vegetation.

Plate 5. *Xanthorrheoa platyphylla* deaths assocated with *Phytophthora cinnamomi*.

4.4 Hygiene Management Plan

4.4.1 Risk Assessment

A risk assessment for the proposed activities that determines the 'Likelihood' and 'Consequence' of introducing or spreading *Phytophthora* was undertaken in accordance with the Phytophthora Dieback Management Manual (DBCA 2017). The proposed soil disturbance activities associated with the Albany Ring Road construction are considered to be complex and will require heavy machinery and the introduction of basic raw materials. The 'Likelihood' of introducing or spreading *Phytophthora* during these activities is considered 'Almost Certain'. The potential 'Consequence' of introducing or spreading *Phytophthora* is dependent on the values of the biodiversity that may potentially be impacted. The 'Consequence' for the proposed activities is considered 'Significant' due to the presence of Uninfested areas and Priority Flora that are moderately to highly susceptible. The combined overall risk rating for the activities are considered 'High'.

4.4.2 Hygiene Management Strategies

The aim of hygiene management is to minimise the anthropogenic spread of *Phytophthora* species through the movement of contaminated soil or plant tissue. Best management principals include: demarcation of disease boundaries, minimising entry points, ensuring Clean on Entry (CoE) is applied to plant, equipment, vehicles and footwear and allowing only uninfested basic raw materials to enter (Department of Conservation and Land Management [CALM] 2003).

The proposed road construction has the potential to spread *Phytophthora* within the local area. Subsequently, the aim of the hygiene management recommendations is to reduce the risk of introducing *P. cinnamomi* into Uninfested/Protectable areas and to reduce the overall spread of weeds and other soil pathogens during construction.

Project Planning

1. Ensure all staff and contractors working within the project area have undertaken appropriate awareness training in Phytophthora Dieback.
2. Ensure all *Phytophthora* occurrence mapping is valid and up-to-date.
3. Timing of all operations and construction (particularly in Protectable Areas) should be conducted in dry soil conditions where possible (generally between November and April).
4. Engaging contactors with demonstrated experience in *Phytophthora* management should be preferentially weighted.
5. Contractors are required to demonstrate record keeping and standard operating procedures for hygiene relevant to all plant, equipment and vehicles (i.e. this includes a washdown checklist specific to each vehicle and plant).
6. Basic biosecurity hygiene management procedures are required for all operations and include consideration of weeds and other potential pathogens (including other isolates and species of *Phytophthora*) as follows:
   a) All plant, equipment, vehicles and footwear should be free of soil and weed seeds prior to entering areas with remnant vegetation (particularly when moving from agricultural areas into remnant vegetation).
   b) Strategies to further reduce the risk of spreading weeds and other pathogens is to operate from areas of high to low vegetation condition and to operate from areas of high to low elevation.
7. Main Roads will be responsible for supervision and evaluation of any environmental or hygiene breaches and non-compliance with this Management Plan by contractors.

8. After completion of operations a follow-up environmental audit is recommended, to ensure no clearing occurred outside the project envelope and to undertake a follow-up weed assessment (and weed control if required).

Management of Protectable Areas

Three areas have been delineated as preliminary Protectable Areas that require general Clean on Entry (CoE) soil hygiene standards (see below). These areas occur exclusively within the potential project footprint, therefore may be completely removed during construction. Subsequently, the CoE management recommendations provided apply only to operations (i.e. geo-tech survey) prior to approval and initiation of the removal of remnant vegetation.

Clean on Entry (CoE) Specifications for Protectable Areas:

1. Demarcation of Protectable Areas should be check/retaped after the approval of this Management Plan and shortly prior to construction.
2. Work in Protectable Areas should be scheduled for periods of low soil moisture.
3. All basic raw material imported into Protectable areas should be low risk for *Phytophthora* contamination.
4. Inspections of all plant, equipment, vehicles and footwear prior to entry into Protectable Areas must be undertaken and recorded.
5. Effective clean down prior to accessing the CoE point should be conducted at an appropriate facility to remove all soil and plant material (including weed seeds). The key components of a suitable washdown are:
    a) All effluent is captured during washdown i.e. sump, for later transport and disposal, or diverted into excluded/infested areas.
    b) Cleaned objects exit washdown area without becoming re-contaminated; and
    c) Safe entry, departure of vehicles by operators is maintained.
6. Transportation of cleaned plant, equipment and vehicles to Protectable Areas should be undertaken via sealed roads where possible.
7. Once work is completed within a Protectable area, all plant, equipment and vehicles can continue to operate in other adjacent "Unprotectable Areas" areas without hygiene intervention.

