Impact Management Plan
Melaleuca irbyana
Renewal for Permit No. WA0009354

432-520 Greenbank Road, Greenbank
Prepared for Mirvac Queensland Pty Ltd
10 July 2020

Job No. 7598

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Reports and plans by others may be included in this document.

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Abbreviations and Acronyms

DAM	Declared Area Map
DES	Department of Environment and Science (Qld)
DNRME	Department of Natural Resources, Mines and Energy (Qld)
EDQ	Economic Development Queensland (Qld)
EVNT	Endangered, Vulnerable or Near Threatened (as defined by the NCA)
NCA	*Nature Conservation Act 1992* (Qld)
NCWR	Nature Conservation (Wildlife) Regulation 2006
PDA	Priority Development Area (herein referencing the Greater Flagstone Priority Development Area)
PMAV	Property Map of Assessable Vegetation
SHG	Sunders Havill Group

1. Introduction

Saunders Havill Group (SHG) was engaged by Mirvac Queensland Pty Ltd (Mirvac) to prepare an Impact Management Plan (IMP) for *Melaleuca irbyana* (Swamp Tee Tree) specimens located within the Greenbank project area located at 432-520 Greenbank Road, Greenbank.

As required under the *Protected Plants Assessment Guidelines* (the Guidelines) this IMP has been prepared to support the renewal of the Protected Plants Clearing Permit (Permit No. WA0009354) for the clearing of *Melaleuca irbyana* specimens within the 277 hectare (ha) development area located at 432-520 Greenbank Road, Greenbank (Lot 1/SP297192). A copy the Protected Plants Clearing Permit is included at **Appendix A**.

1.1. Background

Protected Plants Flora Surveys undertaken over the site in 2018 recorded four isolated patches of *Melaleuca irbyana*; three of which are located within the Clearing Area (refer **Plan 1**). The species is listed as Endangered under the *Nature Conservation Act 1992*.

Subsequently, an Impact Management Plan *'Impact Management Plan Melaleuca irbyana 43-520 Greenbank Road, Greenbank prepared for Mirvac QLD Pty Ltd, dated 3 July 2018'* (IMP) was prepared to support a Protected Plants Clearing Permit application to the Department of Environment and Science (DES) in accordance with Section 3.2 of the *Nature Conservation (Wildlife Management) Regulation 2006 – Protected Plants Assessment Guidelines*. A copy of the IMP is included at **Appendix B**.

A Protected Plants Clearing Permit (Permit No. WA0009354) was issued by the DES on 24 August 2018 which allows for clearing of all *M. irbyana* over the entire Clearing Impact Area (i.e. 277 ha site). Conditions of the Permit (PPCM01) require all activities relating to the impact of EVNT plant species under the permit to be carried out in accordance with the procedures and actions in the IMP. This included rehabilitation planting of *M. irbyana* within future Conservation land in the eastern portion of the site to ensure no significant residual impact on the species occurs as a result of the development.

In March 2019, rehabilitation planting by land care consultant Evolve commenced at the rehabilitation area in accordance with the IMP. This included weed treatment and tube-stock planting of *M. irbyana* within a 5,000 m^2 area within the eastern Conservation land.

As the Conservation land (and *M. irbyana* rehabilitation area) will be ultimately handed over to Logan City Council, the proposed *M. irbyana* rehabilitation area was requested to be legally secured as a Declared Area (Category A) under the *Vegetation Management Act 1999* (VMA) to counterbalance the clearing of *M. irbyana*. on site and to ensure objectives of the exchange area are fully achieved. The Voluntary Declaration Management Plan was approved by DNRME and the Declared Area was secured on title on 3 March 2020 and is shown as Category A (PMAV 2019/002658). A copy of the Declared Area Map is included at **Appendix C**.

The Protected Plants Clearing Permit (Permit No. WA0009354) expires on 23 August 2020. While clearing within the Permit area has been undertaken, clearing at the locations of the *M. irbyana* patches has not yet occurred. Importantly, rehabilitation works have commenced and subject to legal rehabilitation success, monitoring and reporting benchmarks under the Voluntary Declaration Management Plan. The purpose of this report is to support renewal of the Protected Plants Clearing Permit.

1.2. Site Details

Contextually, the site is located 30 kilometres (km) south of Brisbane and 10 km west of Logan Village, within the western suburb of Greenbank. The site is bound by Greenbank and Teviot Roads to the west and is predominately surrounded by rural residential development. Wearing Park immediately adjoins the site to the east and Greenbank Shopping Centre and Community Centre are located opposite the site, on the western side of Teviot Road. The site is located approximately 1.5 km southeast of Greenbank Military Training Camp and 500 metres east of the Brisbane – Sydney Railway Line. An infrastructure easement traverses the site parallel to the northern boundary. The site remains one of the last large rural properties in the immediate landscape predominately comprised of rural residential development.

The proposed clearing works will be undertaken over 277 ha of the 412 ha site to facilitate a master planned development and will be subject to future operational works approvals from Economic Development Queensland (EDQ) (DEV 2016/768).

Key site details are provided in **Table 1** below.

Table 1: Property Summary

Address	423-520 Greenbank Road, Greenbank
RPD	Lot 1 on SP297192
Local Government Area	Logan City
Administering Authority	Economic Development Queensland
Priority Development Area	Greater Flagstone PDA
Planning Scheme	Greater Flagstone PDA Development Scheme
Area Classification / Zone	Urban Living
Existing Land Use	Rural

1.3. Protected Plants Flora Survey

In accordance with the regulatory requirements, Protected Plant Flora surveys were conducted where clearing is proposed, including within areas mapped as 'High risk' under the Protect Plants Flora Survey Trigger Map High Risk and as per the Guidelines. The 2020 surveys were undertaken in accordance with the Guidelines (i.e. High Risk Areas), but also included survey at the four previously known locations of *M. irbyana* on site recorded by 2018 surveys.

Protected Plants Flora Surveys undertaken in June 2020 confirmed *M. irbyana* in the four previously recorded locations and well as one new location (location 5). Refer **Plan 1** for *M. irbyana* located during 2018 surveys and **Plan 2** for the location for *M. irbyana* located during 2020 surveys and **Table 2** for a summary. It is noted growth categories have changed since 2018 with the classification of "semi-mature" introduced. Growth categories are defined in **Section 2.2**.

A copy of the 2020 Protected Plans Flora Survey Report is provided under a separate cover.

Table 2: *M. irbyana* Locations

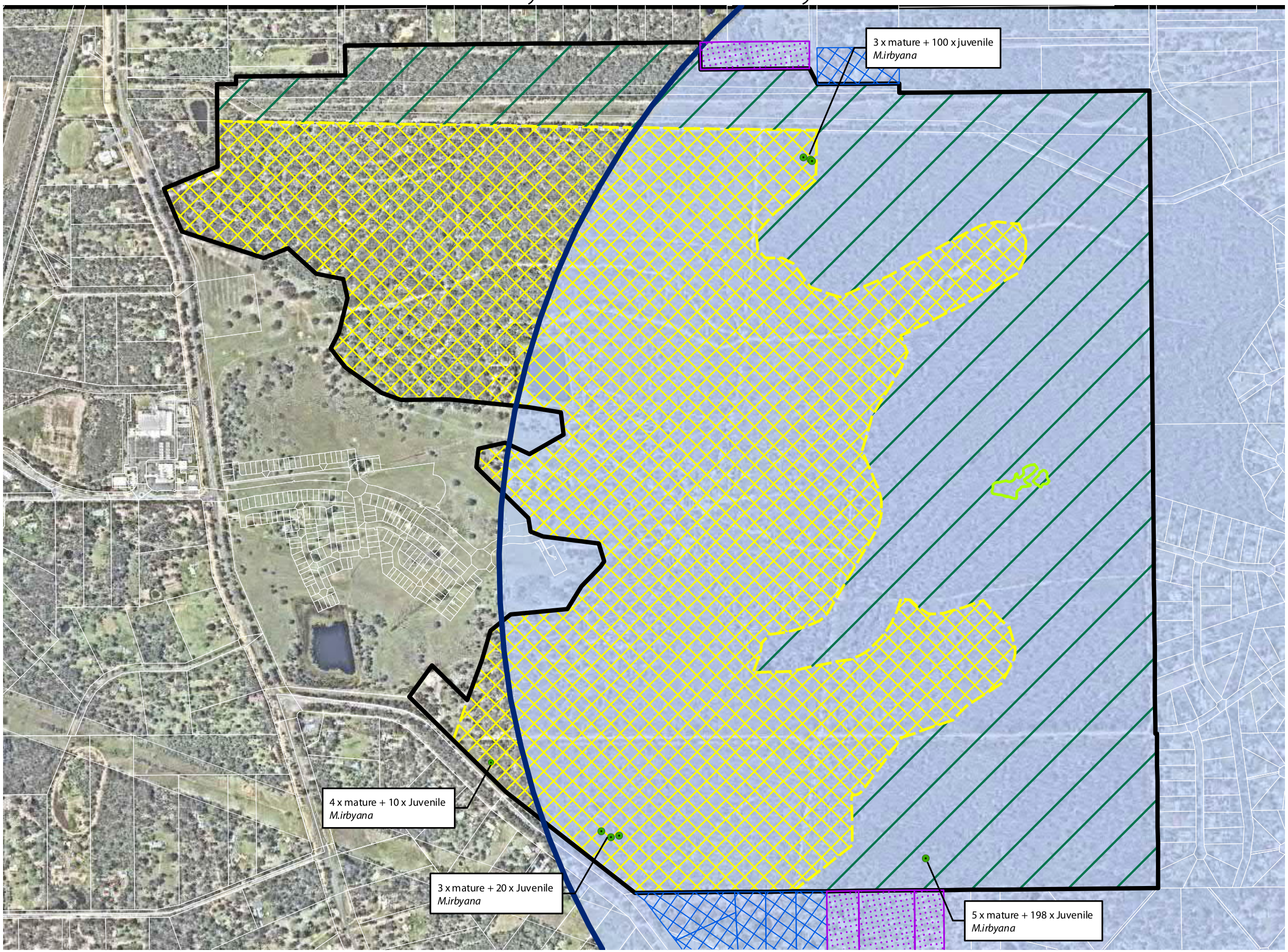
Location	2018 Survey Results	2020 Survey Results
1	3 x mature + 100 juveniles	3 x mature + 1 x semi mature + 100 juvenile
2	3 x mature + 20 x juveniles	3 x mature + 11 x semi mature + 10 juvenile
3a	4 x mature + 10 x juveniles	3 x mature
3b		1 x mature + 9 x juvenile
3c		2 x mature + 9 x semi mature + 3 x juvenile
3d		2 x semi mature + 2 x juvenile
4	5 x mature + 100 juveniles	5 x mature + 107 x semi mature + 8 x juvenile
5		x mature + 3 x semi mature + 24 x juvenile

1.4. IMP Intent

The IMP has been prepared in accordance with Section 3.2.1, as follows:

> **3.2.1 Impact management plan**
>
> An impact management plan must include the following sections:
>
> - attempts to avoid and minimise impact
> - nature of impact
> - management of impact
> - justification of impact management
> - survival of plant in the wild

1. 2018 Protected Plants Survey - *Melaleuca irbyana*



NOTES
This plan was prepared as a desktop assessment tool.
The information on this plan is not suitable for any other purpose.
Property dimensions, areas, numbers of lots and contours and other physical features shown have been compiled from existing information and may not have been verified by field survey. These may need verification if the development application is approved and development proceeds, and may change when a full survey is undertaken or in order to comply with development approval conditions. No reliance should be placed on the information on this plan for detailed design or for any financial dealings involving the land. Saunders Havill Group therefore disclaims any liability for any loss or damage whatsoever or howsoever incurred, arising from any party using or relying upon this plan for any purpose other than as a document prepared for the sole purpose of accompanying a development application and which may be subject to alteration beyond the control of the Saunders Havill Group. Unless a development approval states otherwise, this is not an approved plan.

Layer Sources: QLD GIS Layers (QLD Gov. Information Service 2020), Aerial (Nearmap 2020)

* This note is an integral part of this plan/data. Reproduction of this plan or any part of it without this note being included in full will render the information shown on such reproduction invalid and not suitable for use.

LEGEND

- Project DCDB
- Qld DCDB
- Development footprint
- Conservation area
- NCA flora survey trigger area
- No Access under NCA Exemption (AP0007102)
- Surveyed under NCA Exemption (AP0007102)
- Mature *Melaleuca irbyana* specimen
- Melaleuca Irbyana planting/rehab site (Approx. 5,000m²)

Note: Juvenile *Melaleuca irbyana* are specimens less than 2 metres tall

Issue	Date	Description	Drawn	Checked
A	13/07/2020	Preliminary	MP	KG

Transverse Mercator | GDA 1994 | Zone 56 | 1:10,000 @ A3

0 50 100 200 300 400 m

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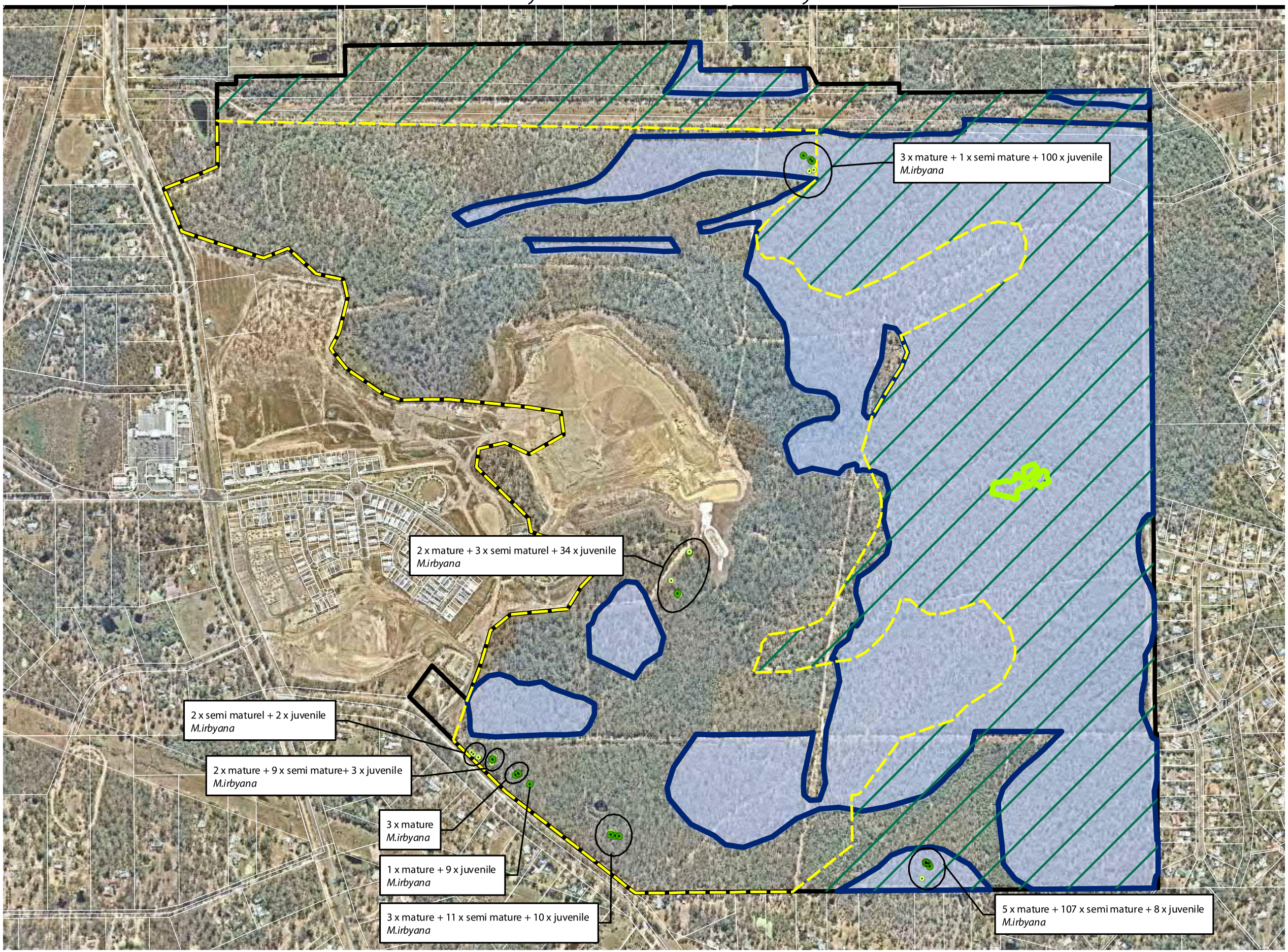
mirvac

Everleigh

ADDRESS/RPD: Teviot Road, Greenbank (1/SP297192) 13/07/2020 7598 E 01 NCA 2018 A

2. 2020 Protected Plants Survey - *Melaleuca irbyana*



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Layer Sources: QLD GIS Layers (QLD Gov. Information Service 2020), Aerial (Nearmap 2020)

LEGEND

- Project DCDB
- QLD DCDB
- Development footprint
- Conservation area
- NCA flora survey trigger area
- Mature *Melaleuca irbyana* specimen
- Semi-mature or juvenile *Melaleuca irbyana* specimen
- Melaleuca Irbyana planting/rehab site (Approx. 5,000m²)

Note: Juvenile *Melaleuca irbyana* are specimens less than 2 metres tall

Issue	Date	Description	Drawn	Checked
A	14/07/2020	Preliminary	MP	KG

Transverse Mercator | GDA 1994 | Zone 56 | 1:10,000 @A3

0 50 100 200 300 400 m

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ADDRESS/RPD: Teviot Road, Greenbank (1/SP297192) 14/07/2020 7598 E 02 NCA 2020 A

1.5. Nature Conservation Act 1992

The *Nature Conservation Act 1992* (NCA) classifies and protects significant areas (Protected Areas) and protects threatened plant and animal species. The Nature Conservation (Wildlife) Regulation 2006 (NCWR) lists plant and animal species presumed extinct, endangered, vulnerable, near threatened, least concern, international or prohibited.

The Queensland Government has adopted a regulatory framework that captures activities that pose a high risk to plant biodiversity. Under the framework, when a non-exempt clearing activity is proposed within a 'High Risk' area, the proponent of that activity is required to complete a flora survey prior to commencement of clearing. The Protected Plants Flora Survey Trigger Map shows 'High Risk' areas for protected plants and is used to help determine flora survey and clearing permit requirements for a particular location.

A search of the Protected Plants Flora Survey Trigger Mapping indicated proposed clearing areas within the subject site are overlayed as 'High Risk' and so are subject to flora survey requirements (refer **Plan 2**).

Prior to flora surveys, the schedules of the NCWR were considered in this report using a Wildlife Online Database Search with a 10 km radius from the site. Three (3) flora species listed under the NCWR were identified as having the potential to occur on site and are presented in **Table 3**. Refer to **Appendix D** for full search results.

Table 3: Wildlife Online Search Results–Flora

Scientific Name	Common Name	NCA Status
Marsdenia coronata	Slender Milkvine	Vulnerable
Coleus habrophyllus	-	Endangered
Melaleuca irbyana	Swamp Tea Tree	Endangered

2. Nature of the Impact

2.1. Background

The only EVNT species located within the Greenbank project area was *Melaleuca irbyana* (Swamp Tea Tree). This species was the only EVNT species recorded by 2018 surveys. Four (4) patches of *M. irbyana* preciously located in 2018 were confirmed on site during contemporary surveys in June 2020 to support renewal of the Protected Plants Clearing Permit (refer **Plan 1**). One additional patch of *M. irbyana* was recorded within the Clearing Area (location 5, refer **Plan 2**).

The existing Permit considered impacts for the entire Clearing Area (i.e. 277 ha). This IMP has been prepared for the same Clearing Area. It is anticipated the clearing of *M. irbyana* will occur within the next 2 years.

The profile of the species is detailed below in **Section 2.2**.

2.2. Protected Plant Profile

Melaleuca irbyana, a member of the Myrtaceae family, is listed as a threatened species under Schedule 2 of the *Nature Conservation (Wildlife) Regulation 2006* (NCWR) and is classified as "endangered". *Melaleuca irbyana* is also included as part of Endangered Regional Ecosystems (RE) 12.3.18, 12.3.19, 12.9-10.11 and 12.9-10.27 under the *Vegetation Management Act 1999* (VMA). This vegetation community is also listed as a Critically Endangered when present as a Threatened Ecological Community under the *Environment Protection and Biodiversity Conservation Act 1999* (EPBC).

M. irbyana forms communities that occur in two (2) structural forms: the more common form consists of a dominant eucalypt canopy with an understorey containing *M. irbya*na thickets 8-12 metres in height; the less common form is an open forest or thicket of *M. irbyana* with emergent eucalypt trees. The understorey is sparse and can comprise of grasses, sedges, and herbs with a few shrubs, vines and possibly orchids present. There are fairly clear descriptions of *M. irbyana* communities, however, there are no clear indications of the point at which an individual tree or small number of trees are considered to be part of a community. An individual tree may still contribute reproductively to a community, or may have the potential to regenerate and in time create a community.

Growth categories for this assessment are definied as juvenile specimens less than two (2) meters in height, semi-mature specimens greater than two (2) meters in height but with a trunk less than 100mm DBH, and mature specimens retaining a trunk diameter of at least 100mm.

Logan City Council defines an *M. irbyana* community as, "*where Melaleuca irbyana occur in a patch size of 0.25 hectares or greater, or where a patch of Melaleuca irbyana less than 0.25 hectares adjoins a second patch and the sum of the patches is greater than 0.25 hectares*". This definition has been determined using methodology from the *Melaleuca irbyana* (Swamp Tea-tree) Community 1:25,000 Scale Mapping Project (Ryan, 2010).

2.3. *Melaleuca irbyana* On-site

The site was traversed as part of previous and contemporary NCA searches. *Melaleuca irbyana* were recorded the species in four (4) separate locations during both 2018 and confirmed again in 2020, with an additional patch also recorded (location 5). Refer to **Plan 1-2** for *Melaleuca irbyana* onsite locations. Four of these locations (locations 1, 2, 3, and 5) occur within the Clearing Area. One patch (location 4) is located outside the Clearing Area and will be retained by the development in Conservation. Refer **Table 4** for a description of the Regional Ecosystems.

2.3.1 Location 1

Location 1 is situated in the northern aspect of the site, adjacent to the power easement. This patch is located within mapped composite 'Of Concern' Regional Ecosystem RE12.9-10.2/12.9-10.7 as confirmed via PMAV 2016/002969 certified on the 11th of May 2017. This patch of *Melaleuca irbyana* (Swamp Tea-tree) consists of three (3) established specimens, one (1) semi-mature specimen and one-hundred (100) juveniles. This patch of *Melaleuca irbyana* was surrounded by vegetation dominated by *Acacia spp., Allocasuarina littoralis* (Black She-oak) and *Alphitonia excelsa* (Soap Tree) regrowth with *Corymbia citriodora* (Spotted Gum) dominated canopy, representing the Least Concern RE12.9-10.2.

Photo Plate 1: Location 1

2.3.2 Location 2

Location 2 is situated towards the south-western property boundary, adjacent to Greenbank Road. This patch is located within mapped non-remnant vegetation as confirmed via PMAV 2016/002969 certified on the 11th of May 2017. This *Melaleuca irbyana* (Swamp Tea-tree) patch consists of three (3) established (mature) specimens, eleven (11) semi-mature specimens and ten (10) juvenile specimens. This patch of *Melaleuca irbyana* was found within a regrowth vegetation community, with surrounding vegetation dominated by *Allocasuarina littoralis* (Black She-oak) and *Acacia spp.* regrowth.

Photo Plate 2: Location 2

2.3.3 Location 3

Location 3 is situated towards the south-western property boundary, adjacent to Greenbank Road and approximately 380 m west of Location 2. This patch is located within mapped non-remnant vegetation as confirmed via PMAV 2016/002969 certified on the 11th of May 2017. This patch of *Melaleuca irbyana* (Swamp Tea-tree) consists of six (6) mature specimens, eleven (11) semi-mature specimens and fourteen (14) juvenile specimens. The overall patch of *Melaleuca irbyana* was found within a regrowth vegetation community, with surrounding vegetation dominated by *Acacia leiocalyx* (Early Flowering Black Wattle), *Allocasuarina littoralis* (Black She-oak) and *Alphitonia excelsa* (Soap Tree) regrowth. The patch is separated into four separate patches.

Photo Plate 3: Location 3

2.3.4 Location 4

Location 4 is situated towards the southern property boundary, approximately 800 m east of Location 3. This patch is located within mapped composite 'Of Concern' Regional Ecosystem RE12.9-10.2/12.9-10.7 as confirmed via PMAV 2016/002969 certified on the 11th of May 2017. This patch consists of five (5) mature specimens, one hundred and seven (107) semi-mature specimens and eight (8) juvenile specimens with a height less than two (2) meters. This patch of *Melaleuca irbyana* was surrounded by vegetation dominated by *Acacia spp., Allocasuarina littoralis* (Black She-oak) and *Alphitonia excelsa* (Soap Tree) regrowth with *Corymbia citriodora* (Spotted Gum) dominated canopy, typically representing the Least Concern RE12.9-10.2.

Photo Plate 4: Location 4

2.3.5 Location 5

Location 5 is situated towards the central portion of the development footprint. This patch is located within mapped non-remnant vegetation or Category X as confirmed via PMAV 2016/002969 certified on the 11th of May 2017. This patch consists of two (2) mature specimens retaining a trunk DBH greater than 100mm, three (3) semi-mature specimens with a trunk less than 100mm and a height greater than two (2) meters, and thirty-four (34) juvenile specimens with a height less than two (2) meters. This patch of *Melaleuca irbyana* was surrounded by vegetation dominated by *Allocasuarina littoralis* (Black She-oak) with scattered *Acacia leiocalyx* (Early Flowering Black Wattle), *Eucalyptus crebra* (Narrow Leaf Ironbark) and *Eucalyptus tereticornis* (Forest Red Gum). These species are typical of the Of Concern Regional Ecosystem community 12.9-10.7.

Photo Plate 5: Location 5

Table 4: Regional Ecosystems Descriptions

Status	Code	Description
Endangered	12.9-10.12	Corymbia intermedia, Angophora leiocarpa, Eucalyptus seeana +/- E. siderophloia, E. tereticornis, E. racemosa subsp. racemosa, C. citriodora subsp. variegata woodland to open forest. Lophostemon suaveolens is often present as a sub-canopy or understorey tree. Occasional Melaleuca quinquenervia on lower slopes. Does not include areas dominated by Eucalyptus racemosa subsp. racemosa. Occurs on Cainozoic and Mesozoic sediments. (BVG1M: 9g).
Of Concern	12.9-10.7:	Eucalyptus crebra +/- E. tereticornis, Corymbia tessellaris, Angophora leiocarpa, E. melanophloia woodland. Occurs on Cainozoic and Mesozoic sediments. (BVG1M: 13c).
Of Concern	12.3.11	Eucalyptus tereticornis +/- E. siderophloia and Corymbia intermedia open forest to woodland. Corymbia tessellaris, Lophostemon suaveolens and Melaleuca quinquenervia frequently occur and often form a low tree layer. Other species present in scattered patches or low densities include Angophora leiocarpa, E. exserta, E. grandis, C. trachyphloia, C. citriodora subsp. variegata, E. latisinensis, E. tindaliae, E. racemosa and Melaleuca sieberi. E. seeana may be present south of Landsborough and Livistona decora may occur in scattered patches or low densities in the Glenbar SF and Wongi SF areas. Occurs on Quaternary alluvial plains and drainage lines along coastal lowlands. Rainfall usually exceeds 1000mm/y. (BVG1M: 16c)
Least Concern	12.3.6:	Melaleuca quinquenervia +/- Eucalyptus tereticornis, Lophostemon suaveolens, Corymbia intermedia open forest to woodland with a grassy ground layer dominated by species such as Imperata cylindrica. Eucalyptus tereticornis may be present as an emergent layer. Occurs on Quaternary floodplains and fringing drainage lines in coastal areas. (BVG1M: 22a)
Least Concern	12.9-10.2:	Corymbia citriodora subsp. variegata open forest or woodland usually with Eucalyptus crebra. Other species such as Eucalyptus tereticornis, E. moluccana, E. acmenoides and E. siderophloia may be present in scattered patches or in low densities. Understorey can be grassy or shrubby. Shrubby understorey of Lophostemon confertus (whipstick form) often present in northern parts of bioregion. Occurs on Cainozoic and Mesozoic sediments. (BVG1M: 10b).

Based on the information provided in **Section 2.2**, the specimens located on site are not consistent with a *Melaleuca irbyana* community due to the patches predominately containing juvenile individuals with relatively few fully mature specimens. Importantly, these patches are not associated with Endangered Regional Ecosystems. Locations 1 and 4 were confirmed via a certified PMAV to be located within composite 'Of Concern' Regional Ecosystem RE12.9-10.2/12.9-10.7 while locations 2, 3 and 5 were located within non-remnant areas.

While Location 1 contains a substantial amount of juvenile species, overall, the significance of these patches is considered less than if they formed part of a broader existing community. The habitat value they currently provide is considered relatively limited, with no obvious noteworthy habitat for flora or fauna observed at the time of survey.

3. Management of the Impact

The proposed earthworks to facilitate the development footprint will require the removal of four (4) relatively small patches of predominately juvenile *Melaleuca irbyana* specimens over the next two years as development progresses. A significant residual impact (SRI) assessment was undertaken in accordance with the *Queensland environmental Offsets Policy - Significant Residual Impact Guideline (DES 2014)* as part of the approved IMP (refer **Appendix B**). Prior to the SRI, an assessment survival in the wild and avoidance and mitigation was considered.

3.1. Avoidance and Minimisation of Impact

An assessment for the survival of the plant in the wild was previously made as part of the IMP (refer **Appendix B**) and has been updated as part of this assessment.

The proposed works are for the development of Greenbank master planned development in the Greater Flagstone PDA. Preliminary approval for the context plan and master plan has been issued by EDQ. These plans were informed by detailed analysis of the site by specialist consultants, including a detailed ecological analysis by SHG. Subsequently, areas for development shown are concentrated to areas of least constraint. Areas of highest ecological value have been identified for retention as conservation.

The proposed works will include the creation of residential allotments, a proposed school site, new roads, park and conservation areas and corridors. Minimisation of overall clearing impacts are evident through location of the proposed development, located outside Endangered remnant vegetation and waterway corridors. Rehabilitation of conservation areas and waterways is proposed as part of the development.

The proposed earthworks to facilitate the development footprint will require the removal of four (4) relatively small patches of predominately juvenile *Melaleuca irbyana* specimens over the next two years, and ongoing property boundary maintenance within 100 m of the retained patch (Location 4). These specimens are located within Of Concern and non-remnant regrowth areas (refer **Plan 2**).

As per the EDQ endorsed Natural Environment Site Strategy, extensive conservation of greater than 89 hectares of proposed Conservation Parkland adjoining Norris Creek and Wearing Park is proposed as part of the development. In accordance with best practice management, restoration and rehabilitation works will seek to stabilise and reverse the negative effects of ongoing habitat fragmentation. The intent is for managed areas of rehabilitation and restoration to rectify canopy gaps and restore bare or denuded areas to provide additional habitat and refugia within the lower strata to maintain connectivity with external approval corridors and improve terrestrial corridor viability. Rehabilitation works within the conservation area and waterway corridors will include weed management and replanting with native species consistent with mapped Regional Ecosystems to augment ecological values and enhance connectivity.

Melaleuca irbyana grows in flat areas that are periodically waterlogged, in eucalypt forest, mixed forest and *Melaleuca* woodland with a sparse and grassy understorey. The species prefers poorly draining, heavy clay soils (Byrnes 1984; Barlow 1987). The approved conservation land rehabilitation works include an established *Melaleuca irbyana* thicket within remnant woodland forest to the north of the central waterway (Plans **2 & 3**). This land is relatively low lying and adjoins an ephemeral waterway that contains permanent billabongs. The approved *Melaleuca irbyana* planting site is therefore considered ideal for the species, which is dependent on specific groundwater and / or surface water hydrology. Impacts to *Melaleuca irbyana* have been minimised to the greatest practical extent and include establishing the *Melaleuca irbyana*

community, on the project site, within future conservation land and managing potential impacts from ongoing works that will occur within 100 m of a retained patch.

3.2. Survival of the Plant in the Wild

An assessment for the survival of the plant in the wild was previously made as part of the IMP (refer **Appendix B**) and has been updated as part of this assessment.

Based on the current disturbed nature of the site and the locations of the *Melaleuca irbyana* specimens mostly along property boundaries, it is not anticipated that the removal of four (4) relatively small patches of predominately juvenile *Melaleuca irbyana* specimens will significantly hinder the future success of the species in the area. Importantly, the patch in location 4 is to be preserved within the conservation area and approved and established rehabilitation works provide a *Melaleuca irbyana* community on the site allowing the community to be protected in perpetuity.

3.3. Significant Residual Impact (Justification of the Impact)

A SRI assessment (refer Section 3 of the IMP at **Appendix B**) was made to support the Protected Plants Clearing Permit (Permit No. WA0009354) for the clearing of *Melaleuca irbyana* specimens within the 277 hectare clearing area. The SRI assessment concluded the clearing of three small patches of M. irbyana for the development would not result in a SRI due to extensive rehabilitation works proposed within the onsite Conservation land, including the establishment of a 5,000 m^2 *Melaleuca irbyana* thicket resulting in a net gain in *Melaleuca irbyana* across the site.

While rehabilitation for the 5,000 m^2 *Melaleuca irbyana* thicket has been undertaken, the permit for clearing within the 277 ha area is about to expire.

Renewal of the Protected Plant Clearing Permit for the same impact (i.e. clearing 277 ha) is requested. While an additional patch of *M. irbyana* has been identified, this falls within the same 277 ha impact area as previously assessed under the Permit No. WA0009354. The below SRI assessment for the clearing of the four patches of mostly juvenile *M. irbyana* proposed under this permit renewal concludes, with the established rehabilitation works, the impact would not result in a SRI.

To demonstrate this mitigation of impact, a response to the four (4) points of consideration within Section 1.2 of the *Significant Residual Impact Guideline* was provided below for ease of reference

- **The extent and duration of impact on the matter and its sensitivity to disturbance.**

  The impact on the matter is the removal of four (4) relatively small patches (locations 1, 2, 3 and 5) of predominately juvenile *Melaleuca irbyana* specimens from former paddock areas that have already been subject to high disturbance from cattle grazing and historical clearing. A patch (at location 4) will be retained with ongoing adjoining works within 100 m limited to the maintenance of the nearby property boundary. The sites are described in detail in **Section 2.3**, shown in **Plan 2** and summarised below:

  - Location 1: 3 x mature s + 1 x semi mature + 100 juvenile specimens, located within the north-east along a drainage feature
  - Location 2: 3 x mature + 11 x semi mature + 10 juvenile specimens, located along the southern boundary
  - Location 3: 5 mature + 20 semi mature + 14 juvenile specimens, located along the southern boundary
  - Location 4: 5 mature + 107 x semi mature + 8 x juvenile specimens, located along the southern boundary in the south-west

- Location 5: 2 x mature + 3 x semi mature + 34 x juvenile specimens, located within the central portion of the site

- **Timeframe for rehabilitation relative to the impact occurring and the ability of the matter to maintain its viability during this timeframe.**

  As required under Permit No. WA0009354 rehabilitation planting of six hundred and twenty-five (625) advanced tube stock specimens of *M. irbyana* occurred within a 5,000m^2 area within the central waterway corridor of the conservation zone (refer **Plan 2**). Although it is expected that these plantings will take approximately four (4) years to reach maturity they have been planted in a thicket to replicate as close to natural conditions for a *M. irbyana* ecological community as possible and will be maintained as part of the extensive rehabilitation works for the conservation zone. The area of planting of this thicket adjoins the central waterway corridor and is not within 100 m of future development areas. This location has been chosen to avoid human disturbance and as far away as possible from conflicting uses. Importantly, the rehabilitation area has been legally secured on title as a declared area (Category A) under the *Vegetation Management Act 1999* (refer **Appendix C**) and will be handed over to Logan City Council, along the with the waterway corridor, following the on-maintenance period. Further, the patch of *M. irbyana* at location 4 will be retained within the Conservation area and will be subject to regular compatible weed suppression and monitored for persistence as part of site maintenance before being handed over to Council.

