

Transport for New South Wales

Coffs Harbour Bypass

Fontainea sp. Coffs Harbour Management Plan

281967-0-DC-EN-MPL-0001

Final | 26 October 2022

This report takes into account the particular instructions and requirements of our client

It is not intended for and should not be relied upon by any third party and no responsibility is undertaken to any third party

Job number 281967

Arup Pty Ltd ABN 18 000 966 165

Arup Pty Ltd
Level 4, 108 Wickham Street
Level 1, Suite 3
Donnelley House
79 Brisbane Road
Mooloolaba QLD 4557
Australia
www.arup.com

ARUP

Document verification

ARUP

| | | | | | |
|-----------------------|-------------|---|---|---------------------------------|----------------|
| Job title | | Coffs Harbour Bypass | | Job number | |
| | | | | 281967 | |
| Document title | | Fontainea sp. Coffs Harbour Management Plan | | File reference | |
| | | | | 281967-0-DC-EN-MPL-0001 | |
| Document ref | | 281967-0-DC-EN-MPL-0001 | | | |
| Revision | Date | Filename | 281967-0-DC-EN-MPL-0001 | | |
| 1 | 07/02/22 | Description | Draft for TfNSW comment | | |
| | | | Prepared by | Checked by | Approved by |
| | | Name | Colin Vaughan Andrew Benwell | Sophie St John | Kayleigh Speed |
| | | Signature | | | |
| 2 | 11/02/22 | Filename | 281967-0-DC-EN-MPL-0001 | | |
| | | Description | TfNSW comments addressed | | |
| | | | Prepared by | Checked by | Approved by |
| | | Name | Colin Vaughan Andrew Benwell | Sophie St John | Kayleigh Speed |
| | Signature | | | | |
| 3 | 15/03/22 | Filename | 281967-0-DC-EN-MPL-0001 | | |
| | | Description | EESG comments addressed | | |
| | | | Prepared by | Checked by | Approved by |
| | | Name | Colin Vaughan Andrew Benwell | Sophie St John | Kayleigh Speed |
| | Signature | | | | |
| 4 | 9/6/22 | Filename | 281967-0-DC-EN-MPL-0001 Fontainea Sp. Coffs Harbour Management Plan | | |
| | | Description | DPE feedback addressed | | |
| | | | Prepared by | Checked by | Approved by |
| | | Name | Andrew Cook | Scott Lawrence Colin Vaughan | Scott Lawrence |
| | Signature | | | | |
| 5 | 20/10/22 | Filename | 281967-0-DC-EN-MPL-0001 Fontainea Sp. Coffs Harbour Management Plan | | |
| | | Description | BCD (DPE) feedback addressed | | |
| | | | Prepared by | Checked by | Approved by |
| | | Name | Andrew Cook | Scott Lawrence | Scott Lawrence |
| | Signature | | | | |
| Final | 26/10/22 | Filename | 281967-0-DC-EN-MPL-0001 Fontainea Sp. Coffs Harbour Management Plan | | |

| | | | | |
|--|-------------|--|----------------|-------------------------------------|
| | Description | BCD (DPE) feedback on monitoring program addressed and finalised | | |
| | | Prepared by | Checked by | Approved by |
| | Name | Andrew Cook | Scott Lawrence | Scott Lawrence |
| | Signature | | | |
| Issue Document verification with document | | | | <input checked="" type="checkbox"/> |

Contents

| | Page |
|---|-----------|
| 1 Introduction | 1 |
| 1.1 Project background | 1 |
| 1.2 Discovery of two new species | 3 |
| 1.3 Surveys completed | 4 |
| 1.4 Genetic analysis | 7 |
| 1.5 Purpose of this report | 7 |
| 2 Nature of impacts | 9 |
| 2.1 Attempts to avoid and minimise impacts | 9 |
| 2.2 Direct impacts | 10 |
| 2.3 Indirect impacts to individuals retained <i>in-situ</i> | 13 |
| 2.4 Summary of impacts to the currently known population | 14 |
| 3 Translocation strategy | 16 |
| 3.1 Translocation objectives | 16 |
| 3.2 Types of translocations | 16 |
| 3.3 General approach | 17 |
| 3.4 Salvage translocation of impacted individuals | 18 |
| 3.5 Propagation trial | 19 |
| 3.6 Propagation proposal | 20 |
| 3.7 Translocation feasibility | 21 |
| 3.8 Translocation benefits and risks | 22 |
| 3.9 Research initiatives | 23 |
| 4 Pre-translocation assessment | 24 |
| 4.1 Species ecology | 24 |
| 4.2 Description of the impact site | 25 |
| 4.3 Translocation Recipient Sites | 26 |
| 4.4 Summary of Recipient Sites | 30 |
| 5 Translocation actions – Installation of salvaged and propagated plants | 32 |
| 5.1 General | 32 |
| 5.2 Preparation of the Recipient Sites | 33 |
| 5.3 Planting of salvaged individual | 36 |
| 5.4 Planting of propagated individuals | 37 |
| 5.5 Tree guards | 38 |
| 5.6 Mulching | 38 |
| 5.7 Installation of salvaged and propagated plants reporting requirements | 38 |

| | | |
|-----------|--|-----------|
| 5.8 | Completion of planting | 39 |
| 6 | Post-translocation actions – Initial Maintenance Period | 41 |
| 6.1 | General | 41 |
| 6.2 | Initial Maintenance Period monitoring schedule | 41 |
| 6.3 | Watering | 42 |
| 6.4 | Fertilising and soil ameliorants | 42 |
| 6.5 | Weed, pest and disease control | 42 |
| 6.6 | Repair or re-installation of treatments | 42 |
| 6.7 | Topping up of mulch | 43 |
| 6.8 | Initial Maintenance Period reporting requirements | 43 |
| 6.9 | Completion of the Initial Maintenance period | 44 |
| 7 | Post-translocation actions – Monitoring period | 46 |
| 7.1 | Monitoring period | 46 |
| 7.2 | Monitoring period schedule | 46 |
| 7.3 | Watering | 47 |
| 7.4 | Fertilising and soil ameliorants | 47 |
| 7.5 | Weed, pest and disease control | 47 |
| 7.6 | Repair or re-installation of treatments | 47 |
| 7.7 | Topping up of mulch | 48 |
| 7.8 | Monitoring period reporting requirements | 48 |
| 7.9 | Completion of the monitoring period | 49 |
| 8 | Translocation objectives, outcomes, performance criteria, and risks | 51 |
| 8.1 | Objectives, outcomes, and performance criteria | 51 |
| 8.2 | Risk analysis | 54 |
| 8.3 | Schedule of works and responsibilities | 58 |
| 9 | Additional management actions and research | 65 |
| 9.1 | Overview | 65 |
| 9.2 | Research initiative – species ecology | 65 |
| 9.3 | Research initiative – <i>Fontainea</i> sp. Coffs Harbour genetic diversity and gene flow | 65 |
| 10 | Works Cited | 67 |

Tables

Table 1: Summary of salvaged and propagated *Fontainea* sp. Coffs Harbour proposed to be translocated

Table 2: Summary of the Recipient Sites and preliminary numbers of *Fontainea* sp. Coffs Harbour proposed for each site

Table 3: Objectives, outcomes, and performance criteria

Table 4: Risks, mitigation measures, and remedial actions

Table 5: The activities, indicative timeframes, and responsible entities for all activities associated with this management plan

Table 6: Research Initiatives proposed for *Fontainea* sp. Coffs Harbour

Table 7: Assessment for compliance with the translocation guidelines

Figures

Figure 1 Project locality and Project Boundary

Figure 2 Location of all identified *Fontainea* sp. Coffs Harbour

Figure 3 Impacted and retained *Fontainea* sp. Coffs Harbour

Figure 4 Recipient Sites and Planting Areas

Appendices

Appendix A |

Compliance with translocation guidelines (Commander et al., 2018)

Appendix B |

Description of the Recipient Sites

Definition of Terms and Glossary

| Term | Definition |
|------------------------------|---|
| BC Act | <i>Biodiversity Conservation Act 2016</i> |
| BCD | Biodiversity and Conservation Division (BCD) of the Biodiversity, Conservation and Science Directorate in the Environment and Heritage Group of the Department of Planning and Environment. |
| EIS | Environmental Impact Statement |
| EPBC Act | <i>Environment Protection and Biodiversity Conservation Act 1999</i> |
| Exclusion Zone | The [REDACTED] Exclusion Zone within which no construction works are to be undertaken and within which <i>Fontainea</i> sp. Coffs Harbour and <i>Pittosporum</i> sp. Coffs Harbour are to be retained <i>in-situ</i> with select translocation and propagation as required. |
| Environmental Representative | A suitably qualified and experienced person who carries out the responsibilities detailed in Condition A25 of the planning approval. |
| Fontainea Expert | A suitably qualified person with direct experience with the ecology of <i>Fontainea</i> sp. Coffs Harbour. |
| Initial Maintenance Period | A 180 day period following the salvage translocation and planting of <i>Fontainea</i> sp. Coffs Harbour during which maintenance and monitoring works are undertaken. |
| Monitoring Period | A five year period following the Initial Maintenance Period during which maintenance and monitoring works are undertaken. |
| Planting Area | The area(s) within the Recipient Sites within which the salvage translocated and propagated <i>Fontainea</i> sp. Coffs Harbour are to be planted and within which maintenance works are to be undertaken. |
| The Project | The Coffs Harbour Bypass Project. |
| Project Boundary | The area within which all works associated with the Coffs Harbour Bypass will be undertaken. |
| Project Ecologist | The suitably qualified person acting on behalf of TfNSW responsible for all the ecological matters associated with the delivery of the Project. |
| Project Footprint | The area directly impacted by the Project including for physical road infrastructure and ancillary activities including laydown areas. |
| Recipient Sites | The sites nominated to receive the salvage translocated and propagated <i>Fontainea</i> sp. Coffs Harbour. |
| Revegetation Contractor | A qualified and appropriately experienced person(s) with direct experience in native rainforest plant salvage translocation, propagation, planting, and monitoring and maintenance. |
| Species Expert | The Fontainea Expert |
| TfNSW | Transport for New South Wales |
| TSMP | Threatened Species Management Plan |
| USC | University of the Sunshine Coast |

1 Introduction

1.1 Project background

Transport for New South Wales (TfNSW) received approval to construct the Coffs Harbour Bypass (the Project) under the *Environmental Planning and Assessment Act 1979* on 2 November 2020 and approval under the *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act) on 8 December 2020. The Project is situated in the Coffs Harbour local government area and located to the west of the Coffs Harbour urban area in northern New South Wales (Figure 1).

The Project complements the Pacific Highway upgrade program which, when complete, will provide free flowing dual carriageway conditions for the Pacific Highway between Hexham and the Queensland border. The principal objectives of the Pacific Highway upgrade program are to:

- Improve traffic safety
- Reduce travel times and freight costs
- Engage the community and consider their issues
- Support economic development
- Support Ecologically Sustainable Development principles
- Provide a safe workplace
- Achieve value for money

The Pacific Highway upgrade program seeks to create public value and ensure the safety of its workers and the travelling public.

An environmental impact statement (EIS) was prepared for the Project in 2019 which (along with an Amendment Report) provides a detailed assessment of impacts to terrestrial and aquatic biodiversity associated with the Project and strategies to avoid, mitigate and manage these impacts during each Project phase.

As part of the EIS process, a Threatened Species Management Plan (TSMP) was prepared for the Project which provides an overarching management framework for all parts of the Project. The TSMP was developed to inform site-specific and species-specific mitigation measures and management protocols to be implemented during the Project. As part of the approval conditions for the Project (approval condition E15), the TSMP is required to be updated during the life of the Project and included an Unexpected Threatened Species Finds procedure to address any impacts to threatened species and ecological communities not addressed by the EIS.



Legend

Project Boundary



Client
Transport for NSW

Job Title
Coffs Harbour Bypass

Map Title
Project location



| | | | | |
|-------|------------|----|------|------|
| D1 | 17/01/2022 | JV | CV | SSJ |
| Issue | Date | By | Chkd | Appd |

ARUP

Level 4, 108 Wickham Street
Fortitude Valley, QLD 4006
Tel +61 (7)3023 6000 Fax +61 (7)3023 6023
www.arup.com

| | |
|--------------------------------|----------------------------|
| Scale at A4 1:51,586 | Map Status Final |
|--------------------------------|----------------------------|

Coordinate System
GDA2020 MGA Zone 56

| | |
|-------------------------|--------------------|
| Job No 281967 | Figure 1 |
|-------------------------|--------------------|

1.2 Discovery of two new species

Surveys undertaken during the EIS phase of the Project, and to support the Amendment Report identified the following threatened flora species:

- Rusty plum (*Niemeyera white*), listed as ‘vulnerable’ under the *Biodiversity Conservation Act 2016* (BC Act)
- Scrub turpentine (*Rhodamnia rubescens*), listed as ‘critically endangered’ under the BC Act and the EPBC Act

In January 2021, slender marsdenia (*Marsdenia longiloba*), which is listed as ‘endangered’ under the BC Act and ‘vulnerable’ under the EPBC Act, was identified by Ecos Environmental whilst mapping the location of the Rusty plum (*Niemeyera white*) within the Project Boundary.

In addition to the slender marsdenia, a *Fontainea* species and *Pittosporum* species were discovered (during the January 2021 flora surveys) that did not conform to the descriptions of any known species and were identified as potentially new species. Upon identification of the new species, the Project’s unexpected threatened species finds procedure (as documented in the TSMP) was applied to guide the management and assessment of these species.

To confirm the taxonomic classification of the plants, samples of the two species were sent to the Queensland Herbarium and the NSW Herbarium which identified the two species as new to science and described as:

- *Fontainea* sp. Coffs Harbour (A.S. Benwell 341, NSW1102027) (Photograph 1)
- *Pittosporum* sp. Coffs Harbour (A.S. Benwell 342, NSW1102028) (Photograph 2)

Both species have been included in the Census of Australian Plants.



Photograph 1 Fruit and leaves of *Fontainea* sp. Coffs Harbour



Photograph 2 *Pittosporum* sp. Coffs Harbour patch of stems (left) and leaves, fruits and seeds (right)

To further confirm the taxonomical classification of the species, genetic analysis was undertaken in October 2021, which confirmed that both the *Fontainea* sp. Coffs Harbour and the *Pittosporum* sp. Coffs Harbour are new species (refer to Section 1.4).

In October 2021, *Fontainea* sp. Coffs Harbour was provisionally listed as ‘critically endangered’ under the BC Act; however, is not currently listed under the EPBC Act.

Pittosporum sp. Coffs Harbour was provisionally listed as ‘critically endangered’ under the BC Act in January 2022 and is not currently listed under the EPBC Act.

1.3 Surveys completed

Following identification of the two new species, three rounds of targeted flora surveys for *Fontainea* sp. Coffs Harbour and *Pittosporum* sp. Coffs Harbour were undertaken in April, August, and November 2021. The aim of the surveys was to acquire more detailed information on the distribution, habitat, and size of populations, inside and outside the Project Boundary, for impact assessment and to inform the development of appropriate management measures of the two new species.

The targeted surveys for *Fontainea* sp. Coffs Harbour and *Pittosporum* sp. Coffs Harbour were carried out over 20 days by a team of three botanists familiar with the flora of the Mid North Coast New South Wales. A total of 56 areas of mature and secondary regrowth forest were surveyed in the Coffs Harbour and Kororo Basins, consisting of 21 ha of potential habitat within the Project Boundary and 140 ha outside the Project Boundary.