Table 6. Protectable Areas 1 to 3.

Protectable Area No.	Area (ha)	Location	Map Reference (Appendix A)	Hygiene Strategies
1	0.23	Albany Highway (Eastern Side)	Map 1	- Clean On Entry off sealed road, Albany Highway - 100% of Protectable Area occurs in disturbance envelope.
2	0.13	Albany Highway (Western Side)	Map 1	- Clean On Entry off sealed road, Albany Highway. - 100% of Protectable Area occurs in disturbance envelope.
3	0.68	Link Road (Eastern side).	Map 4	- Clean On Entry off sealed road, Link Rd. - 100% of Protectable Area occurs in disturbance envelope.

Management of Unprotectable Areas

Operations within Unprotectable areas should generally occur after completion of work in Protectable Areas and can be scheduled for periods of moist or wet soil conditions. Basic biosecurity hygiene management for spreading soil pathogens and weeds should still be applied within Unprotectable areas (see point 5a and b). Once work is completed within Unprotectable Areas, all plant, equipment and vehicles are effectively contaminated with *Phytophthora*, therefore must be cleaned at an appropriate facility before continuing to operate in other areas.

General strategies for Vegetation Clearing and Earthmoving Operations

1. Any vegetation cleared and mulched can be reused within the same disease category. Preferably, as close to its origin as possible and within the micro-catchment (i.e. side of the road) that it originated.
2. Any mulch reused on site should be confined within the approval clearing area and not placed on intact vegetation.
3. Any cleared vegetation material that includes weeds should not be reused.
4. Any vegetation removed from the site should preferably be disposed as Class 2 Landfill.
5. Any soil removed from unprotectable area areas should preferably be disposed as Class 2 Landfill.
6. All vehicles, machinery, and personnel are to not to enter, or be stored in natural vegetation areas outside the development envelop.

4.5 Assessment Validity

The *Phytophthora* occurrence information in this report is valid as of the 13rd August 2019. *Phytophthora* species can spread autonomously or by animals, bushwalkers and unauthorised vehicles, therefore the assessed boundaries within this report should be revalidated after one year. If continuing or new disturbance activities occur within the Survey Area, a full re-interpretation should be undertaken after three years.

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6 APPENDIX A – Map Series 1-8 (Attached)

574800 575000 575200 575400 575600 575800 576000 576200

6131400 6131200 6131000 6130800 6130600 6130400 6130200 6130000 6129800

N

Sample 7

Protectable Area 2 Protectable Area 1

Sample 8

0 50 100 200

Metres

Map 1 of 8: Phytophthora Dieback Status, Albany Ring Road.

Mapping produced on 15/08/2019, see report for period of validity.
Report Reference: Rathbone, DA (2020). Phytophthora Dieback Management Plan: Albany Ring Road. Unpublished report by Southern Ecology for Main Roads Western Australia (SE1810).

Map Projection: Transverse Mercator Horizontal Datum GDA 1994
Grid: MGA Zone 50 Map Size: A3 Scale 1:6,000

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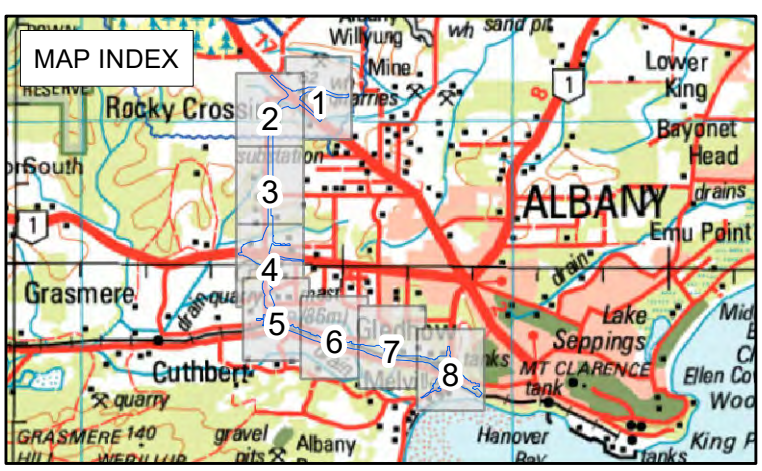
Phytophthora Dieback Status