- **Likely success of rehabilitation works to return the impacted matter to its original condition, and;**

  It is important to note that the Regional Ecosystems within and adjoining the creek corridor reflect those where the *M. irbyana* patches are currently located on-site. The rehabilitation area was chosen after detailed ecological survey of site attributes, including the prevailing low-lying topography, proximity to the creek, and canopy gaps with limited existing understorey. Thus, the planting of *M. irbyana* in the creek corridor has a high likelihood of success given the suitable landscape and habitat.

  Planting was undertaken by land care experts Evolve Environmental. Given that the impact is the removal predominately juvenile *M. irbyana*, the planting of six hundred and twenty-five (625) specimens of *M. irbyana* as a thicket within the conservation zone will result in rehabilitation outcomes and a consolidated *M. irbyana* thicket which will far exceed the impacted matter.

- **The time-lag effect—between impact and rehabilitation successfully delivering the original condition for the matter—on the matter's viability.**

  As mentioned previously, the removal of four relatively small patches of *M. irbyana* is not considered to significantly impact upon the viability of local populations nor remove significant habitat values. Although there will be a time-lag between the removal of the predominantly juvenile *M. irbyana* specimens and the maturity of the tube stock of *M. irbyana*, planting has already occurred to reduce the potential time lag-effect to the greatest practical extent. Overall, the rehabilitation proposed is considered a far superior ecological outcome for viability of local populations.

  The extent and number of *M. irbyana* planted is intended to establish a self-sustaining thicket of *M. irbyana* in a safe and secluded buffer environment that is capable of mitigating the proposed impacts. It is acknowledged that any future unavoidable loss of *M. irbyana* from the development area will be assessed by DES on a case by case basis, however, it is requested that DES consider the approval of Permit No. WA0009354 for the clearing of 277ha on the site consistent with the clearing being proposed.

3.4. Voluntary Declaration

As the Conservation land (and *M. irbyana* rehabilitation area) will be ultimately handed over to Logan City Council, the proposed *M. irbyana* rehabilitation area was requested to be legally secured as a Declared Area (Category A) under the *Vegetation Management Act 1999* (VMA) to counterbalance the clearing of *M. irbyana*. on site and to ensure objectives of the exchange area are fully achieved.

The "*Voluntary Declaration Management Plan (Melaleuca irbyana Declared Area), 432-520 Greenbank Road, Greenbank, prepared by Saunders Havill Group for Mirvac (Queensland) Pty Ltd, dated March 2019*" was submitted to the Department of Natural Resources, Mines and Energy (DNRME) as part of the Voluntary Declaration and included the following attachments:

- Appendix A – Protected Plants Clearing Permit (Permit No. WA0009354)
- Appendix B - *Impact Management Plan Melaleuca irbyana 43-520 Greenbank Road, Greenbank prepared for Mirvac QLD Pty Ltd, dated 3 July 2018'*
- Appendix C – Declared Area Plan (proposed)
- Appendix D - *Melaleuca irbyana* Declared Area Rehabilitation Plan, prepared for Mirvac QLD Pty Ltd, by SHG dated March 2019.

Importantly, the Rehabilitation Plan in Appendix D of the Voluntary Declaration application, provides detailed rehabilitation, monitoring and reporting procedures in format suitable for tender and expands on the single page plan in Section 3 of the IMP (previously assessed and approved by DES in 2018 (Permit No. WA0009354).

The Voluntary Declaration Management Plan was approved by DNRME and the Declared Area was secured on title on 3 March 2020 and is shown as Category A (PMAV 2019/002658).

A copy of the Rehabilitation Plan has been extracted and included hereafter for ease of reference.

3.5. Rehabilitation

Land care Consultants Evolve were engaged by Mirvac to undertake installation and establishment of the *M. irbyana* rehabilitation area. Rehabilitation works area ongoing in accordance with the Rehabilitation Plan (refer Photos below). It is understood that the *M. irbyana* offset area planting was completed in January 2020 and Evolve are continuing maintenance practices as specified in the approved Rehabilitation Plan. Refer to **Plan 3** for a plan of the rehabilitation area extracted from the VDec.

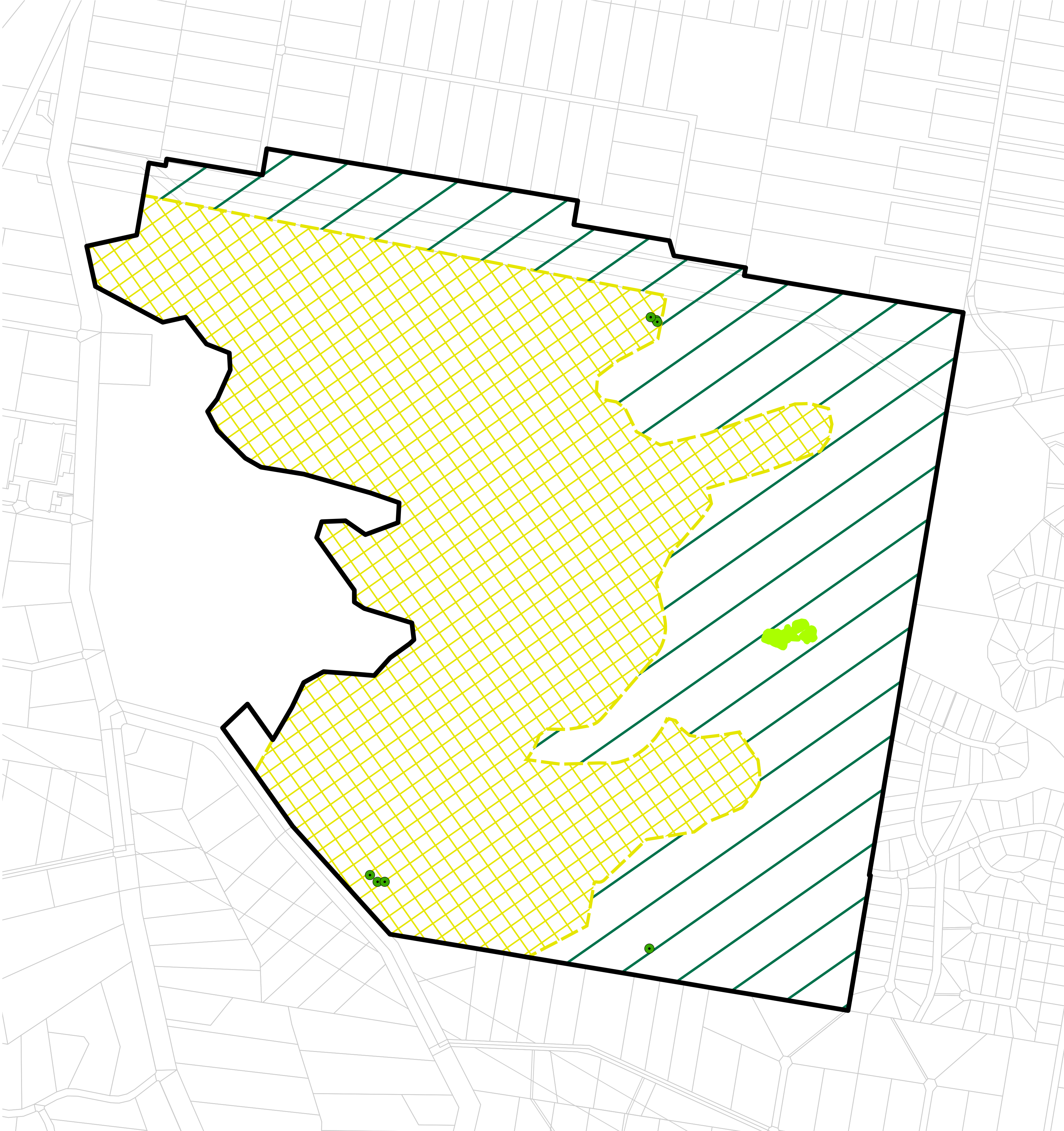
Everleigh, Greenbank

VOLUNTARY DECLARATION REHABILITATION PLAN

PLAN SET				
SHEET NO.	TITLE	DESCRIPTION	ISSUE	DATE
1	7598 E 01 VDEC RMP B	Cover sheet	B	23/05/2019
2	7598 E 02 VDEC RMP A	Details sheet	A	15/04/2019
3	7598 E 03 VDEC RMP B	Introduction / Weed management	B	23/05/2019
4	7598 E 04 VDEC RMP A	Planting, fauna, responsibilities	A	15/04/2019
5	7598 E 05 VDEC RMP B	Maintenance and monitoring	B	23/05/2019
6	7598 E 06 VDEC RMP A	Monitoring photo plan - Pre-works/Maintenance	A	15/04/2019
7-9	7598 E A01-A03 V-DEC RMP A	Appendix A - Weed treatment & Removal	A	15/04/2019

Legend

- *Melaleuca irbyana* patch
- Declared Area
- Conservation area
- Urban Area
- Project site
- QLD DCDB



saunders havill group
Saunders Havill Group Pty Ltd ABN 24 144 972 949
Brisbane ■ Emerald ■ Rockhampton
■ surveying ■ town planning ■ urban design ■ environmental management ■ landscape architecture

CLIENT:
mirvac
Everleigh

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AMENDMENTS:

Issue	Date	Description	Checked
B	24/05/2019	Client Amendments	AD

PROJECT:

423 - 520 Greenbank Road, Greenbank (1/SP297192)

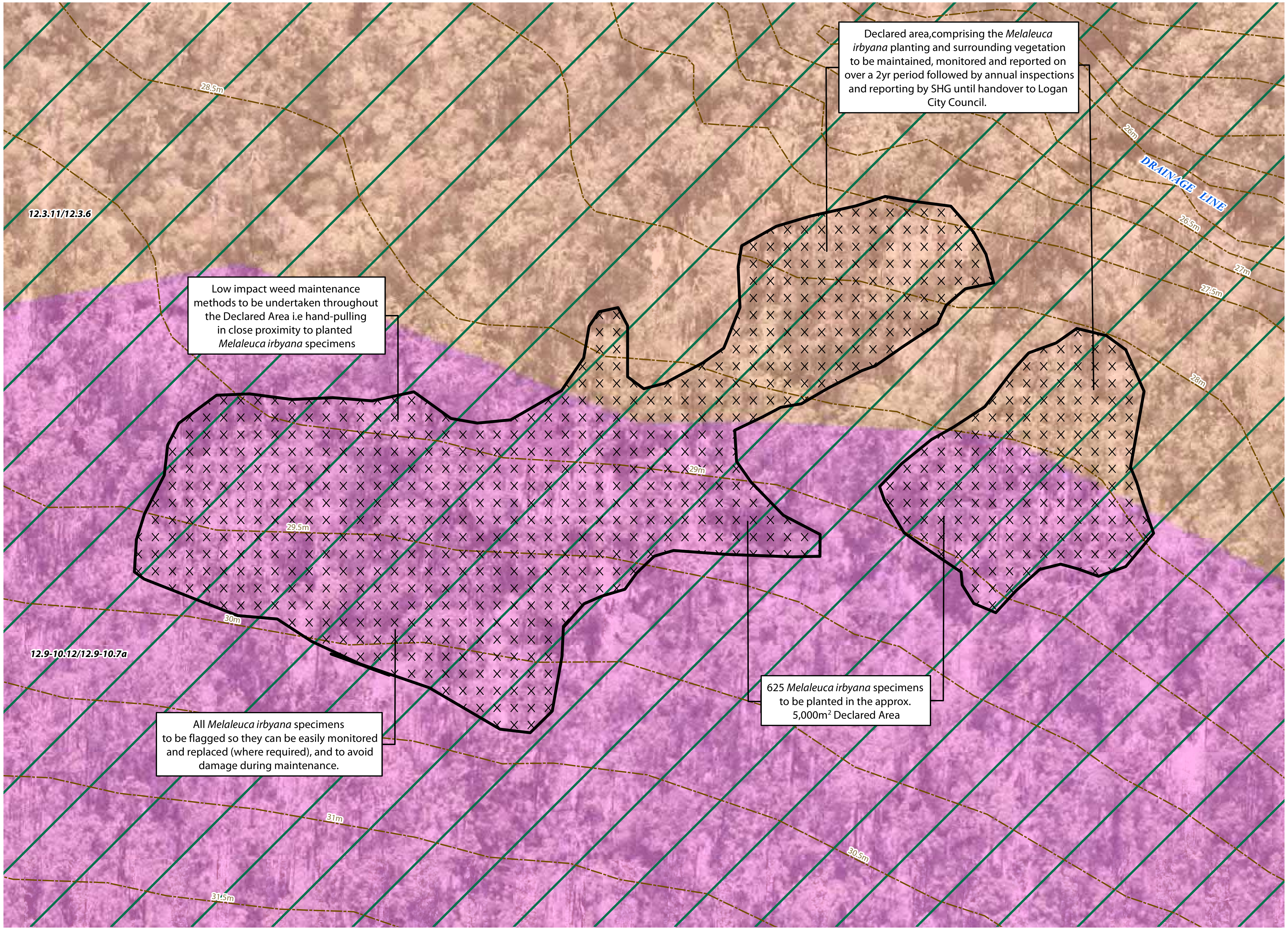
environmental management

PLAN OF: Rehabilitation Plan Cover Sheet

DATE: 24/05/2019		CHECKED:	AD
CLIENT REF.: JOB NO.		DRAWN:	MC
DRAWING No.: 7598 E 01 VDEC RMP B			

Everleigh, Greenbank

VOLUNTARY DECLARATION REHABILITATION PLAN - DETAIL SHEET



LEGEND

- Management Zone 1: Melaleuca Irbyana planting and rehabilitation site (Approx. 5,000m²)
- Conservation area
- Contours (0.5m)

VM regional ecosystem map - v11

- Category A or B area containing endangered regional ecosystems
- Category A or B area containing of concern regional ecosystems

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REFERENCES:

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AMENDMENTS:

Issue	Date	Description	Checked
A	15/04/2019	Client Draft	AD

PROJECT: 423 - 520 Greenbank Road, Greenbank (1/SP297192)

environmental management

PLAN OF: Detail Sheet

DATE: 15/04/2019 CHECKED: AD

CLIENT REF.: 7598 DRAWN: MC

DRAWING No.: 7598 E 02 VDEC RMP A

Everleigh, Greenbank

VOLUNTARY DECLARATION REHABILITATION PLAN

INTRODUCTION

Saunders Havill Group (SHG) was engaged by MIRVAC to prepare a Voluntary Declaration Rehabilitation Plan (VDRP) for the clearing of 140 *Melaleuca irbyana* (Swamp Tree Tree) specimens. The replacement plants will be located in a Declared Area within the approved conservation area of the Everleigh project. The clearing works, current and future will facilitate the creation of residential lots, a school, and internal roads for the site's ultimate development layout.

The rehabilitation proposal for the clearing of 140 *Melaleuca Irbyana* is the planting of more than four (4) advanced tube stock specimens of *Melaleuca Irbyana* per tree cleared. A total of 625 (560+65 additional) *Melaleuca Irbyana* will be planted as a result. The Declared planting area is proposed within the site's conservation zone (refer Plan 2) and will cover 5,000 m^2. The specific location of the planting area was determined onsite by Ecologists from SHG. The percentage of existing canopy cover and the land zone features were taken into consideration when determining the optimal location for planting. Although it is expected that these plantings will take approximately four (4) years to reach the size of the impacted matter, they will be planted in a thicket to replicate as close to natural conditions for a *Melaleuca Irbyana* ecological community as possible and maintained as part of the rehabilitation works for the conservation zones. The area of planting of this thicket is centralised within the conservation zone and adjacent the waterway corridor, as stipulated by the EDQ approved NESS, and not within 100m of future development areas.

This Rehabilitation Plan is drafted to identify and manage the site disturbances for the planting of the 625 *Melaleuca Irbyana* specimens within a 5,000m^2. The planting will involve low impact weed removal and the retention of any existing native vegetation in the immediate area. The planting will be succeeded by a two (2) year period of maintenance, monitoring and reporting, then annual inspections and reporting by SHG until handover to Logan City Council.

REHABILITATION - APPROACHES

Ecologists from SHG have assessed the site's vegetation. Broadly, it was determined that a hybrid of infill planting and minor reconstruction approaches will be used on site. This approach is described below:

ECOLOGICAL RESTORATION APPROACH	
INFILL PLANTING / MINOR RECONSTRUCTION	
Applies:	To natural areas where the native plant community is largely healthy and functioning. Where area retains canopy trees, few T2 layer trees but with largely bare shrub and ground cover layers. Where the natural regeneration processes (seedling germination, root suckering, etc.) are being inhibited by external factors, such as weed invasion, soil compaction, cattle grazing, mechanical slashing, etc. When the main management issue is weed infestation and/or historical land use practices is causing ground and shrub layers to be absent from the area.
Role of planting:	Infill planting is to assist the existing natural area reach the intended composition through planting specific species.
Goal vegetation community:	The re-establishing plant community will be substantially similar in structure, composition and diversity to the original vegetation.

Note: Table adapted from Gold Coast City Council's 'Guideline for the preparation of a Rehabilitation Plan'

WEED MANAGEMENT

Rehabilitation treatment is to generally include the following points:

- A number of weeds are recorded for removal within shrub & ground layer
- Weed removal and management will utilise low impact methods to minimise impacts on planted *Melaleuca Irbyana* specimens

Weed management typically comprises a major part of rehabilitation site works. Weed management provides the basis of aiding natural regeneration and assisted natural regeneration. It also forms part of the preliminary work required for reconstruction and fabrication scopes. Weed Management to be undertaken in accordance with SEQERF Primary, Follow-up and Maintenance works notes (adjacent).

Critical skills for Weed Management include:

- Knowledge of relevant legislation
- Plant Identification skills
- Knowledge of different weed management techniques

Knowledge of Relevant Legislation:

It is expected contractors have a depth of knowledge of relevant legislation to complete site rehabilitation works.

This may include occupational Health and Safety laws as well as environmental and heritage protection legislation. Bush regenerators must comply with the requirements of the Workplace Health and Safety Act 2011 or, when working on Commonwealth lands, the Commonwealth's Occupational Health and Safety (Commonwealth Employment) Act 1991. Contractors should also obtain all relevant permits required under State and Commonwealth legislation (e.g.Nature Conservation Act 1992, Fisheries Act 1994, Vegetation Management Act 1999, Biosecurity Act 2014). Contractors must also be aware of and adhere to cultural heritage protection obligations under the Aboriginal Cultural Heritage Act 2003 and where chemicals are in use, the Agricultural Chemicals Distribution Control Act 1966.

In addition to the above, contractors should also be familiar with local government body requirements (e.g. Pest Management Plans, Local Codes, Policies and Guidelines) and Classifications of weeds. Refer to adjacent schedules for classification of weeds under the Biosecurity Act 2014).

RESTRICTED MATTERS (*BIOSECURITY ACT 2014*)	
Category	Description
1	must be reported to an inspector within 24 hours if it is present in, or on, something in your possession or under your control or at a place where you are the occupier, unless an appropriately authorised officer has already been advised or you possess a permit for the restricted matter. Includes red imported fire ants, electric ants, Asian honey bees, and certain animal diseases, aquatic diseases and pathogens.
2	must be reported to an inspector within 24 hours if it is present in, or on, something in your possession or under your control or at a place where you are the occupier, unless an appropriately authorised officer has already been advised or you possess a permit for the restricted matter. includes certain noxious fish, weeds and pest animals
3	You must not distribute this restricted matter. It must not be given as a gift, sold, traded or released into the environment unless the distribution or disposal is authorised in a regulation or under a permit. Deliberate human distribution or disposal contrary to the legislation is a key source of spread into other areas. includes weeds, pest animals and noxious fish
4	You must not move this restricted matter to ensure that it does not spread into other areas of the state. includes specific weeds, pest animals and noxious fish
5	You must not possess or keep this restricted matter under your control. These pests have a high risk of negatively impacting on the environment. You may only keep this restricted matter under a permit of the *Biosecurity Act 2014* or another Act. includes weeds, pest animals and noxious fish
6	You must not feed this category of restricted matter. Feeding this restricted matter may cause their numbers to increase and negatively impact the economy or the environment. Feeding for the purpose of preparing for or undertaking a control program is exempted. Includes invasive animals such as feral deer, foxes, rabbits and wild dogs and noxious fish such as carp, gambusia and tilapia.
7	If you have these noxious fish in your possession you must kill the restricted matter and dispose of the carcass by burying the whole carcass in the ground above the high tide water mark or placing it in a waste disposal receptacle. Includes noxious fish such as carp, weather loach, climbing perch and gambusia

Plant Identification Skills:

Both native and weed species should be identified prior to primary weed removal works and ongoing throughout the follow-up and maintenance periods. This is to maximise natural regeneration and reducing likelihood of accidental weed spraying to native vegetation. Regenerating species to be treated and maintained in a similar manner to newly planted revegetation tubestock. If contractor is unsure of species, advise should be sought by botanist, specialist contractor or confirmed with Queensland Herbarium. Refer to indicative Weed Treatment schedules derived from Queensland Herbarium for an indication of weed species and treatments.

Knowledge of Different Weed Management Techniques:

A range of weed management techniques are available to combat varying weed species and scenarios. Refer to adjacent schedules and Appendix A for an indication of weed management techniques.

WEED MANAGEMENT TECHNIQUES	
METHOD	DESCRIPTION
Herbicide	The herbicide weed control techniques described below provide a range of proven methods that can be used on a restoration site.
Cut - Scrape- Paint	Cut the stem of the plant close to the ground (approximately 1-2cm) ensuring that soil does not come in contact with the cut surface. The cut can be made at a slight angle in order to increase the surface area that is exposed to the chemical. Apply herbicide immediately to the cut stump using poison pot and brush or dripper bottle. Using a knife, scrape the sides of the stump thoroughly to expose the green tissue. Apply herbicide to the scraped stump. The chemical must be applied within 10 seconds of the cut or scrape being made in order for it to be fully effective.
Cut - Paint	Cut the stem of the plant close to ground level. Apply herbicide to the cut stump using poison pot and brush or dripper bottle. This method is best suited to easy-to-treat weeds such as small-leaved privet (Ligustrum sinense), provided that the diameter of the stem at ground level is less than approximately three centimetres. If a glyphosate-/ metsulfuron methyl herbicide mix is being used in the poison pot, a greater range of weeds can be controlled using this method e.g. Easter cassia.
Scrape - Paint	Scrape as much of the stem as possible (one side of the stem) using a knife and apply herbicide to the scrape. Leave a small section of the vine unscraped, and then twist the vine so that the next scrape is made on the opposite side of the stem to the preceding scrape. Continue along the length of the vine, scraping and painting as much of the stem as possible, with scraping to be concentrated along the thicker stems close to the root of the plant. This is the best method to use for madeira vine, as it allows the chemical to translocate to the underground storage organs and aerial tubers which may be hanging in large clusters above head height. This avoids the potential problem of tubers from cut stems left hanging in the trees from dropping to the ground and sprouting. When scraping madeira vine stems a deep scrape is advisable – scrape right through to the fibrous, stringy section of the stem, taking care not to sever the vine. This method is also suitable for treatment of ochna.
Over- spraying	Over-spraying involves the use of knapsacks or power sprayers to treat large expanses of weed such as lantana thickets. The foliage must be covered with herbicide but not to the point of running off the plant. The dead plants remain in place and can be cut down at a later stage. Prior to over-spraying, any weeds that are growing closely around established native plants must be hand removed or treated by cut-scrape-paint.
oll-hang	Vines such as mile-a-minute (*Ipomoea cairica*) which produce long stolons extending many metres along the surface of the ground, are suited to the roll-hang method. Locate the base of the plant and carefully pull up the runners and roll them up. The resulting roll of vine is then hung in the fork of a tree to dry out as if it is left on the ground it is likely to re-shoot. Where runners are climbing up into a tree they are cut off at head height prior to the runner being rolled up – there is no need to pull cut vines down from trees as this action is likely to damage the tree. The base of the vine is treated using the cutscrape-paint method.
Gouge- paint	This method applies to plant species that have a fleshy underground storage organ, such as the large tuber that is often found at the base of madeira vine. It is also particularly appropriate for the treatment of climbing asparagus (*Protasparagus plumosus*). If using this technique on climbing asparagus, first cut the stems that are growing into the canopy at head height and also at the base. The fleshy rhizome can then be gouged, or alternatively in the case of climbing asparagus, it can be struck several times firmly with the head of a pair of loppers, allowing the brown outer covering of the crown to peel away exposing the white fleshy inner section of the rhizome for application of herbicide. Gouge out sections of the fleshy base with a knife and apply herbicide using a paint pot and brush or dripper bottle within 10 seconds.

WEED MANAGEMENT TECHNIQUES	
METHOD	DESCRIPTION
Basal Barking	This method involves mixing an oil-soluble herbicide in diesel/kerosene and painting or spraying the full circumference of the trunk or stem of the plant from ground level to a height of approximately 45cm. Basal bark application is suitable for thin-barked woody weeds including saplings, regrowth and multi-stemmed shrubs. The method will usually result in the mortality of difficult-to-control woody weeds at any time of the year, provided the bark is not wet or too thick to enable the herbicide to penetrate. The method should not be used in wet weather, adjacent to waterways or in areas where native trees and shrubs are located. The use should be restricted to situations where a weed is particularly difficult to control e.g. cherry guava and where other methods have been unsuccessful.
Splatter Gun	This small gas-powered injector kit is fitted into a knapsack for easy carrying and delivers large droplets in a stream over the weed. The gun is used to deliver a concentrated herbicide (glyphosate or metsulfuron methyl) across large dense expanses of weed. The method is used for species such as lantana (ratio of 1:9 of glyphosate:water). Splatter gun involves spraying strips at one to two metre intervals over the thicket. The herbicide is then translocated throughout the entire plant. The method does not require the whole plant to be covered as in over-spray.
Spot- spraying	A knapsack filled with an appropriate herbicide mix is used by the operator to selectively control environmental weeds. A keen eye and an ability to distinguish between the native and weed species likely to be present, especially at seedling stage, is essential. Marker dye is added to the chemical mix to allow the operator to see what has already been sprayed, thus covering the ground weeds comprehensively and thoroughly Glyphosate and metsulfuron methyl are the main herbicides used for spot-spraying in ecological restoration, together with the addition of a penetrant and/or surfactant and marker dye.
Stem Injection	Large woody weeds such as camphor laurel, coral trees (Erythrina spp, Privet Ligustrum spp) and umbrella trees are generally treated by stem-injection. Holes are drilled at regular intervals around the base of the tree and exposed roots using a drill. A tree injection syringe attached to a small capacity knapsack is used to fill the holes with the herbicide. Stem-injection of trees can also be undertaken using a hatchet to create cuts in a 'brickwork pattern' in trunks of trees for the application of herbicide (known as tree frilling). Frilling is more labour intensive than drilling. The greatest benefit of steminjection is that the trees can be left standing in situ as they die, provided there is no risk to humans or infrastructure from falling limbs. This creates convenient roosts for birds and other animals, and prevents the formation of large amounts of debris on the ground and damage to understorey plants which would result if the trees were to be cut down using a chainsaw.
Wick Wiping	Wick wipers can be manually used with a sponge or wick applicator, attached to a container filled with herbicide or as an attachment towed by a tractor. The manual method can be used to selectively apply herbicide to the leaves of weeds growing in sensitive situations. The hand-held container can leak and generally spot spraying would be recommended. The use of a tractor drawn wick wiper is used to control taller growing species such as introduced grasses and to encourage the growth of lower growing species. This method could be used in preparation for planting.
Mechanical	Mechanical weed control involves the use of powered and non-powered equipment such as brushcutters, chainsaws, slashers, shovels, pruners, saws, etc. These methods are best used in situations where there is a large, uninterrupted stand of weeds.
Dig and Bag	Dig and remove tuberous/ rhizomatous root systems. Remove roots or whole plant in hard/ compacted soils. Place in suitable container and remove from site, dispose of by deep burial, burn or burial at a land fill, must not place declared weed species in recycling (mulch).
Hand-Pull	Remove totally from ground by hand (human). Perform when soil is moist. Applicable to small infestations or areas of environmental sensitivity (including sensitive watercourses, when frogs are breeding, or presence of threatened species).
General Mechanical	May involve use of machinery (e.g. brushcutter, chainsaw, slasher, dozer, excavator). Suitable for large infestations and weed trees. Initially cost-effective, but requires immediate revegetation of site or matting/ mulch application and extensive maintenance periods. Generates excessive soil and vegetation disturbance.

Note: Table adapted from a table in SEQERF

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■ surveying ■ town planning ■ urban design ■ environmental management ■ landscape architecture

CLIENT: mirvac Everleigh

REFERENCES:

South East Queensland Ecological Restoration Framework (2012)

Guideline for the preparation of a Rehabilitation Plan (GCC)

AMENDMENTS:

Issue	Date	Description	Checked
A	15/04/2019	Client Draft	AD
B	24/05/2019	Client Amendments	AD

PROJECT: 423 - 520 Greenbank Road, Greenbank (1/SP297192)

environmental management

PLAN OF: Rehabilitation Plan Notes

DATE:	24/05/2019	CHECKED:	AD
CLIENT REF.:	7598	DRAWN:	MC
DRAWING No.:	7598 E 03 VDEC RMP B		

Everleigh, Greenbank

VOLUNTARY DECLARATION REHABILITATION PLAN

PLANTING

Prior to undertaking planting installation, the following general items should be considered:

- Sourcing plant material
- Timing of planting
- Site preparation
- Planting density
- Planting installation

Sourcing Plant Material:

There are a number of options for sourcing plant material for revegetation purposes. Propagation from site seed is a good outcome however is often limited by required timing of works. Sourcing planting from local nurseries is the commonly chosen option and has the following benefits:

- Awareness of genetic considerations when collecting seed.
- Experience with breaking dormancy mechanisms in hard to germinate seeds.
- Highly successful propagation techniques.
- Ability to provide high quality stock to order
- Draw on industry resources.

For threatened species, it is recommended to source seed from stock of local provenance, as close to the receiving site as possible—to maintain the genetic signature of the local population. Furthermore, seed should be sourced randomly from as many individuals as possible across the population—to ensure a representative range of genetic material is collected and to minimise potential for inbreeding.

Timing of Planting:

The timing of planting should ideally be aligned with the wet season in SEQ (summer and autumn). This minimises the need for intensive watering to establishment planting. Planting between February to May is the most beneficial as it also seeks to avoid intense heat periods of summer. Despite this, it is understood planting may occur at various times within the rehabilitation areas due to development timing needs.

Site Preparation:

Site or planting preparation includes:

- Fencing to exclude grazing animals and people (if required)
- Pre-spraying of exotic grasses and other weeds to planting areas
- Consideration of source of water for new planting (access tracks, temporary irrigation)
- Arranging delivery of mulch, jute netting and treeguards (if required)
- Treatment of heavily compacted soils by ripping and or application of gypsum
- Soil amelioration as required

Planting Density:

The planting will provide a net benefit of greater than 4 to 1 in an area protected under the NESS. Planting of the 625 specimens will be planted at approximately 1 per 8m2 to form a *Melaleuca Irbyana* thicket.

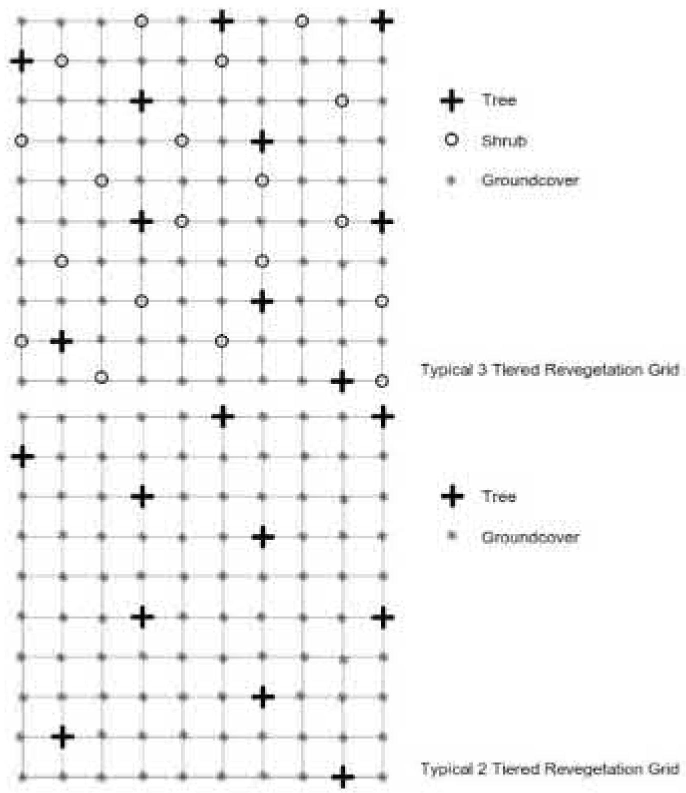
PLANTING INSTALLATION

The following outlines the preferred installation methodology for revegetation works within the rehabilitation areas. It has been designed to maximise plant establishment success rates and minimise plant mortality. Revegetation works shall be either undertaken or directly supervised by an experienced and qualified bush regenerator. All works shall be in accordance with the provisions of this sheet, local government policies and Australian Standards. Plant installation methods shall include:

- Plants are to be vigorous, well established, hardened off, consistent with species or variety, free from disease and insect pests, with large root systems and no evidence of having been restricted or damaged.
- Plants are to be planted immediately after delivery to the planting site. If not possible, they should be stored in the shade and watered sufficiently during the day.
- Planting is to be undertaken in accordance with the planting grid contained within this drawing sheet.
- Excavate planting medium to a depth suitable for the installation of tube or pot specimens. In areas where planting substrate is deemed to be very poor (compacted, nutrient depauperate, hydrophobic etc.) and above areas of potential frequent inundation and water flow, topsoil may be used or the ground mechanically ripped where access is feasible.
- Pre-water plant hole, if soil is dry, to decrease root stress upon planting and assess the infiltration of water through the soil
- Incorporate into the planting substrate the appropriate quantity of prepared water crystals or other suitable hydrating product such as Hortex 'Rainsaver' or 'Moisturaid'.
- Place plant into hole and backfill ensuring that the plant is upright and the stem is not covered in any less than 10mm or any more than 20mm of planting medium
- Plants are to be watered thoroughly immediately after planting (ensure deep irrigation) and thereafter as required during the construction phase of the development depending on climatic conditions. Creation of a concave hollow around the base of each plant will aid water infiltration to the plant roots.
- A complete, slow release fertiliser is recommended, and is to be administered appropriately during planting. Top dressing with slow release fertiliser is preferred to avoid toxic levels of fertiliser accumulating in the plant hole around the plant roots.
- To ensure successful establishment, all planting surfaces must be covered in:
  - 100mm layer of high-quality weed-free composted chip mulch (site mulch) - Note: to avoid possible stem rot in some 'drier' species ensure mulch is 'dished' and not covering plant stem by more than 200mm
  - suitable individual anchored natural fibre weed mat; or
  - As presented within other section, where available mulch material will be sourced from cleared vegetation material if adequately seasoned.
- A long-term slow release fertiliser, such as Nutricote or similar product should be used for all plantings after initial plant establishment.
- Seedlings and saplings are to be encouraged and maintained throughout the establishment period.

PLANTING SET OUT

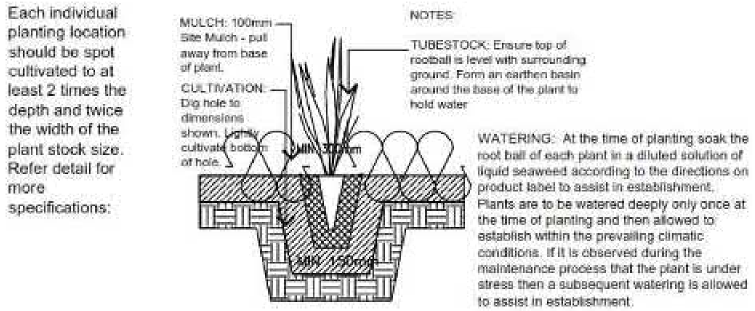
Revegetation planting locations shall be generally set out in accordance with a typical random grid pattern as shown below.