The areas selected for the surveys were assessed as supporting habitat (i.e. vegetation, geology and landform) similar to the sites at which the original *Fontainea* sp. Coffs Harbour and *Pittosporum* sp. Coffs Harbour were identified. Potential habitat for the two new species was identified broadly as wet sclerophyll forest with a well-developed rainforest mid-stratum, particularly Brush Box (*Lophostemon confertus*) dominated forest along lower slopes, gullies and creeks, similar to the initial sites.



The surveys were undertaken as per the meander traverse survey method (Cropper 1993) with sufficient coverage of each area so there was a high likelihood of the species being detected if present.

The results of the targeted surveys identified *Fontainea* sp. Coffs Harbour in the following two areas (approximately 1 km apart) within the Project Boundary:

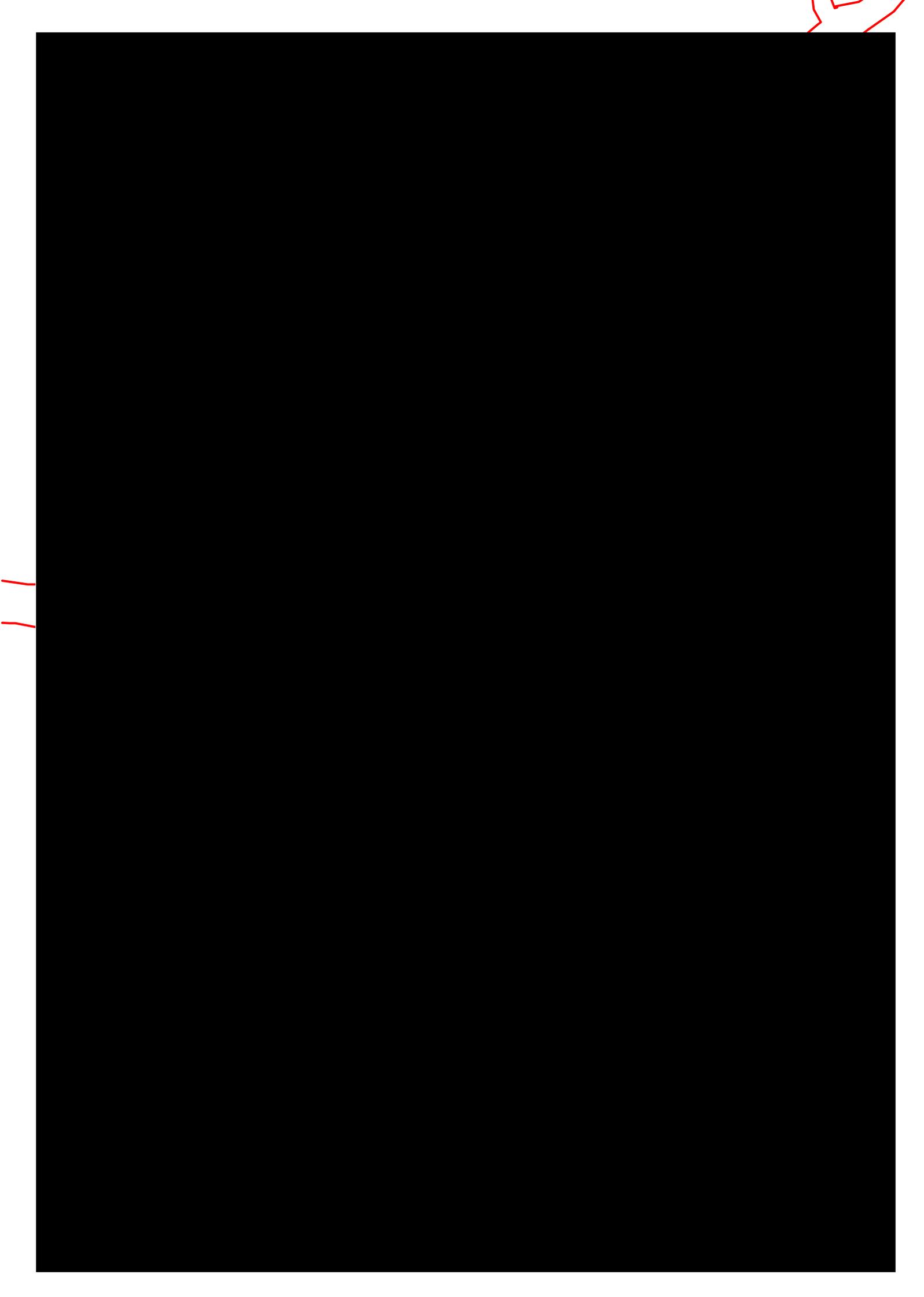
- [REDACTED]
- [REDACTED]

The [REDACTED] is located within the Project Footprint and consists of a single mature tree to 4.5 m in height which was observed to have produced approximately 50 fruits between January 2021 and April 2021. A total of 31 seedlings were observed to have germinated under the single mature tree at [REDACTED]. However, subsequent visits to the [REDACTED] in June 2021 identified that approximately half of these seedlings had died of natural causes or were severely desiccated and likely to die of natural causes. The seedlings that remained alive were removed from site to a nursery under the advice of the Project Ecologist for growing-on in pots and monitoring.

The [REDACTED] is located outside of the Project Footprint and consists of a single mature tree to 4 m in height, with a total of two seedlings (cotyledons present) and 36 juvenile and sapling plants ranging in height from 0.3 m to 3 m.

The location of all *Fontainea* sp. Coffs Harbour identified during the field surveys are show in Figure 2.

The results of the targeted surveys for *Pittosporum* sp. Coffs Harbour are detailed in the *Pittosporum* sp. Coffs Harbour & [REDACTED] Exclusion Zone Management Plan.



1.4 Genetic analysis

TfNSW have engaged Dr Steven Ogbourne of the University of the Sunshine Coast (USC) to conduct a genetic analysis of *Fontainea* sp. Coffs Harbour to determine if the initial taxonomic findings (of the species being new to science) could be confirmed by genetic analysis and to outline the conservation implications of the findings.

USC have investigated the genetic profile and features of *Fontainea* sp. Coffs Harbour individuals and populations to determine if the recently described ‘new species’ is a distinct species from a genetic perspective.

Using reduced-representation genotype sequencing, the analyses showed that *Fontainea* sp. Coffs Harbour is a genetically distinct species from other recorded *Fontainea* species. This outcome was supported by taxonomic findings by the Queensland Herbarium and NSW Herbariums based on physical metrics and suggests a formal delineation as *Fontainea* sp. Coffs Harbour (A.S. Benwell).

USC identified that *Fontainea* sp. Coffs Harbour populations have been isolated from other *Fontainea* species and are characterised by relatively low levels of genetic diversity, and high levels of inbreeding. However, given the small number of individuals identified and that low levels of genetic diversity are characteristic of other species of the *Fontainea* genus, this finding was not unexpected. USC found that the two identified populations of *Fontainea* sp. Coffs Harbour are also potentially genetically distinct from each other. However, the analysis of the [REDACTED] was based on the single tree, and therefore a robust statistical analysis was not possible. A future assessment of 20 – 30 progeny off the parent tree would assist to verify this conclusion.

Genetic analysis has been carried out for *Pittosporum* sp. Coffs Harbour and is detailed in the *Pittosporum* sp. Coffs Harbour & [REDACTED] Exclusion Zone Management Plan.

1.5 Purpose of this report

This *Fontainea* sp. Coffs Harbour Management Plan has been developed to provide the following:

- Description of the Project
- Background to the discovery of *Fontainea* sp. Coffs Harbour
- Summary of the impacts and mitigation measures
- A translocation plan, which includes:
 - Translocation objectives
 - Translocation strategy
 - Pre-translocation assessment
 - Translocation actions
 - Post-translocation actions
- Translocation objectives, outcomes, and performance requirements

- Additional species-specific management actions.

This management plan has been prepared to be consistent with the translocation principles contained within the Australian Network for Plant Conservation's *Guidelines for the Translocation of Threatened Plants in Australia* (Commander *et al.*, 2018) and the Department of Planning, Industry & Environment's *Translocation Operational Policy* (DPIE, 2019).

A checklist against the requirements of the Australian Network for Plant Conservation's *Guidelines for the Translocation of Threatened Plants in Australia* (Commander *et al.*, 2018) is provided in Appendix A.

A separate management plan, *Pittosporum* sp. Coffs Harbour & [REDACTED] Exclusion Zone Management Plan, has been prepared to document the translocation and propagation actions to address impacts to *Pittosporum* sp. Coffs Harbour and the management requirements for the protection of the retained population of *Fontainea* sp. Coffs Harbour and *Pittosporum* sp. Coffs Harbour at [REDACTED]. In this regard, the management plan deals specifically with the salvage translocation and propagation of *Fontainea* sp. Coffs Harbour only.

2 Nature of impacts

2.1 Attempts to avoid and minimise impacts

Following identification of the *Fontainea* sp. Coffs Harbour and *Pittosporum* sp. Coffs Harbour as new species, TfNSW developed six design options with the specific aim of avoiding and minimising impacts to the *Fontainea* sp. Coffs Harbour and *Pittosporum* sp. Coffs Harbour individuals and their supporting habitat. This included four options for the [REDACTED] area and two options for the [REDACTED] to avoid and minimise impacts on the individual mature *Fontainea* sp. Coffs Harbour at this location.

The design options were developed in consultation with Dr Andrew Benwell (Ecos Environmental), the Project Ecologist and other key environmental advisors. The design options were presented to BCD and the Project's Environmental Representative on 17 November 2021 to gain their feedback and advice as to the most appropriate option to avoid and minimise impacts.

Following the options assessment and comparative analysis and feedback from the key stakeholders, the [REDACTED] – Central Option' was considered the preferred option for the Project and outperformed the other options for [REDACTED] in the evaluation criteria (including environment, social, functional and cost).

The benefits of the [REDACTED] – Central Option' option include the following:

- Avoiding the entire [REDACTED] population of *Fontainea* sp. Coffs Harbour (i.e. the one mature *Fontainea* sp. Coffs Harbour, two seedlings, and 36 juveniles).
- Avoiding 12 patches of *Pittosporum* sp. Coffs Harbour (comprising 1,770 individual stems) within the Project Boundary.
- Preserving approximately 2 ha of wet sclerophyll-rainforest habitat within the Project Boundary
- Restoring approximately 3 ha of blueberry farm as wet sclerophyll-rainforest to provide suitable future habitat for *Fontainea* sp. Coffs Harbour and *Pittosporum* sp. Coffs Harbour, as well as linking existing koala habitat at [REDACTED].
- Minimising impacts to the hydrology of [REDACTED] by constructing a bridge over the tributary where the *Fontainea* sp. Coffs Harbour are present. The bridge structure will replace the 3 m x 3 m reinforced concrete box culverts included in the EIS design. The bridge structure reduces earthworks, maintains natural drainage, and negates the need for outlet scour protection works; all of which have avoided impacts to the retained *Fontainea* sp. and *Pittosporum* sp. Coffs Harbour and minimised impacts to their supporting habitat at this location.

- Retention of approximately 1.3 ha of the identified supporting habitat for *Fontainea* sp. Coffs Harbour and *Pittosporum* sp. Coffs Harbour within the Project Boundary.
- Minimising impacts to 26 individual Rusty Plums (*Niemeyera whitei*) when compared to the EIS design.
- Minimising impacts to [REDACTED] riparian vegetation.

In addition to the above, the [REDACTED] – Central Option’ provides further opportunity to protect more than 12 ha of wet sclerophyll-rainforest, which is considered suitable habitat for *Fontainea* sp. Coffs Harbour and includes several patches of *Pittosporum* sp. Coffs Harbour through the use of a BSA on private land outside the Project Boundary.

The options for the [REDACTED] to avoid/minimise impacts on the one individual mature *Fontainea* sp. Coffs Harbour were considered not to be feasible as the alternative design options considered at this location would result in significant additional impacts to the adjacent environment and adjacent community when compared to the EIS design. In addition, the options would result in significant program delays and increased capital cost. A detailed options assessment report was developed which analysed the feasibility of the design changes through this area.

The retained *Fontainea* sp. Coffs Harbour and *Pittosporum* sp. Coffs Harbour individuals and supporting habitat within the [REDACTED] Exclusion Zone will be subject to the management measures described in the *Pittosporum* sp. Coffs Harbour & [REDACTED] Exclusion Zone Management Plan.

As the design option development was unable to completely avoid impacts to *Fontainea* sp. Coffs Harbour and *Pittosporum* sp. Coffs Harbour and their supporting habitat, the impacts of the [REDACTED] – Central Option’ have been minimised to the greatest extent possible. Additional mitigation measures have been developed to further minimise potential direct and indirect impacts to these species and their supporting habitat.

The direct and indirect impacts to *Fontainea* sp. Coffs Harbour and its supporting habitat are discussed in the following sections.

The direct and indirect impacts to *Pittosporum* sp. Coffs Harbour and its supporting habitat are detailed in the *Pittosporum* sp. Coffs Harbour & [REDACTED] Exclusion Zone Management Plan.

2.2 Direct impacts

2.2.1 Direct impact to individuals

Following all attempts to avoid direct impacts, the Project is anticipated to result in impacts to one mature *Fontainea* sp. Coffs Harbour individual at [REDACTED].

The impacted and retained *Fontainea* sp. Coffs Harbour are shown in Figure 3.





A cohort of *Fontainea* sp. Coffs Harbour seedlings that germinated in summer/autumn 2021 from the mature *Fontainea* sp. Coffs Harbour have either died or have been removed from site by Dr Andrew Benwell (Ecos Environmental) as part of a propagation and translocation trial. Due to wet spring-early summer conditions in 2021 – 2022 another cohort of approximately 20 seedlings were present in January 2022, which will be salvaged along with any others present at the time of translocation (refer to Section 3.4).

2.2.2 Direct impact to supporting habitat

The Project is anticipated to result in the following direct impacts to the supporting habitat of *Fontainea* sp. Coffs Harbour:

- Direct impacts to the tall Brush Box (*Lophostemon confertus*) dominated forest with a well-developed rainforest mid-stratum, within which the individuals have been recorded and which provides suitable habitat for both *Fontainea* sp. Coffs Harbour and *Pittosporum* sp. Coffs Harbour.
- Direct impacts to the tall moist eucalypt forest (*Eucalyptus pilularis*, *Eucalyptus microcorys*, *Eucalyptus siderophloia*, *Eucalyptus grandis*, *Eucalyptus propinqua*, *Eucalyptus saligna*) with a rainforest understorey structure, which provides suitable habitat for *Pittosporum* sp. Coffs Harbour and may provide suitable habitat for *Fontainea* sp. Coffs Harbour.

With respect to the extent of suitable habitat being impacted by the Project, the USC has been engaged by TfNSW to develop a predictive model of suitable habitat for *Fontainea* sp. Coffs Harbour in the Coffs Harbour and Bellingen region. The modelling will be used to further refine and locate areas of potential habitat for the species. The modelling will be used in conjunction with the knowledge and predictions of the Species Expert and botanists familiar with the habitat and distribution patterns of the local flora.