- Uninfested (Protectable Area 1-3)
- Infested
- Uninterpretable
- Excluded

Soil and Root Samples (Sample No.)

- *P. cinnamomi*
- Negative
- Contours (5m)
- Survey Area



573600 573800 574000 574200 574400 574600 574800 575000

6131000 6130800 6130600 6130400 6130200 6130000 6129800 6129600 6129400

N

Sample 7
Protectable Area 1
Protectable Area 2
Sample 8

0 50 100 200
Metres

Map 2 of 8: Phytophthora Dieback Status, Albany Ring Road.

Mapping produced on 15/08/2019, see report for period of validity.
Report Reference: Rathbone, DA (2020). Phytophthora Dieback Management Plan: Albany Ring Road. Unpublished report by Southern Ecology for Main Roads Western Australia (SE1810).

Map Projection: Transverse Mercator Horizontal Datum GDA 1994
Grid: MGA Zone 50 Map Size: A3 Scale 1:6,000

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Phytophthora Dieback Status

- Uninfested (Protectable Area 1-3)
- Infested
- Uninterpretable
- Excluded

Soil and Root Samples (Sample No.)

- *P. cinnamomi*
- Negative
- Contours (5m)
- Survey Area

MAP INDEX

Sample 5

Protectable Area 3

0 50 100 200

Metres

Map 3 of 8: Phytophthora Dieback Status, Albany Ring Road.

Mapping produced on 15/08/2019, see report for period of validity.
Report Reference: Rathbone, DA (2020). Phytophthora Dieback Management Plan: Albany Ring Road. Unpublished report by Southern Ecology for Main Roads Western Australia (SE1810).

Map Projection: Transverse Mercator Horizontal Datum GDA 1994
Grid: MGA Zone 50 Map Size: A3 Scale 1:6,000

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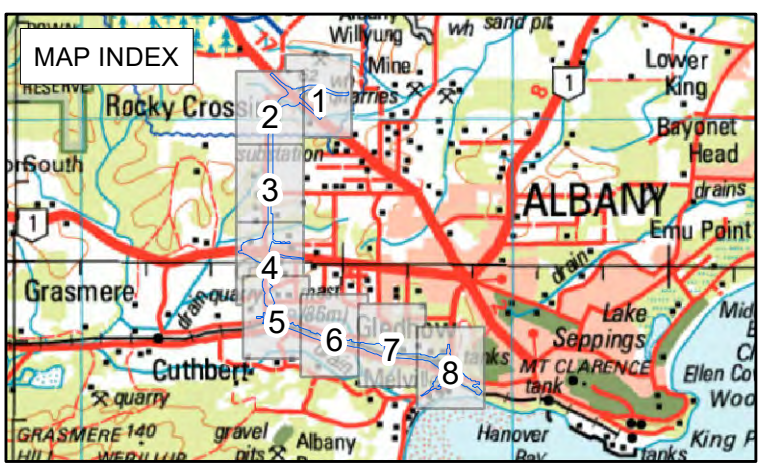
Phytophthora Dieback Status

- Uninfested (Protectable Area 1-3)
- Infested
- Uninterpretable
- Excluded

Soil and Root Samples (Sample No.)

- *P. cinnamomi*
- Negative
- Contours (5m)
- Survey Area

MAP INDEX



Sample 5
Protectable Area 3
Sample 6
Sample 4
Sample 3
0 50 100 200
Metres

Map 4 of 8: Phytophthora Dieback Status, Albany Ring Road.