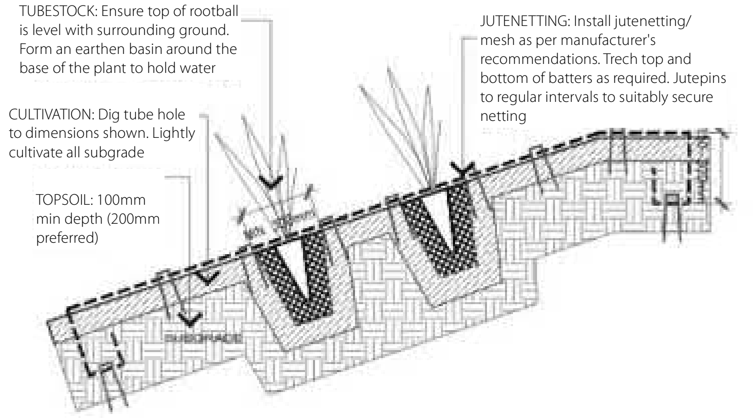
MULCH / JUTE MATTING

Areas to be blanket mulched to a minimum depth of 100mm leaving a 50mm gap surrounding the trunk of planted stock. Areas which are too steep or where overland flows may occur, a combination of mulch and Jute mat and or suitably anchored natural fibre weed mat installed to manufactures specifications have been specified.

Typical planting details as below for standard medium mulch installation and jute netting. Refer to manufacturer's recommendations for detailed jute netting installation including pinning, etc.



Where evidence of plant damage is occurring i.e. Kangaroo or wallaby grazing, tree guards grow tubes to be installed as required.



Jute netting mesh to be installed as per manufacturer's recommendations. Indicative detail shown only.

FAUNA CONSIDERATIONS

Consideration for fauna habitat and values should be given during rehabilitation site works and should seek to enhance and restore the existing native vegetation areas and promote safe fauna movement throughout the site and into the larger greenspace corridors where possible. It is assumed properties adjacent to the rehabilitation scope of works will undertake individual site analysis, fauna investigations, and implement future measures as required. As part of these rehabilitation works, basic fauna works will be undertaken. These treatments will primarily involve:

- Fauna Habitat Value and Protection
- Increased fauna habitat value within the rehabilitation areas.

Rehabilitation Areas to include reuse of site fallen hollow logs and site rock to create fauna safe havens and cover from predators for small fauna. This approach coupled with additional revegetation works allows greater fauna security and movement within the rehabilitation areas. Consideration for bushfire requirements should be reviewed to confirm no conflict in both the fauna and rehabilitation approaches. Refer indicative images below.

RESPONSIBILITIES

It is also critical for all parties to understand their responsibilities as part of the overall rehabilitation 'team'.

REHABILITATION TEAM RESPONSIBILITIES

PARTY	DESCRIPTION
Proponent	Ensure all consultants, contractors, sub-contractors or others utilizing the area are aware of the Rehabilitation Plan.
	Appoint appropriate consultants and contractors to undertake works as prescribed on the drawings and conditioned by the Assessment Manager.
	Provide security via an uncompleted works bond and maintenance bond for the cost of works if required.
	Cover the costs of all necessary resources to ensure works are completed as per the approved documents.
Consultants	Brief proponent on their requirements in implementing and maintaining works as per the Rehabilitation Plan.
	Attend pre-start and compliance (on and off maintenance) inspections.
	Undertake monitoring and reporting to the Assessment Manager as set up by this document.
	Be available to respond to technical queries to the approved documentation when on-site conditions require changes.
	Liaise with the Assessment Manager throughout all stages of approval, initial works and maintenance of works.
Assessment Manager	Provide technical expertise via commentary on the approval of documentation.
	Attend pre-start and compliance (on and off maintenance) inspections.
	Reduce and release securities held against works at the completion of successful milestone inspections.
	Be available to respond to technical queries to the approved documentation when on-site conditions require changes.
	Accept and review maintenance reports as dictated (if required) in this document.
Contractor	Complete works in strict accordance with the documentation.
	Attend pre-start and compliance (on and off maintenance) inspections.
	Hold relevant licenses in applicable weed management/ revegetation/ fauna management, any required insurances for scope of works and an understanding of required Laws, Act, Policies and Guidelines.
	Recommend changes to the documentation when specific experience or on-site conditions require so.

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CLIENT:
mirvac
Everleigh

REFERENCES:
South East Queensland Ecological Restoration Framework (2012)

AMENDMENTS:

Issue	Date	Description	Checked
A	15/04/2019	Client Draft	AD

PROJECT:
423 - 520 Greenbank Road, Greenbank (1/SP297192)

environmental management

PLAN OF:
Planting, fauna, responsibilites

DATE:	15/04/2019	CHECKED:	AD
CLIENT REF.:	7598	DRAWN:	MC
DRAWING No.:	7598 E 04 VDEC RMP A		

Everleigh, Greenbank

VOLUNTARY DECLARATION REHABILITATION PLAN

MAINTENANCE

The planting will be followed up by a two (2) year period of maintenance, monitoring and reporting to ensure benchmarks for plant survival and weed management are obtained. Further annual inspections and reporting will be undertaken by SHG until handover to Logan City Council.

Maintenance, as with all ecological restoration work, is fundamental in ensuring project success. Maintenance of the planting includes tasks such as:

- Herbicide spraying to control competing weeds.
- Watering while plants are establishing. This is often highly variable and depends on the suite of species planted, weather conditions and time of year when planted. A watering schedule may consist of watering every day for week 1, twice per week for weeks 2-6 and then weekly from weeks 6-12.
- Repair of tree guards if they become damaged.
- Replenishment of mulch.
- Maintaining exclusion fencing; and
- Additional planting may be required to replace plants that do not survive (e.g.to meet survival rate requirements, or to fill gaps).

Maintenance is required following installation of the plants, although if maintenance is regular and thorough during the first year, maintenance requirements are likely to taper off significantly in the following years. The utilisation of benchmark criteria helps to determine rehabilitation success during the maintenance period and assists in prompting when additional maintenance activities are required. Typically accepted benchmarks or performance indicators for dedicated or open space rehabilitation works include:

- Compliance 'On Maintenance' requirements:
  - All required planting completed.
  - 98% plant survival.
  - 98% kill rate of declared environmental weeds.
- Ongoing 'Off Maintenance' requirements:
  - 98% plant survival.
  - Tree guards, stakes and general rubbish removed.
  - No remaining eroded or degraded areas.
  - 98% kill rate of declared environmental weeds.

The desired end-product is a fully-functioning system that can support itself in perpetuity, with minimal maintenance and input required.

MONITORING

Informal monitoring will occur through ongoing site inspections, note taking and photo-monitoring for the duration of the maintenance / monitoring period (2 years) (Refer to tables below for frequency).

Informal monitoring notes and photos (to address accepted benchmarks above) are to be submitted to SHG and DNRME under the Voluntary Declaration. Notes should also be distributed to the rehabilitation team and rectification works completed against notes.

Monitoring of rehabilitation works is a method of determining ecological restoration success in conjunction with the adjacent benchmarks. Monitoring of the weed management and revegetation works allows for:

- Review of the pre-established performance indicators for measuring the success of the weed removal and control.
- Ensure level of protection for existing identified native vegetation inclusive of that which has naturally regenerated
- Review the rate of spread or contraction of weed infestation within the control program.
- Monitor the rate of assisted regeneration and revegetation of desirable native species promoted in areas where weeds have been removed.
- Identification of new weed threats or other factors that may be effecting areas designated for rehabilitation.

Monitoring timeframes may involve a series of key milestones:

- Prestart Inspection - On site meeting prior to the initial commencement of work. Typically involves Consultant, Contractor and Assessment Manager to work through rehabilitation areas and clarify any adjustments to scope against approved works.
- Compliance Inspections - At the completion of the Primary Site Works, a compliance inspection meeting will be held with the Consultant, Contractor and Assessment Manager to inspect the works on-site in relation to the approved plans and previously agreed benchmarks performance indicators. Should the rehabilitation be a dedicated asset (open space) to the assessment manager, this inspection is commonly referred to as 'on maintenance'. For dedicated assets, a secondary compliance inspection will be required (off maintenance).
- Ongoing Monitoring Inspections- Monitoring to occur on a regular basis as highlighted above. These inspections will generally occur throughout the process, specifically before, during and after relevant compliance inspections.

Photo-monitoring is required for submission over the duration of the monitoring period. Approximate photo-monitoring locations were determined by SHG during the preliminary approval process (refer *Sheet 6*) and are to be utilised for the remainder of the monitoring period.

A permanent photo point can be set up using a star picket marked with fluorescent yellow safety cap or painted timber stakes, so that a photograph may be taken of the site at regular intervals as it is being restored. A time series of photographs from a degraded state prior to the commencement of restoration, through the transition stages and into the maintenance stage will assist in assessing the success of the ecological restoration process. Collected site data and photos should be compiled in a 'master' monitoring report for proper record keeping.

INDICATIVE SCHEDULE OF WORK ITEMS AND MAINTENANCE SEQUENCING FOR THE TWO (2) YEAR MAINTENANCE PERIOD

TIMING	SPRING			MILESTONE: COMPLIANCE / "ON MAINTENANCE"	SUMMER			AUTUMN		
	PRIMARY WORKS				FOLLOW-UP WORKS			FOLLOW-UP / MAINTENANCE WORKS		
	Month 1	Month 2	Month 3		Month 1	Month 2	Month 3	Month 1	Month 2	Month 3
WEEK 1	Pre-start meeting Council, Contractor and Superintendent	Weed management - "knockdown spray"	Mulch spreading and Jute-mat installation		Watering and Monitoring and reporting (throughout establishment)	Watering and Monitoring and reporting (throughout establishment)	Watering and Monitoring and reporting (throughout establishment)	Monitoring and reporting (watering to replacement plants only)	Monitoring and reporting	Monitoring and reporting
WEEK 2	Initial weed management works - wood weed removal /"knockdown" spray	Soil Preparation and cultivation	Natural regeneration plants staking for identification		Weed management - "knockdown spray" in mulched areas	Weed management - "knockdown spray" re-apply woody weeds	Weed management - "knockdown spray" in mulched areas	Weed management - rotation "knockdown spray" in mulched areas	Weed management - rotation "knockdown spray" in mulched areas	Weed management - rotation "knockdown spray" in mulched areas
WEEK 3	Weed management works - removal by hand	Soil Preparation and modification	Planting and Watering		Natural regeneration plants - weed management	Replacement of Failed Plants	Replacement of Failed Plants	Natural regeneration plants - weed management	Natural regeneration plants - weed management	Replacement of Failed Plants
WEEK 4	Weed Management - slashing of maintenance access paths	Mulch - stockpiled on site	Planting and Watering		Weed Management - slashing of maintenance access paths	Weed Management - slashing of maintenance access paths	Weed Management - slashing of maintenance access paths	Weed Management - slashing of maintenance access paths	Weed Management - slashing of maintenance access paths	Weed Management - slashing of maintenance access paths

TIMING	WINTER			SPRING			SUMMER		
	MAINTENANCE WORKS			MAINTENANCE WORKS			MAINTENANCE WORKS		
	Month 1	Month 2	Month 3	Month 1	Month 2	Month 3	Month 1	Month 2	Month 3
WEEK 1	Monitoring (watering to replacement plants only). Photomonitoring as required		Informal monitoring and reporting	Informal monitoring and reporting. Photomonitoring as required.		Informal monitoring and reporting	Monitoring (watering to replacement plants only). Photomonitoring as required		Informal monitoring and reporting
WEEK 2	Weed management - rotation "knockdown spray" in mulched areas		Weed management - rotation "knockdown spray" in mulched areas	Weed management - rotation "knockdown spray" in mulched areas		Weed management - rotation "knockdown spray" in mulched areas	Weed management - rotation "knockdown spray" in mulched areas		Weed management - rotation "knockdown spray" in mulched areas
WEEK 3	Natural regeneration plants - weed management		Trees formative pruning			Replacement of Failed Plants			
WEEK 4	Weed Management - slashing of maintenance access paths		Weed Management - slashing of maintenance access paths	Weed Management - slashing of maintenance access paths		Weed Management - slashing of maintenance access paths	Weed Management - slashing of maintenance access paths		Weed Management - slashing of maintenance access paths

TIMING	AUTUMN			WINTER			SPRING			MILESTONE: COMPLIANCE / "OFF MAINTENANCE"
	MAINTENANCE WORKS			MAINTENANCE WORKS			MAINTENANCE WORKS			
	Month 1	Month 2	Month 3	Month 1	Month 2	Month 3	Month 1	Month 2	Month 3	
WEEK 1	Informal monitoring and reporting. Photomonitoring as required.		Monitoring and reporting	Informal monitoring and reporting. Photomonitoring as required.		Informal monitoring and reporting	Mulch - top up depths to 100mm and replace / repair Jutematting as required	Informal monitoring and reporting. Photomonitoring as required.	Monitoring (watering to replacement plants only)	
WEEK 2	Weed management - rotation "knockdown spray" in mulched areas		Weed management - rotation "knockdown spray" in mulched areas	Weed management - rotation "knockdown spray" in mulched areas		Weed management - rotation "knockdown spray" in mulched areas	Natural regeneration plants - weed management	Weed management - "knockdown spray" re-apply woody weeds	Weed management - "knockdown spray" in mulched areas	
WEEK 3	Natural regeneration plants - weed management		Trees formative pruning				Trees formative pruning	Replacement of Failed Plants	Natural regeneration plants - weed management	
WEEK 4	Weed Management - slashing of maintenance access paths		Weed Management - slashing of maintenance access paths	Weed Management - slashing of maintenance access paths		Weed Management - slashing of maintenance access paths	Replacement of Failed Plants	Weed Management - slashing of maintenance access paths	Weed Management - slashing of maintenance access paths	

INDICATIVE SCHEDULE OF MAINTENANCE AND MONITORING SEQUENCING UNTIL HANDOVER TO COUNCIL

ACTIVITY	INDICATIVE OCCURANCE - YEAR 0-2	INDICATIVE OCCURANCE - YEAR 2 UNTIL HANDOVER TO COUNCIL
Cleaning Operations		
Litter Collection (general landscape)	"As above"	Annually*
Horticultural Environment		
Planting of shrubs and trees (infill planting post initial works)	"As above"	Annually*
Care of existing trees and shrubs (inc. formative pruning)	"As above"	Annually*
Native bushland maintenance (inc. maintaining access paths, mulch, matting, etc.)	"As above"	Annually*
Pest control	"As above"	Annually*
Weed treatment	"As above"	Annually*
Watering	"As above"	Monitor*
Monitoring / Photo location	Quarterly	Annually
* Reactionary maintenance as required		

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CLIENT: mirvac Everleigh

REFERENCES:

South East Queensland Ecological Restoration Framework (2012)

AMENDMENTS:

Issue	Date	Description	Checked
A	15/04/2019	Client Draft	AD
B	24/05/2019	Client Amendments	AD

PROJECT:

423 - 520 Greenbank Road, Greenbank (1/SP297192)

environmental management

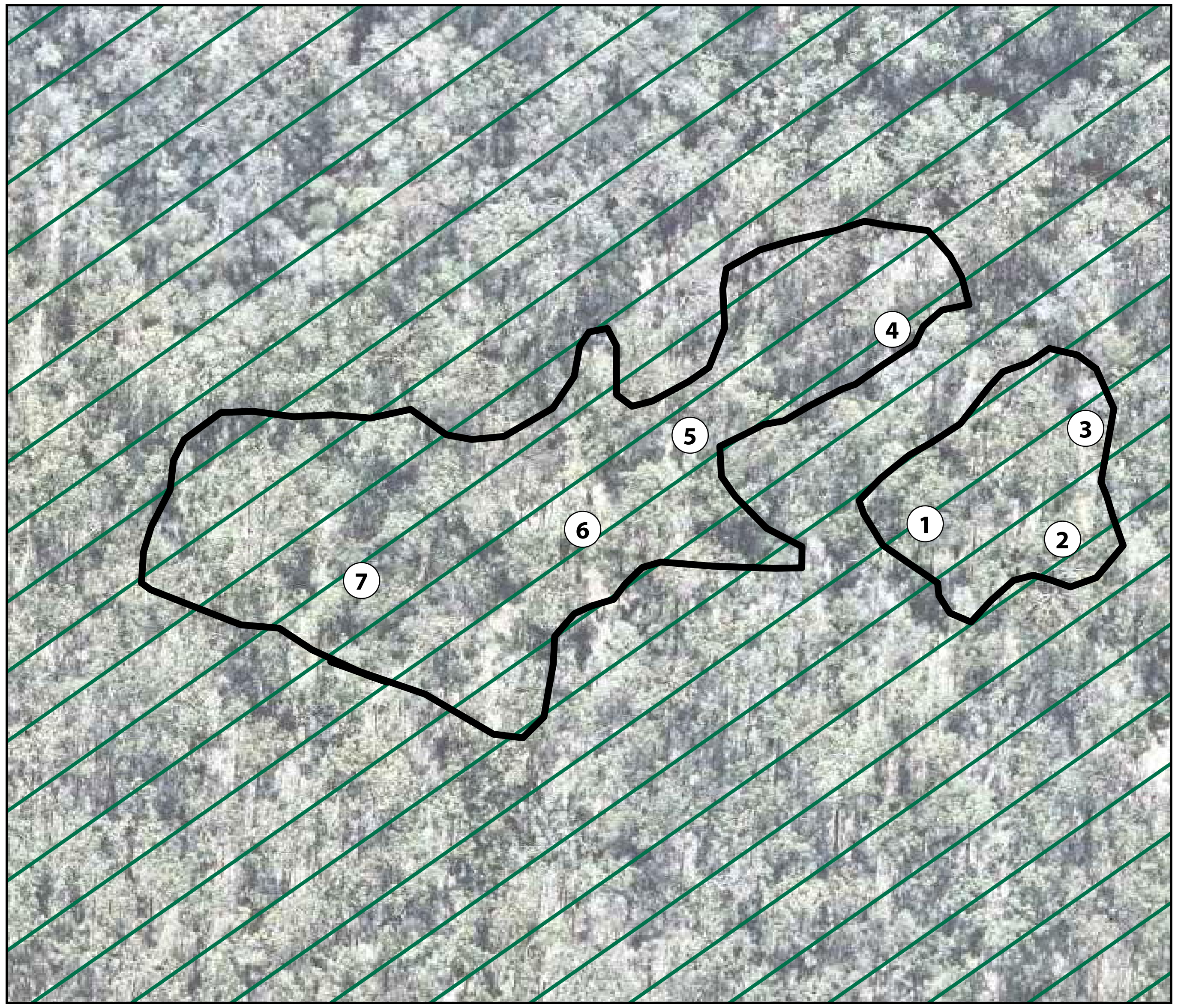
PLAN OF:	Maintenance & Monitoring		
DATE:	24/05/2019	CHECKED:	AD
CLIENT REF.:	7598	DRAWN:	MC
DRAWING No.:	7598 E 05 VDEC RMP B		

Everleigh, Greenbank

VOLUNTARY DECLARATION REHABILITATION PLAN - APPROXIMATE PHOTO MONITORING LOCATIONS

LEGEND

- Photo monitoring location (approximate)
- Conservation area
- Melaleuca Irbyana planting/rehab site (Approx. 5,000m²)



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CLIENT: mirvac Everleigh

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PRIOR TO ANY DEMOLITION, EXCAVATION OR CONSTRUCTION ON SITE, THE RELEVANT AUTHORITY SHOULD BE CONTACTED FOR FURTHER UNDER-GROUND SERVICES AND DETAILD LOCATIONS OF ALL SERVICES.

REFERENCES:

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AMENDMENTS:

Issue	Date	Description	Checked
A	15/04/2019	Client Draft	AD

PROJECT:

423 - 520 Greenbank Road, Greenbank (1/SP297192)

environmental management

PLAN OF:

Photo monitoring locations

DATE:	15/04/2019	CHECKED:	AD
CLIENT REF.:	7598	DRAWN:	MC
DRAWING No.:	7598 E 06 VDEC RMP A		

Everleigh, Greenbank

VOLUNTARY DECLARATION REHABILITATION PLAN - WEED TREATMENT & REMOVAL (1)

QUEENSLAND HERBARIUM INVASIVE NATURALISED PLANTS IN SOUTH EAST QUEENSLAND

Rk	Family	Scientific and common names	Sr	R	S	LFS	Non-Chemical Control	Chemical Control
1	Verbenaceae	Lantana camara var. camara (lantana)	10	455	5	S/O	Seedlings: Hand pull	Herbicides must be applied by appropriately qualified / supervised persons in accordance with the Agricultural Chemicals and Distribution Control Act 1966 at rates identified on registered product labels, or on an Australian Pesticides and Veterinary Medicines Authority (APVMA) issued off-label permit where applicable. Refer to South East Queensland Ecological Restoration Framework for additional guidance.
2	Asteraceae	Baccharis halimifolia (groundsel bush)	10	168	5	S/O	Seedlings: Hand pull	
3	Crassulaceae	Bryophyllum delagoense (mother of millions)	8	38	5	H/O	Hand pull and dispose	
4	Bignoniaceae	Macfadyena unguis-cati (cat's claw creeper)	5	36	5	V/O	Tubers: crown or dig up, bag and remove.	
	Basellaceae	Anredera cordifolia (madeira vine)	8	16	5	V/O	Small Vines & Tubers: Hand pull. Bag and dispose.	
6	Asparagaceae	Asparagus africanus (ornamental asparagus, asparagus fern)	7	26	5	V/O	dig out roots and dispose of at local council landfill site. remove entire crown and underground stem to prevent regrowth	
7	Ulmaceae	Celtis sinensis (Chinese celtis)	8	19	5	T/O	remove when small .hand pull or dig out small seedlings. combine dozing, burning and controlled grazing for large infestations	
8	Lauraceae	Cinnamomum camphora (camphor laurel)	7	25	5	T/O	Seedlings: Hand pull	
9	Anacardiaceae	Schinus terebinthifolius (broad-leaf pepper tree)	6	49	5	T/O	Seedlings: Hand pull	
	Salviniaceae	Salvinia molesta (salvinia)	8	57	5	Ha/F	Mechanical removal of small infestations; Salvinia weevil (Biological control)	
11	Cabombaceae	Cabomba caroliniana (cabomba, fanwort)	4	12	5	Ha/F	Mechanical removal of small infestations	
12	Asteraceae	Chrysanthemoides monilifera subsp. rotundata (bitou bush)	3	23	5	S/OA	N/A	
13	Pontederiaceae	Eichhornia crassipes (water hyacinth)	4	8	5	Ha/OF	Mechanical removal of small infestations	
14	Acanthaceae	Hygrophila costata (Glush weed)	3	7	5	Ha/F	Hand pull smal infestations. Can be controlled by planting competitive native species.	
	Oleaceae	Ligustrum lucidum (tree privet)	5	9	5	T/O	Seedlings: Hand pull	
16	Asteraceae	Sphagneticola trilobata (Singapore daisy)	6	34	5	H/O	Hand pull	
17	Asteraceae	Ageratina adenophora (crofton weed)	6	38	5	H/O	Hand pull and hang to dry.	
18	Verbenaceae	Lantana montevidensis (creeping lantana)	8	62	5	S/O	Fire and/or mechanical control	
19	Fabaceae	Neonotonia wightii (glycine)	5	16	5	H/A	N/A	
	Poaceae	Panicum maximum (green panic and guinea grass)	8	78	5	H/A	Hand or mechanical removal of small infestations	
21	Oleaceae	Ligustrum sinense (Chinese privet)	4	11	5	T/O	Seedlings: Hand pull	
22	Ochnaceae	Ochna serrulata (ochna)	7	33	5	S/O	N/A	
23	Asparagaceae	Asparagus aethiopicus cv. Sprengeri (asparagus ground fern)	5	35	5	H/O	dig out unwanted plants and dispose of at the appropriate council landfill. remove the entire crown of underground stem of plant to prevent regrowth	
24	Poaceae	Sporobolus pyramidalis and S. natalensis (giant rat's tail grasses)	8	72	5	H/U?	Hand or mechanical removal of small infestations	

Rk	Family	Scientific and common names	Sr	R	S	LFS	Non-Chemical Control	Chemical Control
25	Asteraceae	Ageratina riparia (mistflower)	5	38	5	H/O	Hand pull and hang to dry.	Herbicides must be applied by appropriately qualified / supervised persons in accordance with the Agricultural Chemicals and Distribution Control Act 1966 at rates identified on registered product labels, or on an Australian Pesticides and Veterinary Medicines Authority (APVMA) issued off-label permit where applicable. Refer to South East Queensland Ecological Restoration Framework for additional guidance.
26	Asclepiadaceae	Araujia sericifera (mothvine)	9	38	4	V/O	Seedlings & Vines: Hand pull. Bag and remove fruit.	
27	Crassulaceae	Bryophyllum daigremontianum x B. delagoense (hybrid mother-of millions)	6	15	5	H/O	Hand pull and dispose	
28	Convolvulaceae	Ipomoea cairica (mile-a-minute)	7	56	4	V/O	Vines & Runners: hand pull, roll up and hand up to dry.	
29	Sapindaceae	Cardiospermum grandiflorum (balloon vine)	7	31	4	V/O	Seedlings & Small Vines: Hand Pull	
30	Asclepiadaceae	Cryptostegia grandiflora (rubber vine)	6	19	4	V/O	Scatteredet or medium-density infestations: Where possible, repeated slashing close to ground level is recommended.	
31	Phytolaccaceae	Rivina humilis (baby pepper)	8	61	4	H/O	Hand pull and hang to dry.	
32	Poaceae	Sporobolus africanus (Parramatta grass)	8	48	5	H/U	Hand or mechanical removal of small infestations	
33	Poaceae	Sporobolus fertilis (giant Parramatta grass)	9	27	5	H/U	Hand or mechanical removal of small infestations	
34	Poaceae	Eragrostis curvula (African lovegrass)	7	29	4	H/U	Chipped out before they flower. When chipping out the plant ensure that the tussock crowns are removed, as this will prevent regrowth. If in seed, the stems must be cut and bagged first.	
35	Asteraceae	Gymnocoronis spilanthoides (Senegal tea)	3	4	5	Ha/F	place plant material in a sealed plastic bag, leave in sunlight to rot then burn or dispose of at a council-approved land fill tip	
36	Amaranthaceae	Alternanthera philoxeroides (alligator weed)	1?	3	5	Ha/U	physical removal of plant should not be attempted	
37	Passifloraceae	Passiflora suberosa (cork passionflower)	8	166	4	V/O	N/A	
38	Poaceae	Melinis minutiflora (molasses grass)	5	17	5	H/A	Grazing or mowing	
39	Aristolochiaceae	Aristolochia elegans (Dutchman's pipe)	8	30	4	V/O	Stems: Hand pull; Fruit: Bag and remove.	
40	Convolvulaceae	Ipomoea indica (blue morning glory)	5	24	4	V/O	Vines and Runners: hand pull, roll up and hang to dry.	
41	Mimosaceae	Leucaena leucocephala (leucaena)	6	14	4	ST/A	Small plants: Hand pull or mechanical removal	
42	Poaceae	Brachiaria mutica (para grass)	6	18	4	Ha/A	Grazing	
43	Hydrocharitacea e	Egeria densa (egeria waterweed)	2	7	4	Ha/F	hand pulling, cutting and digging with machines effective	
44	Pinaceae	Pinus elliottii (slash pine)	4	22	4	T/A	Seedlings: Hand pull; Saplings and Trees: cut close to ground or ring-bark	
41	Mimosaceae	Leucaena leucocephala (leucaena)	6	14	4	ST/A	Small plants: Hand pull or mechanical removal	
42	Poaceae	Brachiaria mutica (para grass)	6	18	4	Ha/A	Grazing	
43	Hydrocharitacea e	Egeria densa (egeria waterweed)	2	7	4	Ha/F	hand pulling, cutting and digging with machines effective	
44	Pinaceae	Pinus elliottii (slash pine)	4	22	4	T/A	Seedlings: Hand pull; Saplings and Trees: cut close to ground or ring-bark	
45	Caesalpiniaceae	Senna pendula var. glabrata (Easter cassia)	7	33	4	ST/O	Seedlings: Hand pull	

Rk	Family	Scientific and common names	Sr	R	S	LFS	Non-Chemical Control	Chemical Control
46	Poaceae	Chloris gayana (Rhodes grass)	9	55	4	H/A	Hand pulling and removal and digging of larger clumps	Herbicides must be applied by appropriately qualified / supervised persons in accordance with the Agricultural Chemicals and Distribution Control Act 1966 at rates identified on registered product labels, or on an Australian Pesticides and Veterinary Medicines Authority (APVMA) issued off-label permit where applicable. Refer to South East Queensland Ecological Restoration Framework for additional guidance.
47	Crassulaceae	Bryophyllum pinnatum (resurrection plant)	6	17	4	H/O	Hand pull and dispose	
48	Asteraceae	Parthenium hysterophorus (parthenium weed)	6	14	4	H/U	hand pulling of small areas is not recommended	
49	Caprifoliaceae	Lonicera japonica (Japanese honeysuckle)	3	6	4	V/O	Vines and Runners: hand pull, roll up and hang to dry.	
50	Acanthaceae	Thunbergia alata (black eyed susan)	5	22	4	H/O	N/A	
51	Fabaceae	Macroptilium atropurpureum (siratro)	8	39	4	V/A	N/A	
52	Rosaceae	Rubus ellipticus (yellowberry)	4	26	4	S/O	slashing hinders growth, giving some control if plants are slashed before they seed	
53	Colchicaceae	Gloriosa superba (glory lily)	3	26	4	V/O	N/A	
54	Verbenaceae	Phyla canescens (lippia, Condamine couch)	3	4	4	Ha/O	a combined approach of different control methods including chemical and mechanical with land management practices is most effective	
55	Solanaceae	Solanum seaforthianum (Brazilian nightshade)	8	78	4	V/O	Hand pull	
56	Araceae	Pistia stratiotes (water lettuce)	3	8	4	Ha/OF	Mechanical removal of small infestations	
57	Asparagaceae	Asparagus plumosus (asparagus fern)	4	8	4	V/O	Rhizomes: crown and hang to dry.	
58	Commelinaceae	Tradescantia fluminensis (Qld use T. albiflora) (wandering jew)	5	9	4	H/O	N/A	
59	Solanaceae	Cestrum parqui (green cestrum)	6	36	4	S/O	Seedlings: Hand pull	
60	Caesalpiniaceae	Senna septemtrionalis (arsenic bush, was S. floribunda)	6	25	4	S/O	Seedlings: Hand pull	
61	Solanaceae	Solanum mauritianum (wild tobacco tree)	8	30	4	S/O	Seedlings: Hand pull	
62	Apocynaceae	Catharanthus roseus (pink periwinkle)	5	22	4	S/O	Hand pull	
63	Passifloraceae	Passiflora subpeltata (white passion flower)	10	60	4	V/O	Stems: Hand pull	
64	Fabaceae	Desmodium uncinatum (silverleaf desmodium)	5	14	4	H/A	Hand pull or crown and dispose	
65	Poaceae	Melinis repens (red Natal grass)	10	134	4	H/A	Grazing or mowing	
66	Nymphaeaceae	Nymphaea caerulea subsp. zanzibarensis (blue lotus)	4	17	4	Ha/OF	Hand pull small infestations.	
67	Onagraceae	Oenothera drummondii subsp. drummondii (beach evening primrose)	3	17	4	H/O	Hand pull	
68	Tiliaceae	Triumfetta rhomboidea (Chinese burr)	7	44	4	H/U	Hand pull	
69	Haloragaceae	Myriophyllum aquaticum (parrot's feather)	3	15	4	Ha/F	N/A	
70	Passifloraceae	Passiflora foetida (stinking passion flower)	7	50	4	V/O	Hand Pull	
71	Asteraceae	Verbesina encelioides (crownbeard)	7	34	4	H/U	Vines: Hand pull and remove; Runners: Roll up and hang to dry.	
72	Poaceae	Paspalum mandiocanum (broad leaf paspalum)	3	6	4	H/A	N/A	
73	Poaceae	Paspalum dilatatum (paspalum grass)	10	30	4	H/A	Hand pull or dig up	

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CLIENT: mirvac Everleigh

REFERENCES:
Queensland Herbarium Invasive Naturalised Plants in South East Queensland

AMENDMENTS:

Issue	Date	Description	Checked
A	15/04/2019	Client Draft	AD

PROJECT: 423 - 520 Greenbank Road, Greenbank (1/SP297192)

environmental management

PLAN OF: Weed Treatment & Removal

DATE: 15/04/2019 CHECKED: AD
CLIENT REF.: 7598 DRAWN: MC
DRAWING No.: 7598 E A07 VDEC RMP A

Everleigh, Greenbank

VOLUNTARY DECLARATION REHABILITATION PLAN - WEED TREATMENT & REMOVAL (2)

QUEENSLAND HERBARIUM INVASIVE NATURALISED PLANTS IN SOUTH EAST QUEENSLAND

Rk	Family	Scientific and common names	Sr	R	S	LFS	Non-Chemical Control	Chemical Control
73	Poaceae	Paspalum dilatatum (paspalum grass)	10	30	4	H/A	Hand pull or dig up	Herbicides must be applied by appropriately qualified / supervised persons in accordance with the Agricultural Chemicals and Distribution Control Act 1966 at rates identified on registered product labels, or on an Australian Pesticides and Veterinary Medicines Authority (APVMA) issued off-label permit where applicable. Refer to South East Queensland Ecological Restoration Framework for additional guidance.
74	Ruppiaceae	Ruppia maritima (sea tassel)	2	8	4	Ha/F	Hand pull or dig up	
75	Arecaceae	Syagrus romanzoffiana (queen palm)	4?	10	4	T/O	Seedlings: Hand pull or crown; Trees: cut below growing point	
76	Poaceae	Hymenachne amplexicaulis cv. Olive (hymenachne)	1?	1	4	Ha/A	a combined approach of different control methods including mechanical, chemical and biological with land management practices is most effective	
77	Asteraceae	Senecio tamoides (Canary creeper)	3	8	4	V/O	Vines: Hand pull and remove; Runners: Roll up and hang to dry.	
78	Poaceae	Cenchrus ciliaris (buffel grass)	4	15	4	H/A	Hand or mechanical removal of young plants	
79	Acanthaceae	Thunbergia grandiflora (thunbergia, blue thunbergia)	2	3	5?	V/O	N/A	
80	Cactaceae	Opuntia tomentosa (velvet tree pear)	8	46	4	S/O	Biological controls available: cactoblastis cactorum successful. Mechanical control difficult. Fire can be used.	
81	Euphorbiaceae	Ricinus communis (castor oil plant)	7	20	4	S/O	Seedlings: Hand pull	
82	Asteraceae	Senecio madagascariensis (fire weed)	6	28	4	H/U	Vines: Hand pull and remove; Runners: Roll up and hang to dry.	
83	Cyperaceae	Cyperus involucratus (African sedge)	6	15	4	Ha/OF	Each has to be dug out with a spade and the entire plant turned over, exposing the root system while making sure all aerial parts of the plant are completely covered.	
84	Asteraceae	Tithonia diversifolia (Mexican sunflower)	5	11	4	H/O	N/A	
85	Poaceae	Setaria sphacelata (South African pigeon grass)	9	41	4	H/A	Hand pull or dig up	
86	Asclepiadaceae	Gomphocarpus physocarpus (balloon cotton bush)	10	132	4	S/OU	Slash in winter and burn cuttings. Wanderer Butterfly can also be used as biological control.	
87	Poaceae	Digitaria didactyla (Queensland blue couch)	9	70	4	H/A	Hand pull or cultivation	
88	Caesalpiniaceae	Gleditsia triacanthos (honey locust)	7	12	4	T/O	For the control of dense infestations on grazing land, burning followed by spot spraying is an economical control method.	
89	Poaceae	Paspalum notatum (bahia grass)	4	10	4	H/A	Hand pull or dig up	
90	Cactaceae	Opuntia monacantha (drooping tree pear, syn. O. vulgaris)	2	3	4	S/O	Biological controls available: cactoblastis cactorum successful. Mechanical control difficult. Fire can be used.	
91	Poaceae	Paspalum conjugatum (paspalum grass)	7	38	4	H/A	Cut below crown.	
92	Malpighiaceae	Hiptage benghalensis (hiptage)	3	5	4	S,V/O	Hand pull small infestations.	