As *Pittosporum* sp. Coffs Harbour share similar habitat requirements with *Fontainea* sp. Coffs Harbour, the additional surveys are also likely to identify any additional *Pittosporum* sp. Coffs Harbour.

Further detail on the habitat modelling and subsequent surveys is provided in the *Pittosporum* sp. Coffs Harbour & [REDACTED] Exclusion Zone Management Plan.

2.3 Indirect impacts to individuals retained *in-situ*

The Project has the potential to indirectly impact individual *Fontainea* sp. Coffs Harbour which are located outside of the Project Footprint, but in close proximity (e.g. 2 m – 10 m) to the edge of the Project Footprint. These individuals and patches will be retained *in-situ* within the [REDACTED] Exclusion Zone.

The Project has the potential to result in the following indirect impacts to the retained *in-situ* *Fontainea* sp. Coffs Harbour:

- The clearing of vegetation adjacent to retained individuals has the potential to alter micro-climatic conditions which would lead to:

- Changes to plant life cycle processes including recruitment from seed, which was observed in the *Fontainea* sp. Coffs Harbour population at [REDACTED], where seedlings died out in the smaller patch of vegetation but have survived and established in the larger patch of vegetation at [REDACTED]. Evidence of feral deer and horse are present at the [REDACTED] site. Hence the potential for these feral species to impact on the germination of the plant by grazing on the seedlings.
- Individual plant stress and/or mortality, reduced health, and/or reduced reproduction.
- Increased weed intrusion into the vegetation communities (via edge effects) reducing the suitability of habitat for the threatened plants and which has the potential to lead to reduced plant health, reduced reproduction and/or individual tree mortality.
- Introducing cleared areas adjacent to the new highway has the potential to facilitate increased pest fauna movement in the locality which has the potential of increasing grazing on individual threatened plants and/or predation of seeds as well as introducing/spreading pathogens and disease.
- Increased dust accumulation on individual plants which has the potential to cause individual plant stress and/or mortality.

The *Pittosporum* sp. Coffs Harbour & [REDACTED] Exclusion Zone Management Plan provides further detail on management requirements for the protection of the retained population of *Fontainea* sp. Coffs Harbour and *Pittosporum* sp. Coffs Harbour at [REDACTED].

2.4 Summary of impacts to the currently known population

The flora surveys undertaken for the Project identified A total of 40 *Fontainea* sp. Coffs Harbour at two locations, comprised of:

- One mature adult at [REDACTED]
- One mature adult, two seedlings and 36 juvenile plants at [REDACTED]

The proportion of the currently known adult population of *Fontainea* sp. Coffs Harbour proposed to be impacted by the Project is 50%. There are no impacts proposed for the currently known population of seedlings or juveniles.

Notwithstanding, as *Fontainea* sp. Coffs Harbour is a species newly described to science and targeted surveys for this species only commenced in 2021. As such, care should be taken in interpreting the significance of impacting 50% of the known adult population, as this may over-estimate impacts to a currently poorly understood population. To assist with understanding the area of occupancy and extent of occurrence of these species, and to understand the total number of individuals within the population, USC has been engaged by TfNSW to undertake predicative habitat modelling which will inform future targeted surveys for the species.

Further detail on the habitat modelling and subsequent surveys is provided in the *Pittosporum* sp. Coffs Harbour & [REDACTED] Exclusion Zone Management Plan.

The above also excludes the *Fontainea* sp. Coffs Harbour seedlings which recent surveys have identified are no longer present. However, as a precautionary approach to minimise impacts, protocols for the salvage translocation of any new *Fontainea* sp. Coffs Harbour seedlings have been included in this management plan should any new seedlings be detected during the salvage translocation works and/or the vegetation clearing works.

3 Translocation strategy

3.1 Translocation objectives

The overall translocation objective for *Fontainea* sp. Coffs Harbour is to establish a viable and self-sustaining population to mitigate the impacts of the Project on this species.

More specific objectives include:

- To transplant and successfully re-establish the impacted individual within a suitable Recipient Sites with vegetation, soil type and topography closely matching the impact site.
- To promote the long-term sustainability of the translocated individual by enhancing population size through propagation and introduction of additional individuals.
- To promote long-term sustainability by undertaking habitat restoration.

The types of translocations most commonly used and those appropriate to the Project are discussed in the following sections.

3.2 Types of translocations

Translocation is defined as the "deliberate transfer of plants or regenerative plant material from one place to another, including existing or new sites or those where the taxon is now extinct" (Commander *et al.* 2018). Translocation is generally carried out in the following two main contexts (Falk *et al.* 1996, Commander *et al.* 2018):

- **Conservation purposes** – being a research or conservation measure to assist in the recovery of threatened or rare species.
- **Developmental translocation** – being a mitigation measure to ameliorate the adverse impact of a development activity.

Translocation in both these contexts has the same general conservation purpose, which is to avoid losing populations of threatened species and decreasing the risk of population extinction (Pavlik 1996). Both types of translocation contexts are proposed for the Project.

Under Developmental translocation, the following three types of translocations are described:

- **Salvage translocation:**
 - The translocation of mature plants to an area not affected by a development. Also referred to as transplantation or rescue dig. Transplanting is usually combined with propagation when aiming to achieve a self-sustaining population by increasing the initial number of individuals. In some instances, transplanting may be the only available translocation method.

- Salvage translocation is proposed as part of this Project.
- **Ameliorative(population) enhancement:**
 - An attempt to increase population size by adding propagated individuals to an existing population to ameliorate the loss of part of that population due to development.
 - Ameliorative enhancement is proposed as part of this Project.
- **Compensatory introduction:**
 - The establishment of a population to compensate for the impact of a development. In the majority of cases such translocations will meet the definition of introduction as described above.
 - Compensatory introduction is proposed as part of this Project.

The translocation proposed for the Project involves the following three complementary types of translocations:

- **Salvage translocation:**
 - This aims to save and re-establish individuals directly impacted by the Project.
- **Population enhancement**
 - This aims to improve the prospective viability of translocated and *in-situ* populations by propagating the impacted species and introducing additional individuals to the population.
- **Research initiative**
 - This aims to increase understanding of species ecology and the underlying genetic factors.

The three approaches are described in the following sections and within the *Pittosporum* sp. Coffs Harbour & [REDACTED] Exclusion Zone Management Plan and are consistent with Commander *et al.* (2018), which recommends that salvage translocations are combined with population enhancement to improve translocation outcomes. Additionally, the proposed Research Initiatives will increase the understanding of the newly described species.

3.3 General approach

The following translocation strategies are proposed to translocate the *Fontainea* sp. Coffs Harbour:

- Salvage translocation of the mature *Fontainea* sp. Coffs Harbour (and any seedlings present) located at [REDACTED].
- Propagation of *Fontainea* sp. Coffs Harbour individuals from locally collected seed.
- Propagation of *Fontainea* sp. Coffs Harbour from cuttings.
- A research initiative to increase the currently limited understanding of *Fontainea* sp. Coffs Harbour.

A summary of the translocation strategies for *Fontainea* sp. Coffs Harbour is provided in Table 1.

Table 1: Summary of salvaged and propagated *Fontainea* sp. Coffs Harbour proposed to be translocated

| | <i>Fontainea</i> sp. Coffs Harbour |
|--------------------------------|------------------------------------|
| No. of plants to be salvaged | 1 |
| No. of plants to be propagated | 500 |
| No. of plants to be planted | 250 |
| No. of Recipient Sites | 3 |
| Research into propagation | Yes |

The salvage translocation and propagation are further discussed in the following sections.

3.4 Salvage translocation of impacted individuals

The single impacted mature *Fontainea* sp. Coffs Harbour individual is proposed to be translocated from within the Project Footprint (being the area directly impacted by the Project) by a suitably qualified and appropriately experienced Revegetation Contractor with support from an arborist and the Species Expert.

The mature *Fontainea* sp. Coffs Harbour tree is to be translocated by excavation of a large rootball with an excavator or back-hoe combined with manual digging. The rootball will be tightly bound in layers of hessian or other suitable material and placed in a heavy-duty mesh bag for lifting onto a truck for transport. A small crane will be used to load and unload the tree. To avoid low hanging powerlines or other constraints (tree branches, etc), the trunk will be learnt forward or backward with the rootball cushioned against a mound of earth on the back of the truck. This technique follows conventional methods of translocating evergreen non-coniferous trees. Further details of the translocation methods and actions are provided in Section 5.

Whilst all seedlings from the [REDACTED] of *Fontainea* sp. Coffs Harbour have either died of natural causes or have been removed from site as part of a propagation and translocation trial by Ecos Environmental, there remains the possibility that additional seedlings will have germinated and are present at the time of translocation. As a precautionary measure, if *Fontainea* sp. Coffs Harbour seedlings are present at the time of translocation or during vegetation clearing works, all seedlings are to be manually translocated by digging up the seedlings (with rootball) with a spade and mattock and inserting the plants into containers appropriate to the size of the plant and rootball. All seedlings and/or juveniles will be taken to a nursery for on growing by a suitably qualified and appropriately

experienced person with direct experience in propagation of threatened plant species.

All *Fontainea* sp. Coffs Harbour seeds observed during the translocation (including seeds on the ground and seeds in the topsoil unearthed during salvage excavation) are to be collected and provided to the nursery for propagation.

3.5 Propagation trial

An interim management strategy was developed following the identification of the *Fontainea* sp. Coffs Harbour and *Pittosporum* sp. Coffs Harbour. The strategy identified that propagation trials would be beneficial in informing a translocation management plan, as the success of propagation (of the two novel species) has implications regarding the success of the translocation efforts. In this regard, a small-scale informal propagation trial was carried out by USC and by Ecos Environmental in 2021.

The Ecos Environmental propagation trial for *Fontainea* sp. Coffs Harbour used the following three methods:

- Cutting propagation
- Propagation of seed
- Growing of field germinated seedlings

The cuttings were collected by Ecos Environmental on 22 June 2021 and delivered to the following two nurseries, both of which specialise in cutting propagation of native rainforest plants:

- Cutting Edge Nursery received 46 *Fontainea* sp. Coffs Harbour.
- Limpinwood Gardens received 41 *Fontainea* sp. Coffs Harbour.

The propagation trial undertaken by USC involved propagation by cuttings only.

The outcomes of the propagation trials are discussed in the following sections.

3.5.1.1 Cutting propagation trial

The cuttings of *Fontainea* sp. Coffs Harbour were collected from the two largest (female) trees at the [REDACTED] sites, and the larger male tree at the Jordans Creek site.

In December 2021, a total of 13 of the 87 cuttings of *Fontainea* sp. Coffs Harbour had formed roots and approximately five of these had produced shoot growth. Overall, the cutting strike was low and rate of cutting growth observed in the first six months was very slow.

Of the cuttings propagated by USC, nine plants had been potted on to larger pots and showed minimal shoot growth (as at on early 2022).

The USC and Cutting Edge Nursery and Limpinwood Gardens results were similar, which is expected as the same propagation material was used, and similar methods were used. Based on the small-scale informal propagation trial of cuttings, the final strike rate for healthy cutting grown plants appears to be

between 5 – 10 % of the number of cuttings collected. However, USC has significant experience with producing clones of other *Fontainea* species (*F. picrosperma*) through vegetative cuttings and a strike rate of 30% was observed to be more typical of the genus.

3.5.1.2 Seed and field germinated seedlings propagation trial

A small number of *Fontainea* sp. Coffs Harbour seeds were germinated successfully and are currently growing steadily, but slowly. The salvaged field-germinated seedlings are currently the tallest.

Rates of growth observed in seedlings and cuttings indicate that 18 months to two years may be required to grow plants to a sufficiently large size to have a high chance of survival and healthy growth when planted out. To maximise the probability of successful planting, the seeds which have been collected and propagated, and the field germinated seedlings which have been salvaged, should be sufficiently tall, and well ‘hardened off’ prior to planting.

Both nurseries reported that the quality of cutting material and timing of cutting collection (being June 2021) was not ideal and likely reduced the strike rate and growth rates. Cutting collection in June is not an ideal time of year as the weather is more cool and new growth is coming to a halt at the start of winter. To increase the strike rate and growth rates, cuttings should be taken in warmer months from November to April (inclusive).

Ecos Environmental also noted that a reasonable level of seedling recruitment vigour was observed in the two mature trees in 2021, with field germination of seedlings observed at both seed producing trees, particularly at the [REDACTED].

3.6 Propagation proposal

Despite the limitation noted above, a total of 500 *Fontainea* sp. Coffs Harbour individuals are proposed to be propagated via cuttings and seed collection (where seed is available). The propagative material will be collected prior to translocation and will be selected from both mature individuals (i.e. the retained *in-situ* and translocated individual) to increase genetic diversity.

During the collection of propagative material, the secateurs used to collect cuttings must be thoroughly sterilised before use on each plant. Transfer of viral pathogens with secateurs and other pruning tools is a significant risk to wild and translocated populations.

Where practical, propagative material is not to be sourced from branchlets with developing fruit, and the sourcing of propagative material is to be undertaken such that further fruit production is not inhibited.

The propagation will be progressed by the *Fontainea* Expert and/or suitably qualified and appropriately experienced persons with direct experience in native and threatened plant propagation.

All propagated plants are to be held at a native plant nursery and overseen by the *Fontainea* Expert and/or suitably qualified and appropriately experienced persons

until the plants have reached “super tube” size (unless agreed otherwise in consultation with BCD and the Species Expert) to ensure appropriate root development and health of the plant for planting. The period of time the plants are held in the nursery is at the discretion of the Fontainea Expert, the Revegetation Contractor, and TfNSW.

Where the native plant nursery is located outside of the Coffs Harbour area, the plants will be well hardened off to local conditions prior to planting.

Whilst a total of 500 individuals are proposed to be propagated, given the uncertainty surrounding the propagation and strike rate, the propagation effort will aim to produce 250 individuals for potting on and planting within the Recipient Sites.

In the event more than 250 individuals are successfully propagated, all additional individuals will be potted on and either:

- Planted within the Recipient Sites.
- Retained at the nursery to be used for replacement planting (should propagated plants fail to establish in the Recipient Sites and additional plants are required to be re-installed (refer to Section 6.6 and Section 7.6)).
- Used in a combination of the above.

3.7 Translocation feasibility

There is currently uncertainty regarding how the *Fontainea* sp. Coffs Harbour individual will respond to the salvage translocation. As with any translocation, the long-term health of the translocated individual and whether the individual would retain sufficient health to continue to produce seeds is uncertain. There is informal observational evidence which suggests that the probability of successfully transplanting the mature *Fontainea* sp. Coffs Harbour may be low due to the slow grow rates observed, which may suggest low resilience to disturbance. As such, any recovery after transplanting has the potential to be slow, which may leave the individual tree susceptible to impacts from disease. However, the seedlings which have been collected from site appear to be healthy, which may indicate that salvage translocation is possible.

The propagation of *Fontainea* species from cuttings and seed collection has been successful for other species of *Fontainea*, including *F. oraria* (Lennox Head Fontainea) and *F. picrosperma* from the Atherton Tableland, propagated by USC.

Fontainea sp. Coffs Harbour appears to be a slow growing species, which could result in delays in the propagated plants reaching sufficient maturity for planting. In considering the use of propagated plants to supplement the existing population, the time for the propagated plants to reach sufficient maturity for planting needs to be taken into consideration by relevant stakeholders (e.g. the Species Expert, Revegetation Contractor) to maximise the survival rate.