Mapping produced on 15/08/2019, see report for period of validity.
Report Reference: Rathbone, DA (2020). Phytophthora Dieback Management Plan: Albany Ring Road. Unpublished report by Southern Ecology for Main Roads Western Australia (SE1810).

Map Projection: Transverse Mercator Horizontal Datum GDA 1994
Grid: MGA Zone 50 Map Size: A3 Scale 1:6,000

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Phytophthora Dieback Status
- Uninfested (Protectable Area 1-3)
- Infested
- Uninterpretable
- Excluded

Soil and Root Samples (Sample No.)
- *P. cinnamomi*
- Negative
- Contours (5m)
- Survey Area

MAP INDEX

573800 574000 574200 574400 574600 574800 575000 575200

6126200 6126000 6125800 6125600 6125400 6125200 6125000 6124800 6124600

0 50 100 200
Metres

Map 5 of 8: Phytophthora Dieback Status, Albany Ring Road.

Mapping produced on 15/08/2019, see report for period of validity.
Report Reference: Rathbone, DA (2020). Phytophthora Dieback Management Plan: Albany Ring Road. Unpublished report by Southern Ecology for Main Roads Western Australia (SE1810).

Map Projection: Transverse Mercator Horizontal Datum GDA 1994
Grid: MGA Zone 50 Map Size: A3 Scale 1:6,000

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Phytophthora Dieback Status

- Uninfested (Protectable Area 1-3)
- Infested
- Uninterpretable
- Excluded

Soil and Root Samples (Sample No.)

- *P. cinnamomi*
- Negative

Contours (5m)

Survey Area

MAP INDEX

575200 575400 575600 575800 576000 576200 576400 576600

6125800 6125600 6125400 6125200 6125000 6124800 6124600 6124400 6124200

0 50 100 200
Metres

Map 6 of 8: Phytophthora Dieback Status, Albany Ring Road.

Mapping produced on 15/08/2019, see report for period of validity.
Report Reference: Rathbone, DA (2020). Phytophthora Dieback Management Plan: Albany Ring Road. Unpublished report by Southern Ecology for Main Roads Western Australia (SE1810).

Map Projection: Transverse Mercator Horizontal Datum GDA 1994
Grid: MGA Zone 50 Map Size: A3 Scale 1:6,000