Rk	Family	Scientific and common names	Sr	R	S	LFS	Non-Chemical Control	Chemical Control
93	Solanaceae	Solanum torvum (devil's fig)	6	39	4	S/O	Seedlings: Hand pull	Herbicides must be applied by appropriately qualified / supervised persons in accordance with the Agricultural Chemicals and Distribution Control Act 1966 at rates identified on registered product labels, or on an Australian Pesticides and Veterinary Medicines Authority (APVMA) issued off-label permit where applicable. Refer to South East Queensland Ecological Restoration Framework for additional guidance.
94	Caesalpiniaceae	Caesalpinia decapetala (thorny poinciana)	4	20	4	S,V/O	Seed-heads: Bag and remove.	
95	Poaceae	Pennisetum alopecuroides (swamp foxtail)	7	29	4	H/O	Hand Pull	
96	Verbenaceae	Duranta erecta (duranta)	6	14	4	ST/O	Shrubs: CS&P (1:1.5)	
97	Brassicaceae	Nasturtium officinale (Qld use Rorippa nasturtium-aquaticum) (watercress)	7	19	4	Ha/FU	Manually grub and destroy.	
98	Polygonaceae	Acetosa sagittata (rambling dock)	4	18	4	V/U	Tubers: Dig up, bag and remove.	
99	Poaceae	Cynodon dactylon (couch, Bahama grass introduced cultivars)	10	45	4	H/OA	Hand pull small infestations, removing all roots or smother with mulch.	
100	Bignoniaceae	Tecoma stans (yellow bells)	4	16	4	ST/O	N/A	
101	Rosaceae	Rhaphiolepis indica (Indian hawthorn)	3	10	4	ST/O	Seedlings: Hand pull	
102	Mimosaceae	Mimosa pudica (common sensitive plant)	4	12	4	S/A	N/A	
103	Commelinaceae	Callisia fragrans (purple succulent)	3	9	4	H/O	N/A	
104	Scrophulariaceae	Paulownia tomentosa (paulownia)	3	5	4	T/AO	Seedlings: Hand pull	
105	Commelinaceae	Tradescantia zebrina (zebrina)	3	12	4	H/O	N/A	
106	Acanthaceae	Ruellia malacosperma (ruellia)	5	16	4	H/O	N/A	
107	Poaceae	Pennisetum clandestinum (kikuyu grass)	4	12	4	H/A	Hand Pull	
108	Liliaceae	Lilium formosanum (Taiwan lily)	5	10	4	H/O	Hand pull or crown and dispose	
109	Asteraceae	Sigesbeckia orientalis (Indian weed)	10	148	4	H/U	Hand pull or cultivation.	
110	Asteraceae	Bidens pilosa (cobbler's pegs)	10	110	4	H/U	Hand pull or cultivation.	
111	Cactaceae	Opuntia stricta (common prickly pear)	7	67	4	S/O	Biological controls available: cactoblastis cactorum successful. Mechanical control difficult. Fire can be used.	
112	Poaceae	Eleusine indica (crowsfoot grass)	8	55	4	H/A	Pull and chip. Replant with native couch.	
113	Poaceae	Axonopus compressus (broad leaved carpet grass)	5	23	4	H/AO	Cut stems from roos.	
114	Lamiaceae	Salvia coccinea (red salvia)	9	46	4	H/O	remove small areas by hand or machine	
115	Asteraceae	Ageratum houstonianum (blue billygoat weed)	8	81	4	H/UO	N/A	
116	Myrtaceae	Psidium guajava and P. guineense (yellow guava and West Indes guava)	4	7	4	ST/AO	N/A	
117	Rosaceae	Rubus bellobatus (kittatinny blackberry)	5	22	4	S/O	slashing hinders growth, giving some control if plants are slashed before they seed	
118	Myrtaceae	Eugenia uniflora (Brazilian cherry)	4	19	4	ST/O	N/A	
119	Oleaceae	Olea europaea (olive)	2	6	4?	T/A	Seedlings: Hand pull	
120	Poaceae	Brachiaria decumbens (signal grass)	4	14	4	H/A	Grazing	
121	Fabaceae	Stylosanthes scabra (shrubby stylo)	4	4	4.3?	H/A	N/A	

Rk	Family	Scientific and common names	Sr	R	S	LFS	Non-Chemical Control	Chemical Control
122	Commelinaceae	Commelina benghalensis (hairy wandering jew)	4	7	4	H/O	Collect and Bag	Herbicides must be applied by appropriately qualified / supervised persons in accordance with the Agricultural Chemicals and Distribution Control Act 1966 at rates identified on registered product labels, or on an Australian Pesticides and Veterinary Medicines Authority (APVMA) issued off-label permit where applicable. Refer to South East Queensland Ecological Restoration Framework for additional guidance.
123	Poaceae	Pennisetum purpureum (elephant grass)	2	9	4	H/O	Grazing or mechanical removal	
124	Zingiberaceae	Hedychium coronarium (wild ginger)	2	2	4	H/O	Small Plants: Hand pull and dispose	
125	Phytolaccaceae	Phytolacca octandra (inkweed)	10	50	3	H/O	Hand pull or crown	
126	Asclepiadaceae	Asclepias curassavica (red cotton bush)	9	43	3	S/O	Hand pull; Slash	
127	Solanaceae	Lycium ferocissimum (African boxthorn)	1?	5	4.4?	S/O	N/A	
128	Mimosaceae	Prosopis pallida (algaroba)	2	2	4	ST/O	When using mechanical control methods, it is important to remove the bud zone of the root system (about 30 cm below the ground surface). If this is not removed, re-shooting can occur.	
129	Juncaceae	Juncus articulatus (jointed rush)	1	2	4	Ha/FO	Hand pull.	
130	Cactaceae	Opuntia aurantiaca (tiger pear)	1	2	4	S/O	Biological controls available: cactoblastis cactorum successful. Mechanical control difficult. Fire can be used.	
131	Poaceae	Arundo donax (giant reed)	1	4	4	H/O	Physical removal of small infestations.	
132	Cactaceae	Opuntia imbricata (rope pear)	1	1	4	H/O	Biological controls available: cactoblastis cactorum successful. Mechanical control difficult. Fire can be used.	
133	Bignoniaceae	Pyrostegia venusta (flame vine)	1	1	4	V/O	N/A	
134	Poaceae	Cortaderia selloana (pampas grass)	2	1	4	H/O	Small Plants: dig out by hand or machine	
135	Solanaceae	Solanum hispidum (giant devil's fig)	5	23	4	S/O	Hand pull	
136	Agavaceae	Furcraea foetida (Cuban hemp)	3	4	4.3?	S/OA	Dig out by hand or machine	
137	Agavaceae	Furcraea selloa (hemp)	1	2	4?	S/OA	Dig out by hand or machine	
138	Agavaceae	Agave americana (century plant)	4	9	4	S/OA	Dig out by hand or machine	
139	Rutaceae	Murraya paniculata cv. Exotica (murraya)	6	26	4	S/O	Seedlings: Hand pull	
140	Rosaceae	Rubus discolor (R. fruticosus complex, a blakberry)	4	10	4	S/OA	slashing hinders growth, giving some control if plants are slashed before they seed	
141	Brassicaceae	Cakile edentula (American sea rocket)	4	24	4	H/U	Manually grub and destroy.	
142	Balsaminaceae	Impatiens walleriana (balsam)	2	6	4	H/O	N/A	
143	Agavaceae	Agave sisalana (sisal)	2	4	4	S/OA	Dig out by hand or machine	
144	Agavaceae	Agave vivipara var. vivipara (sisal)	2	3	4	S/OA	Dig out by hand or machine	
145	Rosaceae	Prunus munsoniana (wild goose plum)	7	31	4	ST/A	Seedlings: Hand pull	
146	Poaceae	Echinochloa crus-galli (barnyard grass)	6	34	4	H/A	Hand pull or dig out small infestations.	

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CLIENT: mirvac Everleigh

REFERENCES:
Queensland Herbarium Invasive Naturalised Plants in South East Queensland

AMENDMENTS:

Issue	Date	Description	Checked
A	15/04/2019	Client Draft	AD

PROJECT:
423 - 520 Greenbank Road, Greenbank (1/SP297192)

environmental management

PLAN OF:
Weed Treatment & Removal

DATE: 15/04/2019 CHECKED: AD
CLIENT REF.: 7598 DRAWN: MC
DRAWING No.: 7598 E A08 VDEC RMP A

VOLUNTARY DECLARATION REHABILITATION PLAN - WEED TREATMENT & REMOVAL (3)

QUEENSLAND HERBARIUM INVASIVE NATURALISED PLANTS IN SOUTH EAST QUEENSLAND

Rk	Family	Scientific and common names	Sr	R	S	LFS	Non-Chemical Control	Chemical Control
147	Asteraceae	Solidago canadensis var. scabra (Canadian goldenrod)	7	15	4?	H/O	Hand pull and hang to dry.	Herbicides must be applied by appropriately qualified / supervised persons in accordance with the Agricultural Chemicals and Distribution Control Act 1966 at rates identified on registered product labels, or on an Australian Pesticides and Veterinary Medicines Authority (APVMA) issued off-label permit where applicable. Refer to South East Queensland Ecological Restoration Framework for additional guidance
148	Fabaceae	Pueraria lobata (kudzu)	3	4	4	V,S/O	Slash; Diminish by shading site	
149	Alismataceae	Sagittaria graminea var. platyphylla (sagittaria arrowhead)	3	7	4	Ha/FO	Physical removal of small infestations.	
150	Nymphaeaceae	Nymphaea mexicana (yellow waterlily)	2	4	4	Ha/OF	Hand pull small infestations.	
151	Poaceae	Phyllostachys aurea (fishpole bamboo)	1	2	4	S/O	N/A	
152	Euphorbiaceae	Jatropha gossypiifolia (cotton-leaf physic nut, bellyache bush)	1	1	4	S/O	Hand pull	
153	Malvaceae	Sida rhombifolia (Paddy`s lucerne)	9	69	4	S/U	Hand pull or dig out.	
154	Poaceae	Themeda quadrivalvis (grader grass)	8	25	4	H/A	Hand pull or dig out small infestations.	
155	Poaceae	Andropogon virginicus (whisky grass)	6	14	4	H/A	Hand pull or dig out small infestations.	
156	Bignoniaceae	Jacaranda mimosifolia (jacaranda)	4	12	3	T/O	Seedlings: Hand pull	
157	Acanthaceae	Justicia betonica (squirreltail)	2	4	4	S/O	Hand pull smal infestations. Can be controlled by planting competitive native species.	
158	Mimosaceae	Acacia boliviana (Bolivian wattle)	1	1	4	T/O	Mechanical or chain removal.	
159	Simaroubaceae	Ailanthus altissima (tree of heaven)	1?	3	4	T/O	Seedlings: Hand pull	
160	Poaceae	Echinochloa colona (awnless barnyard grass)	9	44	3	H/A	Hand or mechanical removal of small infestations	
161	Cyperaceae	Cyperus brevifolius (Mullumbimby couch)	8	53	3	H/O	Each has to be dug out with a spade and the entire plant turned over, exposing the root system while making sure all aerial parts of the plant are completely covered.	

Rk	Family	Scientific and common names	Sr	R	S	LFS	Non-Chemical Control	Chemical Control
162	Moraceae	Morus alba (white mulberry)	3	10	3	T/O	N/A	Herbicides must be applied by appropriately qualified / supervised persons in accordance with the Agricultural Chemicals and Distribution Control Act 1966 at rates identified on registered product labels, or on an Australian Pesticides and Veterinary Medicines Authority (APVMA) issued off-label permit where applicable. Refer to South East Queensland Ecological Restoration Framework for additional guidance
163	Arecaceae	Colocasia esculenta (taro)	3	4	3	H/AO	Hand pull.	
164	Cannaceae	Canna indica (canna lily)	3	9	3	H/O	Dig out entire plant	
165	Buddlejaceae	Buddleja madagascariensis (buddleja)	5	6	3	S,V/O	N/A	
166	Bignoniaceae	Tecoma capensis (Cape honeysuckle)	3	8	4	ST/O	N/A	
167	Cactaceae	Harrisia martinii (harrisia cactus)	2?	4	4	S/O	The use of the biological mealy-bug agent is recommended	
168	Acanthaceae	Thunbergia laurifolia (laurel clock vine)	1	1	4	V/O	N/A	
169	Fabaceae	Erythrina crista-galli (cockspur coral tree)	2?	4	4	T/O	N/A	
170	Sapindaceae	Koelreuteria elegans (Chinese rain tree)	1?	1	3.6?	T/O	Seedlings: Hand pull	
171	Zingiberaceae	Hedychium gardnerianum (ginger lily)	1?	3	4	H/O	Small Plants: Hand pull and dispose	
172	Acanthaceae	Hypoestes phyllostachya (polka-dot plant	3	5	4	H/O	Hand pull or crown and dispose	
173	Caprifoliaceae	Sambucus canadensis (American elder)	3	7	3	ST/O	Vines and Runners: hand pull, roll up and hang to dry.	
174	Asteraceae	Conyza sumatrensis (tall fleabane)	9	45	3	H/U	Hand or mechanical removal of small infestations	
175	Fabaceae	Tipuana tipu (tipuana)	2	5	3	T/O	Seedlings: Hand pull	
176	Asteraceae	Tagetes minuta (stinking roger)	8	32	3	H/U	Hand pull and hang to dry.	
177	Caesalpiniaceae	Chamaecrista rotundifolia (round-leaf cassia)	6	14	3	ST/A	Seedlings: Hand pull	
178	Poaceae	Cenchrus echinatus (Mossman river grass)	8	43	3	H/A	Hand or mechanical removal of young plants	
179	Asteraceae	Conyza canadensis (Canadian fleabane)	10	55	3	H/U	Hand or mechanical removal of small infestations	
180	Euphorbiaceae	Euphorbia cyathophora (painted spuge)	8	20	3	H/O	Hand pull	
181	Poaceae	Setaria palmifolia (palm leaf setaria)	5	13	3	H/O	Hand pull or dig up	

Rk	Family	Scientific and common names	Sr	R	S	LFS	Non-Chemical Control	Chemical Control
182	Euphorbiaceae	Euphorbia heterophylla (milk weed)	5	12	3	H/O?	Hand pull	Herbicides must be applied by appropriately qualified / supervised persons in accordance with the Agricultural Chemicals and Distribution Control Act 1966 at rates identified on registered product labels, or on an Australian Pesticides and Veterinary Medicines Authority (APVMA) issued off-label permit where applicable. Refer to South East Queensland Ecological Restoration Framework for additional guidance
183	Fabaceae	Desmodium intortum (greenleaf desmodium)	4	11	3	H/A	Hand pull or crown and dispose	
184	Poaceae	Pennisetum setaceum (fountain grass)	3	11	3	H/O	Hand Pull	
185	Asteraceae	Conyza bonariensis (flax-leaf fleabane)	7	38	3	H/U	Hand or mechanical removal of small infestations	
186	Solanaceae	Solanum erianthum (a tobacco bush)	7	19	3	S/O	Hand pull	
187	Poaceae	Stenotaphrum secundatum (buffalo grass)	3	23	3	H/AO	Hand or mechanical removal of small infestations	
188	Apocynaceae	Cascabela thevetia (syn. Thevetia peruviana) (yellow oleander)	5	9	3	ST/O	Hand pull small infesttions. Slashing can be used but should be followed up by herbicide application.	
189	Rubiaceae	Coffea arabica (coffee)	3	7	3	ST/A	Saplings: Hand pull	
190	Bignoniaceae	Spathodea campanulata (African tulip tree)	1?	1	3	T/O	N/A	
191	Fabaceae	Macrotyloma axillare (perennial horse gram)	4	12	3	V,H/A	N/A	
192	Iridaceae	Watsonia meriana var. bulbillifera (bulbil watsonia)	2	3	3	H/O	Dig up, bag and remove	
193	Passifloraceae	Passiflora edulis (passion fruit)	6	12	3	V/AO	Hand Pull	
194	Asteraceae	Zinnia peruviana (wild zinnia)	6	33	3	H/O	Seedlings: Hand pull	
195	Dracaenaceae	Sansevieria trifasciata (sanseviera)	2?	7	3	H/O	Hand pull or dig up	
196	Poaceae	Digitaria eriantha (pangola grass)	5	20	3	H/A	Hand pull or cultivation	
197	Rosaceae	Eriobotrya japonica (loquat)	3	5	3	T/O	Seedlings: Hand pull	
198	Cactaceae	Acanthocereus tetragonus (sword pear)	1	1	3	S/O	Biological controls available: cactoblastis cactorum successful. Mechanical control difficult. Fire can be used.	
199	Mimosaceae	Acacia nilotica subsp. indica (prickly acacia)	3	3	4.4?	T/A	Mechanical or chain removal.	
200	Mimosaceae	Acacia farnesiana (mimosa bush)	6	15	3	T/A	Mechanical removal of small plants.	

Explanatory notes.

Sub-region (Sr): Number of the ten sub-regions of the Southeast Queensland bioregion (Young and Dillewaard 1999) within which species recorded (Queensland Herbarium data).
Rec no. (R): Total number of records for species within study area, Queensland Herbarium CORVEG and HERBRECS data.
Scores (S): Based on panel data of invasiveness, 5 (highest) to 3 (moderate). ? indicate doubtful scores.

Life forms (LFS): T-tree (woody plant >5m), ST-small tree (2-5m), S-shrub (woody <2m), H-herb (grasses & forbes), Ha-aquatic herbs.
Source: A-agriculture, O-ornamental and landscaping, F-fish aquarium, U-unintentional introduction and/or contaminant.

Abbreviations: Control Methods

CS&P = cut scrape and paint

S&P = scrape and paint

C&P = cut and paint

F/I = frill or inject stem

Abbreviations: Herbicides

G = Glyphosate, eg. Roundup Biactive, Weedmaster Duo

MM = Metsulfuron methyl, eg, Brushoff

F = Fluroxypyr, eg. Starane

Abbreviations: Herbicide Dilution Rates for High Concentration Applications

GU = Glyphosate undiluted

G1 = 1 part water to 1 part glyhphosate

G1.5 = 1.5 parts water to 1 part glyphosate

G4 = 4 parts water to 1 part glyphosate

Abbreviations: Herbicide Spray Concentrations

G100 = 100mL glyphosate per 10L of water + surfactant, eg 20mL LI 700 per 10L
G200 = 200mL glyphosate per 10L of water + surfactant, eg 50mL LI 700 per 10L

G100 + MM = 100mL glyphosate + 1.5g metsulfuron methyl per 10L of water + wetting agent, eg. 2mL Agral per 10L water
G200 + MM = 200mL glyphosate + 1.5g metsulfuron methyl per 10L of water + wetting agent, eg. 2mL Agral per 10L water

MM = 1.5g metsulfuron methyl per 10L water + wetting agent, eg. 2mL Agral per 10L water

F100 = 100mL fluroxypyr per 10L water

F150 = 150mL fluroxypyr per 10L water

Other Abbreviations

= Locally non-indigenous native species

Ref. 1. Big Scrub Rainforest Landcare Group (2008), 'Common Weeds of Subtropical Rainforests of Eastern Australia: A practical manual on their identification and control'

Ref. 2. Department of Primary Industries and Fisheries (QLD), 'Weeds and pest animals and ants'.

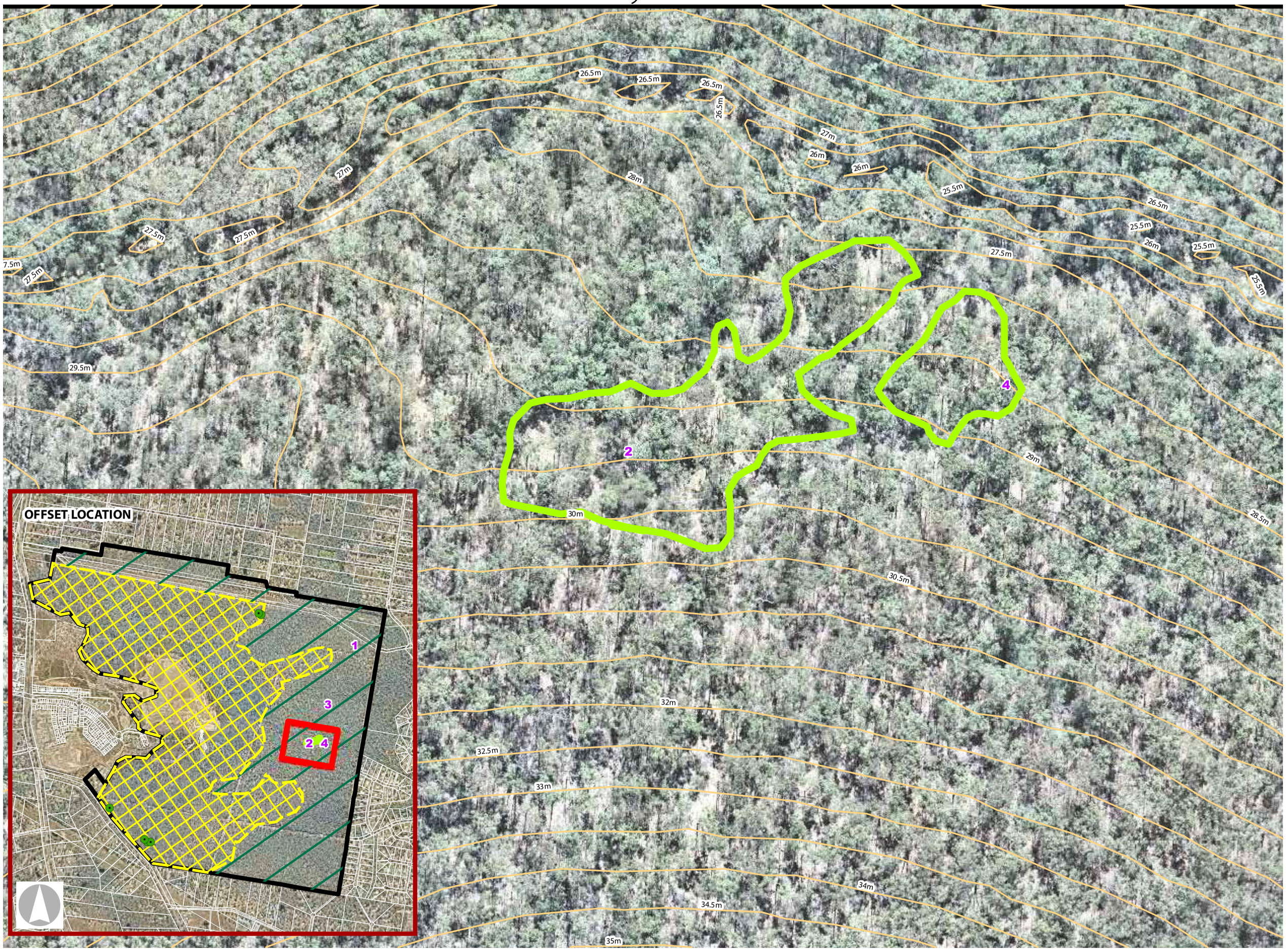
Ref. 3. Holland et al. (1996), 'Suburban Weeds', DPI QLD.

Ref 4. Port Stephens Council (NSW), 'Weed Busters'.
Ref 5. Depertment of Primary Industries (NSW), 'Noxious and Environmental Weed Handbook, 3rd Edition'.

Ref 6. Department of Environment and Conservation, 'Florabase', (DEC- WA)

Ref 7. Vitelli, J.S. and Madigan, B.A. and Van Haaren, P.E. and Setter, S. and Logan, P. (2009) Control of the invasive liana, Hiptage benghalensis. Weed Biology and Management, 9 (1). pp. 54-62.

3. Rehabilitation Area - *Melaleuca irbyana*



NOTES
This plan was prepared as a desktop assessment tool.
The information on this plan is not suitable for any other purpose.
Property dimensions, areas, numbers of lots and contours and other physical features shown have been compiled from existing information and may not have been verified by field survey. These may need verification if the development application is approved and development proceeds, and may change when a full survey is undertaken or in order to comply with development approval conditions. No reliance should be placed on the information on this plan for detailed design or for any financial dealings involving the land. Saunders Havill Group therefore disclaims any liability for any loss or damage whatsoever or howsoever incurred, arising from any party using or relying upon this plan for any purpose other than as a document prepared for the sole purpose of accompanying a development application and which may be subject to alteration beyond the control of the Saunders Havill Group. Unless a development approval states otherwise, this is not an approved plan.

Layer Sources: QLD GIS Layers (QLD Gov. Information Service 2020), Aerial (Nearmap 2020)

* This note is an integral part of this plan/data. Reproduction of this plan or any part of it without this note being included in full will render the information shown on such reproduction invalid and not suitable for use.

LEGEND

- Project DCDB
- Development footprint
- Conservation area
- Mature *Melaleuca irbyana* specimen to be impacted by clearing works
- Melaleuca Irbyana planting/rehab site (Approx. 5,000m²)
- Contours (0.5m)
- 1 Evolve Environmental Solutions photo monitoring points

Note: Juvenile *Melaleuca irbyana* are specimens less than 2 metres tall

Issue	Date	Description	Drawn	Checked
A	13/07/2020	Preliminary	MP	KG

Transverse Mercator | GDA 1994 | Zone 56 | 1:1,095 @A3

0 5 10 20 30 40 m

saunders havill group

mirvac

Everleigh

ADDRESS/RPD: Teviot Road, Greenbank (1/SP297192) 13/07/2020 7598 E 03 Rehabilitation Area A

4. Summary and Conclusion

Saunders Havill Group has been engaged by Mirvac Queensland Pty Ltd to prepare an Impact Management Plan (IMP) for *Melaleuca irbyana* located within the extent of works for the Everleigh Greenbank project. This IMP is intended to support the renewal of the Protected Plants Clearing Permit (Permit No. WA0009354) from Department of Environment and Science (DES). The IMP has been prepared in accordance with the *Nature Conservation (Wildlife Management) Regulation 2006 - Protected Plants Assessment Guidelines*.

A Protected Plants Clearing Permit (Permit No. WA0009354) was issued by the DES on 24 August 2018 which allows for clearing of M. irbyana over the entire Clearing Impact Area (i.e. 277 ha site). Conditions of the Permit (PPCM01) require all activities relating to the impact of EVNT plant species under the permit to be carried out in accordance with the procedures and actions in the IMP. This included rehabilitation planting of M. irbyana within future Conservation land in the eastern portion of the site to ensure no significant residual impact on the species occurs as a result of the development. Rehabilitation works in accordance with the IMP, including weed removal and advanced tubestock planting commenced in March 2019. Further, a 5,000m^2 *M. irbyana* rehabilitation area was made a declared area (Category A) under the *Vegetation Management Act* 1999 and is subject to legal monitoring and reporting benchmarks set by DNRME.

While clearing within the Permit area has been undertaken, clearing at the locations of the *M. irbyana* patches has not yet occurred. Therefore, this IMP seeks to support renewal of the Protected Plants Clearing Permit (Permit No. WA0009354) which expires on 23 August 2020 for the clearing of protected plants within the 277 ha impact area at the project site.

5. Appendices

Appendix A

Protected Plants Clearing Permit (WA0009354)

Appendix B

Impact Management Plan Melaleuca irbyana 43-520 Greenbank Road, Greenbank prepared for Mirvac QLD Pty Ltd, dated 3 July 2018

Appendix C

Declared Area Map

Appendix D

Wildlife Online Search

Nature Conservation Act 1992

Appendix A

Protected Plants Clearing Permit (WA0009354)

Permit

Protected Plant Clearing Permit

This wildlife authority is issued under the following legislation: Nature Conservation (Administration) Regulation 2017 Part 2 Division 1.

Permit number: WA0009354 **Valid from:** 24 August 2018 to 23 August 2020

Activity: Clearing endangered, vulnerable or near threatened plants

Role	Name	Registered address	
Principal Holder:	Saunders Havill Group Pty Ltd	9 Thompson St BOWEN HILLS QLD 4006 Australia	
Person In Charge:	Mark Clancy	Mark Clancy	
Business name:	144972949	**ABN/ACN**	Nature Conservation (Wildlife) Regulation 2006 /
Activity location/licensed premises	LOT 1/sp297192		

Schedule

Family or Species or Schedule	Details	Category	Quantity	Unit
Species	bush house or weeping paperbark or swamp teatree, Melaleuca irbyana	Live	277	Hectares

Jenny Keys
Department of Environment and Science
Delegate of the administering authority
Nature Conservation Act 1992

Date issued: 24 August 2018

Enquiries:
Wildlife Assessment Team
Email: wildlife@des.qld.gov.au
WA0009354
Postal Address: PO Box 102, Toowoomba, QLD, 4350

ABN 46 640 294 485

Queensland Government

Legislative Requirements and Conditions of Wildlife Authority

Legislative Requirements

PPCLR06 Where monitoring by the permit holder of impact management actions with respect to endangered, vulnerable or near threatened species in the clearing area identifies that those actions appear to be unsuccessful or failing, the permittee must notify DES immediately in order to discuss the significant residual impact of the clearing and furthermore discuss any potential implementation of an offset action in accordance with the Queensland Environmental Offset Policy.
This requirement may be found in Section 284(1) 0f the Nature Conservation (Wildlife Management) Regulation 2006

Nature Conservation

PPCLR01 This permit does not exempt the permit holder from obtaining other approvals relevant to the harvest of whole protected plants at the site.

PPCLR02 Activities carried out under this authority, unless otherwise authorised, apply to non-protected areas only.
This requirement may be found in section 15 of the Nature Conservation (Administration) Regulation 2017

PPCLR03 This permit includes the clearing of least concern protected plants within the clearing area.

Conditions

PPCM01 Activities relating to the impact of EVNT plant species under this permit must be in accordance with the procedures and actions outlined in the following documents, except where conditions below indicate otherwise:

'Impact Management Plan Melaleuca irbyana 432-520 Greenbank Road, Greenbank prepared for Mirvac QLD Pty Ltd 3 July 2018', and associated appendices and supporting documentation.

PPCM02 The permit holder is to notify DES in writing at least 48 hours in advance of clearing commencing, for example, via an email to wildlife.management@ehp.qld.gov.au

PPCM04 Should the project not proceed, in addition to the requirement to rehabilitate the area/s once cleared, the site/s must not be further disturbed and must be maintained to ensure erosion and weed control.

PPCM08 It is the permit holder's responsibility to ensure that the proposed rehabilitation area with EVNT species *Melaleuca irbyana* is legally secured.

Department of Environment and Science
www.des.qld.gov.au ABN 46 640 294 485

Queensland Government

PPCM09 Rehabilitation and/or translocation reporting must be maintained from the commencement date of clearing and continue for a minimum period of 24 months.
The written report (including advice on each monitoring period) must be lodged with the Wildlife Assessment Team, Department of Environment and Heritage Protection, via an email to wildlife@des.qld.gov.au within 10 business days after each annual period.

Department of Environment and Science
www.des.qld.gov.au ABN 46 640 294 485

Appendix B

Impact Management Plan Melaleuca irbyana 43-520 Greenbank Road, Greenbank prepared for Mirvac QLD Pty Ltd, dated 3 July 2018

Impact Management Plan
Melaleuca irbyana

432-520 Greenbank Road, Greenbank
Prepared for Mirvac Queensland Pty Ltd
3 July 2018

Job No. 7598

Document Control

Document: Impact Management Plan for 432-520 Greenbank Road, prepared by Saunders Havill Group for Mirvac Queensland Pty Ltd.

Document Issue

Issue	Date	Prepared By	Checked By
A	14.02.2018	KG / JG	AD
B	03.07.2018	JG	AD

Prepared by

ABN 24 144 972 949
www.saundershavill.com

Reports and plans by others may be included in this document.

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Plans

Plan 1: Impact Assessment
Plan 2: Rehabilitation Area
Plan 3: Rehabilitation Plan
Plan 4: Rehabilitation Area Assessment

Abbreviations and Acronyms

DES Department of Environment and Science (Qld) (formally EHP)
EDQ Economic Development Queensland (Qld)
EHP Former Department of Environment and Heritage Protection (Qld) (now DES)
EVNT Endangered, Vulnerable or Near Threatened (as defined by the NCA)
NCA *Nature Conservation Act 1992* (Qld)
NCWR Nature Conservation (Wildlife) Regulation 2006
PDA Priority Development Area (herein referencing the Greater Flagstone Priority Development Area)
SHG Sunders Havill Group

1. Introduction

Saunders Havill Group (SHG) was engaged by Mirvac Queensland Pty Ltd (Mirvac) to prepare an Impact Management Plan (IMP) for *Melaleuca irbyana* (Swamp Tee Tree) specimens located within the Greenbank project area located at 432-520 Greenbank Road, Greenbank.

The Greenbank project was referred to the Commonwealth Department of the Environment and Energy (DEE) on behalf of Mirvac by SHG and deemed a Controlled Action for potential impacts on the Koala and Grey-headed Flying-fox under the *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act) to be assessed on Preliminary Documentation. Of note, Area 1 was approved by the DEE to be excised from the referral area. The Preliminary Documentation for the assessment of the project is nearing completion.

The Greenbank project has received preliminary approval under the Greater Flagstone Urban Development Area Development Scheme 2011 (PDA Development Scheme) by Economic Development Queensland (EDQ) who are the administering authority for development in the Greater Flagstone Priority Development Area (PDA).

As part of a protected plants flora trigger survey in accordance with the Protected Plants Guidelines, specimens of *M. irbyana*, listed as Endangered under the *Nature Conservation Act 1992* (NCA), were recorded within the Greenbank project area. This IMP has been prepared to support a clearing permit (protected plants) application to the Department of Environment and Science (DES) in accordance with Section 3.2 of the *Nature Conservation (Wildlife Management) Regulation 2006 – Protected Plants Assessment Guidelines*.

The IMP has been prepared in accordance with Section 3.2.1 of the *Protected Plants Assessment Guidelines,* as follows:

> **3.2.1 Impact management plan**
>
> An impact management plan must include the following sections:
>
> - attempts to avoid and minimise impact
> - nature of impact
> - management of impact
> - justification of impact management
> - survival of plant in the wild

Contextually, the site is located 30 kilometres (km) south of Brisbane and 10 km west of Logan Village, within the western suburb of Greenbank. The site is bound by Greenbank and Teviot Roads to the west and is predominately surrounded by rural residential development. Wearing Park immediately adjoins the site to the east and Greenbank Shopping Centre and Community Centre are located opposite the site, on the western side of Teviot Road. The site is located approximately 1.5 km southeast of Greenbank Military Training Camp and 500 metres east of the Brisbane – Sydney Railway Line. An infrastructure easement traverses the site parallel to the northern boundary. The site remains one of the last large rural properties in the immediate landscape predominately comprised of rural residential development. Refer to Figure 1 for the site context and Figure 2 for the site aerial.

The proposed clearing works will be undertaken over parts of the 412 hectare (ha) site to facilitate a master planned development and will be subject to future operational works approvals from EDQ. It is noted that a NCA Protected Plants Flora Survey has been undertaken and exemption obtained from the DES, formally the Department of Environment and Heritage Protection (EHP), for clearing over Area 1 to the west (Lot 2 & Lot 3 on SP297192 and along the boundary fence

line to support existing operational works approvals (Ref: APP0007102, APP0007278, respectively). No EVNT species were recorded within these clearing areas.