Fontainea oraria (Lennox Head Fontainea) is a threatened species of Fontainea which grows in Lennox Head, NSW. This species has responded well to an intensive program of cutting propagation and planting, which indicates that the

genus *Fontainea* has the potential to respond well to propagation by cuttings and planting. At the same time, *Fontainea* sp. Coffs Harbour is at the southern limit of the genus' range, and is growing on podzolic soil on metasediment geology rather than higher nutrient krasnozems on basalt (i.e. *F. oraria*). These two factors may reduce the vigour and resilience of *Fontainea* sp. Coffs Harbour; however, the translocation outcome is difficult to predict with certainty given the currently limited knowledge of the species.

3.8 Translocation benefits and risks

3.8.1 Salvage translocation and propagation benefits

The combination of salvage translocation and propagation of *Fontainea* sp. Coffs Harbour is anticipated to have the following benefits:

- A no-net loss and, where possible, net gain of *Fontainea* sp. Coffs Harbour as a result of the Project.
- Plants that would have been lost to clearing are rescued by carrying out salvage translocation.
- As the [REDACTED] *Fontainea* sp. Coffs Harbour is genetically distinct from the [REDACTED], planting propagated individuals from the [REDACTED] maximises the potential genetic diversity of the retained population. The propagation will therefore aim to maintain and increase the genetic diversity of the population.
- The translocation program provides opportunities for increasing the understanding of the ecology and genetics of the newly described species.
- Increased knowledge of the species and experience gained with translocation methods will assist future conservation efforts.
- The propagation and planting of additional individuals will increase the local population size, mitigate against species' decline, and assist with the conservation of the species.
- A greater species-wide resilience given the planting of additional individuals in various locations reduces the potential of a localised stochastic event impacting all individuals and causing species decline and/or extinction.

3.8.2 Salvage translocation and propagation risks

The overarching risks associated with salvage translocation and propagation is that the translocated and propagated individuals fail to establish over the short or long-term.

Specific risks to the salvage translocated and propagated individuals include the following:

- Mortality of salvaged individuals during the translocation process.
- Salvage translocated individuals fail to establish at the Recipient Sites.

- Propagation is not successful.
- Propagated plants fail to establish at the Recipient Sites.
- Weeds becoming established or dominant at the Recipient Sites and outcompeting the planted individuals, causing the death or reduced growth of the planted individuals.
- Due to the uniqueness of the species, there is a risk the individuals are poached from the Recipient Sites.
- Drought and bushfire have the potential to impact the Recipient Site and cause individual tree or vegetation community mortality.
- A flood event has the potential to affect the Recipient Sites and cause individual or vegetation community mortality.
- A localised insect outbreak in the Planting Areas and Exclusion Zone has the potential to reduce plant growth and/or cause plant mortality via complete or partial plant defoliation or plant stress.
- The health of the planted treatments may be influenced by various phytopathogens which could cause reduced growth, plant stress, and/or plant mortality on an individual or community level.

Mitigation measures proposed to reduce these risks are provided in Section 8.2.

3.9 Research initiatives

The translocation of *Fontainea* sp. Coffs Harbour (being a newly described species) provides an opportunity to conduct research on the population ecology and genetics of the plant species, and to acquire more knowledge and experience with the application of translocation methods. This information is likely to be of equal use in a conservation or species recovery translocation context as in the current mitigative context.

Section 9 details the proposed *Fontainea* sp. Coffs Harbour Research Initiatives, which includes genetic analysis currently being undertaken by USC.

4 Pre-translocation assessment

4.1 Species ecology

Fontainea sp. Coffs Harbour is currently known from only two locations, as discussed in Section 1.3. The [REDACTED] is a single mature tree to 4.5 m in height, which produced approximately 50 fruits between January and April 2021. A total of 31 seedlings were observed to have germinated under the [REDACTED]; however, the majority of the seedlings were observed to have died from natural causes and the remainder appeared close to mortality and were salvaged as part of a translocation and propagation trial undertaken by Ecos Environmental.

The [REDACTED] *Fontainea* sp. Coffs Harbour population supports a single mature individual approximately 4 m in height. A total of two seedlings and 36 juveniles occur in a 10 m x 10 m area, all of which appear to have originated from the single mature plant and which have likely recruited from seed over the last 5 – 10 years. There is one outlying juvenile plant located approximately 30 m from this group.

Flowers or fruits were observed on four of the juvenile individuals, which indicates that four out of 36 juveniles appear to be reproductively mature. Only male flowers were observed; however, the presence of fruits indicates female flowers are produced.

The cohort of individuals at the [REDACTED] shows evidence of new individuals (saplings and seedlings) being recruited, likely due to the stand of remnant forest being larger than the northern site and the slope aspect more southerly, which combine to provide more favourable micro-climatic conditions for seedling germination.

Fontainea sp. Coffs Harbour flowers and fruits were recorded from January to April with a few fruits extending to May. This taxon has a long flowering and fruiting season that starts in December and continues to April – May. No reproductive activity (or new leaf growth) was seen between May and August.

The habitat indicators for *Fontainea* sp. Coffs Harbour (based on only two populations) include the following:

- Brush Box (*Lophostemon confertus*) the most common canopy tree.
- Canopy tall (>30 m)
- Well-developed forest mid-stratum (or thinned by past logging) of rainforest trees, shrubs and vines, species diversity relatively high.
- Ground layer flora intact and not replaced by grass and weeds; ferns abundant (*Blechnum indicum*, *Doodia aspera*, *Adiantum* sp., *Lastreopsis* sp., *Arachnoides aristata*), native sedges (including *Cyperus filipes*), herbs and grass common.
- Low elevation (<50 m ASL).

- Southerly aspect (SE to SW).
- Lower slope topographic bench next to drainage line.
- 1 km – 1.6 km from the coast.

4.2 Description of the impact site

4.2.1 Vegetation

[REDACTED]

[REDACTED]

The Brush Box – rainforest community was observed to be dominated by mature Brush Box (*Lophostemon confertus*) to 30 m – 40 m high with occasional Tallowwood (*Eucalyptus microcorys*), Pink Bloodwood (*Corymbia intermedia*), Blackbutt (*Eucalyptus pilularis*) and Flooded Gum (*Eucalyptus grandis*). The understorey was dominated by small to medium sized rainforest trees 5 m – 15 m high, including Red Bean (*Dysoxylum mollissimum*), Murrogun (*Cryptocarya microneura*), Forest Maple (*Cryptocarya rigida*), Blue-berry Ash (*Elaeocarpus reticulatus*), Domatia Tree (*Endiandra discolor*), Scentless Rosewood (*Synoum glandulosum*), Rusty Plum (*Niemeyera whitei*), Bangalow Palm (*Archontophoenix cunninghamiana*), and Strangler Fig (*Ficus watkinsiana*). Vines, herbs and ferns were typically observed in the ground layer.

The Brush Box – rainforest community occurs locally in narrow zones along drainage lines and gullies and can be broadly classed as a type of wet sclerophyll forest, transitional between wet sclerophyll dominated by *Eucalyptus* and subtropical rainforest.

4.2.2 Geology, soils, and topography

[REDACTED]

The soil is a medium fertility, red-yellow clay podzol formed on metasediment. Soil characteristics vary depending on the underlying geology of the area and the geomorphological processes to which they have been exposed. The Coffs Harbour 1:100,000 scale Soil Landscape Sheet and Report (Milford 1999) indicates the

soils at the impact sites consist of well drained and strongly acidic structured red and brown earths.

4.2.3 Hydrology

[REDACTED]

4.3 Translocation Recipient Sites

There are currently three Recipient Sites nominated to receive the salvage translocated and propagated *Fontainea* sp. Coffs Harbour. The Recipient Sites were selected primarily based on matching habitat in terms of topography, soil/geology and vegetation, and suitability of tenure for long-term conservation management.

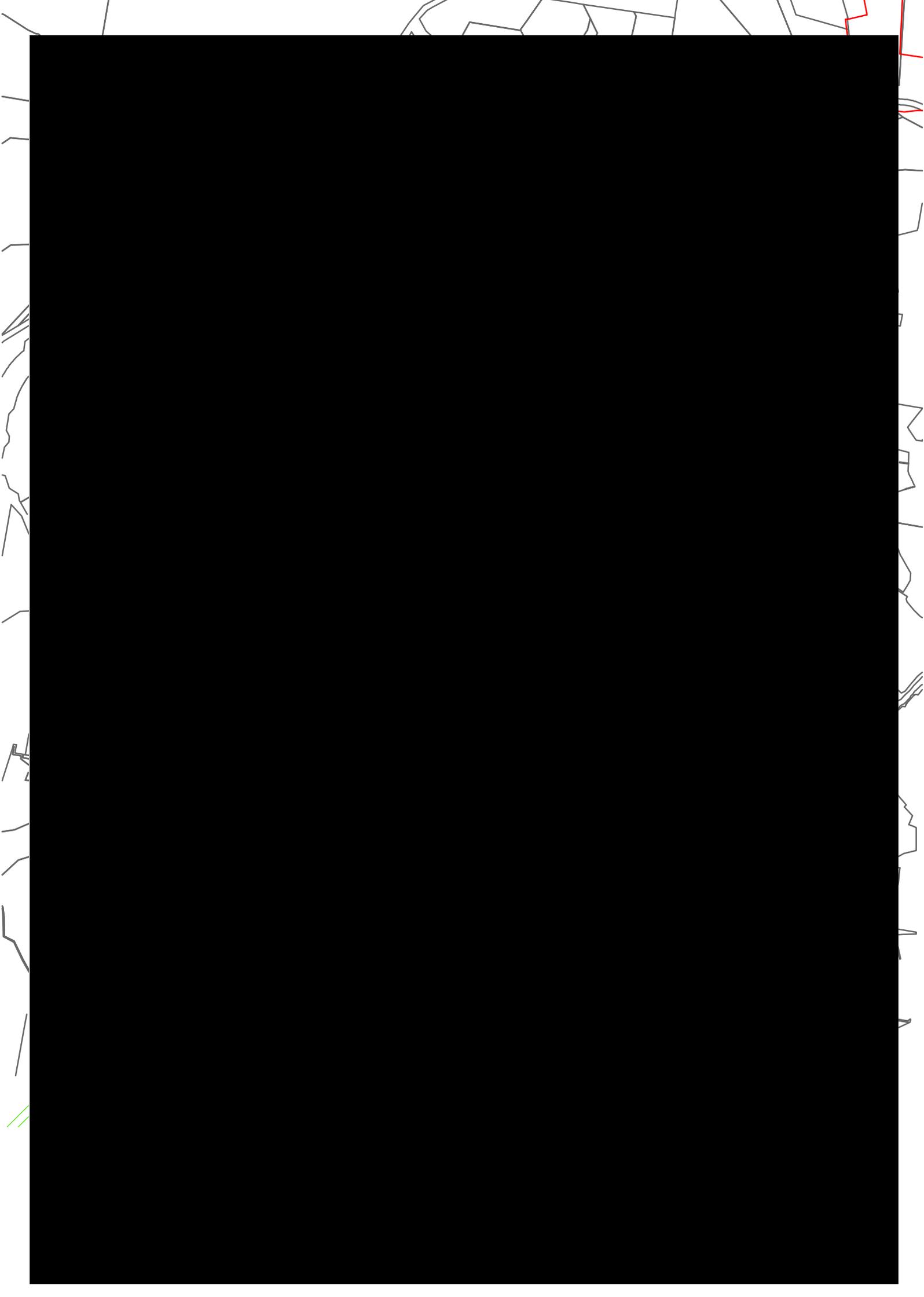
The Recipient Sites are as follows:

- [REDACTED]
- [REDACTED]
- [REDACTED]

The Recipient Sites are described in the following sections, shown on Figure 4, and a summary is provided in Section 4.4.

The Recipient Sites will also include translocated and propagated individuals of *Pittosporum* sp. Coffs Harbour. Further information is provided in the *Pittosporum* sp. Coffs Harbour & [REDACTED] Exclusion Zone Management Plan.

A detailed description of each site is provided in Appendix B.



In the event that additional Recipient Sites are required, additional sites will be selected by the Species Experts and TfNSW based on their suitability for *Fontainea* sp. Coffs Harbour and in consultation with BCD.

Propagated material will also be provided to and the Australian Botanic Garden Mount Annan for *ex-situ* conservation as well as appropriate distribution of *Fontainea* plants to the Australian Botanic Garden's network of Botanical Gardens across eastern NSW. These include for example Lismore Rainforest Botanic Gardens, Hunter Region Botanic Gardens and the North Coast Botanical Gardens, Coffs Harbour (refer to Section 11 of the *Pittosporum* sp. Coffs Harbour & [REDACTED] Exclusion Zone Management Plan).

[REDACTED]

4.4 Summary of Recipient Sites

Table 2 provides a summary of the Recipient Sites and the total number of *Fontainea* sp. Coffs Harbour proposed for each site. The total number of *Fontainea* sp. Coffs Harbour is based on a total of 250 propagated individuals. As described in Section 3.6, where the propagation effort is successful in propagating more than 250 of either species, additional individuals may be allocated to Recipient Sites based on the recommendations of the Revegetation Contractor and the Species Expert.

Table 2: Summary of the Recipient Sites and preliminary numbers of *Fontainea* sp. Coffs Harbour proposed for each site

| Recipient Site Name | <i>Fontainea</i> sp. Coffs Harbour | |
|---------------------|------------------------------------|----------------------|
| | Salvage Translocation | Propagation Planting |
| [REDACTED] | 1 mature individual | 83 propagated plants |
| [REDACTED] | - | 83 propagated plants |
| [REDACTED] | - | 84 propagated plants |

The exact number of propagated *Fontainea* sp. Coffs Harbour to be planted at each Recipient Site will be determined following genetic analysis, which will distribute the propagated plants such that genetic diversity at each Recipient Site is maximised.

5 Translocation actions – Installation of salvaged and propagated plants

5.1 General

This section details the following management measures:

- Requirements for each plant nominated for translocation to have a unique identifier code
- Preparation of the Recipient Sites and Planting Areas
- Planting the salvaged individual
- Planting the propagated individuals
- Mulching requirements
- Reporting requirements
- Completion of planting requirements

A schedule of works and responsibilities for all translocation actions is provided in Section 8.3.

A number of other translocation activities are proposed as part of the project, including those for *Pittosporum* sp. Coffs Harbour, rusty plum (*Niemeyera white*) and slender marsdenia (*Marsdenia longiloba*). Prior to commencing any work associated with this plan, the Revegetation Contactor will review the associated management plans and translocations proposals for other species to ensure any works carried out by the Revegetation Contractor are not inconsistent with the other management plans and translocations proposals.

5.1.1 Unique identifier code

Prior to transplanting any plants, all plants nominated for transplanting are to be tagged with a unique identifier code to allow for each individual plant and/or discrete patch/clump to be tracked during the translocation process.

A figure is to be created which identifies each plant's unique identifier code to show the original spatial distribution of the plants and the proposed planting location within the Receiving Sites.