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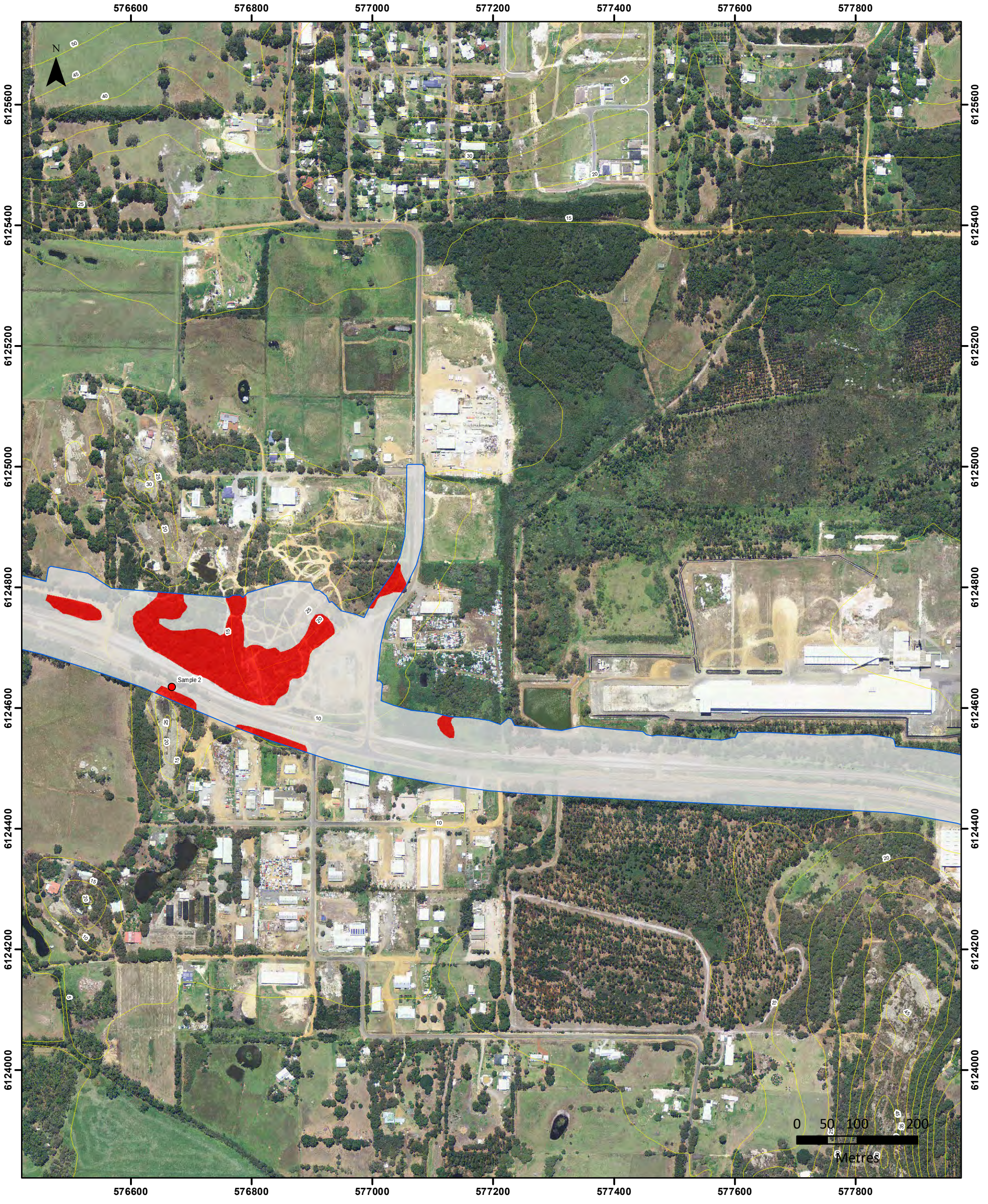
Phytophthora Dieback Status
- Uninfested (Protectable Area 1-3)
- Infested
- Uninterpretable
- Excluded

Soil and Root Samples (Sample No.)
- *P. cinnamomi*
- Negative
- Contours (5m)
- Survey Area



Map 7 of 8: Phytophthora Dieback Status, Albany Ring Road.

Mapping produced on 15/08/2019, see report for period of validity.
Report Reference: Rathbone, DA (2020). Phytophthora Dieback Management Plan: Albany Ring Road. Unpublished report by Southern Ecology for Main Roads Western Australia (SE1810).

Map Projection: Transverse Mercator Horizontal Datum GDA 1994
Grid: MGA Zone 50 Map Size: A3 Scale 1:6,000

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Phytophthora Dieback Status

- Uninfested (Protectable Area 1-3)
- Infested
- Uninterpretable
- Excluded

Soil and Root Samples (Sample No.)

- *P. cinnamomi*
- Negative
- Contours (5m)
- Survey Area

577800 578000 578200 578400 578600 578800 579000 579200

6125200 6125000 6124800 6124600 6124400 6124200 6124000 6123800 6123600 6123400

N

Sample 1

0 50 100 200
Metres

Map 8 of 8: Phytophthora Dieback Status, Albany Ring Road.

Mapping produced on 15/08/2019, see report for period of validity.
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Map Projection: Transverse Mercator Horizontal Datum GDA 1994
Grid: MGA Zone 50 Map Size: A3 Scale 1:6,000

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Phytophthora Dieback Status

- Uninfested (Protectable Area 1-3)
- Infested
- Uninterpretable
- Excluded

Soil and Root Samples (Sample No.)

- *P. cinnamomi*
- Negative
- Contours (5m)
- Survey Area

Appendix G: Albany Ring Road Stage 2 and 3b WRP Management Plan

Albany Ring Road Stage 2 and 3b

WESTERN RINGTAIL POSSUM MANAGEMENT PLAN

D19#1025140
March 2020

Contents

Amendments

Author / Reviewer	Name and Position	Revision Number	Revision Date
Author	P. West Senior Environmental Officer	Rev A	4/12/2019
Review	ARR Team	Rev 0	4/12/2019