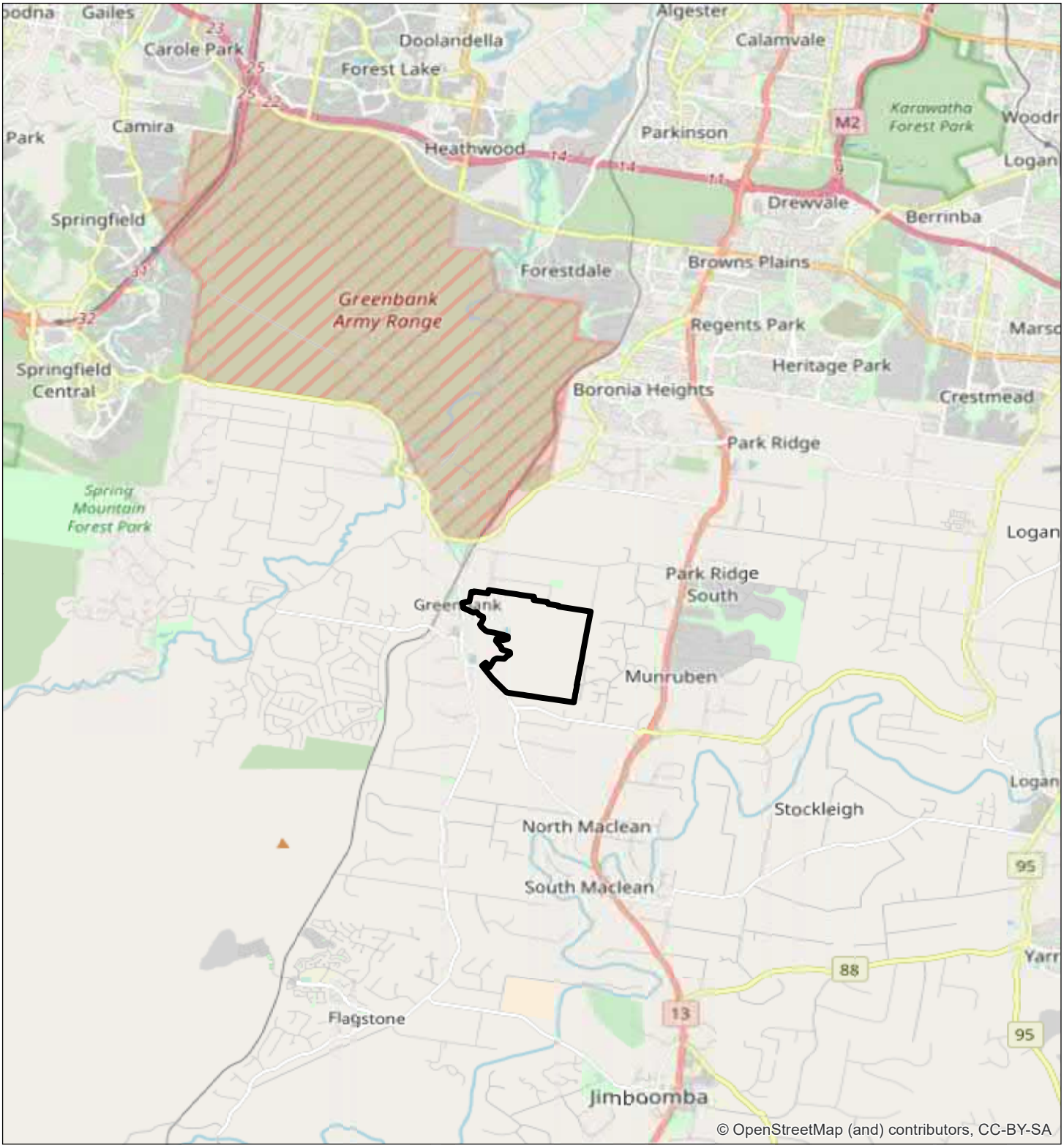
Flora surveys were conducted where clearing is proposed, including within areas mapped as 'High risk' under the Protect Plants Flora Survey Trigger Map High Risk (refer Figure 3) and as per the Flora Survey Guidelines – Protected Plants.

1.1. Property Summary

Key site details are provided in Table 1 below.

Table 1: Property Summary

Address	423-520 Greenbank Road, Greenbank
RPD	Lot 1 on SP297192
Local Government Area	Logan City
Administering Authority	Economic Development Queensland
Priority Development Area	Greater Flagstone PDA
Planning Scheme	Greater Flagstone PDA Development Scheme
Area Classification / Zone	Urban Living
Existing Land Use	Rural



Legend

Site DCDB

Figure 1

Site Context

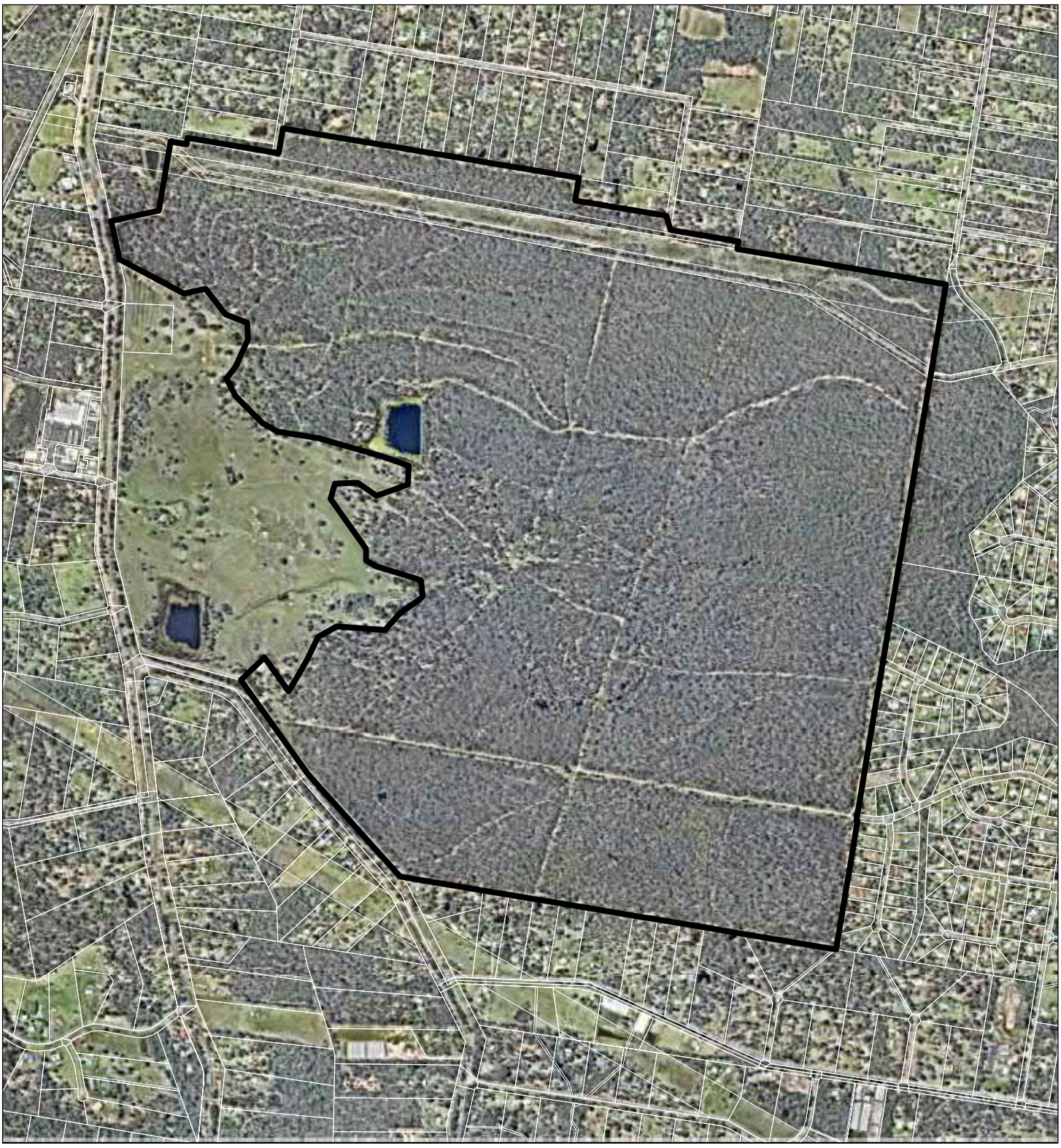
File ref. 7598 E Figure 1 NCA 2 Site Context B
Date *19/02/2018*
Project *Greater Flagstone Project, Greenbank (1/SP297192)*

0 1,000 2,000 3,000 4,000 *m*

N

Scale (A4): 1:125,000 [GDA 1994 MGA Z56]

Layer Sources QLD GIS Layers (QLD Gov. Information Service 2017)



Legend

Project Site DCDB

Qld DCDB

Figure 2

Site Aerial

mirvac

saunders havill group

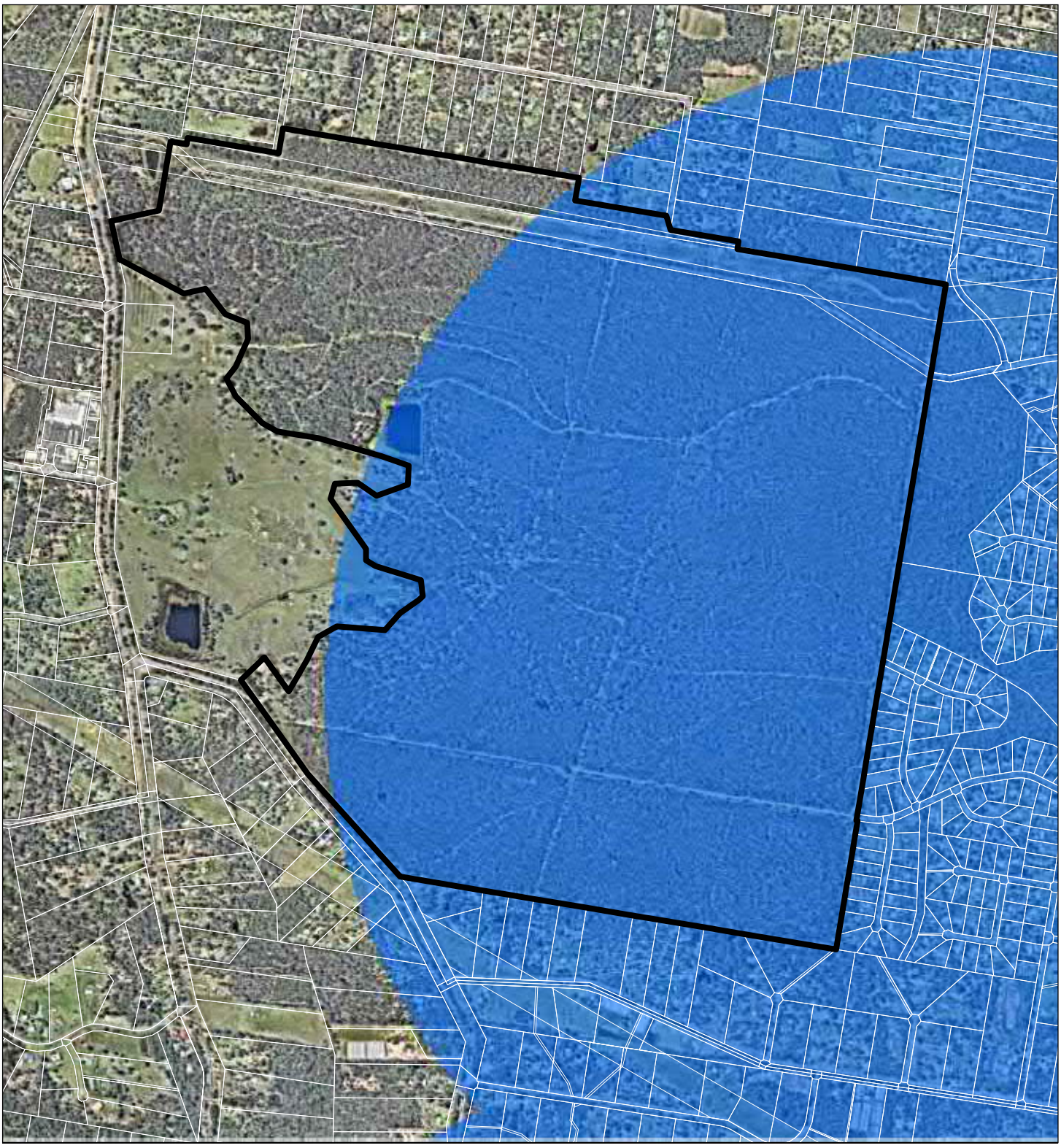
File ref. 7598 E Figure 2 NCA 2 Site Aerial B
Date *19/02/2018*
Project *Greater Flagstone Project, Greenbank (1/SP297192)*

0 100 200 400 600 800 *m*

N

Scale (A4): 1:17,000 [GDA 1994 MGA Z56]

Layer Sources QLD GIS Layers (QLD Gov. Information Service 2017), Aerial (Nearmap 2017)



Legend

- Project Site DCDB
- Qld DCDB
- Flora survey trigger area

Figure 3

NCA - Protected Plants Flora Survey Trigger Mapping

File ref. 7598 E Figure 3 NCA 2 Protected Plants B
Date *19/02/2018*
Project *Greater Flagstone Project, Greenbank (1/SP297192)*

0 100 200 400 600 800 *m*

N

Scale (A4): 1:17,000 [GDA 1994 MGA Z56]

mirvac

saunders havill group

Layer Sources QLD GIS Layers (QLD Gov. Information Service 2017), aerial (Nearmap 2017)

1.2. Nature Conservation Act 1992

The *Nature Conservation Act 1992* (NCA) classifies and protects significant areas (Protected Areas) and protects threatened plant and animal species. The Nature Conservation (Wildlife) Regulation 2006 (NCWR) lists plant and animal species presumed extinct, endangered, vulnerable, near threatened, least concern, international or prohibited.

The Queensland Government has adopted a regulatory framework that captures activities that pose a high risk to plant biodiversity. Under the framework, when a non-exempt clearing activity is proposed within a 'High Risk' area, the proponent of that activity is required to complete a flora survey prior to commencement of clearing. The Protected Plants Flora Survey Trigger Map shows 'High Risk' areas for protected plants and is used to help determine flora survey and clearing permit requirements for a particular location.

A search of the Protected Plants Flora Survey Trigger Mapping indicated proposed clearing areas within the subject site are overlayed as 'High Risk' and so are subject to flora survey requirements (refer Figure 3).

Prior to flora surveys, the schedules of the NCWR were considered in this report using a Wildlife Online Database Search with a 10 km radius from the site. Three (3) flora species listed under the NCWR were identified as having the potential to occur on site and are presented in Table 1. Refer to Appendix A for full search results.

Table 2: Wildlife Online Search Results–Flora

Scientific Name	Common Name	NCA Status
Marsdenia coronata	Slender Milkvine	Vulnerable
Plectranthus habrophyllus	-	Endangered
Melaleuca irbyana	-	Endangered

2. Nature of the Impact

2.1. Background

The only EVNT species located within the Greenbank project area was *Melaleuca irbyana* (Swamp Tea Tree). The profile of this species is detailed below in Section 2.2.

2.2. Protected Plant Profile

Melaleuca irbyana, a member of the Myrtaceae family, is listed as a threatened species under Schedule 2 of the *Nature Conservation (Wildlife) Regulation 2006* (NCWR) and is classified as "endangered". *Melaleuca irbyana* is also included as part of Endangered Regional Ecosystems (RE) 12.3.18, 12.3.19, 12.9-10.11 and 12.9-10.27 under the *Vegetation Management Act 1999* (VMA). This vegetation community is also listed as a Critically Endangered when present as a Threatened Ecological Community under the *Environment Protection and Biodiversity Conservation Act 1999* (EPBC).

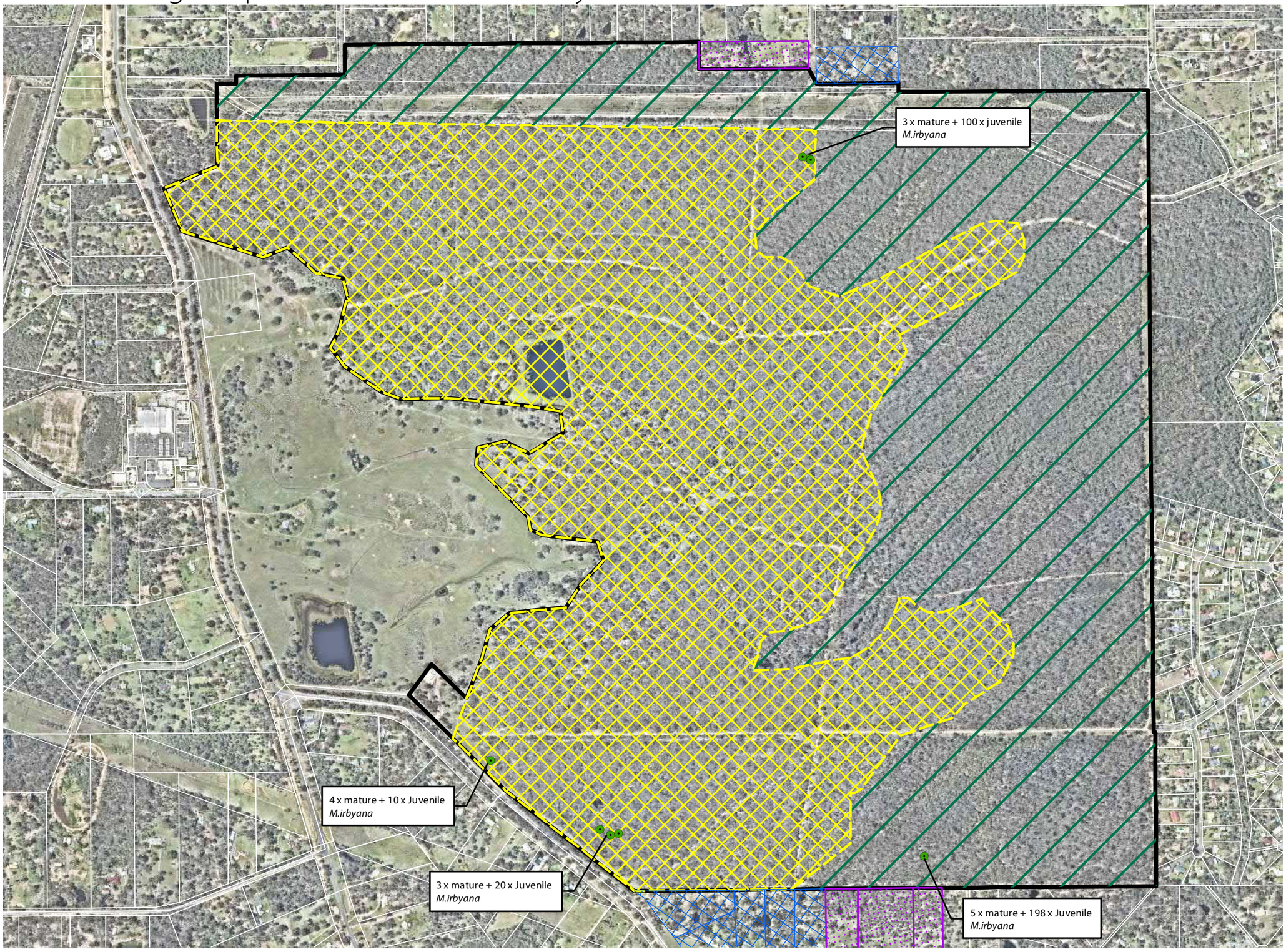
M. irbyana forms communities that occur in two (2) structural forms: the more common form consists of a dominant eucalypt canopy with an understorey containing *M. irbya*na thickets 8-12 metres in height; the less common form is an open forest or thicket of *M. irbyana* with emergent eucalypt trees. The understorey is sparse and can comprise of grasses, sedges, and herbs with a few shrubs, vines and possibly orchids present. There are fairly clear descriptions of *M. irbyana* communities, however, there are no clear indications of the point at which an individual tree or small number of trees are considered to be part of a community. An individual tree may still contribute reproductively to a community, or may have the potential to regenerate and in time create a community.

Logan City Council defines an *M. irbyana* community as, "*where Melaleuca irbyana occur in a patch size of 0.25 hectares or greater, or where a patch of Melaleuca irbyana less than 0.25 hectares adjoins a second patch and the sum of the patches is greater than 0.25 hectares*". This definition has been determined using methodology from the *Melaleuca irbyana* (Swamp Tea-tree) Community 1:25,000 Scale Mapping Project (Ryan, 2010).

2.3. *Melaleuca irbyana* On-site

The entire site was traversed as part of previous and contemporary NCA searches. While *Melaleuca irbyana* were not previously recorded in the Clearing Impact Area associated with Area 1 and the Perimeter Clearing works extents, surveys conducted as part of this reporting, over the balance of the site, recorded the species in four (4) separate locations. Refer to Plan 1 for *Melaleuca irbyana* onsite locations.

1. Clearing Impact - *Melaleuca irbyana*



NOTES
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Layer Sources: QLD GIS Layers (QLD Gov. Information Service 2016), Aerial (Qld Gov. and Google 2016)

* This note is an integral part of this plan/data. Reproduction of this plan or any part of it without this note being included in full will render the information shown on such reproduction invalid and not suitable for use.

LEGEND

- Project DCDB
- Development footprint
- Conservation area
- NCA flora survey trigger area
- No Access under NCA Exemption (AP0007102)
- Surveyed under NCA Exemption (AP0007102)
- Mature *Melaleuca irbyana* specimen

Note: Juvenile *Melaleuca irbyana* are specimens less than 2 metres tall

Issue	Date	Description	Drawn	Checked
A	5/03/2018	Preliminary	TC	AD
B	11/06/2018	Updated impact area	TC	AD

Transverse Mercator | GDA 1994 | Zone 56 | 1:10,000 @ A3

0 50 100 200 300 400 m

saunders havill group

mirvac

Everleigh

ADDRESS/RPD: Teviot Road, Greenbank (1/SP297192) 11/06/2018 7598 E 01 NCA 2 Impact Plan B

Location 1:

Location 1 is situated in the northern aspect of the site, adjacent to the power easement. This patch is located within mapped composite 'Of Concern' Regional Ecosystem RE12.9-10.2/12.9-10.7 as confirmed via PMAV 2016/002969 certified on the 11th of May 2017. Refer to Plan 1 for *Melaleuca irbyana* on site locations and Table 3 for a description of the Regional Ecosystems). This patch of *Melaleuca irbyana* (Swamp Tea-tree) consisted of three (3) established specimens and one-hundred (100) juveniles. This patch of *Melaleuca irbyana* was surrounded by vegetation dominated by *Acacia spp., Allocasuarina littoralis* (Black She-oak) and *Alphitonia excelsa* (Soap Tree) regrowth with *Corymbia citriodora* (Spotted Gum) dominated canopy.

Photo Plate 1: Location 1

Location 2:

Location 2 is situated towards the south-western property boundary, adjacent to Greenbank Road. This patch is located within mapped non-remnant vegetation as confirmed via PMAV 2016/002969 certified on the 11th of May 2017. This *Melaleuca irbyana* (Swamp Tea-tree) patch consisted of three (3) established specimens and twenty (20) juveniles. This patch of *Melaleuca irbyana* was found within a regrowth vegetation community, with surrounding vegetation dominated by *Allocasuarina littoralis* (Black She-oak) and *Acacia spp*. regrowth.

Photo Plate 2: Location 2

Location 3:

Location 3 is situated towards the south-western property boundary, adjacent to Greenbank Road and approximately 380 m west of Location 2. This patch is located within mapped non-remnant vegetation as confirmed via PMAV 2016/002969 certified on the 11th of May 2017. This patch of *Melaleuca irbyana* (Swamp Tea-tree) consisted of four (4) established specimens and ten (10) juveniles. The patch of *Melaleuca irbyana* was found within a regrowth vegetation community, with surrounding vegetation dominated by *Acacia spp., Allocasuarina littoralis* (Black She-oak) and *Alphitonia excelsa* (Soap Tree) regrowth.

Photo Plate 3: Location 3

Location 4:

Location 4 is situated towards the southern property boundary, approximately 800 m east of Location 2. This patch is located within mapped composite 'Of Concern' Regional Ecosystem RE12.9-10.2/12.9-10.7 as confirmed via PMAV 2016/002969 certified on the 11th of May 2017. These Regional Ecosystems are described in Table 3 below. This patch consists of five (5) established specimens and one hundred and ninety-eight (198) juveniles. This patch of *Melaleuca irbyana* was surrounded by vegetation dominated by *Acacia spp., Allocasuarina littoralis* (Black She-oak) and *Alphitonia excelsa* (Soap Tree) regrowth with *Corymbia citriodora* (Spotted Gum) dominated canopy.

Photo Plate 4: Location 4

Table 3: Regional Ecosystems Descriptions

Status	Code	Description
Endangered	12.9-10.12	Corymbia intermedia, Angophora leiocarpa, Eucalyptus seeana +/- E. siderophloia, E. tereticornis, E. racemosa subsp. racemosa, C. citriodora subsp. variegata woodland to open forest. Lophostemon suaveolens is often present as a sub-canopy or understorey tree. Occasional Melaleuca quinquenervia on lower slopes. Does not include areas dominated by Eucalyptus racemosa subsp. racemosa. Occurs on Cainozoic and Mesozoic sediments. (BVG1M: 9g).
Of Concern	12.9-10.7:	Eucalyptus crebra +/- E. tereticornis, Corymbia tessellaris, Angophora leiocarpa, E. melanophloia woodland. Occurs on Cainozoic and Mesozoic sediments. (BVG1M: 13c).
Of Concern	12.3.11	Eucalyptus tereticornis +/- E. siderophloia and Corymbia intermedia open forest to woodland. Corymbia tessellaris, Lophostemon suaveolens and Melaleuca quinquenervia frequently occur and often form a low tree layer. Other species present in scattered patches or low densities include Angophora leiocarpa, E. exserta, E. grandis, C. trachyphloia, C. citriodora subsp. variegata, E. latisinensis, E. tindaliae, E. racemosa and Melaleuca sieberi. E. seeana may be present south of Landsborough and Livistona decora may occur in scattered patches or low densities in the Glenbar SF and Wongi SF areas. Occurs on Quaternary alluvial plains and drainage lines along coastal lowlands. Rainfall usually exceeds 1000mm/y. (BVG1M: 16c)
Least Concern	12.3.6:	Melaleuca quinquenervia +/- Eucalyptus tereticornis, Lophostemon suaveolens, Corymbia intermedia open forest to woodland with a grassy ground layer dominated by species such as Imperata cylindrica. Eucalyptus tereticornis may be present as an emergent layer. Occurs on Quaternary floodplains and fringing drainage lines in coastal areas. (BVG1M: 22a)
Least Concern	12.9-10.2:	Corymbia citriodora subsp. variegata open forest or woodland usually with Eucalyptus crebra. Other species such as Eucalyptus tereticornis, E. moluccana, E. acmenoides and E. siderophloia may be present in scattered patches or in low densities. Understorey can be grassy or shrubby. Shrubby understorey of Lophostemon confertus (whipstick form) often present in northern parts of bioregion. Occurs on Cainozoic and Mesozoic sediments. (BVG1M: 10b).

Based on the information provided in **Section 2.2**, the specimens located on site are not consistent with a *Melaleuca irbyana* community due to the patches predominately containing juvenile individuals with very few mature specimens. Importantly, these patches are not associated with Endangered Regional Ecosystems. Locations 1 and 4 were confirmed via a certified PMAV to be located within composite 'Of Concern' Regional Ecosystem RE12.9-10.2/12.9-10.7 while locations 2 and 3 were located within non-remnant areas.

While Location 1 contains a substantial amount of juvenile species, overall, the significance of these patches is considered less than if they formed part of a broader existing community. The habitat value they currently provide is considered relatively limited, with no obvious noteworthy habitat for flora or fauna observed at the time of survey.

2.4. Avoidance and Minimisation of Impact

The proposed works are for the development of Greenbank master planned development in the Greater Flagstone PDA. Preliminary approval for the context plan and master plan has been issued by EDQ. These plans were informed by detailed analysis of the site by specialist consultants, including a detailed ecological analysis by SHG. Subsequently, areas for development shown are concentrated to areas of least constraint. Areas of highest ecological value have been identified for retention as conservation.

The proposed works will include the creation of residential allotments, a proposed school site, new roads, park and conservation areas and corridors. Minimisation of overall clearing impacts are evident through location of the proposed development, located outside Endangered remnant vegetation and waterway corridors. Rehabilitation of conservation areas and waterways is proposed as part of the development.

The proposed earthworks to facilitate the development footprint will require the removal of three (3) relatively small patches of predominately juvenile *Melaleuca irbyana* specimens, and ongoing property boundary maintenance within 100 m of a fourth patch. These specimens are located within Of Concern and non-remnant regrowth areas (refer Plan 1).

As per the EDQ endorsed Natural Environment Site Strategy, extensive conservation of greater than 89 hectares of proposed Conservation Parkland adjoining Norris Creek and Wearing Park is proposed as part of the development. In accordance with best practice management, restoration and rehabilitation works will seek to stabilise and reverse the negative effects of ongoing habitat fragmentation. The intent is for managed areas of rehabilitation and restoration to rectify canopy gaps and restore bare or denuded areas to provide additional habitat and refugia within the lower strata to maintain connectivity with external approval corridors and improve terrestrial corridor viability. Rehabilitation works within the conservation area and waterway corridors will include weed management and replanting with native species consistent with mapped Regional Ecosystems to augment ecological values and enhance connectivity.

Melaleuca irbyana grows in flat areas that are periodically waterlogged, in eucalypt forest, mixed forest and *Melaleuca* woodland with a sparse and grassy understorey. The species prefers poorly draining, heavy clay soils (Byrnes 1984; Barlow 1987). The proposed conservation land rehabilitation works will include establishing a *Melaleuca irbyana* thicket within remnant woodland forest to the north of the central waterway. This land is relatively low lying and adjoins an ephemeral waterway that contains permanent billabongs. The proposal *Melaleuca irbyana* planting site is therefore considered ideal for the species, which is dependent on specific groundwater and / or surface water hydrology. Impacts to *Melaleuca irbyana* have been minimised to the greatest practical extent and include establishing a *Melaleuca irbyana* community, on the project site, within future conservation land and managing potential impacts from ongoing works that will occur within 100 m of a retained patch.

2.5. Survival of the Plant in the Wild

Based on the current disturbed nature of the site and the locations of the *Melaleuca irbyana* specimens along property boundaries, it is not anticipated that the removal of three (3) relatively small patches of predominately juvenile *Melaleuca irbyana* specimens will significantly hinder the future success of the species in the area. Importantly, the fourth patch is to be preserved within the conservation area and proposed rehabilitation works seek to establish a *Melaleuca irbyana* community on the site allowing the community to be protected in perpetuity.

3. Offset Assessment

The *Protected Plants Assessment Guideline* states that an offset compensates for residual impacts after impact management requirements of the guideline have been met. The specimens located are not considered to constitute ecological communities (as described in Section 2.2.), and therefore the viability of *Melaleuca irbyana* local populations are not considered to be impacted by this proposal.

The proposed earthworks to facilitate the development footprint will require the removal of three (3) relatively small patches of predominately juvenile *Melaleuca irbyana* specimens. In consideration of the extensive rehabilitation works proposed within the onsite conservation land, including the establishment of an *Melaleuca irbyana* thicket, the proposed rehabilitation works will ensure a net gain in *Melaleuca irbyana* across the site. IN light of rehabilitation efforts, the removal of small patches of *Melaleuca irbyana* specimens is not considered to impose a Significant Residual Impact, as defined under the DES policy, and therefore offsets are not considered applicable in this case.

3.1. Rehabilitation works

It is considered that the proposed rehabilitation works will mitigate the impact to the extent that the impact on the Matter of State Environmental Significance (MSES) would not be considered significant.

To demonstrate this mitigation of impact, a response to the four (4) points of consideration within Section 1.2 of the *Significant Residual Impact Guideline* is provided below.

- **The extent and duration of impact on the matter and its sensitivity to disturbance.**

  The impact on the matter is the removal of three (3) relatively small patches of predominately juvenile *Melaleuca irbyana* specimens from former paddock areas that have already been subject to high disturbance from cattle grazing and historical clearing. A fourth patch will be retained with ongoing adjoining works within 100 m limited to the maintenance of the nearby property boundary. The sites are described in detail in Section 2.3, shown in Plan 1 and summarised below:

  - Location 1: 3 x mature s + 100 juvenile specimens, located within the north-east along a drainage feature
  - Location 2: 4 x mature + 10 juvenile specimens, located along the southern boundary
  - Location 3: 3 mature +20 juvenile specimens, located along the southern boundary
  - Location 4: 5 mature + 198 juvenile specimens, located along the southern boundary in the south-west

- **Timeframe for rehabilitation relative to the impact occurring and the ability of the matter to maintain its viability during this timeframe.**

  The rehabilitation proposed is the planting of six hundred and twenty-five (625, equates to 140 cleared specimens at 4:1 plus an additional 65 specimens over 5,000 m^2 at 1 per 8 m^2) advanced tube stock specimens of *M. irbyana* within a relatively isolated portion of the central waterway corridor of the conservation zone (refer Plans 2 to 4). Although it is expected that these plantings will take approximately four (4) years to reach the size of the impacted matter, they will be planted in a thicket to replicate as close to natural conditions for a *M. irbyana* ecological community as possible and maintained as part of the extensive rehabilitation works for the conservation zone. The area of planting of this thicket adjoins the central waterway corridor and is not within 100 m of future development areas. This location has been chosen to avoid human disturbance and as far away as possible from conflicting uses.

It is noted that the rehabilitated creek corridor will be handed over to Logan City Council following the on-maintenance period. Further, the fourth patch of *M. irbyana* that is to be retained within the conservation area will be subject to regular compatible weed suppression and monitored for persistence as part of site maintenance due to its proximity to ongoing property boundary maintenance works within 100 m.

- **Likely success of rehabilitation works to return the impacted matter to its original condition, and;**

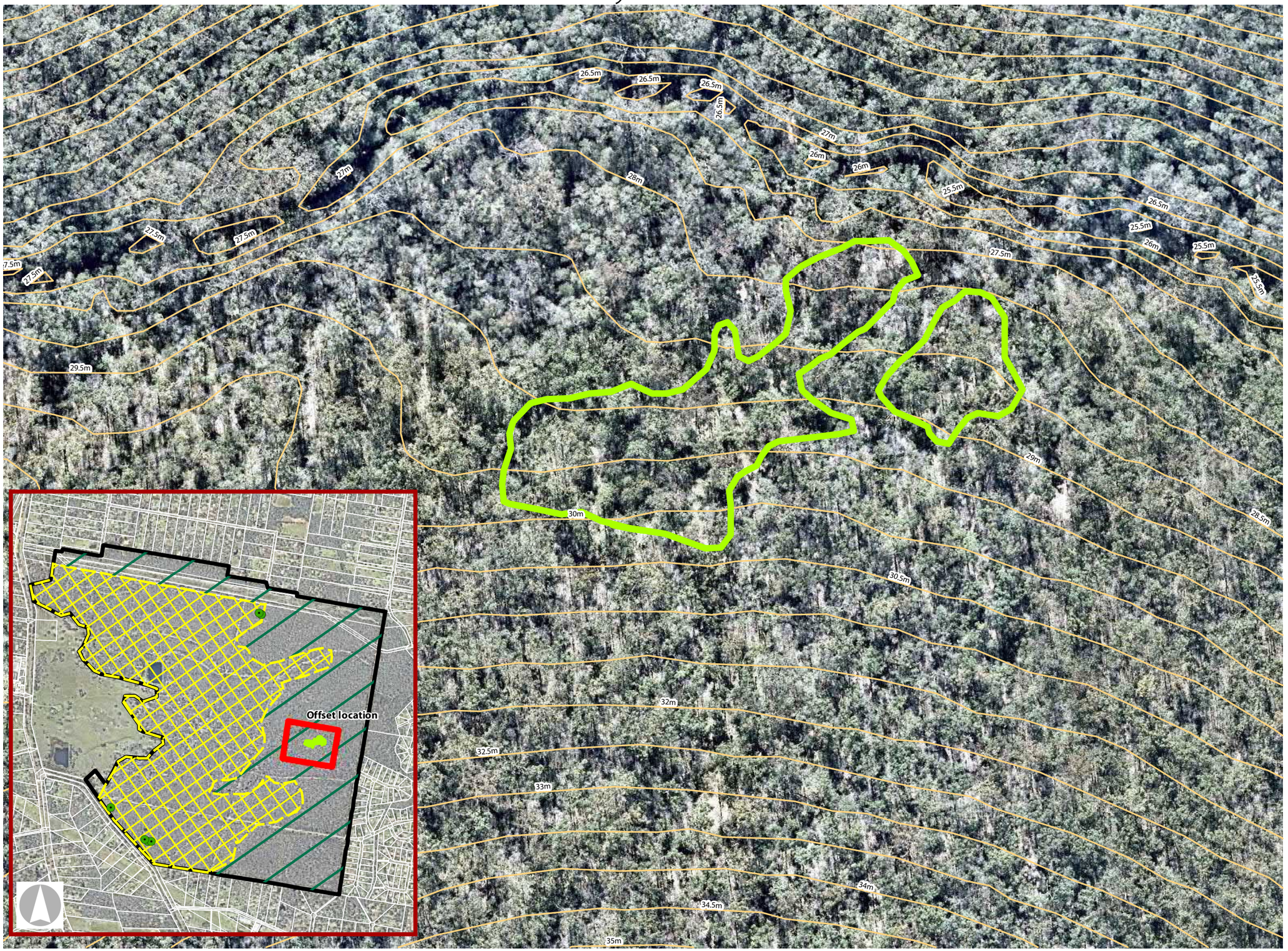
  It is important to note that the Regional Ecosystems within and adjoining the creek corridor reflect those where the *M. irbyana* patches are currently located on-site. The proposed rehabilitation area was chosen after detailed ecological survey of site attributes, including the prevailing low-lying topography, proximity to the creek, and canopy gaps with limited existing understorey (refer Plans 2 & 4). Thus, the planting of *M. irbyana* in the creek corridor has a high likelihood of success given the suitable landscape and habitat. Given that the impact is the removal of a 140 single individual specimens of *M. irbyana* which are almost entirely juveniles, the planting of six hundred and twenty-five (625) specimens of *M. irbyana* as a thicket within the conservation zone to be rehabilitated will far exceed the original condition of the impacted matter at an offset ratio of greater than 4:1.