5.1.2 Soil sampling and comparative analysis

Prior to translocation, soil samples are to be collected and soil profiles recorded from the impact sites and Recipient Sites for analysis to allow the soil properties (including soil chemistry, texture and soil profile) each site to be compared. The following soil properties (as a minimum) are to be analysed:

- Nutrients
- Organic material

- pH
- Soil horizons and depth of each horizon (i.e. the soil profile)
- Soil type classification
- Soil profile
- Soil toxicity
- Any other indicators that are likely to impact revegetation

The identification of the above will enable a more detailed analysis of the equivalence of soil conditions (i.e. matching habitat) at the impact sites and Recipient Sites in addition to determining any soil amelioration requirements.

5.1.3 Project arborist

A suitably qualified and appropriately experienced arborist or horticulturalist is to be engaged by TfNSW to work with the Species Expert and Revegetation Contractor during the translocation and planting of the *Fontainea* sp. Coffs Harbour. The arborist will provide advice on suitable translocation methods and will be required to have the following:

- Direct experience with translocating native rainforest trees or shrubs.
- A minimum of five years' horticultural experience growing or maintaining native plants.
- Demonstrated knowledge of native vegetation and plant ecology of native plants in Coffs Harbour area.

5.1.4 Pre-translocation and propagation planting report

A report is to be prepared by the Revegetation Contractor and provided to TfNSW for approval prior translocation and planting of the propagated plants. The report is to include information on how the Revegetation Contractor will meet the requirements of Section 5.2, Section 5.3, and Section 5.4 of this management plan including appropriate weed and hygiene protocols to be implemented.

The pre-translocation and propagation planting report must also be developed in consultation with The Australian Botanic Garden Mount Annan.

5.2 Preparation of the Recipient Sites

5.2.1 Timing of translocation/planting

The *Fontainea* sp. Coffs Harbour individual at [REDACTED] is proposed to be translocated in May 2023.

The following requirements are to be followed when determining when to undertake the planting of the propagated individuals:

- Planting must be staggered across several weeks and undertaken in consideration of seasonal rainfall patterns with planting to occur in the wetter months of the year or in autumn when soil moisture is high.
- Planting must be avoided when there is a risk of flooding.
- Planting must be avoided in the colder and drier month of the year, particularly when there is a risk of frost.
- Planting must allow for a few months of warm, moist conditions before the onset of cold, dry, and windy conditions in winter-spring.

For the purposes of the following sections, both salvage translocation and planting of propagated individuals is referred to as 'planting'.

5.2.2 Surveying and pegging of the Planting Areas

The Planting Areas within each Recipient Site, and the entirety of the Exclusion Zone are to be surveyed (by a surveyor) with each vertex of the Planting Areas and Exclusion Zone pegged. Each vertex/peg shall be marked to be clearly visible in order to allow for ease of visibility when preparing the Planting Areas and Exclusion Zone, and when undertaking future works and/or monitoring.

5.2.3 Weed and hygiene control measures

Prior to the commencement of planting, the Revegetation Contractor is required to undertake a weed survey within the Planting Areas and within the entirety of the Exclusion Zone. All weeds that have the potential to impact the translocated, propagated, and *in-situ* threatened plants are required to be removed/treated. Weed control adjacent to any threatened plant is to be undertaken manually and no herbicide is to be used within 2 m of a threatened plant. All weed management works shall be conducted by suitably qualified and appropriately experienced Revegetation Contractors proficient in both native and weed species identification.

A period of two to three weeks is typically required between herbicide application and planting. Only herbicides suitable for application adjacent to waterways (as detailed on the manufacturer's specifications) are to be used. Only frog friendly herbicides are permitted to be used and herbicides are not to be used within 10 m of the high banks of waterways and drainage lines which discharge directly into waterways.

To minimise incidental poisoning of native species, the Revegetation Contractor will walk over the treatment area and mark all small native juveniles and seedlings to minimise spray contact. Herbicide sprays should not be applied on days of forecasted rainfall or in windy conditions. Herbicide application is not to impact on soil quality.

All weed control works are to be conducted using best practise techniques. Where herbicides are used, the handling and application of herbicides shall:

- Only be carried out by a licensed Revegetation Contractor who possesses qualifications and licences relevant to the products being applied.

- Be in accordance with relevant legislation and policies.
- Be in accordance with the manufacturer's instructions.
- Be applied with biodegradable, non-toxic tracer dye to highlight areas sprayed.

The Revegetation Contractor shall maintain records of all herbicide application including type, dates and volumes sprayed, and areas where applied (noting that herbicides are not to be used within 2 m of any threatened plant).

To minimise the potential to introduce and/or spread weeds and myrtle rust to the Planting Areas, the following weed and hygiene strategies are required:

- All vehicles and machinery are to be weed free and cleaned prior to commencing work within the Recipient Sites.
- All clothing, shoes and other equipment are to be cleaned regularly between activities, especially when leaving an area known to support high priority weeds and entering the Recipient Sites.
- All soil, gravel or fill imported into the Recipient Sites is to be sterile and declared weed free.
- Training and inductions detailing the importance of weed control are to be provided for contractors and workers.
- All staff are required to be trained in the identification of myrtle rust.

5.2.4 Plant set-out locations

The Revegetation Contractor shall determine the locations and extent of the following within the Recipient Sites (as relevant to the Planting Areas and Exclusion Zone) prior to setting-out plants:

- Existing (*in-situ*) and proposed translocated threatened plants
- Services
- Services easements
- Overhead powerlines
- Roads/tracks
- Allotment boundaries
- Flooding levels
- Planting Areas of other translocated or propagated species

Planting Areas will be set out so as not to limit the ability of planting additional areas in the future (i.e. access to all areas of the Recipient Sites shall be maintained) and no translocated and/or propagated plants are to be located within 5 m of any allotment boundary.

Within the Planting Areas of the Recipient Sites, the Revegetation Contractor shall:

- Identify the location where all plants are to be planted and label the locations with the unique identifying number of each plant that is to be planted at the location. Materials used for labelling should be durable and of high quality to avoid degradation over time.
- The planting locations for propagated plants are to be set out at 2 m centres; however, are able to be adjusted, as required, in accordance with on-ground vegetation and micro-habitat features.
- Micrositing of the salvage translocation planting site for the mature *Fontainea* sp. Coffs Harbour within the [REDACTED] Exclusion Zone is to be carried out in consultation with the Project Ecologist, Species Expert and Project Arborist. Following micrositing, a planting hole is to be excavated that is larger than the anticipated rootball of the *Fontainea* sp. Coffs Harbour in readiness for the translocation.
- The planting hole should be excavated the day before the salvage translocation, and when there is minimal chance of rain, and following all weed control.
- Identify areas where the salvaged topsoil from the impact site (which may contain *Fontainea* sp. Coffs Harbour seeds in the seed bank) is able to be spread out.

5.3 Planting of salvaged individual

The salvage translocation of the single mature *Fontainea* sp. Coffs Harbour is to be undertaken by a suitably qualified and appropriately experienced Revegetation Contractor in collaboration with the Species Expert and Project Arborist (refer to Section 5.1.3).

Prior to the salvage translocation, the Revegetation Contractor is required to confirm with TfNSW that all propagative material has been collected and any seedlings salvaged prior to the salvage translocation being undertaken. Where seedlings are present, consultation with The Australian Botanic Garden Mount Annan is to be undertaken to confirm appropriate methodology and management requirements are implemented.

The salvage translocation is to be undertaken as follows:

- Implement weed and hygiene protocols as detailed in Section 5.2.3.
- The salvaged tree will be thoroughly watered for 2 – 3 days before excavation (e.g. 1 – 2 hrs/day). The watering requirement will be reduced in the event of heavy rainfall.
- Access to the site will be cleared and surrounding trees removed to create space to work.
- Prior to excavation, the tree is to be pruned back.
- Excavation of the mature tree is to be carried out using an excavator or back-hoe combined with hand-digging to minimise break-up of the rootball.

- The rootball will be at least 1 m deep and 1.5 m wide to minimising damage to the root system and maximising rootball soil retention.
- A Rusty Plum (*Niemeyera whitei*) growing close to *Fontainea* sp. Coffs Harbour at the [REDACTED] will be removed with the *Fontainea* sp. Coffs Harbour. These are to be retained during the salvage excavation to hold the rootball together. The Rusty Plum (*Niemeyera whitei*) can be felled to approximately 1.5 m above the ground to provide additional space in which to work.
- The tree with rootball is to be lifted using a heavy-duty hammock bag with the rootball wrapped and tightly bound. A crane will be used if the tree is likely to rub on the arm of an excavator or back-hoe.
- Once the tree has been excavated, the tree is to be wetted down prior to transportation to the Recipient Site.
- During transportation to the Recipient Site, the tree is to be wetted down and protected from wind and sun desiccation during transport (e.g. under a secure tarpaulin).
- Once at the Recipient Site, the tree/rootball will be wetted down again. The hessian bag (or similar) is to be removed when the rootball is resting on the ground in the excavated hole to avoid it breaking up. The bag used to lift the tree should not be removed until the correct planting depth has been achieved
- The tree will be planted such that the surface of the rootball/base of tree is slightly above (e.g. 2 – 5 cm) the surrounding ground level to allow for settling of the soil. The planting hole is to be manually backfilled with a shovel (or similar) to remove any large air cavities. An excavator is not to be used to compact the soil as this may cause excessive damage to the root system.
- Additional topsoil from around the base of the impacted *Fontainea* sp. Coffs Harbour is to be transported to the Recipient Site to assist with habitat restoration and revegetation works by utilising the soil seedbank present in the topsoil at the impact site. The topsoil will be spread around the Recipient Site on the day of translocation.
- Once the tree has been planted and soil is backfilled, additional watering is to be undertaken so the soil around the tree is saturated. Watering will be continued to ensure the soil remains moist (at field capacity) but must not be waterlogged.
- Hay mulch is to be applied around the tree and to all areas disturbed during the translocation.

5.4 Planting of propagated individuals

The planting of all propagated plants is to be undertaken by a suitably qualified and appropriately experience Revegetation Contractor with input from the Species Expert, as follows:

- Implement weed and hygiene protocols as detailed in Section 5.2.3.

- Prior to installing the plants, the planting points shall be set out in accordance with Section 5.2.4.
- Prior to installing the plants, all plants shall be inspected for any signs of pathogen and/or viral infection.
- All plants shall be:
 - “Super tube” size (unless otherwise agreed between BCD and the Species Expert) and well hardened off with no signs of disease.
 - Identified with a unique identifier code.
 - Thoroughly watered 1 – 2 hours prior to planting.
 - Planted with 12-month controlled/slow-release organic fertiliser for native plants (as deemed required by the Revegetation Contractor).
 - Watered, on the day of installation, with a solution of water and seaweed solution, and wetting agent (as deemed required by the Revegetation Contractor) until the topsoil layer is moist. Watering shall be applied in multiple applications to ensure surface erosion does not occur.
- Planting holes are to be dug at an appropriate depth (e.g. four times the pot size).
- The soil around each planted plant is to be compacted by hand to remove large air pockets and ensure plant stem is straight and not damaged.
- A minimum of 20 mm of weed free grass/hay mulch is to be applied to the base of the plants.

5.5 Tree guards

Tree guards (or similar, including chicken wire) are to be installed around each plant and are to be 1.2 m high with a hardwood stake(s).

5.6 Mulching

Where mulch is deemed to be required by the Revegetation Contractor, the mulch shall be a grass or hay mulch, weed free, and installed as follows:

- Within one day of the completion of planting.
- Spread to 20 mm depth and is to be installed at the base of plants identified as requiring mulch.

5.7 Installation of salvaged and propagated plants reporting requirements

A report is to be prepared by the Revegetation Contractor for the Planting Areas and the entirety of the Exclusion Zone and is to be submitted to TfNSW following:

- The completion of the salvage translocation.
- Upon completion of planting the propagated plants.

The report shall include, as a minimum, the following:

- Dates of site inspections and works.
- Works undertaken to prepare the Recipient Sites.
- All weeds identified within the Planting Areas and within the entirety of the Exclusion Zone and method of treatment.
- Weed, pest and disease management measures undertaken within the Planting Areas and within the entirety of the Exclusion Zone.
- Description of salvage translocation and propagated planting works undertaken.
- Issues encountered during the salvage translocations and propagated planting and actions undertaken and / or required to remedy the issues.
- Watering application dates and volumes.
- Damage to plants during salvage translocation and propagated planting and actions undertaken and / or required to remedy the damage.
- Any proposed adaptive management measures (to be identified and developed by the Revegetation Contractor if required).
- Recommendations for additional/further works required.

This report is required to include a figure showing:

- Upon completion of the salvage translocation – the original location of the salvage translocated individual (with unique identifier code) and the translocated location (with unique identifier code).
- Upon completion of the propagation planting – the planting location of the propagated plants and their unique identifier code.

5.8 Completion of planting

The installation of salvaged and propagated plants shall be deemed completed when the Planting Areas and Exclusion Zone have met the following completion criteria:

- The Planting Areas and the entirety of the Exclusion Zone has been surveyed and each vertex has been pegged to be highly visible.
- All weeds have been treated and are not hindering (or likely to hinder) the growth rates of the plants.
- For salvage translocation, translocation has been undertaken in accordance with Section 5.3.
- For propagated plants, the required number of plants have been planted in accordance with Section 5.2.4.
- For propagated plants, the planted individuals:
 - Show no signs of nutrient deficiency.

- Show no signs of water deficiency.
- Show no signs of pest impacts.
- Have been treated appropriately where there is a risk of disease.
- Are established and well formed, showing evidence of growth typical of the species.
- Have a 20 mm mulch depth (as applicable).

Upon completion of the salvage translocation and/or the planting of all propagated individuals, the Planting Areas and Exclusion Zone shall be inspected by TfNSW and/or their representative.

Where TfNSW and/or their representative deem the salvage translocation and/or planting to be compliant with the completion criteria, a Certificate of the Commencement of the Initial Maintenance Period will be issued to the Revegetation Contractor by TfNSW.

6 Post-translocation actions – Initial Maintenance Period

6.1 General

The Initial Maintenance Period shall commence when the installation of the salvaged individual and propagated plants is deemed compliant, and a Certificate of Commencement of the Initial Maintenance Period has been issued by TfNSW.

The Initial Maintenance Period shall be a minimum of 180 days. During the Initial Maintenance Period, the Revegetation Contractor shall care for the salvaged and propagated plants to ensure their long-term viability and to meet the completion criteria detailed in Section 6.9.

The following sections detail the works required as part of the Initial Maintenance Period.

Additional management measures and maintenance requirements for the Jordans Creek Exclusion Zone relevant to the Initial Maintenance Period are detailed in the *Pittosporum* sp. Coffs Harbour & [REDACTED] Exclusion Zone Management Plan. The measures and requirements apply to the protection of the retained population of *Fontainea* sp. Coffs Harbour at [REDACTED] during the Construction Phase of the Project and would also help manage potential indirect impacts on the salvaged and propagated individuals planted within the Exclusion Zone.

6.2 Initial Maintenance Period monitoring schedule

The Revegetation Contractor, with advice provided by the Species Expert, is to prepare a monitoring schedule of works for the duration of the Initial Maintenance Period, which is required to be approved by TfNSW. The monitoring schedule and requirements are to be developed to be consistent with any requirements of a BSA and the Biodiversity Conservation Trust.

The monitoring schedule shall be developed to allow, as a minimum, the following:

- Identification of watering requirements to satisfy Section 6.3.
- Identification of fertiliser and soil ameliorant requirements to satisfy Section 6.4.
- Identification of weed, pest and disease control requirements to satisfy Section 6.5.
- Identification of repairing or re-installing of failed treatments requirements to satisfy Section 6.6.
- Identification of mulching requirements to satisfy Section 6.7.