- **The time-lag effect—between impact and rehabilitation successfully delivering the original condition for the matter—on the matter's viability.**

  As mentioned previously, the removal of three small patches of *M. irbyana* is not considered to significantly impact upon the viability of local populations nor remove significant habitat values. Although there will be a time-lag between the removal of the predominantly juvenile *M. irbyana* specimens and the maturity of the tube stock of *M. irbyana* to be planted. Overall, the rehabilitation proposed is considered a far superior ecological outcome for viability of local populations.

  The extent and number of *M. irbyana* to be planted is intended to establish a self-sustaining thicket of *M. irbyana* in a safe and secluded buffer environment that is capable of mitigating the proposed impacts. It is acknowledged that any future unavoidable loss of *M. irbyana* from the development area will be assessed by DES on a case by case basis.

2. Offset Assessment - *Melaleuca irbyana*



NOTES
This plan was prepared as a desktop assessment tool.
The information on this plan is not suitable for any other purpose.
Property dimensions, areas, numbers of lots and contours and other physical features shown have been compiled from existing information and may not have been verified by field survey. These may need verification if the development application is approved and development proceeds, and may change when a full survey is undertaken or in order to comply with development approval conditions. No reliance should be placed on the information on this plan for detailed design or for any financial dealings involving the land. Saunders Havill Group therefore disclaims any liability for any loss or damage whatsoever or howsoever incurred, arising from any party using or relying upon this plan for any purpose other than as a document prepared for the sole purpose of accompanying a development application and which may be subject to alteration beyond the control of the Saunders Havill Group. Unless a development approval states otherwise, this is not an approved plan.

Layer Sources: QLD GIS Layers (QLD Gov. Information Service 2016), Aerial (Nearmap 2018)

* This note is an integral part of this plan/data. Reproduction of this plan or any part of it without this note being included in full will render the information shown on such reproduction invalid and not suitable for use.

LEGEND

- Project DCDB
- Development footprint
- Conservation area
- Mature *Melaleuca irbyana* specimen to be impacted by clearing works
- Melaleuca Irbyana planting/rehab site (Approx. 5,000m²)
- Contours (0.5m)

Note: Juvenile *Melaleuca irbyana* are specimens less than 2 metres tall

Issue	Date	Description	Drawn	Checked
A	11/06/2018	Preliminary	TC	AD

Transverse Mercator | GDA 1994 | Zone 56 | 1:1,095 @A3

0 5 10 20 30 40 m

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mirvac

Everleigh

3. Melaleuca Irbyana - Rehabilitation/Planting Site Notes

INTRODUCTION

Saunders Havill Group (SHG) was engaged by MIRVAC to prepare an Impact Management Plan (IMP) for the clearing of 140 *Melaleuca irbyana* (Swamp Tree Tree) specimens. The replacement plants will be located within the approved conservation area of the Everleigh project (herein referred to as 'the site'). The clearing works, current and future will facilitate the creation of residential lots, a school and internal roads for the site's ultimate development layout.

The rehabilitation proposal for the clearing of 140 *Melaleuca Irbyana* is the planting of four (4) advanced tube stock specimens of *Melaleuca Irbyana* per tree cleared. A total of 625 (560+65 additional) *Melaleuca Irbyana* will be planted as a result. The planting area is proposed within the site's conservation zone (refer Plan 2) and will cover 5,000 m^2. The specific location of the planting area was determined onsite by Ecologists from SHG. The percentage of exiting canopy cover and the land zone features were taken into consideration when determining the optimal location for planting. Although it is expected that these plantings will take approximately four (4) years to reach the size of the impacted matter, they will be planted in a thicket to replicate as close to natural conditions for a *Melaleuca Irbyana* ecological community as possible and maintained as part of the rehabilitation works for the conservation zones. The area of planting of this thicket is centralised within the conservation zone and adjacent the waterway corridor, as stipulated by the EDQ approved NESS, and not within 100m of future development areas.

This Rehabilitation Plan is drafted to identify and manage the site disturbances for the planting of the 625 *Melaleuca Irbyana* specimens within a 5,000m^2. The planting will involve low impact weed removal and the retention of any existing native vegetation in the immediate area.

SITE PREPARATION

Once the planting locations have been determined not to impact existing native vegetation, the location is to be spot sprayed prior to soil cultivation. Herbicides must be applied by appropriately qualified/supervised persons in accordance with the Agricultural Chemicals and Distribution Control Act 1966 at rates identified on registered product labels, or on an Australian Pesticides and Veterinary Medicines Authority (APVMA) issued off-label permit where applicable. Refer to South East Queensland Ecological Restoration Framework for additional guidance.

The planting will provide a net benefit of greater than 4 to 1 in an area protected under the NESS.
Rehabilitation treatment is to generally include the following points:

- A number of weeds are recorded for removal within shrub & ground layer
- Weed removal and management will utilise low impact methods
- Planting of the 625 specimens will be planted at approximately 1 per 8m^2 to form a *Melaleuca Irbyana* thicket.

Ecologists from SHG have assessed the site's vegetation. Broadly, it was determined that the assisted natural regenerate approach will be used on site. This approach is described below:

ASSISTED NATURAL REGENERATION

Applies:

- To natural areas where the native plant community is largely healthy and functioning
- When native plant seed is still stored in the soil or will be able to reach the site from nearby natural areas, by birds or other animals, wind or water
- Where the natural regeneration processes (seedling germination, root suckering, etc.) are being inhibited by external factors, such as weed invasion, soil compaction, cattle grazing, mechanical slashing, etc.
- When limited human intervention, such as weed control, minor amelioration of soil conditions, erection of fencing, cessation of slashing, etc. will be enough to trigger the recovery processes through natural regeneration
- When the main management issue is weed infestation and/or current land use practices

Role of planting:

- Planting in such areas should be limited to where species cannot return to site without direct intervention.

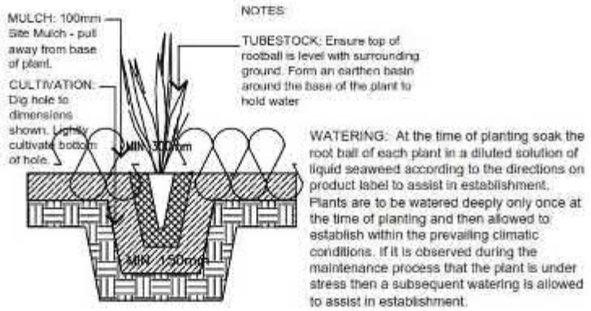
Goal vegetation community:

- The re-establishing plant community will be substantially similar in structure, composition and diversity to the original vegetation

MULCH

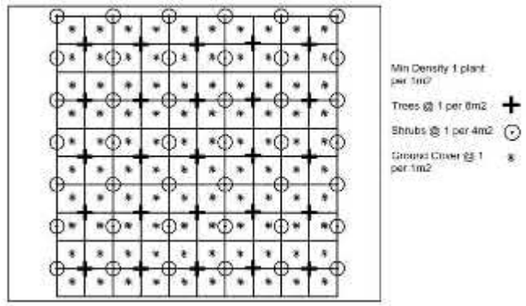
Areas to be blanket mulched to a minimum depth of 100mm leaving a 50mm gap surrounding the trunk of planted stock. Areas which are too steep or where overland flows may occur, a combination of mulch and Jute mat and or suitably anchored natural fibre weed mat installed to manufactures specifications have been specified.

Each individual planting location should be spot cultivated to at least 2 times the depth and twice the width of the plant stock size. Refer detail for more specifications:



PLANTING

Planting locations shall be generally set out in accordance with a typical random grid pattern as shown on this drawing sheet below with the *Melaleuca Irbyana* to be planted at 1 per 8m^2.



All stock shall be advanced tube stock specimens of *Melaleuca Irbyana*, well formed, and hardened off to suit final revegetation location, nursery stock. The root system should be well formed without being tube bound or large roots extruding from the tube container. The environmental coordinator has the right to inspect and reject stock prior to planting.

INSTALLATION

The following outlines the preferred installation methodology for revegetation works within the rehabilitation areas. It has been designed to maximise plant establishment success rates and minimise plant mortality. Revegetation works shall be either undertaken or directly supervised by an experienced and qualified bush regenerator. All works shall be in accordance with the provisions of this sheet, local government policies and Australian Standards. Plant installation methods shall include:

- Plants are to be vigorous, well established, hardened off, consistent with species or variety, free from disease and insect pests, with large root systems and no evidence of having been restricted or damaged.
- Plants are to be planted immediately after delivery to the planting site. If not possible, they should be stored in the shade and watered sufficiently during the day.
- Planting is to be undertaken in accordance with the planting grid contained within this drawing sheet.
- Excavate planting medium to a depth suitable for the installation of tube or pot specimens. In areas where planting substrate is deemed to be very poor (compacted, nutrient depauperate, hydrophobic etc.) and above areas of potential frequent inundation and water flow, topsoil may be used or the ground mechanically ripped where access is feasible.
- Pre-water plant hole, if soil is dry, to decrease root stress upon planting and assess the infiltration of water through the soil
- Incorporate into the planting substrate the appropriate quantity of prepared water crystals or other suitable hydrating product such as Hortex 'Rainsaver' or 'Moisturaid'.
- Place plant into hole and backfill ensuring that the plant is upright and the stem is not covered in any less than 10mm or any more than 20mm of planting medium
- Plants are to be watered thoroughly immediately after planting (ensure deep irrigation) and thereafter as required during the construction phase of the development depending on climatic conditions. Creation of a concave hollow around the base of each plant will aid water infiltration to the plant roots.
- A complete, slow release fertiliser is recommended, and is to be administered appropriately during planting. Top dressing with slow release fertiliser is preferred to avoid toxic levels of fertiliser accumulating in the plant hole around the plant roots.
- To ensure successful establishment, all planting surfaces must be covered in:
    - 100mm layer of high quality weed-free composted chip mulch (site mulch) - Note: to avoid possible stem rot in some 'drier' species ensure mulch is 'dished' and not covering plant stem by more than 200mm
    - suitable individual anchored natural fibre weed mat; or
    - As presented within other section, where available mulch material will be sourced from cleared vegetation material if adequately seasoned.
- A long term slow release fertiliser, such as Nutricote or similar product should be used for all plantings after initial plant establishment.
- Seedlings and saplings are to be encouraged and maintained throughout the establishment period.

MAINTENANCE & MONITORING

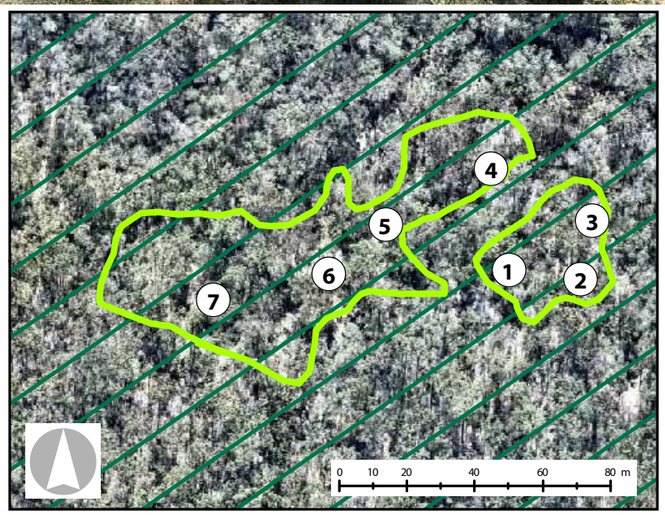
MAINTENANCE SCHEDULE

Maintenance schedule for revegetation areas of the proposed development as specified on the Landscape Plans

ESTABLISHMENT	*Establishment is to occur at the completion of the primary and secondary weed removal phases and any rehabilitation planting. During this period any failed stock are to be replaced and/or defects identified then reparations are to be made to site works.*
1. Watering	Watering shall be carried out to ensure establishment of revegetation.
	At the time of planting soak the root ball of each plant in a diluted solution of liquid seaweed according to the directions on product label to assist in establishment.
	Plants are to be watered deeply only once at the time of planting and then allowed to establish within the prevailing climatic conditions. If it's observed during the maintenance process that the plant is under stress then a subsequent watering is allowed
2.Weed Removal	Weeds evident during the Establishment period but should be removed as part of a monthly weed management program. Best Practice weed management techniques should be employed for weed removal amongst revegetation areas.
	Where grass seeding or turf establishes within planted areas it should be treated with approved herbicide for waterways.
MAINTENANCE	*(Weeks 13- 2 years)*
1. Watering	No specified watering regime is provided during the maintenance period. The intent is for the area to become self sufficient in utilising natural rain patterns and run off. Watering should occur during extended dry periods to ensure continued establishment
2. Weed Removal	Weeds should be tended to on a monthly program. Treatment techniques vary within the landscape planted areas versus revegetation and retention areas.
3. Management	Throughout the establishment and maintenance periods areas where planting stock has not achieved a 90% success survival additional planting shall be installed.
4. Erosion Control	Prior to the commencement of works and to remain throughout the establishment and maintenance period an erosion and sediment control measures shall be employed over the rehabilitaion area of the site.

Issue	Date	Description	Drawn	Checked
A	3/07/2018	Preliminary	TC	MS

4. Melaleuca Irbyana - Rehabilitation/Planting Site Photos



LEGEND

- Project DCDB
- Development footprint
- Conservation area
- Mature *Melaleuca irbyana* specimen to be impacted by clearing works
- Melaleuca Irbyana planting/rehab site (Approx. 5,000m²)
- Contours (0.5m)

Note: Juvenile *Melaleuca irbyana* are specimens less than 2 metres tall

NOTES
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Layer Sources: QLD GIS Layers (QLD Gov. Information Service 2016), Aerial (Nearmap 2018)

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Issue	Date	Description	Drawn	Checked
A	11/06/2018	Preliminary	TC	AD

Transverse Mercator | GDA 1994 | Zone 56 | 1:1,095 @A3

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4. Summary and Conclusion

Saunders Havill Group has been engaged by Mirvac Queensland Pty Ltd to complete an Impact Management Plan (IMP) for *Melaleuca irbyana* located within the extent of works for the Everleigh Greenbank project. This IMP is intended to support a clearing permit (protected plants) application to the Department of Environment and Science (DES) in accordance with the *Nature Conservation (Wildlife Management) Regulation 2006 - Protected Plants Assessment Guidelines*.

Earthworks associated with the development will necessitate the removal of three (3) relatively small patches of predominantly juvenile *M. irbyana* and the retention of a fourth within the conservation area but within 100 m of ongoing property boundary maintenance. The Protected Plants Assessment Guideline states that an offset compensates for residual impacts after impact management requirements of the guideline have been met. Activities are not anticipated to adversely impact on the viability of any localised *M. irbyana* ecological communities, and the removal of three small *M. irbyana* patches is not considered to impose a Significant Residual Impact as defined under the DES policy in consideration of proposed rehabilitation works within the central creek corridor of the conservation zone. Therefore, offsets are not considered applicable in this case. It is important to note that investment in the conservation zone rehabilitation works proposed, i.e. revegetation and weed removal and the establishment of 625 tube stock *M. irbyana* plantings, is considered to provide a superior ecological outcome relative to the removal of a single specimen at an offset ratio greater than 4:1.

5. Appendices

Appendix A

Wildlife Online Search

Nature Conservation Act 1992

Appendix A

Wildlife Online Search

Nature Conservation Act 1992

Queensland Government

Wildlife Online Extract

Search Criteria: Species List for a Specified Point
Species: All
Type: All
Status: Rare and threatened species
Records: All
Date: All
Latitude: -27.7401
Longitude: 152.9975
Distance: 10
Email: keiragrundy@saundershavill.com
Date submitted: Wednesday 14 Feb 2018 16:50:28
Date extracted: Wednesday 14 Feb 2018 17:00:02

The number of records retrieved = 13

Kingdom	Class	Family	Scientific Name	Common Name	I	Q	A	Records
animals	amphibians	Limnodynastidae	*Adelotus brevis*	tusked frog		V		3
animals	amphibians	Myobatrachidae	*Crinia tinnula*	wallum froglet		V		3/3
animals	birds	Cacatuidae	*Calyptorhynchus lathami lathami*	glossy black-cockatoo (eastern)		V		3
animals	birds	Falconidae	*Falco hypoleucos*	grey falcon		V		1
animals	birds	Psittacidae	*Lathamus discolor*	swift parrot		E	CE	1
animals	birds	Strigidae	*Ninox strenua*	powerful owl		V		5
animals	mammals	Dasyuridae	*Dasyurus maculatus maculatus*	spotted-tailed quoll (southern subspecies)		V	E	15
animals	mammals	Macropodidae	*Petrogale penicillata*	brush-tailed rock-wallaby		V	V	2
animals	mammals	Phascolarctidae	*Phascolarctos cinereus*	koala		V	V	515
animals	mammals	Pseudocheiridae	*Petauroides volans volans*	southern greater glider		V	V	12/2
plants	higher dicots	Apocynaceae	*Marsdenia coronata*	slender milkvine		V		2/2
plants	higher dicots	Lamiaceae	*Plectranthus habrophyllus*			E	E	6/6
plants	higher dicots	Myrtaceae	*Melaleuca irbyana*			E		7/6

CODES

I - Y indicates that the taxon is introduced to Queensland and has naturalised.

Q - Indicates the Queensland conservation status of each taxon under the *Nature Conservation Act 1992.* The codes are Extinct in the Wild (PE), Endangered (E), Vulnerable (V), Near Threatened (NT), Least Concern (C) or Not Protected ( ).

A - Indicates the Australian conservation status of each taxon under the *Environment Protection and Biodiversity Conservation Act 1999.* The values of EPBC are Conservation Dependent (CD), Critically Endangered (CE), Endangered (E), Extinct (EX), Extinct in the Wild (XW) and Vulnerable (V).

Records – The first number indicates the total number of records of the taxon for the record option selected (i.e. All, Confirmed or Specimens).
This number is output as 99999 if it equals or exceeds this value. The second number located after the / indicates the number of specimen records for the taxon.
This number is output as 999 if it equals or exceeds this value.

Appendix C

Declared Area Map

Derived Reference Points for GPS
Projection: UTM (MGA Zone 56)
Datum: GDA94

Point	Easting	Northing	Point	Easting	Northing
1	500604	6931430	54	500530	6931398
2	500607	6931426	55	500534	6931398
3	500609	6931423	56	500538	6931398
4	500610	6931419	57	500546	6931403
5	500606	6931418	58	500549	6931407
6	500603	6931415	59	500550	6931409
7	500602	6931412	60	500550	6931412
8	500597	6931409	61	500552	6931414
9	500593	6931406	62	500554	6931415
10	500591	6931405	63	500556	6931412
11	500586	6931403	64	500556	6931405
12	500582	6931401	65	500558	6931403
13	500579	6931400	66	500561	6931404
14	500576	6931399	67	500567	6931407
15	500572	6931397	68	500570	6931409
16	500572	6931392	69	500573	6931415
17	500574	6931389	70	500572	6931421
18	500579	6931384	71	500573	6931424
19	500584	6931381	72	500578	6931427
20	500584	6931378	73	500583	6931428
21	500580	6931378	74	500590	6931430
22	500571	6931378	75	500594	6931431
23	500563	6931379	76	500598	6931431
24	500560	6931378	77	500623	6931412
25	500557	6931375	78	500627	6931411
26	500555	6931373	79	500630	6931409
27	500552	6931372	80	500633	6931402
28	500549	6931371	81	500631	6931391
29	500546	6931367	82	500632	6931389
30	500546	6931363	83	500632	6931386
31	500545	6931359	84	500634	6931381
32	500545	6931355	85	500630	6931376
33	500541	6931352	86	500626	6931375
34	500537	6931352	87	500623	6931376
35	500526	6931358	88	500620	6931377
36	500516	6931362	89	500617	6931376
37	500509	6931365	90	500614	6931373
38	500504	6931369	91	500611	6931369
39	500498	6931369	92	500607	6931371
40	500493	6931371	93	500606	6931374
41	500484	6931374	94	500605	6931376
42	500483	6931376	95	500601	6931379
43	500483	6931380	96	500597	6931381
44	500484	6931384	97	500594	6931386
45	500487	6931390	98	500593	6931388
46	500487	6931394	99	500597	6931392
47	500489	6931398	100	500601	6931395
48	500495	6931402	101	500604	6931397
49	500500	6931402	102	500609	6931400
50	500506	6931401	103	500613	6931406
51	500512	6931401	104	500616	6931408
52	500518	6931401	105	500620	6931410
53	500524	6931402			

Declared Area Map 2019/002656 - Sheet 2 of 2

Lot on Plan:
1/SP297192

Local Government:	Logan City	Satellite Image:	Logan 2017 10cm SISP
Centre:	Toowoomba	Prepared By:	JDC
Region:	South	Map Date:	9 October 2019
Map Reference:		File Reference:	-

Legend

- Derived Reference Points for GPS
- Declared Area
- Property boundary
- QLD DCDB

0 0.01 0.02 0.03 0.04 km

NON-STANDARD MAP

Disclaimer:
While every care is taken to ensure the accuracy of this product, the Department of Natural Resources and Mines makes no representations or warranties about its accuracy, reliability, completeness or suitability for any particular purpose and disclaims all responsibility and all liability (including without limitation, liability in negligence) for all expenses, losses, damages (including indirect or consequential damage) and costs which you might incur as a result of the product being inaccurate or incomplete in any way and for any reason.

Horizontal Datum: Geocentric Datum of Australia 1994 (GDA94 MGA Zone 56)

Cadastral data provided with the permission of the Department of Natural Resources and Mines

Property boundaries shown on this map are provided as a locational aid only. DCDB boundaries do not represent legal cadastral boundaries.

N

Queensland Government

Appendix D

Wildlife Online Search

Nature Conservation Act 1992

Queensland Government

Wildlife Online Extract

Search Criteria: Species List for a Specified Point
Species: Plants (including other non-animals such as fungi and protists)
Type: All
Status: Rare and threatened species
Records: All
Date: All
Latitude: -27.737
Longitude: 152.995
Distance: 10
Email: keiragrundy@saundershavill.com
Date submitted: Wednesday 08 Jul 2020 12:17:20
Date extracted: Wednesday 08 Jul 2020 12:20:02

The number of records retrieved = 3

Kingdom	Class	Family	Scientific Name	Common Name	I	Q	A	Records
plants	land plants	Apocynaceae	*Marsdenia coronata*	slender milkvine		V		6/2
plants	land plants	Lamiaceae	*Coleus habrophyllus*			E	E	8/8
plants	land plants	Myrtaceae	*Melaleuca irbyana*			E		6/4

CODES

I - Y indicates that the taxon is introduced to Queensland and has naturalised.

Q - Indicates the Queensland conservation status of each taxon under the *Nature Conservation Act 1992.* The codes are Extinct in the Wild (PE), Endangered (E), Vulnerable (V), Near Threatened (NT), Least Concern (C) or Not Protected ( ).

A - Indicates the Australian conservation status of each taxon under the *Environment Protection and Biodiversity Conservation Act 1999.* The values of EPBC are Conservation Dependent (CD), Critically Endangered (CE), Endangered (E), Extinct (EX), Extinct in the Wild (XW) and Vulnerable (V).

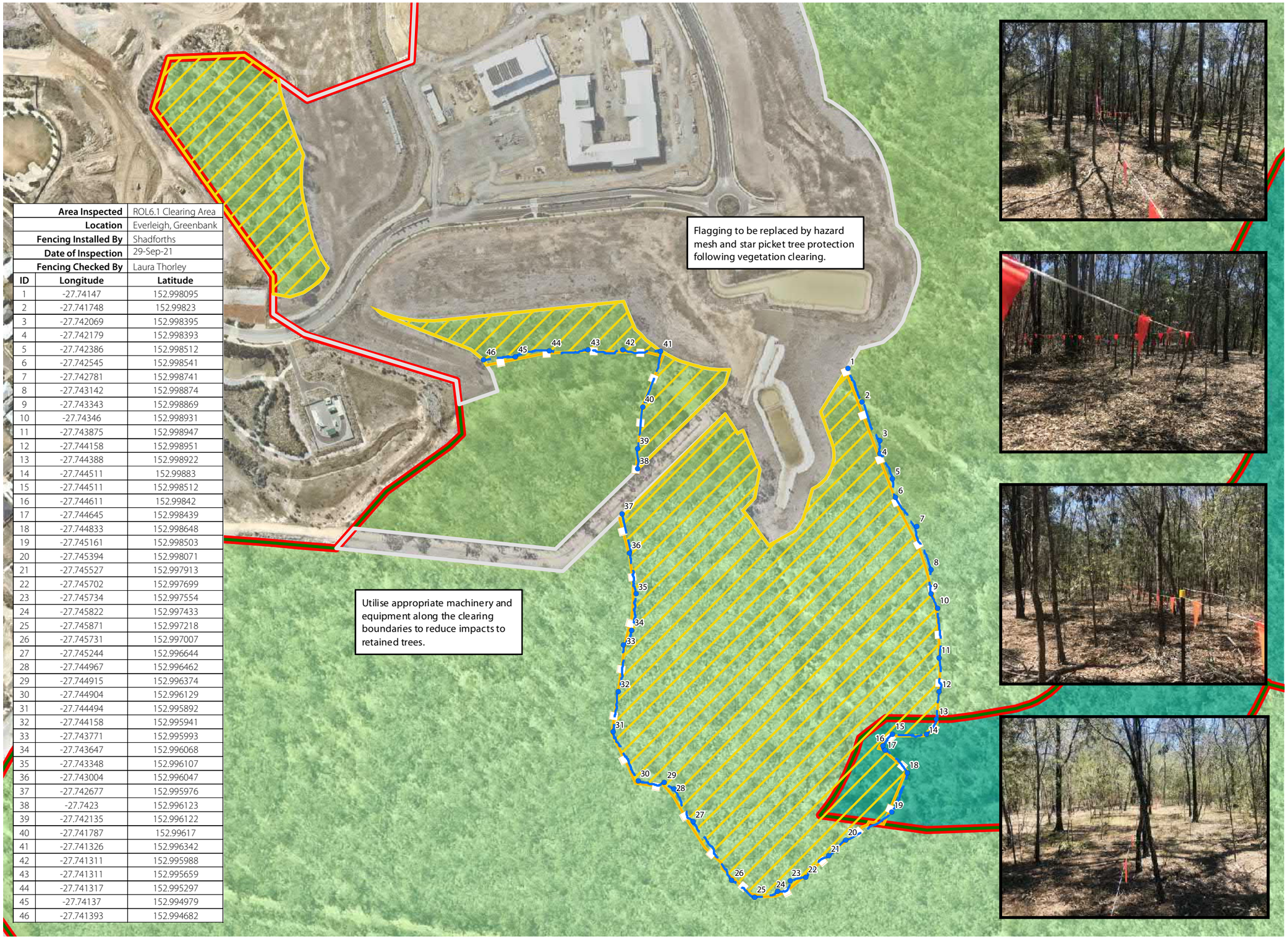
Records – The first number indicates the total number of records of the taxon for the record option selected (i.e. All, Confirmed or Specimens).
This number is output as 99999 if it equals or exceeds this value. The second number located after the / indicates the number of specimen records for the taxon.
This number is output as 999 if it equals or exceeds this value.

Environmental Pre-Start Checklist

Attachment 6

Demarcation Fencing

ATTACHMENT 5 - Demarcation Fencing



Area Inspected	ROL6.1 Clearing Area
Location	Everleigh, Greenbank
Fencing Installed By	Shadforths
Date of Inspection	29-Sep-21
Fencing Checked By	Laura Thorley

ID	Longitude	Latitude
1	-27.74147	152.998095
2	-27.741748	152.99823
3	-27.742069	152.998395
4	-27.742179	152.998393
5	-27.742386	152.998512
6	-27.742545	152.998541
7	-27.742781	152.998741
8	-27.743142	152.998874
9	-27.743343	152.998869
10	-27.74346	152.998931
11	-27.743875	152.998947
12	-27.744158	152.998951
13	-27.744388	152.998922
14	-27.744511	152.99883
15	-27.744511	152.998512
16	-27.744611	152.99842
17	-27.744645	152.998439
18	-27.744833	152.998648
19	-27.745161	152.998503
20	-27.745394	152.998071
21	-27.745527	152.997913
22	-27.745702	152.997699
23	-27.745734	152.997554
24	-27.745822	152.997433
25	-27.745871	152.997218
26	-27.745731	152.997007
27	-27.745244	152.996644
28	-27.744967	152.996462
29	-27.744915	152.996374
30	-27.744904	152.996129
31	-27.744494	152.995892
32	-27.744158	152.995941
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35	-27.743348	152.996107
36	-27.743004	152.996047
37	-27.742677	152.995976
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39	-27.742135	152.996122
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43	-27.741311	152.995659
44	-27.741317	152.995297
45	-27.74137	152.994979
46	-27.741393	152.994682

Notes:
This plan was prepared as a desktop assessment tool. The information on this plan is not suitable for any other purpose. Property dimensions, areas, numbers of lots and contours and other physical features shown have been compiled from existing information and may not have been verified by field survey. These may need verification if the development application is approved and development proceeds, and may change when a full survey is undertaken or in order to comply with development approval conditions. No reliance should be placed on the information on this plan for detailed design or for any financial dealings involving the land. Saunders Havill Group therefore disclaims any liability for any loss or damage whatsoever or howsoever incurred, arising from any party using or relying upon this plan for any purpose other than as a document prepared for the sole purpose of accompanying a development application and which may be subject to alteration beyond the control of the Saunders Havill Group. Unless a development approval states otherwise, this is not an approved plan.

Layer Sources
© State of Queensland 2021. Updated data available at http://qldspatial.information.qldgov.au/catalogue//
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*This note is an integral part of this plan/data. Reproduction of this plan or any part of it without this note being included in full will render the information shown on such reproduction invalid and not suitable for use.

Legend

- Impact area
- ROL 6.1 clearing area (12.46 ha)
- Stage 2 site (201 ha)
- Stage 1 site (29 ha)
- Onsite conservation (180 ha)
- ROL 6.1 Fence location
- ROL 6.1 Fence location (Survey data)
- Tree fencing points

Issue	Date	Description	Drawn	Checked
A	5/10/2021	Preliminary	TC	LT

0 20 40 60 m

Transverse Mercator | GDA 1994 | Zone 56 | 1:3,500 @ A3

Address / RPD: Teviot Rd & Greenbank Rd, Greenbank

*5/10/2021 | 7598 E ATTS P12 Demarcation Fence A_*

saunders havill group

mirvac

Everleigh

Environmental Pre-Start Checklist

Attachment 7

Wildlife Protection and Management Plan & Thermal Clearance Survey

Wildlife Protection and Management Plan

SHADFORTH CIVIL CONTRACTORS

EVERLEIGH PRECINCT Central Park School

Teviot Road

Greenbank, Queensland

October 2021

Document prepared by:

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Revision History

Rev No	Issue Date	Revision Details	Prepared By	Reviewed By	Approved By
0	September 2021	Issue for Use	Laura Steiniger	Yolande Venter	Joel Keady
1	October 2021	Issue for Use	Laura Steiniger	Yolande Venter	Joel Keady
2					

Document Approval

Approved:	*Name*	*Signature*	*Date*
Company Director	*Yolande Venter*		*September 2021*

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1. Introduction

1.1. Background

Australia Wide Environmental Consultants were commissioned by SHADFORTH CIVIL CONTRACTORS to compile a Wildlife Protection and Management Plan for EVERLEIGH PRECINCT Central Park School development off Teviot Road in Greenbank, Queensland (**See Figure 1**).

The project is a master planned residential development located on allotments at the corner of Teviot Road and Greenbank Road. Area for Central Park School is adjoining to the already existing development and connected to an active jobsite.

Site was surveyed on the 22nd of September and 12th October 2021 by a suitably qualified ecologist.

1.2. Ecologist and Qualifications

The AWEC nominated Ecologist is Yolande Venter who is a degree qualified ecologist/environmental coordinator with over 15 years of field experience within the ecology and environmental sectors.

1.3. Scope

1. A desktop review of the site's potential ecological value and any planning constraints, including but not limited to-
    a. QLD Nature Conservation Act 1992 (NC Act) flora and fauna species database (Wildlife Online).
    b. QLD Sustainable Development Assessment Provisions Module 8 Native Vegetation Clearing State Code & QLD Vegetation Management Act 1999;
    c. QLD SEQ Koala State Regulatory Planning Provisions.
    d. Commonwealth's Environment Protection and Biodiversity Conservation Act 1999 (EPBC Act) Protected Matters Search Tool database.
2. A site inspection which included ground trothing the desktop review findings and a fauna survey.
3. Discussion of the likely impacts of the development upon the ecological value identified through the desktop review and site survey.