The person(s) undertaking the monitoring are to be suitably qualified and appropriately experienced and able to confidently identify plant health

characteristics including (as a minimum) water and nutrient deficiencies, impacts from pest and disease, and irregular growth issues. The suitability of the persons(s) undertaking the monitoring is to be supplied to TfNSW for approval.

6.3 Watering

The watering requirements are to be determined by the Revegetation Contractor and approved by TfNSW. However, the following is to be used as a guide for determining minimum watering requirements:

- Watering is required to be undertaken every day for the first two weeks.
- Watering is required once every second day for the following five weeks.
- Watering once a week until the completion of the Initial Maintenance Period.

Where sufficient rainfall has been received or is forecasted at the Planting Area, the above watering requirements can be revised by the Revegetation Contractor in consultation with TfNSW to ensure plants are not overwatered.

During the Initial Maintenance Period, watering shall be ‘misted’ or conducted in a manner that does not cause damage to the treatments, run-off, erosion or displacement of the Planting Areas and Exclusion Zone.

6.4 Fertilising and soil ameliorants

The fertilising and soil ameliorant requirements are to be determined by the Revegetation Contractor and approved by TfNSW.

Where required, fertiliser and soil ameliorants are to be applied to ensure plant health and to achieve the Initial Maintenance Period completion criteria.

6.5 Weed, pest and disease control

All weeds within the Planting Areas and the Exclusion Zone with the potential of impacting the translocated and/or propagated *Fontainea* sp. Coffs Harbour are to be treated in accordance with Section 5.2.3 to ensure weeds are not hindering the growth of the translocated, existing *in-situ* threatened plants, and the propagated plants.

Where pest and diseases are identified, all plants are to be treated appropriately by the Revegetation Contractor to ensure the continued health and growth of the translocated and/or propagated *Fontainea* sp. Coffs Harbour.

6.6 Repair or re-installation of treatments

A total of 500 *Fontainea* sp. Coffs Harbour individuals are proposed to be propagated, with a minimum of 250 proposed to be planted across the Recipient Sites (the total number will be informed by the success of the propagation and will be determined in consultation with the Species Expert, the Revegetation Contractor, and TfNSW, refer to Section 3.6). TfNSW has assumed there will be

20% mortality of propagated individuals across the Recipient Sites following planting which would result in 200 propagated individuals.

Where less than 200 propagated individuals have survived at the completion of the 180-day Initial Maintenance Period, the Revegetation Contractor is required to notify TfNSW who, to re-instate a minimum of 200 across the Recipient Sites, will either:

- Commence the process of propagating additional individuals to re-instate a minimum of 200 across the Recipient Sites.
- Where additional propagated plants are available, plant these individuals.

Where propagated individuals are proposed to reinstate the required number of individuals, the propagated individuals are to be re-installed as soon as is reasonably practical upon identification of the failed or damaged plants; noting that the time between propagation and planting could be up to two years or more.

When considering propagation of additional individuals, the previous propagation success rate is to be considered. Where the previous propagation success rate was low and therefore unlikely to yield sufficient results to re-establish 200 individuals, TfNSW will seek alternative mitigation strategies.

Prior to re-installation, the Revegetation Contractor shall investigate the failed treatment to determine the cause of the poor performance, damage, or failure and take any corrective actions necessary.

The monitoring and maintenance requirements of the re-installed plants are to be developed by the Revegetation Contractor in consultation with the Species Expert, TfNSW, and BCD.

Where plants have failed, and additional propagative material and/or seeds are required, the Revegetation Contractor is to source the propagative material and/or seeds from individuals which appear to be the healthiest.

6.7 Topping up of mulch

Thirty days before the completion of the Initial Maintenance Period, where mulch has been applied to plants, the mulch shall be topped up to achieve the originally specified depths (20 mm).

6.8 Initial Maintenance Period reporting requirements

A report is to be prepared by the Revegetation Contractor for the Planting Areas and Exclusion Zone and is to be submitted to TfNSW and the BCD Senior Team Leader Planning, North East Branch monthly from the commencement of the Initial Maintenance Period.

The report shall include, as a minimum, the following:

- Monthly program of maintenance works.

- Dates of maintenance visits and inspections.
- Average height and general health of the salvage translocated and propagated *Fontainea* sp. Coffs Harbour.
- Evidence of recruitment, including number and height of seedlings.
- Surrounding vegetation characteristics including:
 - Dominant canopy species
 - Canopy height (m)
 - Canopy cover (%)
- Maintenance works undertaken.
- Maintenance works in progress.
- Watering application dates and volumes.
- Weed, pest and disease management measures undertaken.
- Failed or failing plants and suspected cause of failure.
- All weeds identified and method of treatment.
- Issues identified during inspections and actions required to remedy the issues.
- Damage to plants including damage caused by vandalism and/or theft.
- Proposed adaptive management measures (if required).
- Recommendations for further works required.

All vandalism and theft claims shall be supported by photographic evidence and / or a police report.

Where the health of the salvage translocated and propagated *Fontainea* sp. Coffs Harbour is considered in jeopardy (eg failed or failing plants, evidence of pest or disease impact, etc), the BCD Senior Team Leader Planning, North East Branch is to be notified within 24 hours of detection. Following the initial notification, suggested remedial actions for the consideration and written agreement of the BCD Senior Team Leader Planning, North East Branch must be provided within 7 days.

6.9 Completion of the Initial Maintenance period

The Initial Maintenance Period shall be completed when the Planting Areas and Exclusion Zone have met the following completion criteria:

- The Revegetation Contractor has identified all failed *Fontainea* sp. Coffs Harbour within the Planting Areas and the Exclusion Zone.
- The Revegetation Contractor has reported to TfNSW the total number of *Fontainea* sp. Coffs Harbour that are required to be propagated to achieve a minimum of 200 *Fontainea* sp. Coffs Harbour individuals within the Planting Areas and/or the Exclusion Zone.

- All weeds within the Planting Areas and the entirety of the Exclusion Zone have been treated and are not hindering (or likely to hinder) the growth rates or successful establishment of the translocated and propagated plants.
- The salvage translocated and propagated plants:
 - Show no signs of nutrient deficiency.
 - Show no signs of water deficiency.
 - Show no signs of pest impacts.
 - Have been treated appropriately where impacted by pests and/or disease.
 - Are established and well formed, showing evidence of growth typical of the species.
 - Have a 20 mm mulch depth (as applicable).
- The Planting Areas and Exclusion Zone have been established for a minimum 180-day duration.

Upon completion of the Initial Maintenance Period, the Planting Areas and Exclusion Zone shall be inspected by TfNSW and/or their representative.

Where TfNSW and/or their representative deem the Planting Areas and Exclusion Zone to be compliant with the completion criteria, a Certificate of Completion of the Initial Maintenance Period shall be issued to the Revegetation Contractor by TfNSW.

7 Post-translocation actions – Monitoring period

7.1 Monitoring period

The Monitoring Period shall commence with the issuing of the Certificate of Commencement of the Monitoring Period by TfNSW.

The Monitoring Period shall be a minimum duration of ten years, from the date of the Certificate of the Commencement of the Monitoring Period.

The monitoring program may be reviewed by the species expert five years after issuing of the Certificate of Commencement of the Monitoring Period by TfNSW. Outcomes of the review may be used to inform a variation of the monitoring program during years six to 10.

Any variation of the monitoring program must be approved in writing by the BCD Senior Team Leader Planning North East Branch before commencement.

The following sections detail the works required as part of the Monitoring Period.

7.2 Monitoring period schedule

The Revegetation Contractor is to prepare a monitoring schedule for the duration of the Monitoring Period, which is required to be approved by TfNSW. The monitoring schedule and requirements are to be developed to be consistent with any requirements of a BSA and the Biodiversity Conservation Trust.

Based on a minimum duration of ten years for the Monitoring Period, the monitoring schedule developed by the Revegetation Contractor is to include (as a minimum) the following:

- Monitoring every three months for Year 1 and Year 2.
- Monitoring every six months for Year 3 to Year 5.
- Monitoring every 12 months for Year 6 to Year 10.

Should the review referred to in Section 7.1 indicate a need to vary the monitoring program, any variation must be approved in writing by the BCD Senior Team Leader Planning, North East Branch, before commencement.

The monitoring schedule shall be developed to allow, as a minimum, the following:

- Identification of watering requirements to satisfy Section 7.3.
- Identification of fertiliser and soil ameliorant requirements to satisfy Section 7.4.
- Identification of weed, pest and disease control requirements to satisfy Section 7.5.

- Identification of repairing or re-installing of failed treatments requirements to satisfy Section 7.6.
- Identification of mulching requirements to satisfy Section 7.7.

The person(s) undertaking the monitoring are to be suitably qualified and appropriately experienced and able to confidently identify plant health characteristics including (as a minimum), water and nutrient deficiencies, impacts from pest and disease, and irregular growth issues. The suitability of the persons(s) undertaking the monitoring is to be supplied to TfNSW for approval.

7.3 Watering

During the Monitoring Period, watering shall:

- Be undertaken as deemed to be required by the Revegetation Contractor to achieve the completion criteria.
- Be conducted in a manner that does not cause damage, run-off or subsequent erosion or displacement of Planting Areas.

7.4 Fertilising and soil ameliorants

Fertiliser and soil ameliorants are to be applied (as deemed to be required by the Revegetation Contractor) to ensure plant growth, plant health and to ensure the treatments achieve the Monitoring Period completion criteria.

7.5 Weed, pest and disease control

All weeds within the Planting Areas and the Exclusion Zone with the potential of impacting the translocated and/or propagated *Fontainea* sp. Coffs Harbour are to be treated in accordance with Section 5.2.3 to ensure weeds are not hindering the growth of the translocated, existing *in-situ* threatened plants, and the propagated plants.

Where pest and diseases are identified, all plants are to be treated appropriately by the Revegetation Contractor to ensure the continued health and growth of the translocated and/or propagated *Fontainea* sp. Coffs Harbour.

7.6 Repair or re-installation of treatments

A total of 500 *Fontainea* sp. Coffs Harbour individuals are proposed to be propagated, with a minimum of 250 individuals proposed to be planted across the Recipient Sites (the total number to be planted will be informed by the success of the propagation and will be determined in consultation with the Species Expert, the Revegetation Contractor, and TfNSW – refer to Section 3.6). TfNSW has assumed there will be 20% mortality of propagated individuals across the Recipient Sites, which would result in 200 propagated individuals.

The Revegetation Contractor is required to include in their reporting requirements the number of failed translocated or propagated plants. Where the loss of individuals will result in less than 200 propagated plants, TfNSW will either:

- Commence the process of propagating additional individuals to re-instate a minimum of 200 across the Recipient Sites.
- Where additional propagated plants are available, plant these individuals.

Where propagated individuals are proposed to reinstate the required number of individuals, the propagated individuals are to be re-installed as soon as is reasonably practical upon identification of the failed or damaged plants; noting that the time between propagation and planting could be up to two years.

When considering propagation of additional individuals, the previous propagation success rate is to be considered. Where the previous propagation success rate was low and therefore unlikely to yield sufficient results to re-establish 200 individuals of either species, TfNSW will seek alternative mitigation strategies.

The monitoring and maintenance requirements of the re-installed plants are to be developed by the Revegetation Contractor in consultation with the Species Expert, TfNSW, and BCD.

Prior to re-installation, the Revegetation Contractor shall investigate the failed treatment to determine the cause of the poor performance, damage, or failure and take any corrective actions necessary.

Where plants have failed, and additional propagative material and/or seeds are required, the Revegetation Contractor is to source the propagative material and/or seeds from individuals which appear to be the healthiest.

7.7 Topping up of mulch

Mulched shall be topped up as deemed required by the Revegetation Contractor required to achieve the originally specified depths (20 mm).

7.8 Monitoring period reporting requirements

A report is to be prepared by the Revegetation Contractor for the Planting Areas and the Exclusion Zone and is to be submitted to TfNSW and the BCD Senior Team Leader Planning, North East Branch following each monitoring event from the commencement of the Monitoring Period.

The report shall include, as a minimum:

- Dates of maintenance visits and inspections.
- Maintenance works undertaken.
- Maintenance works in progress.
- Average height and general health of salvage translocated and propagated *Fontainea* sp. Coffs Harbour.

- Evidence of recruitment, including number and height of seedlings.
- Surrounding vegetation characteristics including:
 - Dominant species in the canopy, subcanopy, shrub layer and ground cover.
 - Canopy height (m).
 - Canopy cover (%).
- Watering application dates and volumes.
- Weed, pest, and disease management measures undertaken.
- Failed or failing vegetation treatments and suspected cause of failure.
- Repair or re-installation of failed plants.
- Weeds identified and method of treatment.
- Issues identified during inspections and actions required to remedy these.
- Damage to vegetation caused by vandalism or theft of vegetation.
- Proposed adaptive management measures (if required).
- Recommendations for further works required.

All vandalism and theft claims shall be supported by photographic evidence and/or police report.

Where the health of the salvage translocated and propagated *Fontainea* sp. Coffs Harbour is considered in jeopardy (eg failed or failing plants, evidence of pest or disease impact, etc), the BCD Senior Team Leader Planning, North East Branch is to be notified within 24 hours of detection. Following the initial notification, suggested remedial actions for the consideration and written agreement of the BCD Senior Team Leader Planning, North East Branch must be provided within 7 days.

7.9 Completion of the monitoring period

The Monitoring Period shall be completed when the Planting Areas and Exclusion Zone have met the following completion criteria:

- The Revegetation Contractor has identified all failed *Fontainea* sp. Coffs Harbour within the Planting Areas.
- The Revegetation Contractor has reported to TfNSW the total number of *Fontainea* sp. Coffs Harbour that are required to be propagated to achieve a minimum of 200 *Fontainea* sp. Coffs Harbour within the Planting Areas (in consideration of the propagation success rate and alternative mitigation strategies discussed in Section 7.6).
- All weeds within the Planting Areas and the entirety of the Exclusion Zone that are hindering (or likely to hinder) the growth rates or on-going health of the translocated and/or propagated plants have been treated.
- The translocated and/or propagated plants:
 - Show no signs of nutrient deficiency.

- Show no signs of water deficiency.
- Show no signs of pests impacts which are likely to cause individual plant mortality.
- Have been treated appropriately where impacted by disease.
- Are established and well formed, showing evidence of growth typical of the species.
- Are reasonably likely to survive in the wild without anthropogenic assistance.
- Have a 20 mm mulch depth (as applicable).

Upon completion of the Monitoring Period, the Planting Areas and Exclusion Zone shall be inspected by TfNSW and/or their representative.

Where TfNSW and/or their representative deem the Planting Areas and Exclusion Zone to be compliant with the completion criteria, a Certificate of Completion of the Monitoring Period shall be issued by TfNSW.

Upon the successful completion of the Monitoring Period, no further work will be undertaken by TfNSW or the Revegetation Contractor.

8 Translocation objectives, outcomes, performance criteria, and risks

8.1 Objectives, outcomes, and performance criteria

The overall management objective for the Planting Areas and the Exclusion Zone is to establish ecologically functional and self-sustaining populations of *Fontainea* sp. Coffs Harbour and provide a net gain of individuals (where possible) to compensate for the loss of wild plants and their habitat.

The management objectives are to be achieved by successfully undertaking the following:

- Salvage translocating the directly impacted *Fontainea* sp. Coffs Harbour individual.
- Planting an additional 250 *Fontainea* sp. Coffs Harbour.
- Managing the translocated and planted individuals to maximise their ability to survive in the wild without anthropogenic assistance.

The objectives, outcomes, and performance criteria relevant to the Planting Areas and the entirety of the Exclusion Zone are detailed in Table 3.

Table 3: Objectives, outcomes, and performance criteria

| Objective | Outcome | Performance Criteria |
|--|---|---|
| Translocation actions – Installation of salvaged and propagated plants | | |
| Minimise inconsistency with other translocation works for the project. | Translocation works for <i>Pittosporum</i> sp. Coffs Harbour, rusty plum (<i>Niemeyera white</i>) and slender marsdenia (<i>Marsdenia longiloba</i>) are not affected. | Translocation and propagation of <i>Pittosporum</i> sp. Coffs Harbour at the Recipient Sites does affect any translocation and/or propagation works associated with <i>Pittosporum</i> sp. Coffs Harbour, rusty plum (<i>Niemeyera white</i>) and slender marsdenia (<i>Marsdenia longiloba</i>). |
| Plants nominated for translocation are able to be uniquely identified. | All plants nominated for translocation have been assigned a unique identifier code. | A unique identifier code has been assigned to each plant nominated for translocation. |
| Analyse the soil at the impact site and Recipient Site to allow for soil characteristics to be compared. | Any soil amelioration requirements at the Recipient Sites are identified. Soil samples collected from the impact sites and Recipient Sites have undergone analysis and any soil amelioration | Soil samples collected from the impact sites and Recipient Sites have undergone analysis and any soil amelioration requirements have been identified. Soil profile and soil chemistry and textural analysis |

| Objective | Outcome | Performance Criteria |
|--|---|--|
| | requirements have been identified. | correspond closely at the impact and Recipient sites. |
| The original location of each plant nominated for salvage translocation is recorded and spatially displayed. | The original location of all plants nominated for translocation is recorded and easily identifiable. | A figure showing the unique identifier code and original location of all plants nominated for translocation has been developed. |
| Recipient Sites have been suitably prepared to accommodate the translocated and propagated individuals. | The Planting Areas have been surveyed and pegged. | The Planting Area has been surveyed and pegged in accordance with Section 5.2.2. |
| | Weed control has been undertaken. | Weed control has been undertaken in accordance with Section 5.2.3. |
| | Planting locations have been identified and numbered. | Planting locations have been identified, set out, and numbered in accordance with Section 5.2.4. |
| Mitigate the direct impact to the individual <i>Fontainea sp. Coffs Harbour</i> by translocating the plant to areas of suitable habitat. | The <i>Fontainea sp. Coffs Harbour</i> directly impacted by the Project is translocated to an area of suitable habitat outside the Project Footprint. | The <i>Fontainea sp. Coffs Harbour</i> directly impacted by the Project is translocated to an area of suitable habitat outside the Project Footprint as per Section 5.3 and Section 5.4. |
| Translocation Actions – Initial Maintenance Period | | |
| Maximise the survival for all translocated and propagated <i>Fontainea sp. Coffs Harbour</i> . | Manage translocated and propagated plants in accordance with the requirements of the Initial Maintenance Period. | Certificate of Commencement of the Initial Maintenance Period has been issued to the Revegetation Contractor by TfNSW. |
| All translocated and propagated <i>Fontainea sp. Coffs Harbour</i> establish within the Recipient Sites. | Watering has been undertaken to facilitate the successful establishment of the translocated and propagated <i>Fontainea sp. Coffs Harbour</i> . | Watering has been undertaken in accordance with Section 6.3. |
| | Fertilising and soil ameliorants have been applied to facilitate the successful establishment of the translocated and propagated <i>Fontainea sp. Coffs Harbour</i> . | Fertilising and soil ameliorants have been applied as per Section 6.4. |

| Objective | Outcome | Performance Criteria |
|--|--|---|
| | Weed, pest and disease control has been undertaken to facilitate the successful establishment of the translocated and propagated <i>Fontainea</i> sp. Coffs Harbour. | Weed, pest and disease control has been undertaken in accordance with Section 6.5. |
| | Mulch has been reapplied to facilitate the successful establishment of the translocated and propagated <i>Fontainea</i> sp. Coffs Harbour. | Mulch has been reapplied as per Section 6.7. |
| The propagated and planted <i>Fontainea</i> sp. Coffs Harbour survive to the completion of the Initial Maintenance Period. | Where less than 200 <i>Fontainea</i> sp. Coffs Harbour are present across the Planting Areas and/or Exclusion Zone, TfNSW has been notified and is in the process of propagating additional individuals to achieve a minimum of 200 individuals. | All failed <i>Fontainea</i> sp. Coffs Harbour have been reported to TfNSW as per Section 6.6 to allow (where necessary) the propagation of additional individuals to be undertaken or the planting of existing propagated individuals to be progressed to achieve 200 <i>Fontainea</i> sp. Coffs Harbour. |
| Reporting of the translocated and propagated plants is undertaken. | Reporting is prepared by the Revegetation Contractor and is submitted to TfNSW as per Section 6.8. | Reporting is undertaken as per Section 6.8. |
| Translocation Actions – Monitoring Period | | |
| Commence the Monitoring Period to monitor the translocated and planted <i>Fontainea</i> sp. Coffs Harbour. | Certificate of Commencement of the Monitoring Period is issued to the Revegetation Contractor by TfNSW. | Completion criteria (Section 6.9) successfully completed and Certificate of Commencement of the Monitoring Period has been issued by TfNSW. |
| Translocated and planted <i>Fontainea</i> sp. Coffs Harbour are in good condition and exhibit growth within the Recipient Sites. | Watering has been undertaken as required to facilitate the continued survival of the translocated and planted <i>Fontainea</i> sp. Coffs Harbour. | Watering has been undertaken in accordance with Section 7.3. |
| | Fertilising and soil ameliorants have been applied as required to facilitate the continued survival of the translocated and planted <i>Fontainea</i> sp. Coffs Harbour. | Fertilising and soil ameliorants have been applied as per Section 7.4. |
| | Weed, pest and disease control has been undertaken as required to facilitate the continued survival of the | Weed, pest and disease control has been undertaken in accordance with Section 7.5. |

| Objective | Outcome | Performance Criteria |
|---|--|--|
| | translocated and planted <i>Fontainea</i> sp. Coffs Harbour. | |
| | Mulch has been reapplied as required to facilitate the continued survival of the translocated and planted <i>Fontainea</i> sp. Coffs Harbour. | Mulch has been reapplied as per Section 7.7. |
| The required number of <i>Fontainea</i> sp. Coffs Harbour survive to the completion of the Monitoring Period. | Where less than 200 <i>Fontainea</i> sp. Coffs Harbour are present across the Planting Areas and/or Exclusion Zone, TfNSW has been notified and has (where required) initiated the propagating additional individuals to achieve a minimum of 200 individuals. | All failed <i>Fontainea</i> sp. Coffs Harbour have been reported to TfNSW as per Section 7.6 to allow (where necessary) the propagation of additional individuals to be undertaken or the planting of existing propagated individuals to achieve 200 <i>Fontainea</i> sp. Coffs Harbour. |
| Reporting of the translocated and propagated plants is undertaken. | Reporting is prepared by the Revegetation Contractor and is submitted to TfNSW. | Reporting is undertaken as per Section 7.8. |

8.2 Risk analysis

The risks, mitigation measures, and remedial actions identified that may impact upon the successful salvage translocation, propagation, and on-going survival of the *Fontainea* sp. Coffs Harbour are discussed in Table 4.

In addition to the mitigation measures detailed in Table 4, a suite of management measures are proposed (refer to Section 9) which will assist with mitigating the overall risks associated with impacting threatened plants.

Table 4: Risks, mitigation measures, and remedial actions

| Risk | Mitigation Measure | Remedial Action |
|--|--|--|
| Salvage translocation | | |
| The salvage translocated individuals fail to establish at the Recipient Sites. | The mitigation measures developed to minimise the risk of the salvage translocated individuals failing to establish at the Recipient Sites are contained within this report and include the following: <ul style="list-style-type: none"> Translocation strategy. | Determine potential cause of poor performance of plants and amend management measures as required in consultation with: <ul style="list-style-type: none"> The Species Expert; and/or Revegetation Contractors with direct experience in |

| Risk | Mitigation Measure | Remedial Action |
|--|---|--|
| | <ul style="list-style-type: none"> • Pre-translocation assessment. • Translocation actions. • Post-translocation actions in the Initial Maintenance Period. • Post-translocation actions in the Monitoring Period. | <p>salvage translocation methodologies; and/or</p> <ul style="list-style-type: none"> • Revegetation Contractors with direct experience in salvage translocation of the genus. |
| Propagation | | |
| Propagation is not successful. | Engaging the Species Expert and/or a suitably qualified and appropriately experienced native plant nursery who have direct experience with propagation of the genus. | N/A |
| | Propagate using standard industry practice, understanding of the species, and previous propagation methodologies. | N/A |
| Propagated plants fail to establish at the Recipient Sites. | <p>The mitigation measures developed to minimise the risk of the salvage translocated individuals failing to establish at the Recipient Sites are contained within this report and include the following:</p> <ul style="list-style-type: none"> • Translocation strategy. • Pre-translocation assessment. • Translocation actions. • Post-translocation actions in the Initial Maintenance Period. • Post-translocation actions in the Monitoring Period. | <p>Investigate potential cause of failure, including potential threats and causes. Consider augmentation from seed propagated plants from alternative donor sites.</p> <p>Evaluate options for sourcing propagative material from propagated plants that are successfully growing to supplement the Recipient Sites.</p> <p>Evaluate options for sourcing additional seeds from the <i>in-situ</i> population to supplement the Recipient Sites.</p> |
| Survival of the translocated and propagated plants within the Recipient Sites | | |

| Risk | Mitigation Measure | Remedial Action |
|--|--|--|
| <p>Weeds becoming established or dominant in the Planting Areas and Exclusion Zone and outcompeting the planted treatments, causing the death or reduced growth of the planted treatments.</p> | <p>Undertake weed control and maintenance as per the provisions detailed in this Management Plan.</p> | <p>Assess the performance of weed control measures and apply adaptive management measures to increase weed control efficiency.</p> <p>Where required, implement additional weed control measures to effectively control weeds impacting the planted treatments.</p> |
| <p>Plant die off for unknown reasons</p> | <p>Monitoring and maintenance works are to be undertaken as per this management plan.</p> | <p>Seek to understand the cause of die off.</p> |
| <p>Due to the uniqueness of the species, there is a risk the individuals are poached from the Recipient Sites.</p> | <p>TfNSW should not release the exact location of the <i>Fontainea</i> sp. Coffs Harbour within the Recipient Sites.</p> <p>Fencing around the perimeter of the site should assist in discouraging poaching. In addition, signs should be included for TfNSW owned Recipient Sites indicating that the site is subject to surveillance (i.e. hidden cameras).</p> | <p>Where individuals are identified as missing and there are obvious signs the plants have removed, TfNSW should investigate the incident with the local police and, if the problem is on-going seek to increase the security of the site or seek another site within which to plant the species.</p> |
| <p>Bushfire has the potential to severely impact the Recipient Sites and cause individual tree or vegetation community mortality.</p> <p>Bushfire has the potential to alter the species composition of the Planting Area which could ultimately lead to a change in vegetation community composition. Bushfire also has the potential to increase the time to completion.</p> | <p>Bushfire should be excluded from the Recipient Sites for the duration of the Establishment and Monitoring Period.</p> <p>TfNSW is to adopt an appropriate fire management strategy for the Planting Areas and Exclusion Zone to prevent bushfire from damaging the Planting Areas and Exclusion Zone and incorporate sufficient fire breaks within the revegetation design (where appropriate).</p> | <p>Following any disturbance caused by bushfire, a site assessment should be undertaken to quantify the impacts to the planted treatments. Remedial actions should be undertaken at a scale appropriate to the size, extent, and intensity of the disturbance.</p> <p>Corrective measures should be undertaken to achieve the required completion criteria (refer to Section 6.9 and Section 7.9).</p> |
| <p>A flood event has the potential to impact the Recipient Sites and cause individual or vegetation community mortality.</p> <p>A flood event has the potential to destroy the planted treatments and</p> | <p>Treatments are not to be planted in an area mapped on local or State government mapping as a flood prone area.</p> | <p>Following any disturbance caused by a flood event, a site assessment should be undertaken to quantify the impacts to planted treatments and the broader vegetation community. Remedial actions should be undertaken at a scale appropriate to the size,</p> |

| Risk | Mitigation Measure | Remedial Action |
|---|---|--|
| <p>existing vegetation potentially altering the species composition of an area and ultimately leading to a change in community composition and/or increase the time to completion.</p> | | <p>extent, and intensity of the disturbance.</p> <p>Corrective measures should be undertaken to achieve the required completion criteria (refer to Section 6.9 and Section 7.9).</p> |
| <p>A localised insect outbreak in the Planting Areas and Exclusion Zone has the potential to reduce plant growth and/or cause plant mortality via complete or partial plant defoliation or plant stress.</p> <p>Insect outbreaks could alter the species composition of the area and ultimately lead to a change in vegetation community or increase the time to Monitoring Period completion.</p> | <p>Regular surveillance during the Establishment and Monitoring Periods for signs of insect attack (e.g. plant stress, leaf predation).</p> <p>Standard treatment is considered an appropriate measure to be implemented to minimise the spread of insects across and within the Planting Areas and Exclusion Zone.</p> | <p>Upon identification of an insect attack or following an outbreak which is, or has the potential to impact the planted treatments, a site visit should be undertaken to assess the extent of impact. Remedial actions should be undertaken at a scale appropriate to the size, extent, and intensity of the disturbance.</p> <p>Corrective measures should be undertaken to achieve the required completion criteria (refer to Section 6.9 and Section 7.9).</p> |
| <p>The health of the planted treatments and the surrounding vegetation community may be influenced by various phytopathogens (such as myrtle rust) which could cause reduced growth, plant stress, and/or plant mortality on an individual or community level.</p> <p>A disease outbreak could alter the species composition of the area and ultimately lead to a change in the vegetation community.</p> | <p>Ensuring disease free planting stock is used, limiting site access, and regular surveillance for symptoms of disease (e.g. plant stress, leaf discoloration, signs of myrtle rust) are considered appropriate measures to be implemented to minimise the introduction, establishment and spread of disease across the site.</p> <p>Plants are only to be propagated and stored in a nursery which does not have myrtle rust.</p> | <p>Upon identification of disease or following an outbreak, a site visit should be undertaken to assess site impacts. Remedial actions should be undertaken at a scale appropriate to the size, extent, and intensity of the disturbance.</p> <p>Corrective measures should be undertaken to achieve the required completion criteria (refer to Section 6.9 and Section 7.9).</p> |
| <p>Design changes or unforeseen design requirements have the potential to impact the Planting Areas and/or Exclusion Zone.</p> | <p>All design changes in the vicinity of the Planting Areas and/or Exclusion Zone are to be reviewed the by the Project Ecologist to ensure they do not impact upon the Planting Areas and/or Exclusion Zone.</p> | <p>The Exclusion Zone and all Planting Areas adjacent to the Project Boundary are to be shown on all design drawings and labelled as Exclusion Zones.</p> <p>Design changes are to avoid the Planting Areas and Exclusion Zone.</p> <p>Design is to consider future maintenance and clearing</p> |

| Risk | Mitigation Measure | Remedial Action |
|------------|--------------------|---|
| | | requirements when locating infrastructure along the boundary of the Exclusion Zone. |
| [REDACTED] | [REDACTED] | [REDACTED] |

8.3 Schedule of works and responsibilities

The activities, indicative timeframes, and responsible entities for all activities associated with this management plan are provided in Table 5.