2. Methodology

2.1. Pre-clearance Survey

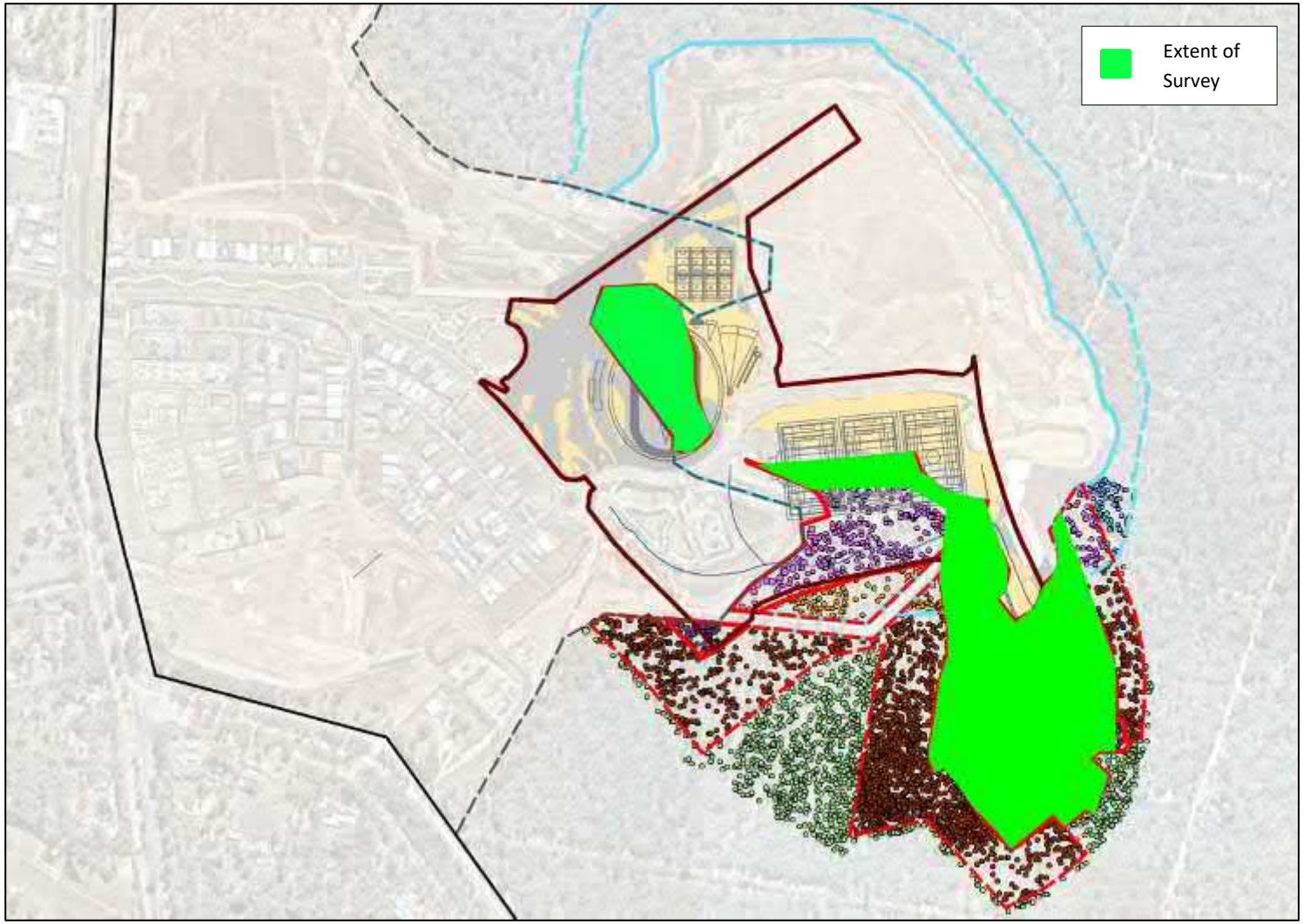
The purpose of the survey is to record the sites overall habitat value, significant habitat features, vegetation connectivity within the site and surrounding lots, fauna signs and opportunistic fauna sightings and the site's suitability for the significant flora species likely to occur in the area.

The site was surveyed on the 22nd of September and 12th October 2021. For this survey, significant fauna habitat features are described as tree hollows (branch and crown), native wildlife nests (stick nests), burrows (feeding burrows), fallen/felled timber, thick groundcover, fissured bark, rocky outcrops, aquatic habitat and flora species considered Koala habitat trees under the Nature conservation (Koala) conservation plan 2006.

This survey is to include a targeted amphibian search which will incorporate frog call recording, playing frog calls and an active search in suitable habitat.

Due to the high level of disturbance and lack of terrestrial habitat features within the site, the data collected from a pre-clearance trapping program would be minimal. Based on this the fauna pre-clearance survey did not include a trapping program.

Figure 1- Extent of Disturbance/Survey



Client: shadforth

Project: Everleigh

3. Statutory Requirements and Guidelines

Table 1- Statutory Requirements and Guidelines

LEGISLATION	PURPOSE OF LEGISLATION	IMPACT ON PROJECT PERSONNEL
Environmental Protection Regulation 2019	Gives legislative support to various national guidelines, plans and Australian Standards. This regulation also outlines requirements for the management of fauna and flora.	To abide by the regulations within the DES.
Environmental Protection and Biodiversity Conservation Act 1999	The EPBC Act focuses Australian Government interests on the protection of matters of national environmental significance, with the states and territories having responsibility for matters of state and local significance.	To comply with the relevant sections of the Act that relate to matters of national significance which are present in the vicinity of the project works.
Nature Conservation Act 2016	The Act provides for the legilative protection of Queensland's threatended biota. It is aligned with the IUCN redlist which categorises biota into their current status in the wild.	To comply with the relevant sections of the Act and regulations and the Environmental Authority administered by the DES.
Nature Conservation (Wildlife) Regulation 2006	This Regulation lists the plants and animals considered presumed extinct, endangered, vulnerable, rare, common, international, and prohibited. It discusses their significance and states the declared management intent and the principles to be observed in any taking and use for each group.	List those animals that may be potentially found on sites being developed as part of the project and limitations for management.
Nature Conservation (Wildlife Management) Regulation 2006	This Regulation provides for the management of wildlife (including taking, keeping and using wildlife including protected plants).	Provides guidance for the management of wildlife on site, particularly in relation to the interference with native wildlife during the clearing process.
Nature Conservation and Other Legislation (Koala Protection) Amendment Regulation 2020	• Guideline for identifying koala habitat • Managing koala habitat	Provides guidance on where spotter/catcher's are legally required and how they are to manage koala habitat
Animal Care and Protection Act 2001	• Animal Welfare	Outlines that animal ethics approval is needed for research, survey and/or monitoring involving vertebrates, where activities such as trapping, census leading to disturbance of animals (such as spotlighting or call play-back), abnormal interruption of behaviour or marking/tagging are involved.
Australian code for the care and use of animals for scientific purposes 8th edition (2013)	• Ethical framwork for animals used for scientific purposes	Governing principles set out in the Code provide guidance for investigators, teachers, instiitiutions, animal ethics committees and all the people involved in the care and use of animals for scientific purposes.
Terrestrial Vertebrate Fauna Survey Guidelines for Queensland (2018)	• Guidelines for Fauna Surveys	Detailed guidelines on designing a survey, the different survey methadologies and the ethical considerations that need to be made for each methadology.
Queensland Hygiene protocol for handling amphibians	• Protocol for handling amphibian species	Outlines how to handle and manage amphibian species to prevent the spread of diseases among specimens and colonies.
Code of Practice- Care and rehabilitation of orphaned, sick or injured protected	• Provides guidelines on the rehabilitation and care of wildlife	Detailed guidelines, in regards to hygiene, housing, capture and release, euthanasia and relevant legistation

animals by wildlife carers(2013)		
Seqwater-Guideline- Fish Stranding and Salvage	• The purpose of this guidance document is to ensure native fish recovery operations are conducted in a timely and safe manner to minimise or eliminate loss of fish from stranding.	Guideline on managing aquatic fauna during dewatering works.
Fisheries Act 1994	• The main purpose of the Fisheries Act is to provide for the use, conservation and enhancement of the community's fisheries resources and fish habitats in a way that seeks to apply the principles of ecologically sustainable development.	Outlines fish habitats and fish movement and migration (regulation of waterway barriers). Guidelines on commercial, recreational and indigenous fishing.
Biosecurity Act 2014	• The Biosecurity Act provides a framework for an effective biosecurity system for Queensland, to ensure the safety and quality of agricultural inputs, and to align responses to biosecurity risks in the state with national and international obligations.	Under the Biosecurity Act, pest species must not be kept, fed, given away, sold, or released into the environment without a permit. Under the Biosecurity Act, everyone has a general biosecurity obligation to take reasonable and practical steps to minimise the risks associated with restricted plants and animals.
DAF Guidelines for Fish Salvage, 2018	• Purpose of these guidelines is to minimise the risk to aquatic fauna during dewatering works.	These guidelines provide detailed instructions for dewatering waterbodies and slavaging aquatic fauna.

Australia Wide Environmental Consultants (AWEC) holds a current DES rehabilitation permit (**Permit #WA0002250**), with an extended authority issued by the Department of Environment and Science specifying that the holder may take, keep or use an animal whose habitat is about to be destroyed by human activity.

4. Results

4.1. Desktop Review

Vegetation is mapped as containing largely non-remnant vegetation and a small patch of Least/Of Concern regional ecosystem (**See Figure 2**).

The site is not located within a Priority Koala Area, but the areas proposed for disturbance contain a section of Core Koala Habitat (**See Figure 3**).

See Table 2 for a list of significant fauna species previously recorded within 5 km of the project area or with essential habitat within 2kms of the site.

Table 2- Significant Species

SIGNIFICANT FAUNA		
Significant Amphibian Species		
Wallum froglet (*Crinia tinnula*) 	**Listed in the Nature Conservation Act as Vulnerable** **0 Confirmed sightings within 2 km of the site** **Essential habitat for this species.**	During wet weather some parts of the site become inundated and could be potential foraging habitat for this species. This species was not recorded during the fauna pre-clearance surveys. The probability of encountering this species on site is low.
Tusked frog (*Adelotus brevis)* 	**Listed in the Nature Conservation Act as Vulnerable** **1 Confirmed sightings within 5 km of the site**	The north to eastern border of the site contains some low value foraging habitat for this species, not suitable as a breeding site. The chances of encountering this species is low.
Significant Avian Species		
Glossy black-cockatoo (*Calyptorhynchus lathami*) 	**Listed in the Nature Conservation Act as Vulnerable** **0 Confirmed sightings within 2 km of the site** **Essential habitat for this species** **1 Confirmed sighting within 5 km of the site**	The eastern section of the site contains suitable food sources for this species. This species wasn't recorded during the fauna pre-clearance survey. There is a low probability of encountering this species.
Rufous Fantail *(Rhipidura rufifrons)* 	**Listed in the Nature Conservation Act as Special Least Concern** **5 Confirmed sightings within 5 km of the site**	This site provides low value breeding sites and moderate value foraging habitat for this species. The chances of encountering this species is low.

Powerful Owl *(Ninox strenua)* 	**Listed in the Nature Conservation Act as Vulnerable** **4 Confirmed sightings within 5 km of the site**	This site provides low value breeding and foraging habitat for this species. This species wasn't recorded during the pre-clearance surveys. There is a low probability of encountering this species.
Significant Mammal Species		
Koala (*Phascolarctos cinereus*) 	**Listed in the Environmental Protection and Biodiversity Conservation Act as Vulnerable** **Listed in the Nature Conservation Act as Vulnerable** **138 Confirmed sightings within 5 km of the site** **Essential habitat for this species.**	This species has been sighted previously in adjacent lots. This lot contained low value habitat for this species, due to it being highly fragmented. Old scratch marks were seen. No fresh scratch marks or scat were recorded. The chance of encountering this species is low.
Greater Glider *(Petauroides volans)* 	**Listed in the Environmental Protection and Biodiversity Conservation Act as Vulnerable** **Listed in the Nature Conservation Act as Vulnerable** **1 Confirmed sighting within 5 km of the site** **Essential habitat for this species**	This site lacks large enough hollows for this species. The lack of connectivity means low value foraging habitat and high risk of predation for this species. No signs of this species were recorded during the fauna pre-clearance survey. The chances of encountering this species on site is low.
Spotted-tailed quoll (southern subspecies) *(Dasyurus maculatus maculatus)* 	**Listed in the Environmental Protection and Biodiversity Conservation Act as Endangered** **Listed in the Nature Conservation Act as Vulnerable** **1 Confirmed sighting within 5 km of the site** **Essential habitat for this species**	The groundcover and mid-storey vegetation layers are too sparse to provide breeding or foraging habitat for this species. No signs of this species were recorded during the pre-clearance survey. The probability of encountering this species on site is low.

Figure 2-Vegetation Management Supporting Map

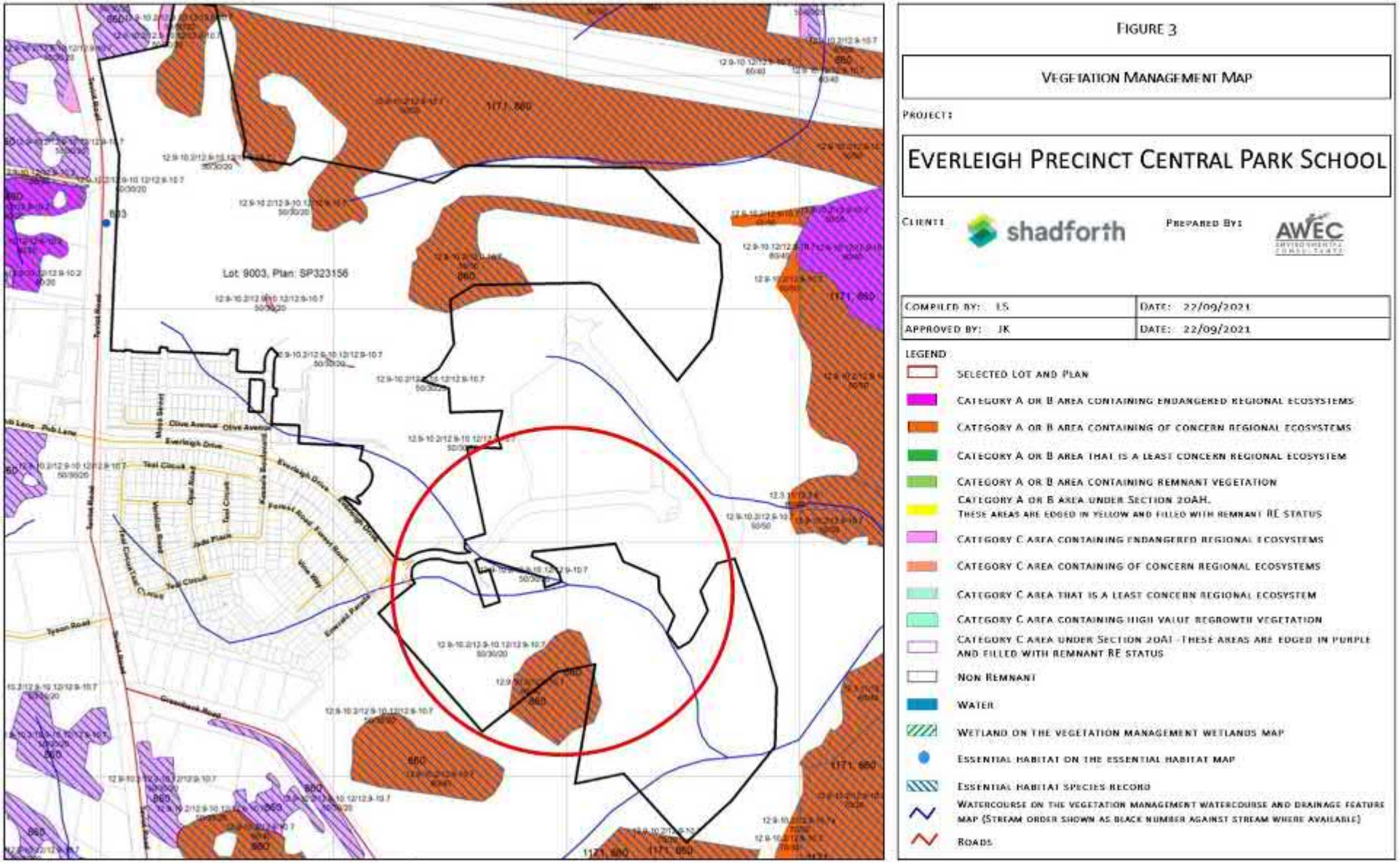
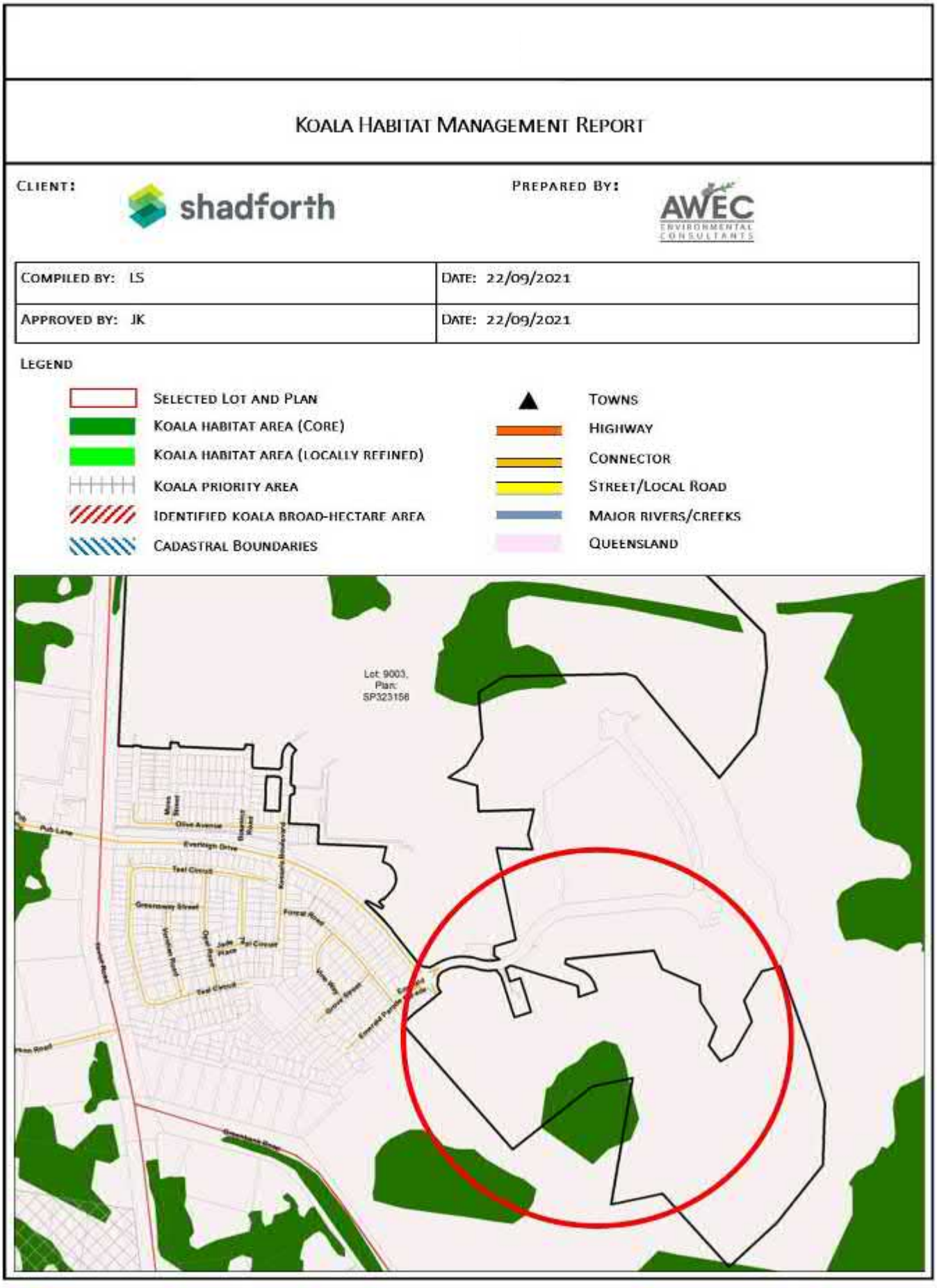


Figure 3- Koala Habitat in Southeast Queensland



4.2. Survey Results

The dominant vegetation community observed on site was Open Eucalypt Forest Regrowth and She-Oak/Paperbark Swamp Land.

The site has been historically cleared and therefore the overall flora biodiversity and structural complexity was low. Because of this the site also lacked significant habitat features in the form of fallen woody debris, thick leaf litter/bark shedding's and an intact canopy layer.
The following Queensland Land Protection (Pest and Stock Route Management) Act 2002 (LPA) Class 3 declared pest plants were observed on site:
Cinnamomum camphora (camphor laurel); and *Lantana camara* (lantana)
A search of the State Government's Wildlife Online Database for confirmed fauna sightings recorded within 2km of the site. The Wildlife Online database hold records of 131 confirmed previously recorded fauna species comprised of:

- 17 reptile species,
- 19 mammal species,
- 12 amphibian species,
- 2 Ray-finned Fish, and
- 81 bird species.

The field survey supported this data that the onsite fauna assemblage is dominated by avian species (**See Table 3**). No fauna species with significant conservation statuses were sighted on site and no active breeding sites were located within the area proposed for disturbance. Vegetation within this stage of works contained 10 significant habitat features, and the species sighted within it were all the more common fauna species better adapted to living in disturbed habitats.
There were no active breeding sites recorded within this area at the time of the Fauna Pre-clearance survey.
The sites fragmented canopy, sparse mid-storey and groundcover layers make the site low value habitat for all the significant species (**See Table 2**) likely to occur in the area. The species most likely to be encountered is the Vulnerable Koala. The fragmented canopy and high immature tree numbers is low value habitat for this species. Especially considering the vast amount of more suitable habitat surrounding the site.

Table 3- Sighted Fauna Biodiversity

COMMON NAME	SCIENTIFIC NAME	CONSERVATION STATUS
Avian		
Australian Magpie	*Cracticus tibicen*	Least Concern
Australian Wood Duck	*Chenonetta jubata*	Least Concern
Black-faced cuckoo-shrike	*Coracina novaehollandiae*	Least Concern
Black-shouldered Kite	*Elanus axillaris*	Least Concern
Blue-faced Honeyeater	*Entomyzon cyanotis*	Least Concern
Crested Pigeon	*Ocyphaps lophotes*	Least Concern
Galah	*Cacatua roseicapilla*	Least Concern
Grey Teal	*Anas gracilis*	Least Concern

COMMON NAME	SCIENTIFIC NAME	CONSERVATION STATUS
Laughing Kookaburra	*Dacelo novaeguineae*	Least Concern
Magpie-lark	*Grallina cyanoleuca*	Least Concern
Masked Lapwing	*Vanellus miles*	Least Concern
Noisy Friarbird	*Philemon corniculatus*	Least Concern
Noisy miner	*Manorina melanocephala*	Least Concern
Pacific Black Duck	*Anas superciliosa*	Least Concern
Pale-headed Rosella	*Platycercus adscitus*	Least Concern
Pied Butcherbird	*Cracticus nigrogularis*	Least Concern
Purple Swamphen	*Porphyrio porphyrio*	Least Concern
Rainbow Lorikeet	*Trichoglossus haematodus*	Least Concern
Sacred Kingfisher	*Todiramphus sanctus*	Least Concern
Scaly-breasted Lorikeet	*Trichoglossus chlorolepidotus*	Least Concern
Spangled Drongo	*Dicrurus bracteatus*	Least Concern
Straw-necked Ibis	*Threskiornis spinicollis*	Least Concern
Sulphur-crested Cockatoo	*Cacatua galerita*	Least Concern
Torresian Crow	*Corvus orru*	Least Concern
Welcome Swallow	*Hirundo neoxena*	Least Concern
Willie Wagtail	*Rhipidura leucophrys*	Least Concern
Mammal		
Eastern grey kangaroo	*Macropus giganteus*	Least Concern

Table 4- Significant Habitat Features

No.	Habitat Feature/ Fauna sign Description	Location (Lat-Long)
1	Possum scratch marks. Old	-27.7412695, 152.9961967
2	Possum scratch marks. Old	-27.7411325, 152.9958847
3	Possum scratch marks. Old	-27.74350633, 152.9970355
4	Koala scratch marks. Old.	-27.74360167, 152.9975043
5	Koala scratch marks. Old.	-27.74359067, 152.9976512
6	Koala scratch marks. Old.	-27.74401533, 152.9979112
7	Remnant old creek line with little pools of stagnant water.	-27.74428217, 152.9978735
8	Second point along remnant old creek line with little pools of stagnant water.	-27.74496567, 152.9979093

9	Arboreal termite mound, hollowed out.	-27.74504483, 152.9978673
10	Koala scratch marks. Old	-27.74510933, 152.9978613

5. Discussion

5.1. Development Impacts

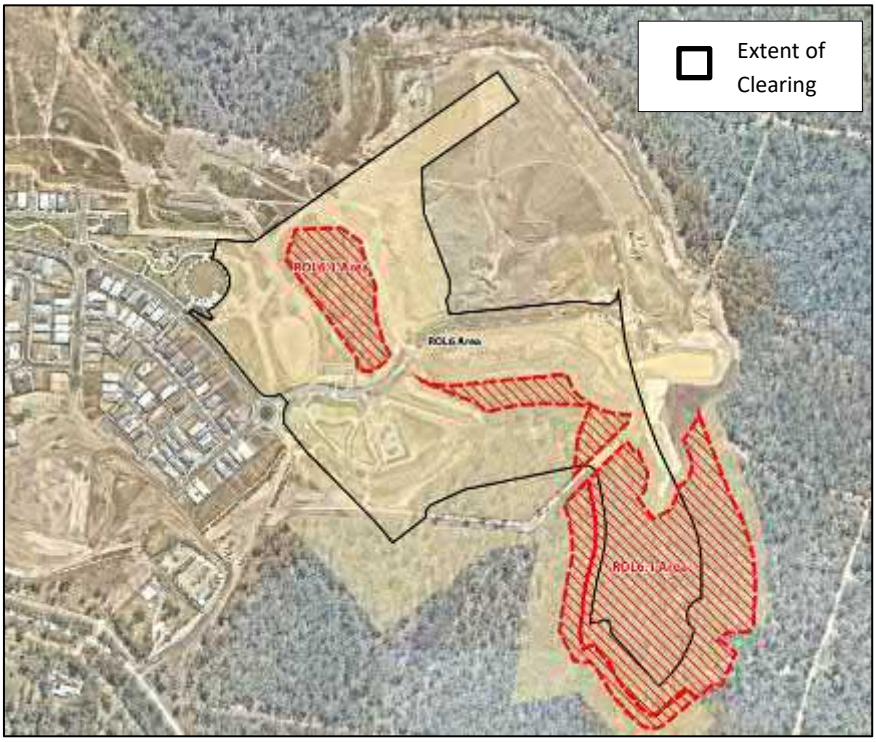
5.1.1. Flora

Vegetation within this lot consist of mostly non-remnant vegetation, with a small patch of Least Concern 12.9-10.2 and Of Concern 12.9-10.7 (Ratio 60/40) (Figure 2).

All native flora species to be cleared are commonly found in surrounding vegetation communities. In this regard, no species or genera would be completely removed from the site or the immediate locality of the site due to the proposed works.

Overall floristic value of the site is low, due to the lack of floral structural complexity, high density, and biodiversity of introduced flora species, compacted topsoil and low floral biodiversity. Clearing this area of vegetation will have little impact on the floristic value of the area.

Figure 4- Extent of Clearing



5.1.2. Fauna

Fauna pre-clearance surveys determined that the site contained 10 significant habitat features and no active breeding sites or fauna movement corridors.

Low density of significant habitat features, low floral structural complexity (absence of the mid-storey and groundcover layers), low density of fauna signs and opportunistic fauna sightings indicate that the fauna density within the site is low. Therefore, the number of animals that will be directly impacted by the proposed works will be minimal and this risk will be mitigated by following the recommendations in the Wildlife and Habitat Impact Mitigation Plan.

These works are being done in breeding season, so the chances of avian species being directly impacted are higher than average and this needs to be considered throughout the clearing process. Adjoining the site is large, vegetated areas that provide a range of alternative nesting sites for the animals that previously used this site as a breeding site.

The lack of complexity in the vegetation structure and high immature tree numbers makes this low value habitat for arboreal mammal, small marsupials and reptiles. The loss of this site won't have a significant direct or cumulative impact on the fauna assemblage in the area. The Wildlife and Habitat Impact Mitigation Plan further reduces the potential of direct or cumulative impacts on the local fauna population as a result of the proposed development.

6. Conclusion

Australia Wide Environmental Consultants were commissioned by SHADFORTH CIVIL CONTRACTORS to compile a Wildlife Protection and Management Plan for EVERLEIGH- Central Park School development off Teviot Road in Greenbank, Queensland (**See Figure 1**).

Vegetation is mapped as containing largely non-remnant vegetation and a small patch of Least/Of Concern regional ecosystem.

Fauna pre-clearance surveys determined that the site contained 10 significant habitat features and no active breeding sites. Due to the immature size of vegetation, this is low value habitat for arboreal mammals, small marsupials and reptiles. The loss of this site won't have a significant direct or cumulative impact on the fauna assemblage in the area.

Wildlife and Habitat Impact Mitigation Plan further reduces the potential of direct or cumulative impacts on the local fauna population as a result of the proposed development.

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Environmental Pre-Start Checklist

Attachment 8

Wildlife and Habitat Impact Mitigation Plan

Wildlife and Habitat Mitigation Plan

SHADFORTH CIVIL CONTRACTORS

EVERLEIGH- Central Park School

Teviot Road

Greenbank, Queensland

October 2021

Document prepared by:

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0	September 2021	Issue for Use	Yolande Venter	Joel Keady	Joel Keady
1	October 2021	Issue for Use	Yolande Venter	Joel Keady	Joel Keady
2					

Document Approval

Approved:	*Name*	*Signature*	*Date*
Company Director	*Yolande Venter*		*October 2021*

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1. Introduction

1.1. Background

Australia Wide Environmental Consultants were commissioned by SHADFORTHS CIVIL CONTRACTORS to compile a Wildlife and Habitat Impact Mitigation Plan for EVERLEIGH PRECINCT Central Park School development on Teviot Road in Greenbank, Queensland (**See Figure 1 &2**).

The project is a master planned residential development located on allotments at the corner of Teviot Road and Greenbank Road. Area for Central Park School is adjoining to the already existing development and connected to an active jobsite.
Site was surveyed on the 22nd of September and 12th October 2021 by a suitably qualified ecologist.

1.2. Ecologist and Qualifications

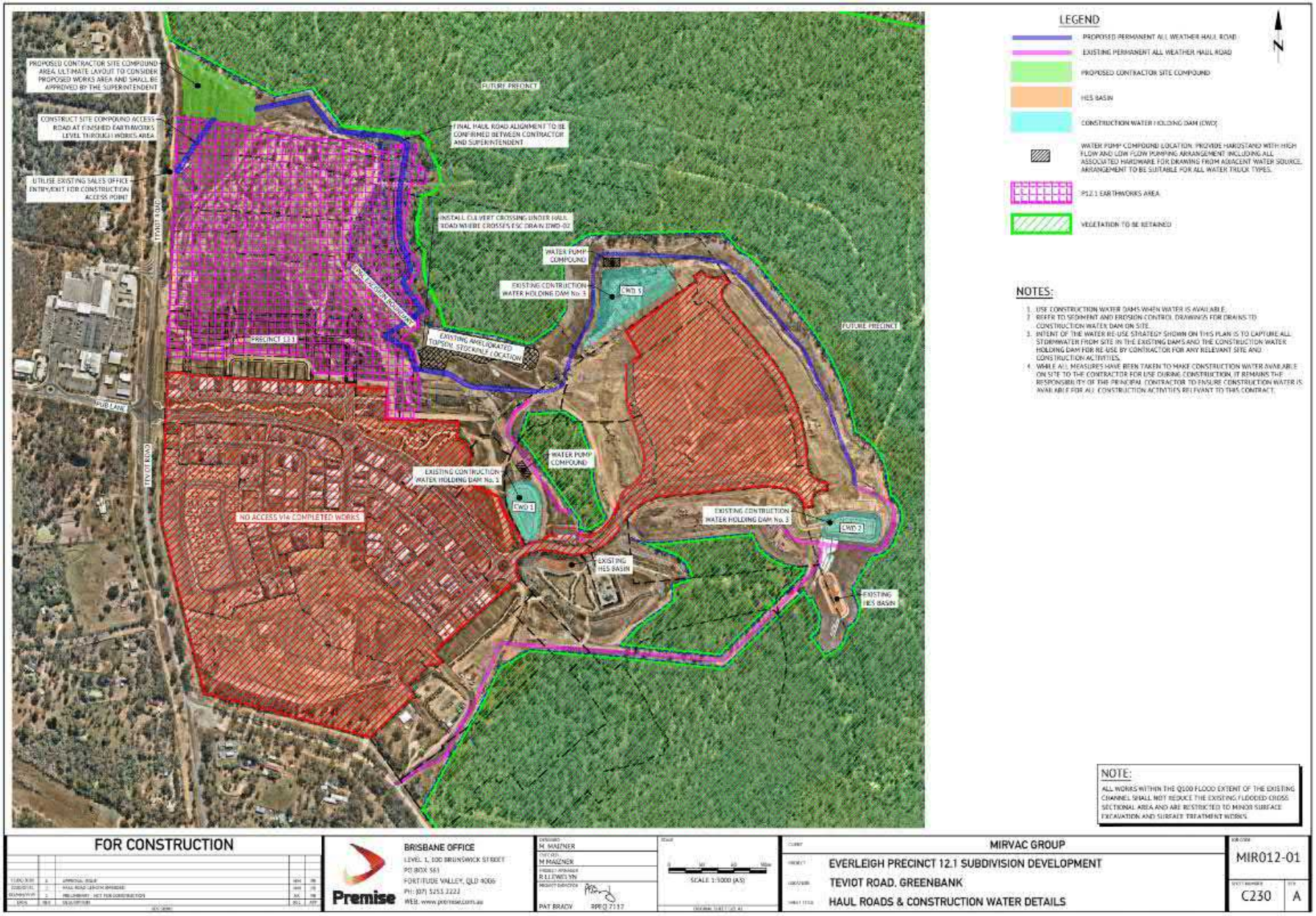
The AWEC nominated Ecologist is Yolande Venter who is a degree qualified ecologist/environmental coordinator with over 15 years of field experience within the ecology and environmental sectors.

1.3. Scope

This report will aim to minimise and mitigate any risks to fauna raised in the Wildlife Protection and Management Plan.

1. Measures required to be completed to minimise wildlife and habitat impacts during operational works;
2. Wildlife capture and removal plan;
3. Contingency plan for wildlife requiring euthanasia, other veterinary procedures or captive care;
4. Wildlife storage and housing plan;
5. Wildlife release and disposal plan; and
6. Post works measures to minimise impacts on wildlife.