Table 5: The activities, indicative timeframes, and responsible entities for all activities associated with this management plan

| Activity | Indicative Timeframe | Responsible Entities |
|--|--------------------------------|-------------------------------|
| Pre-translocation assessment | | |
| Recipient Site identification | Prior to salvage translocation | TfNSW |
| | | |
| Translocation actions – Installation of salvaged and propagated plants | | |
| Review management plans and translocations proposals for <i>Pittosporum</i> sp. Coffs Harbour, rusty plum (<i>Niemeyera white</i>) and slender marsdenia (<i>Marsdenia longiloba</i>). | Prior to salvage translocation | Revegetation Contractor |
| Unique identifier codes assigned to all individuals proposed for salvage translocation | Prior to salvage translocation | Revegetation Contractor |
| A figure is to be created which identifies each plant's unique identifier code to show the original spatial distribution of the plants. | Prior to salvage translocation | Revegetation Contractor |
| Soil samples are to be collected from the impact sites and Recipient Sites for analysis | Prior to salvage translocation | TfNSW/Revegetation Contractor |
| A suitably qualified and appropriately experienced arborist or horticulturalist is to be engaged to work with the Species Expert and Revegetation Contractor | Prior to salvage translocation | TfNSW |

| Activity | Indicative Timeframe | Responsible Entities |
|---|--|---|
| <p>during translocation and planting of the <i>Fontainea</i> sp. Coffs Harbour.</p> | | |
| <p>A report is to be prepared by the Revegetation Contractor which address how the Revegetation Contractor will meet the requirements of Section 5.2, Section 5.3, and Section 5.4. The report is to be prepared in consultation with the Environmental Representative and The Australian Botanic Garden Mount Annan.</p> | <p>Prior to salvage translocation</p> | <p>Revegetation Contractor</p> |
| <p>Propagative material has been collected prior to salvage translocation</p> | <p>Propagative material to be collected between August and October, unless otherwise directed by Department of Planning and Environment and/or with support of the Species Expert.</p> <p>Additional cuttings may also be obtained immediately prior to translocation of <i>Fontainea</i> sp. Coffs Harbour as the individual will be pruned as part of the translocation methodology to reduce evapotranspiration stress.</p> | <p>Suitably qualified and appropriately experienced native plant nursery /Species Expert – Collection and care of <i>Fontainea</i> sp. Coffs Harbour material</p> |
| <p>All <i>Fontainea</i> sp. Coffs Harbour seedlings present at the base of the [REDACTED] [REDACTED] are salvaged.</p> | <p>Within one month prior to salvage translocation</p> | <p>Revegetation Contractor / Species Expert – Salvage of seedlings</p> <p>Suitably qualified and appropriately experienced native plant nursery – care of salvaged <i>Fontainea</i> sp. Coffs Harbour seedlings</p> |
| <p>Surveying and pegging of the Planting Area</p> | <p>Prior to salvage translocation</p> | <p>TfNSW – Management</p> <p>Revegetation Contractor – Implementation</p> |

| Activity | Indicative Timeframe | Responsible Entities |
|---|--|--|
| Weed control and implementation of weed and hygiene strategies | Maximum of two weeks prior to the salvage translocation | Revegetation Contractor |
| Plant set-out locations | Prior to salvage translocation | Revegetation Contractor |
| Temporary star picket fence to be installed along Exclusion Zone. | After salvage translocation | TfNSW |
| High visibility temporary fencing installation at the interface of the Exclusion Zone and Project Boundary | Prior to construction | Construction Contractor |
| Permanent fence to be installed along boundary of Exclusion Zone | Following construction works | Construction Contractor |
| Installation of tree-guards | Following planting | Revegetation Contractor |
| Fencing installation at Recipient Sites | Prior to salvage translocation | TfNSW – Management Revegetation Contractor – Implementation |
| Excavation of planting hole for the salvage translocated <i>Fontainea</i> sp. Coffs Harbour | The day prior to salvage translocation | Revegetation Contractor |
| Additional topsoil from around the base of the impacted <i>Fontainea</i> sp. Coffs Harbour is to be transported to the Recipient Site to be spread around the Recipient Site. | The day of translocation | Revegetation Contractor |
| Salvage translocation of <i>Fontainea</i> sp. Coffs Harbour | Planned for May 2023 | TfNSW – Management Revegetation Contractor – Implementation |
| Planting propagated individuals | Once plants have reached “super tube” size (or an alternate size agreed in | TfNSW – Management |

| Activity | Indicative Timeframe | Responsible Entities |
|--|--|---|
| | <p>consultation with BCD and the Species Expert) to ensure appropriate root development and health of the plant for planting.</p> <p>Timeframe for planting is to be in accordance with the requirements provided in Section 5.2.1 and be confirmed with Revegetation Contractor, Species Expert and TfNSW.</p> <p>Where the suitably qualified and appropriately experienced native plant nursery used in propagation is located outside of the Coffs Harbour area, plants are to be well hardened off to local conditions prior to planting.</p> | <p>Species Expert – advice on plant health, development and whether they are well hardened off</p> <p>Revegetation Contractor – Planting all propagated individuals</p> |
| Fencing and signage | Prior to vegetation clearing works during the Construction Phase of the project. | Construction Contractor |
| Reporting | <p>As per the requirements of this management plan.</p> <p>Refer to Section 5.7.</p> | <p>Project Ecologist – Management of reporting requirements</p> <p>Revegetation Contractor – Provision of reporting</p> |
| Post-translocation actions – Initial Maintenance Period | | |
| Watering | <p>As per the requirements of this management plan.</p> <p>Refer to Section 6.3.</p> | Revegetation Contractor |
| Fertilising and soil ameliorants | <p>As per the requirements of this management plan.</p> <p>Refer to Section 6.4.</p> | Revegetation Contractor |
| Weed, pest and disease control | As per the requirements of this management plan. | Revegetation Contractor |

| Activity | Indicative Timeframe | Responsible Entities |
|---|---|---|
| | Refer to Section 6.5. | |
| Repair or re-installation of treatments | As per the requirements of this management plan. Refer to Section 6.6. | Revegetation Contractor – Identification of all failed treatments within the Planting Areas and Exclusion Zone TfNSW – Engagement with Revegetation Contractor and/or Species Expert to commence additional propagation. |
| Topping up of mulch | As per the requirements of this management plan. Refer to Section 6.7. | Revegetation Contractor |
| Initial Maintenance Period reporting | As per the requirements of this management plan. Refer to Section 6.8. | Project Ecologist – Management of reporting requirements Revegetation Contractor – Provision of reporting |
| Post-translocation actions – Monitoring period | | |
| Watering | As per the requirements of this management plan. Refer to Section 7.3. | Revegetation Contractor |
| Fertilising and soil ameliorants | As per the requirements of this management plan. Refer to Section 7.4. | Revegetation Contractor |
| Weed, pest and disease control | As per the requirements of this management plan. Refer to Section 7.5. | Revegetation Contractor |
| Repair or re-installation of treatments | As per the requirements of this management plan. Refer to Section 7.6. | Revegetation Contractor – Identification of all failed treatments within the Planting Areas and Exclusion Zone TfNSW – Engagement with Revegetation Contractor and/or Species Expert to |

| Activity | Indicative Timeframe | Responsible Entities |
|-----------------------------|---|--|
| | | commence additional propagation. |
| Topping up of mulch | As per the requirements of this management plan. Refer to Section 7.7. | Revegetation Contractor |
| Monitoring period reporting | As per the requirements of this management plan. Refer to Section 7.8. | Project Ecologist – Management of reporting requirements Revegetation Contractor – Provision of reporting |

9 Additional management actions and research

9.1 Overview

This section details additional species-specific management actions for *Fontainea* sp. Coffs Harbour to assist with the conservation of *Fontainea* sp. Coffs Harbour.

The *Pittosporum* sp. Coffs Harbour & [REDACTED] Exclusion Zone Management Plan also provides additional management actions that apply to both *Pittosporum* sp. Coffs Harbour and *Fontainea* sp. Coffs Harbour.

9.2 Research initiative – species ecology

The following preliminary research proposal has been developed by Dr Andrew Benwell (Ecos Environmental) for delivery by suitable suppliers (e.g. USC), with funding supplied in whole or part by TfNSW. The following preliminary research proposals are proposed and will be refined with input from the Species Expert and the USC.

The Research Initiative proposed for *Fontainea* sp. Coffs Harbour is detailed in Table 6.

Table 6: Research Initiatives proposed for *Fontainea* sp. Coffs Harbour

| Preliminary Description of Experiment | Rationale/Justification |
|--|---|
| <p>Determine if male flowers are present amongst female flowers on all flower producing <i>Fontainea</i> sp. Coffs Harbour.</p> <p>Carry out detailed examination of flowers on all flowering trees.</p> | <p><i>Fontainea</i> species are usually dioecious (male and female flowers on separate plants) but are reported to occasionally and spontaneously produce flowers of the other sex. This may explain how the female <i>Fontainea</i> sp. Coffs Harbour located at [REDACTED] is able to produce fruit with viable seed from female flowers.</p> |

9.3 Research initiative – *Fontainea* sp. Coffs Harbour genetic diversity and gene flow

To further understand genetic diversity and gene flow in *Fontainea* sp. Coffs Harbour the USC will genetically analyse individuals from the [REDACTED] populations. The outcomes of the genetic analysis will provide additional information regarding the overall genetic diversity of the species, such that comparisons with other species of *Fontainea* sp. can be more rigorously undertaken and advice relating to plant set-out at the Recipient Sites can be supported by genetic analysis.

To further understand gene flow within the *Fontainea* sp. Coffs Harbour, the seedlings within the [REDACTED] populations will be

genetically analysed to identify the reproductive adults in each population and provide insights into pollen flow dynamics of the species. The outcomes of the genetic analysis will assist in identifying the planting set-out at the Recipient Sites.

10 Works Cited

Commander, L.E., Coates, D., Broadhurst, L., Offord, C.A., Makinson, R.O. and Matthes, M. (2018) Guidelines for the translocation of threatened plants in Australia. Third Edition. Australian Network for Plant Conservation, Canberra.

Department of Planning, Industry and Environment (2019) *Translocation Operational Policy*. Sydney.

Ecos Environmental (2020). Coffs Harbour Bypass Rusty Plum and Slender Marsdenia Salvage and Re-establishment Plan.

Falk, D.A, Millar, C.I. and Olwell, M. (1996). Restoring Biodiversity. Island Press, Washington.

Goldrick, Geoff, et al. (2001). New technology and soil landscape mapping in NSW. Proceedings of the Geospatial Information and Agriculture Symposium, Sydney.

Pavlick, B. M. (1996). Defining and measuring success. In D.A. Falk, C.I. Millar and M. Olwell (eds) Restoring Biodiversity pp. 208-234. Island Press, Washington.

Transport for NSW, Environment and Sustainability Branch (2020). Sydney.

Appendix A |

Compliance with translocation guidelines (Commander et al., 2018)

An assessment against the checklist for translocation guidelines (Commander *et al.*, 2018) has been undertaken in Table 7.

Table 7: Assessment for compliance with the translocation guidelines

| Translocation Guidelines Criteria | Response |
|---|--|
| Have all alternative management options been attempted or considered? | Alternative route options were investigated with the aim of completely avoiding impacts to <i>Fontainea</i> sp. Coffs Harbour and its habitat. However, complete avoidance was assessed as not being feasible. Further design alterations and refinements have minimized impacts to the greatest extent possible. |
| Is the taxonomic status of the taxon certain? | <i>Fontainea</i> sp. Coffs Harbour has been determined by the Queensland and NSW Herbarium as a newly discovered species and its status is considered certain. |
| Is the distribution of the taxon adequately understood? | <p>Three rounds of targeted surveys have been carried out in the broader locality to determine the distribution of <i>Fontainea</i> sp. Coffs Harbour. The targeted surveys have focused on areas of habitat similar to the habitat within the individuals have been identified. As the species has been newly discovered, their distribution in the Coffs Harbour local government area (and surrounds) is currently uncertain. However, their distribution within the Project Boundary is well understood.</p> <p>Further targeted surveys are proposed to confirm the distribution of <i>Fontainea</i> sp. Coffs Harbour in other areas of Coffs Harbour and Bellingen local government area.</p> |
| Are threatening processes understood and can they be controlled? | <p>Impacts from vegetation clearing is likely to be the main historical and current threat to <i>Fontainea</i> sp. Coffs Harbour. Other threatening processes are likely to include seed predation which limits recruitment, habitat degradation from weeds, debarking by feral deer and loss of suitable habitat as a result of climate change.</p> <p>Weed control measures, exclusion fencing, salvage translocation, propagation and planting are included in the suite of management measures proposed to assist with the long-term survival of <i>Fontainea</i> sp. Coffs Harbour.</p> |

| Translocation Guidelines Criteria | Response |
|---|--|
| Have potential suitable Recipient Sites been identified? | Several suitable Recipient Sites have been identified for the translocated and propagated individuals. Additional Recipient Sites will be selected as required. |
| If considering population enhancement, do you have evidence of population decline and have you considered or attempted alternative means of increasing population size? | <p>The population of <i>Fontainea</i> sp. Coffs Harbour is likely to have historically declined due to vegetation clearing. The population of <i>Fontainea</i> sp. Coffs Harbour shows evidence of natural regeneration in the last decade via natural recruitment. The Project has the potential to contribute towards the species decline (in the absence of mitigation measures).</p> <p>Population enhancement is being proposed along with salvage translocations. Population enhancement of <i>Fontainea</i> sp. Coffs Harbour is proposed in conjunction with salvage translocation and habitat management to increase the local population size.</p> |
| Have you considered the success of any previous translocation programs? | <i>Fontainea</i> sp. Coffs Harbour has not previously been salvage translocated, however, other <i>Fontainea</i> spp. have successfully been propagated and planted. In this regard, the genera has a demonstrated history of successful propagation. |
| Have you determined the cost of implementing the translocation program including post translocation monitoring and management and have sufficient funds been secured? | TfNSW have allocated sufficient budget to implement the translocation program, post translocation monitoring and management measures |

Appendix B |

Description of the Recipient Sites

A description of the proposed Recipient Sites for salvage translocated and propagated *Fontainea* sp. Coffs Harbour including area (ha) and present owner, vegetation, topography and microclimate.

| Recipient Sites | Area (ha) | Owner | Vegetation | Topography and Microclimate |
|-----------------|------------|------------|------------|-----------------------------|
| [REDACTED] | [REDACTED] | [REDACTED] | [REDACTED] | [REDACTED] |
| [REDACTED] | [REDACTED] | [REDACTED] | [REDACTED] | [REDACTED] |
| [REDACTED] | [REDACTED] | [REDACTED] | [REDACTED] | [REDACTED] |