Figure 1- Precinct Layout Plan



2. Statutory Requirements and Guidelines

Table 1- Statutory Requirements and Guidelines

LEGISLATION	PURPOSE OF LEGISLATION	IMPACT ON PROJECT PERSONNEL
Environmental Protection Regulation 2019	Gives legislative support to various national guidelines, plans and Australian Standards. This regulation also outlines requirements for the management of fauna and flora.	To abide by the regulations within the DES.
Environmental Protection and Biodiversity Conservation Act 1999	The EPBC Act focuses Australian Government interests on the protection of matters of national environmental significance, with the states and territories having responsibility for matters of state and local significance.	To comply with the relevant sections of the Act that relate to matters of national significance which are present in the vicinity of the project works.
Nature Conservation Act 2016	The Act provides for the legilative protection of Queensland's threatended biota. It is aligned with the IUCN redlist which categorises biota into their current status in the wild.	To comply with the relevant sections of the Act and regulations and the Environmental Authority administered by the DES.
Nature Conservation (Wildlife) Regulation 2006	This Regulation lists the plants and animals considered presumed extinct, endangered, vulnerable, rare, common, international, and prohibited. It discusses their significance and states the declared management intent and the principles to be observed in any taking and use for each group.	List those animals that may be potentially found on sites being developed as part of the project and limitations for management.
Nature Conservation (Wildlife Management) Regulation 2006	This Regulation provides for the management of wildlife (including taking, keeping and using wildlife including protected plants).	Provides guidance for the management of wildlife on site, particularly in relation to the interference with native wildlife during the clearing process.
Nature Conservation and Other Legislation (Koala Protection) Amendment Regulation 2020	• Guideline for identifying koala habitat • Managing koala habitat	Provides guidance on where spotter/catcher's are legally required and how they are to manage koala habitat
Animal Care and Protection Act 2001	• Animal Welfare	Outlines that animal ethics approval is needed for research, survey and/or monitoring involving vertebrates, where activities such as trapping, census leading to disturbance of animals (such as spotlighting or call play-back), abnormal interruption of behaviour or marking/tagging are involved.
Australian code for the care and use of animals for scientific purposes 8th edition (2013)	• Ethical framwork for animals used for scientific purposes	Governing principles set out in the Code provide guidance for investigators, teachers, instiitiutions, animal ethics committees and all the people involved in the care and use of animals for scientific purposes.
Terrestrial Vertebrate Fauna Survey Guidelines for Queensland (2018)	• Guidelines for Fauna Surveys	Detailed guidelines on designing a survey, the different survey methadologies and the ethical considerations that need to be made for each methadology.
Queensland Hygiene protocol for handling amphibians	• Protocol for handling amphibian species	Outlines how to handle and manage amphibian species to prevent the spread of diseases among specimens and colonies.
Code of Practice- Care and rehabilitation of orphaned, sick or injured protected	• Provides guidelines on the rehabilitation and care of wildlife	Detailed guidelines, in regards to hygiene, housing, capture and release, euthanasia and relevant legistation

animals by wildlife carers(2013)		
Seqwater-Guideline- Fish Stranding and Salvage	• The purpose of this guidance document is to ensure native fish recovery operations are conducted in a timely and safe manner to minimise or eliminate loss of fish from stranding.	Guideline on managing aquatic fauna during dewatering works.
Fisheries Act 1994	• The main purpose of the Fisheries Act is to provide for the use, conservation and enhancement of the community's fisheries resources and fish habitats in a way that seeks to apply the principles of ecologically sustainable development.	Outlines fish habitats and fish movement and migration (regulation of waterway barriers). Guidelines on commercial, recreational and indigenous fishing.
Biosecurity Act 2014	• The Biosecurity Act provides a framework for an effective biosecurity system for Queensland, to ensure the safety and quality of agricultural inputs, and to align responses to biosecurity risks in the state with national and international obligations.	Under the Biosecurity Act, pest species must not be kept, fed, given away, sold, or released into the environment without a permit. Under the Biosecurity Act, everyone has a general biosecurity obligation to take reasonable and practical steps to minimise the risks associated with restricted plants and animals.
DAF Guidelines for Fish Salvage, 2018	• Purpose of these guidelines is to minimise the risk to aquatic fauna during dewatering works.	These guidelines provide detailed instructions for dewatering waterbodies and slavaging aquatic fauna.

Australia Wide Environmental Consultants (AWEC) holds a current DES rehabilitation permit (**Permit #WA0002250**), with an extended authority issued by the Department of Environment and Science specifying that the holder may take, keep or use an animal whose habitat is about to be destroyed by human activity.

3. Occupational Health and Safety

Before commencement of work on the site all inductions including client, inductions must be completed; all onsite requirements outlined in the inductions must always be adhered to.

Before handling any venomous snakes, you must have completed a Venomous snake relocation course and an acceptable level of attainment must have been achieved.

3.1. Personal Protective Equipment (PPE)

The PPE required on site must always be worn. As a minimum a long sleeve high visibility work shirt, long work pants, hard hat with sun brim, lace up work boots, safety glasses and suitable gloves for your planned task are to be worn.

3.2. First Aid

It is a requirement of your position as a Fauna Handler that you have a current first aid certificate and first aid kits have been placed in every vehicle for your use. If working in the field and are situated away from your site vehicle you must carry a snake bit kit.

3.3. Biosecurity/ Hygiene Measures

Biosecurity/hygiene measures include-

Zoonotic diseases (those that affect both animals and humans and may be passed between them) are known to be present in Australian native wildlife e.g. Australian bat lyssavirus. Diseases may also be transferred between animals. Fauna handlers should therefore take basic precautions to prevent animal-animal, animal-human and human-animal transfer of disease. Such precautions should include the following:

- High levels of personal hygiene.
- Using personal protective equipment such as gloves, boots etc.
- Not eating, drinking or smoking while handling wildlife, also disinfecting before eating or drinking.
- Washing field clothes and equipment that has encounter animal's blood or body fluids and cleaning all trapping equipment between surveys.
- Basic first aid for treatment of cuts, bites and scratches.
- Observe conditions in Queensland Hygiene protocol for handling to avoid spreading Chytrid fungus.
- Obtaining vaccinations against Australian bat lyssavirus before handling bat species.
- Knowledge and familiarisation with C3 bat protocol
- Should anyone who handled animals become ill within two months of a survey, the attending medical practitioner should be informed of the potential exposure to zoonosis.

3.4. Working around plant

Placement

When working besides plant (Bulldozers and Excavators) a clear line of sight to the machine operator is required. For the operator to maintain line of sight it is important to be on the correct side of the machine, for excavators this is the left side (operator cabin side). For bulldozers, the correct place is on either side, not in front or behind the machine and always maintain positive communication with the operators. When vegetation is being felled it is important to stand well clear (but still within sight of the operator). If further inspection of a tree is required, the operator must be contacted and place the machine in the "safe" position (Stationary with the bucket or blade on the ground) before you can approach the tree.

Clearing zone

Clearing zone is defined as that area within two tree lengths (50 metres) from the operating machine. This zone is a hazardous area, care must always be taken while working within this zone. The clearing zone is where most of the spotter/catcher's work occurs.

Communication

Communication with the plant operator is to be made via hand help UHF radios. Radios must always be charged and carried on your person. Clear communication with the operator is essential to ensure safety and the required co-operation is achieved. The operator must be informed upon the sighting of any wildlife and of your intentions to catch the animal; you require positive communication before approaching the machinery.

4. Fauna Management

4.1. Managing Disturbance Activities

4.1.1. Prior to Work Commencing-

A quick inspection of the site prior to any construction activities commencing every morning. The purpose of this inspection is to check for any fauna (in particular Koalas) are present within the next area to be cleared, if any habitat features or nesting sites are located within the site and that their clearly marked out and that their planned mitigation measures have been discussed with the clearing crew.

4.1.2. During Disturbance Works-

During clearing works a spotter/catcher is to be present to manage the risk to native fauna within the site. The spotter/catcher will ensure that significant habitat features and breeding sites are cleared in a manner that best mitigates the risk to fauna potentially in-habiting them.

The spotter-catcher will also manage the direction of clearing to ensure that fauna is directed into a suitable location.

4.2. Fauna Capture

One of the roles of the fauna spotter/catcher on site is to remove any fauna within the disturbance site. Where practical animals are to be moved out of an area proposed for disturbance before clearing/stripping works commence.

Where there is a risk to native fauna a spotter/catcher is to be present during clearing works and watch out for any fauna, fauna signs and significant habitat features. When an animal is sighted, and it is deemed safe to approach the animal the capture procedure listed below will be adhered to.

This does not apply to the Vulnerable Koala which cannot be captures, handled, stored or removed from site and must be managed in accordance with the Nature Conservation (Koala) Conservation Plan 2006 and Management Program 2006-2016.

4.2.1. Fauna Identification

It is important that correct identification (Fauna/Flora) is made for record keeping purposes. If a sighted or captured/collected flora or fauna specimen can't be identified on site an ecologist is to be contacted who will direct the Spotter/Catcher on site on the types of images they require to correctly identify the specimen.

4.2.2. Fauna Handling Equipment

Various methods can be used to safely capture native wildlife in the field, capturing native wildlife does not only pose a risk to the handler's personal safety but could also cause unnecessary stress and or injury to the animal involved. Before capturing any wildlife plan your capture, handle the animal as per training and have the correct equipment available.

4.2.3. Fauna Handling Procedure

Capture myopathy is a disease associated with the capture or handling of many species of mammals and birds and minimising the stress on any captured fauna is a priority. Emphasis should be on prevention as treatment of wild fauna has a very low success rate.

The following principal should be applied-

- Remove stressors if possible. Physically separating the animal from the stressors, e.g., by blindfolding the animal, placing it in a darkened area, or moving other activities away from the holding area.
- Treat shock if present. Ensure adequate ventilation, replace fluids, correct acidosis, and keep the animal warm.
- Restriction of free movement as a result of muscle injury means a careful watch must be kept on fluid balance. Many animals with capture myopathy will suffer from exposure and /I one of the common features in hot environments is dehydration. Balanced electrolyte replacers may be needed.
- If possible, restrict movement of the animal to reduce the chance of rupturing necrotic muscles.
- Minimizing duration of exposure to stressors. High stress situations include frequent handling, repeated blood sampling, or being left in exposed conditions (such as in a trap enclosure without natural cover)

Species specific procedures-

Possums

To capture possums on the ground, it is best practice to grab the tail and the back of the neck. This will ensure the best grip on the animal and ensures that the handler is not in danger of being scratched or bitten, where practical the spotter/catcher should wear the appropriate gloves. Once the possum is restrained, it should be placed into an appropriately sized calico bag or pet carrier.

Where the presence of a possum is confirmed within a drey or hollow using an EWP or inspection camera, the spotter/catcher will deem which method is practical and will gain the best outcome for the in-habitant. Potential methods include removal using an EWP where practical or soft felling the tree. As possums are predominantly nocturnal, they should be released after sunset.

Gliders

To capture gliders on the ground it is best practice to grab the tail and the back of the neck. This will ensure the beast grip on the animal and ensures that staff are in no danger of being scratched or bitten, where practical the spotter/catcher should wear the appropriate gloves. Gliders are smaller than possums so it will be easier to get a grip around the back of the neck. Once the glider is caught it is to be placed into an appropriately sized calico bag, where multiple gliders are found in one hollow, they should be housed in one large calico bag.

Non-venomous Snakes

Caution should be taken when handling non-venomous snakes. If the identification can't be confirmed prior to handling or if there's any uncertainty the snake should be handled as if it's venomous. Where possible the hook and bag technique should be

used, where this is not possible the animal can be restrained at the base of the skull with a thumb and forefinger either side of the head and to the rear of the lower jaw.

When a snake is sighted, warn others of its location and ask them to stand back as you capture and secure the animal. Place the animal into snake hoop bag and securely close the bag. The bag should be placed in safe location and everyone should be made aware not to touch any bags containing fauna.

Venomous Snakes

Do not handle Venomous snakes unless you have completed a venomous snake handling course with a suitably qualified trainer and have been approved by Joel Keady to handle venomous snakes. Where practical use the hook and bag method to capture venomous snakes.

When a snake is sighted, warn others of its location and ask them to stand back as you capture and secure the animal. Place the animal into snake hoop bag and securely close the bag. The bag should be placed in safe location and everyone should be made aware not to touch any bags containing fauna. All containers or bags containing a venomous animal should be labelled and closed using zip ties.

Monitors

Monitors can be caught by the base of the tail; caution should be taken as these animals are powerful and their bite can easily result in severe infections. When you have grabbed an animal take care as they will easily swing towards the handler and can cause severe injuries through scratching and biting. Once the animal is under some control, use a catch bag or towel to cover their head, this will allow the handler to take hold of the neck. The hand/arm holding the neck must align the wrist and forearm along the back of the monitor, the animal can then be lifted. Tilt the head/neck back a small amount and hold the animal (away from your body) be careful of the tail as it will be used to strike.

These animals need to be released straight away or placed into a suitably sized pet carrier or calico/hessian bag.

Frogs

The spread of disease, such as the chytrid fungus, may occur as a result of handling frogs. Unnecessary handling should be avoided, and the specimen released as soon as possible. When handling amphibians, the handler should wear unused disposable gloves or capture and handle frogs in single use lightweight plastic bags. Bare hands may be used provided they are wiped before each capture with a sterilising alcohol-based hand disinfectant.

Bats/Flying Foxes

Bats should not be handled by staff that are not immunised. Bats should always be handled with gloves, flying foxes should be handled with heavy duty gloves. Bats can carry a disease called Lyssavirus which is closely related to the common rabies. If handlers are bitten or scratched it should be reported immediately.

If several micro-bats are removed from one hollow, they should all be stored in the same calico bag.

4.3. Storing Captured Fauna

Captured fauna should be secured in either a calico bag, snake bag or pet carrier after being captured. If an animal is placed into a bag the end should be securely knotted closed and then tied using a bag tie or zip-tie.

These bags should be placed in a quite dark location that is the appropriate temperature for the species that has been captured. Captured fauna should be released into suitable habitat as soon as possible. Some species are nocturnal and cannot be released till dusk, extra care should be taken when storing an animal for this long a period to ensure it isn't stressed or over/under heated.

If an animal is injured or orphaned, it should be secured in a manner that prevents unnecessary stress or increases the severity of its injuries. It should be transported to a wildlife carer or vet clinic as soon as possible.

4.4. Releasing Captured Fauna

When releasing animals away from disturbed habitat, attention must be paid to several factors, including weather conditions, seasonal conditions and the animal's ecology. Native Fauna should be released:

- Into suitable Habitat with an adequate food supply
- In appropriate weather, season and time of day. This is particularly important for migratory species.
- Under circumstances which will not cause additional stress, such as extreme weather conditions, the wrong time of day (i.e. nocturnal species)
- In the appropriate social group. Some animals fare better if released into social groups.
- Within 1km of the site as per EHP guidelines.

Fauna should be released at a suitable time of day, in a protected location close to the site. Data should be recorded and kept on all fauna species trapped and relocated in accordance with EHP guidelines under the Rehabilitation Permit issued to AWEC.

If situations occur where animals can be re-released on the clearing site once clearing is complete the following criteria must be followed:

- Sufficient habitat is retained on site to support the animal's required niche, considering factors such as: vulnerability to predation; availability of nesting sites, hollows or microhabitats and the availability of water and sufficient food sources.
- Habitat corridors retained are of a suitable size, topography and vegetation cover to provide effective routes for normal ecological processes such as immigration, emigration, recruitment and dispersal.
- Habitat blocks and corridors are of sufficient size to maintain ecological integrity and effectiveness, considering likely edge effects.
- Long term risk factors to individual and population survival associated with the development have been (or will be) adequately managed or mitigated. For example: domestic animal control, motor vehicle/road impacts, swimming pool risk.

4.5. Injures & Euthanasia

Euthanasia is sometimes required to alleviate any pain or suffering of an injured captured animal that is not capable of recovering to a degree to be released back into its natural habitat. Any euthanasia that is required should be done promptly and, in the manner, most humane to that particular species.

Any injured animals that have a reasonable chance of being rehabilitated and released back into their natural habitat should immediately be given the care that they require. Any animals that require medical attention to treat or diagnose an injury should be taken to the closest vet. Any orphaned young or fauna with minor injuries (e.g. concussion) should be taken to the closest carer. Some animals for example koalas will require specialist care and the closest suitable care facility should be contacted.

Recommended Wildlife Surgery-

- Brisbane Veterinary Emergency and Critical Care Services- 53 Old Northern Road, Albany Creek QLD
- The Bloomin Vet- Greenbank Shopping Centre- Teviot Road, Greenbank, QLD

5. Fauna Management Measures

5.1 Clearing Methodology

Proposed disturbance site is to be sequentially cleared according to Figure 3 using excavators and bulldozers.

After under scrubbing of each area is complete, non-habitat trees (i.e. trees other than those identified as habitat trees) will be cleared and stockpiled for mulching. Clearing of non-habitat trees will only occur where their removal will not impact on identified habitat trees (e.g. canopies do not interconnect with habitat trees).

(e) After under scrubbing and clearing on non-habitat trees, an elevated work platform or cherry-picker will be used in conjunction with a chainsaw operator and suitably qualified fauna spotter/catcher to inspect and remove hollows a necessary prior to habitat tree felling. This method involves the fauna spotter/catcher inspecting each of the potential habitat features (usually hollows, dreys and arboreal termite nests) to determine the presence of arboreal fauna. This process is detailed following the step by step basis below:

1. The fauna spotter/catcher (with arborist unless the fauna spotter/catcher is a qualified chainsaw operator) will inspect each visible hollow or potential habitat resource (i.e. ringtail possum drey) identified in each tree using the cherry-picker. This is usually carried out by simply looking into hollows with the assistance of a small torch, however, burrow and bore-scopes can also be useful for deep hollows.
2. If fauna is located within a hollow, a piece of towel or rag will be firmly laced in the entrance to prevent the wildlife form escaping as in most cases arboreal fauna become aware of the presence of the fauna spotter/catcher and may attempt to flee the nesting/denning hollow due to a perceived threat. If an occupied ringtail possum drey is encountered, the fauna spotter/catcher should quietly approach (i.e. avoid contacting other branches) the drey in the cherry-picker bucket and physically capture the possum by placing the entire drey in a catch bag or only the possum if it emerges from the drey.

3. Once the hollow entrance has been secured the arborist or fauna spotter/catcher will cut the entire hollow limb off below the cavity where the branch remains solid. In circumstances where a hollow continues into the main stem of the tree, a small window will be carefully cut into the hollow, allowing the fauna spotter/catcher to plug the hollow above and below the window, then the hollow limb removed and lowered to the ground in sections.
4. When the fauna has been safely secured within its hollow, the entire limb can then be placed in the cherry-picker bucket or lowered to the ground using ropes depending on the size of the limb.
5. This limb will then be placed in a cool, quiet location until translocation to the recipient habitat site, when at dusk the follow entrance is re-opened to allow the fauna to emerge of its own accord.

5.2 Checking Hollows

Habitat trees of high importance should be felled last, after surrounding less important vegetation has been cleared to allow easy access of special plant and equipment (such as an EWP), and to allow unhindered lowering of hollow bearing limbs.

Prior to felling any hollow bearing trees, the hollows are to be checked for occupants. A fibre optic camera on an extended pole will be used to check all hollows prior to the trees being felled. All the trees containing a hollow with an occupant will be marked and the machine operator will be notified of its location. Where ground conditions allow a cherry picker will be used to either the remove the animal from the hollow or close the hollow up and remove the entire hollow containing the animal and bring it down with the EWP. Prior to any intervention, exit holes should be plugged to prevent escape of wildlife.

If ground conditions do not allow the use of an EWP, a tree climber is to be used to remove the hollows prior to the tree being softly felled using on site machinery.

Whenever possible, the integrity and structure of tree hollows contained in trees which are to be removed should be preserved. These should be relocated to appropriate habitat retained on the site, or to appropriate habitat close to the site.

5.3 Native Beehive Relocation

All native bee hives of the genera *Tetragonula* (*syn Trigona*) and/or *Austroplebelia* are to be recovered during vegetation clearing associated with “bulk earthworks/civil works” for relocation into the retained vegetation and/or recovered and “boxed up” (if damaged) for later installation.

If a native beehive is located on site, its entrance is to be blocked off prior to sunrise. The extent of the beehive within the hollow is to be established using a fibre optic camera. The beehive is then to be cut out and both ends of the hive sealed off using treated wood. The beehive is then to be relocated to a suitable location and left-over night. The next morning at sunrise the entrance is to be opened.

Figure 3- Relocated Native Beehive

5.4 Habitat Replacement

The aim of nest boxes is to compensate for the loss of habitat features by developing the site (**See Figure 2**). The types of nest boxes installed was influenced by the Fauna Pre-clearance survey conducted on site by AWEC and the fauna captured and sighted during the clearing works on site.

Nest boxes will be sourced from Hollow Log Homes and hollows suitable to the species sighted/signs of species sighted/captured on site will be ordered. Nest boxes will be fixed to trees using a method designed to ensure no damage is done to the tree as the tree matures (**See Figure 7**). Possum and glider boxes will be placed in the foliage to protect them from hot afternoon sun and can be positioned facing any direction except for west. The nest boxes should be placed in an area that gives protection from direct sunlight and the entrance should face away from prevailing winds and rain. Nest boxes for possums should be attached approximately 2-4m off the ground and 3- 6m high for glider and bird boxes (Franks, 2006). The nest boxes should be placed within an area that contains suitable species and quantities of food trees that are favoured by the species that the nest box was designed for.

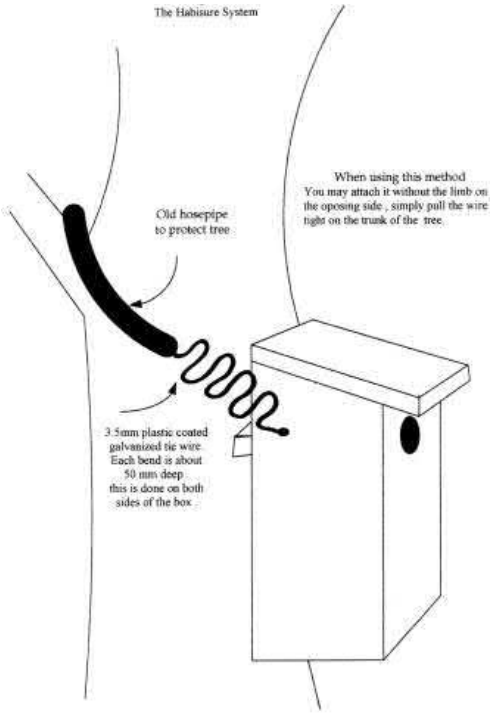


Figure 4- Nest Box Installation

The compensation ratio to be applied where hollows are identified as being utilised by possums, gliders or hollow dependant bird species will be a 1:1 ratio. In the case where hollows are identified but occupancy is not confirmed a 3:1 compensation ratio will be utilised (Smith, 1999).

The amount of arboreal fauna captured during the disturbance activity will also influence the quantity and type of habitat replacement features that will be required. Suitable nest boxes will be provided if possums, gliders or hollow dependent birds are found to be utilising hollows

within the proposed disturbance site. Installing these nest boxes prior to clearing works commencing will ensure that hollow dependant species have immediate access to suitable habitat.

5.5 Fauna Management Measures- Clearing Works

Objective	Management Methods	Responsibility	Timing
A) Pre-clearing			
Mitigate the risk to native fauna	1. Prior to the commencement of works a temporary star picket fence shall be installed around open space areas and any individual trees identified for retention within the works area. Fencing shall be fauna friendly and provide at least a 30 cm gap between the bottom of the fence and the ground. 2. A Queensland National Parks & Wildlife Service (QNPWS) and DES approved fauna spotter catcher shall inspect the site no more than two weeks prior to clearing works commencing onsite and prepare a Fauna Spotter Catcher Report. The report must include a full list of fauna species encountered during the inspection, as well as the marking and identification of significant habitat trees. 3. In addition, the DES registered fauna spotter catcher must assess the site for: • The presence of native fauna and/or supporting habitat on-site. • Available adjacent habitat. • The presence of any fauna that is 'protected wildlife' as defined under the Nature Conservation Act 1992 ('protected wildlife') • The presence of any species that is a 'listed threatened species under the Environment Protection and Biodiversity Conservation Act 1999 (Cth) ('listed species') 4. The DES approved fauna spotter must be present during the pre-start meeting to identify all fauna habitat trees prior to commencement of works; damage to any such trees, to ensure that wildlife is unharmed; and at the time of tree clearing operations. 5. A quick active fauna inspection is to be conducted the morning prior to clearing works commencing, active search	Fauna Spotter	Pre-construction

Objective	Management Methods	Responsibility	Timing
	over micro-habitats for any fauna, locate any potential nesting sites, ensure all habitat trees are marked and inspect canopy for the presence of koalas. 6. Any fauna sighted during the pre-clearance survey should be relocated to a nearby suitable habitat.		
B) Clearing and Grubbing			
Reduce risk to native fauna during disturbance activities	1. Suitably qualified S/C's are to be present for all clearing and grubbing activities where there is a risk to native fauna. S/C's are to implement and check that all practical measures to minimise the risk to fauna during construction are adhered to. S/C's must hold or be approved to work under DES a Rehabilitation spotter/catcher endorsed permit and damage mitigation permit. 2. Vegetation must be cleared sequentially to direct wildlife into surrounding retained vegetation and prevents isolates patches of vegetation where wildlife may seek refuge. The relocating of fauna is not permitted, and fauna must move off at its own accord and encouraged/flushed into safe havens. Unless the animal is at high risk of injury or predation if allowed to self-relocate. 3. In the event of an animal being located an area of 5 m radius should be established around the tree excluding machinery from the area until the animal has relocated (usually overnight). Unless the animal is at high risk of injury or predation if allowed to self-relocate. 4. All habitat trees and hollow bearing trees will be inspected using a camera on an extendable pole whether they are currently occupied. Any occupied trees will be blocked off and relocated using an EWP or tree climber where practical and site conditions allow. 5. Any habitat or hollow bearing trees with un-confirmed occupancy are to be soft-felled in order to reduce the risk of injury to any fauna in-habiting the tree and to reduce the risk of damaging the hollows. 6. Any injured wildlife will be taken to receive veterinary attention within 24 hours if required. If veterinary attention is not required any injured or orphaned wildlife is to be	Fauna spotter and construction/ clearing crew	Earthworks

Objective	Management Methods	Responsibility	Timing
	transferred to a suitably qualified Wildlife Carer. Any native fauna orphaned or injured by the development process must be immediately reported to the DES (1300 130 372) or RSPCA (1300 264 625).		
C) Koala Management			
To protect the local population of Koalas	1. If a koala is sighted within the site a koala spotter will be on site to manage and monitor the animal until it has self-relocated out of the site. A koala spotter is to be present on the first day of clearing works with the sole responsibility to inspect all the vegetation proposed for disturbance for the presence of koalas. 2. Following measures will be undertaken to minimise, reduce or mitigate impacts to koalas in potential koala habitat areas: a. Sequential clearing will be utilised to assist fauna in relocating to nearby habitat on their own accord. b. No tree in which a Koala is present and no tree with a crown overlapping a tree with a Koala present will be disturbed. A 50m buffer around any tree containing a Koala is to be established and works to seize within this buffer until the has moved off on its own accord. c. A vegetation corridor is to be left where practical to allow the koala to self-relocate to a suitable area that is not a proposed disturbance site. d. In areas containing a dominance of koala food trees and positively identified Koala sightings and/or identified scat or scratch marks a koala spotter is to be present during clearing activities. e. If a Koala is not injured but refuses to move from the clearance area on its own accord after two days, the S/C will liaise with DES and negotiate appropriate methods for removal and relocation. 3. A DES approved Koala Spotter is a person who holds a tertiary qualification in Biology or Zoology, or who is demonstrably experienced in the identification and location of Koalas in their natural habitat and has authorisation from DES to conduct such activities.	Fauna spotter and clearing crew	Earthworks

Objective	Management Methods	Responsibility	Timing
	4. Prior to the commencement and during felling operations, it is the responsibility of the DES approved Koala spotter to: • be present at the site of felling operations. • Identify any tree at the site within which a Koala is present, as well as any tree that has a crown which is intermeshed or overlapping with such a tree; and • Advice the person who is authorised to conduct the felling operation, or that person's representative, of the precise location of each such tree.		
D) Releasing Fauna			
To reduce the impact the project has on native fauna	1. The animal must be released as near as practical to the point of capture. 2. Where practical animals should be relocated with the hollow in which they were found or a suitable nest box. 3. When releasing wildlife attention must be paid to several factors, including weather conditions, seasonal conditions and the animal's ecology. 4. Fauna should be released at a suitable time of day in a suitable location.	Fauna spotter	Project Duration
E) **Mulching Works**			
To reduce the impact the project has on native fauna	1. All the hollow features within the cleared vegetation should either be removed so that they can relocated into the protected areas or destroyed. This reduces the risk of any native fauna occupying the cleared vegetation stockpiles and being injured during the mulching works. 2. Stockpiled vegetation, topsoil and other materials can quickly become temporary habitat for animals displaced during the actual clearing and earthworks. Prior to removal of any stockpiled vegetation, the Fauna Spotter Catcher must inspect for any fauna using the stockpile as temporary shelter.	Fauna spotter and construction/ clearing crew	Clearing Works
F) **Reporting**			

Objective	Management Methods	Responsibility	Timing
To reduce the impact the project has on native fauna	1. Wildlife Habitat Management Plan – Aspects of the planning, design, construction and ongoing operation of the project in which risks to wildlife have been identified. This plan should also include recommendations and outline the type, frequency and timeframes for monitoring 2. Wildlife Capture and Disposal Plan – Should contain the following details for each captured animal: a. Species b. Identification name or number c. Sex (M, F or unknown) d. Approximate Age or Age Class (neonate, juvenile, sub-adult, adult) e. Time and date of capture f. Method of capture g. Exact point of capture (GPS coordinates) h. State of health i. Incidents associated with capture likely to affect health j. Veterinary intervention or treatments k. Time held in captivity l. Disposal method (euthanasia, translocation, re-release) m. Date and time of disposal n. Detailed of disposal (GPS points of release) o. For released animals, location relative to point of capture 3. Animal Injury and Euthanasia Report – similar details for the Wildlife Capture and Disposal Plan should be included in this report.	Fauna Spotter	Post-clearing Works
G) **Earthworks and Construction Phase**			
To reduce the impact the project has on native fauna	1. The Contractor shall ensure that to the extent possible project infrastructure and auxiliary works (laydown areas, stockpile sites, site office) are constructed in a manner that does not create additional hazards for wildlife. 2. To minimise impacts and conflicts between native animals, vehicular movement and access during construction, site access should be controlled via a single entry and exit point.	Construction Crew	Clearing Works

Objective	Management Methods	Responsibility	Timing
	3. Inspect open trenches, culverts and other structures prior to works being undertaken within an area to determine whether there are any trapped or injured native fauna species present and act as appropriate. 4. Trenches, manholes, excavations for footings, etc. while open pose threats to native animal entrapment and should be backfilled as soon as possible. In some location's barriers may be required overnight to eliminate the accidental capture of animals moving through the site. 5. Educate staff, including sub-contractors, in relation to the risk of fauna injury and deaths and how to manage animals which are displaced, including threatened species 6. All native wildlife is protected (including snakes) and shall not be intentionally harmed as a result of work or workers actions. 7. All native animal fatalities must be reported immediately to the Environmental Coordinator. 8. Where any site staff (contractors or subcontractors) witness or locates distressed, injured or orphaned animals they should immediately contact the Fauna Spotter Catcher and Environmental Coordinator. Works within the area of the animal must cease until further instruction is provided by one of the above authorities.		

6. Conclusion

Australia Wide Environmental Consultants were commissioned by SHADFORTHS CIVIL CONTRACTORS to compile a Wildlife and Habitat Impact Mitigation Plan for EVERLEIGH- Central Park School development off Teviot Road in Greenbank, Queensland (**See Figure 1 &2**).

Direct potential impacts raised in the Wildlife Protection and Management Plan will be mitigated by ensuring the fauna management measures listed in Section 5.5 of this report are adhered to for the duration of works on Precinct 12.1. Potential cumulative impacts raised in the Wildlife Protection and Management Plan will be minimised through the habitat replacement measures listed section 5.4 of this plan.

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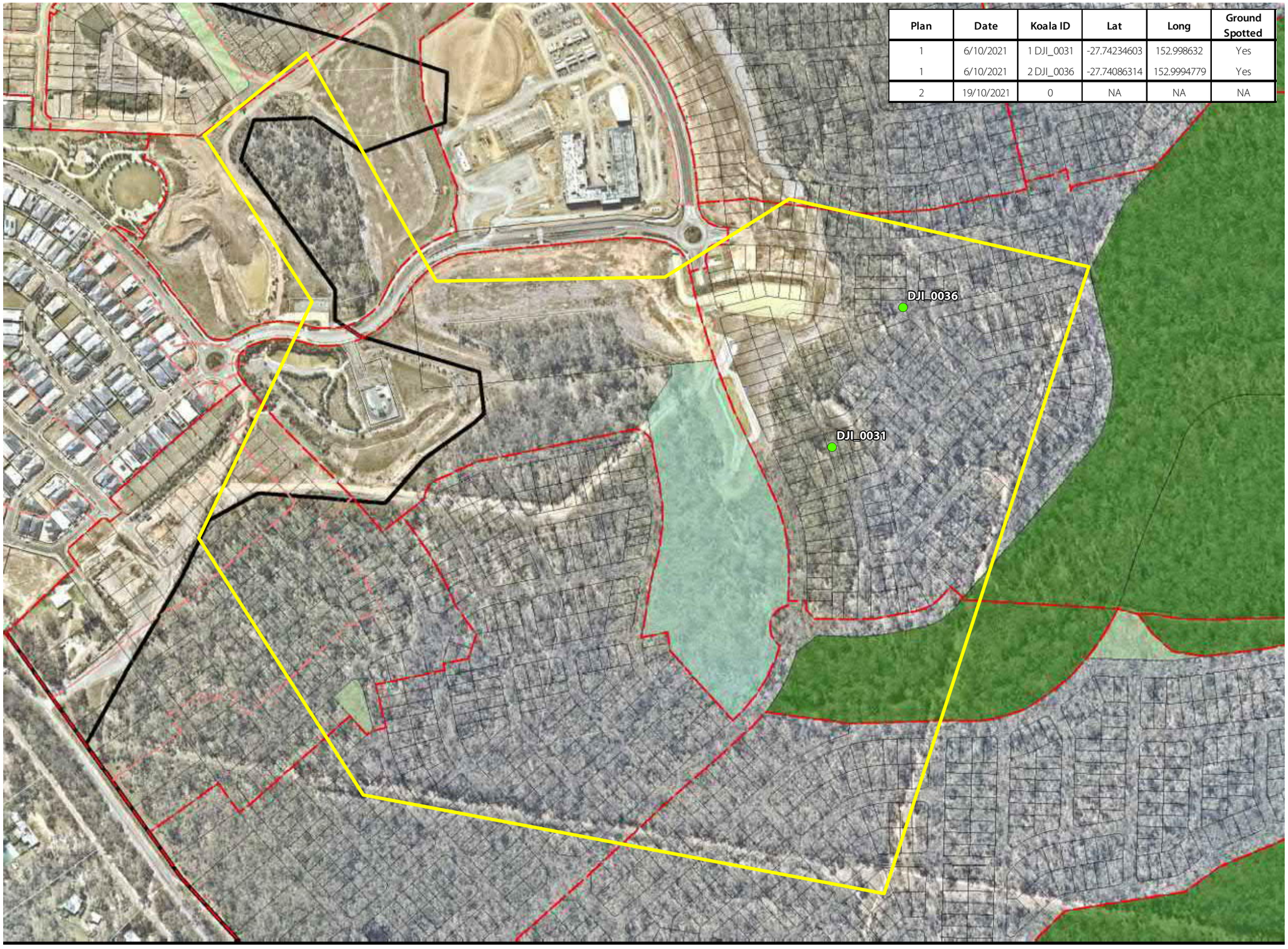

Plan	Date	Koala ID	Lat	Long	Ground Spotted
1	6/10/2021	1 DJI_0031	-27.74234603	152.998632	Yes
1	6/10/2021	2 DJI_0036	-27.74086314	152.9994779	Yes
2	19/10/2021	0	NA	NA	NA

Notes:
This plan was prepared as a desktop assessment tool. The information on this plan is not suitable for any other purpose. Property dimensions, areas, numbers of lots and contours and other physical features shown have been compiled from existing information and may not have been verified by field survey. These may need verification if the development application is approved and development proceeds, and may change when a full survey is undertaken or in order to comply with development approval conditions. No reliance should be placed on the information on this plan for detailed design or for any financial dealings involving the land. Saunders Havill Group therefore disclaims any liability for any loss or damage whatsoever or howsoever incurred, arising from any party using or relying upon this plan for any purpose other than as a document prepared for the sole purpose of accompanying a development application and which may be subject to alteration beyond the control of the Saunders Havill Group. Unless a development approval states otherwise, this is not an approved plan.

Layer Sources
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Legend

- Referral site
- Qld DCDB
- Area of Interest

Koala/s observed per night

- 06/10/2021
- Precinct boundary
- Stage boundary
- Layout
- Road
- Recreation sports park
- Linear park
- Neighbourhood park
- Conservation area

Survey Details

- Flights conducted between the hours of 0300-0500 each night of operations
- Flight altitude 60m above ground level
- Inspection altitude 30m above ground level
- Drone: DJI Matrice 100
- Sensor: Zenmuse XT-R 19mm
- Flight grid: NNE/SSW – 40% side overlap

Issue	Date	Description	Drawn	Checked
A	15/11/2021	Preliminary	MP	JH

0 20 40 60 80 100 m

Transverse Mercator | GDA 2020 | Zone 56 | 1:4,500 @ A3

saunders havill group

mirvac

Everleigh

Address / RPD: Teviot Rd & Greenbank Rd, Greenbank

15/11/2021 | 7598 E 03 Koala Survey Combined A