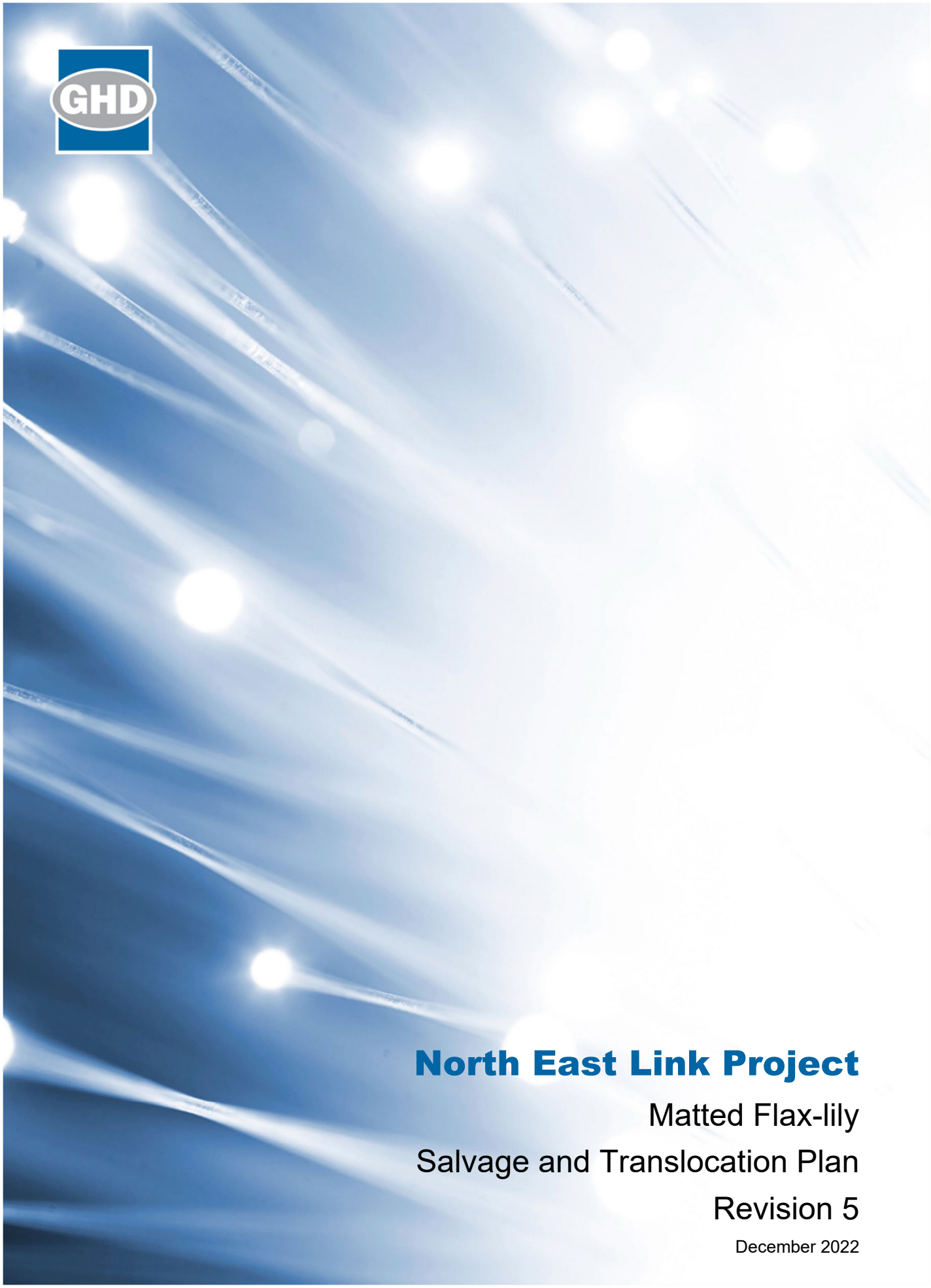

North East Link Project

Matted Flax-lily Salvage and Translocation Plan

Revision 5

December 2022

This report is prepared to inform regulators and the public about the North East Link. This report may be of assistance to you but the North East Link Project (a division of the Major Transport Infrastructure Authority) and its employees, contractors or consultants (including the issuer of this document) do not guarantee that the report is without any defect, error or omission of any kind or is appropriate for your particular purposes and therefore disclaims all liability for any error, loss or other consequence which may arise from you relying on any information in this report.

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Summary of this Plan

The following table summarises this Salvage and Translocation Plan.

Project title	North East Link
Taxon to be translocated	Matted Flax-lily *Dianella amoena* Arching Flax-lily *Dianella longifolia* var. *grandis*
Number of plants to be translocated	Approximately 139 plants/patches of Matted Flax-lily may be subject to removal. However, it should be recognised that the final figure is likely to vary (+/-) depending on the prevailing conditions at the time of salvage. Five individuals of Arching Flax-lily were observed within the project boundary during the EES and PER. Recent surveys have only located three individuals, and, if located again during pre-clearance surveys, are likely to be subject to removal.
Proposed dates of translocation	The proposed timing of translocation depends on when project planning and environmental approvals are received and on project procurement. The initial salvage event occurred on 1 April 2020 for plants along the new boundary fence of Simpson Barracks. Further salvage for the fire/patrol track at Simpson Barracks occurred on 2 September 2020, with the remainder in 2021/22 after the project design has been finalised. Timing of translocation is yet to be determined. Alteration to this program may be considered if suitable conditions are prevalent or if early human intervention is likely to lead to higher salvage success rates. Translocation is proposed to be undertaken within two years of salvage; subject to both the conditions of the plants at the time of salvage, and the conditions of the recipient site(s).
Source location or propagation facility	North East Link ('the project') is a proposed new freeway-standard road connection that would complete the missing link in Melbourne's ring road, giving the city a fully completed orbital connection for the first time. North East Link would connect the M80 Ring Road (otherwise known as the Metropolitan Ring Road) to the Eastern Freeway, and include upgrade works at the Eastern Freeway. Within the project area (see Figure 1-1), Matted Flax-lily has been identified within the: • M80 Ring Road reserve • Hurstbridge line rail corridor • Commonwealth land (Simpson Barracks site). Arching Flax-lily has been identified within: • Commonwealth land (Simpson Barracks site) • Colleen Reserve • Crown land north of the Eastern Freeway between Yarra Boulevard and the Yarra River.
Recipient sites	The plan outlines the process for identifying a recipient site and presents a number of potential sites.
Summary of the Translocation	North East Link Project (NELP) is proposing to salvage and translocate approximately -139 individual plants/patches of Matted Flax-lily and three plants of Arching Flax-lily. Salvage and translocation will be undertaken by NELP, a division of the Major Transport Infrastructure Authority, on behalf of the State of Victoria. This plan documents: • A protocol for salvage and translocation • Nomination and selection criteria to determine a recipient site(s) • Pre-clearance surveys • Post translocation management • Monitoring and reporting • Contingency planning and adaptive management

1. Introduction

1.1 Objectives

GHD Pty Ltd (GHD) and Emerge Environmental Services Pty Ltd (Emerge Associates) were engaged by the North East Link Project (NELP) to prepare a Salvage and Translocation Plan for Matted Flax-lily *Dianella amoena* and Arching Flax-lily *Dianella longifolia* var. *grandis* to support the Environment Effects Statement (EES) and Public Environment Report (PER) required to inform approvals for the North East Link project.

The objectives of this plan are to:

- Provide background on the project, Matted Flax-lily and Arching Flax-lily, and the regulatory requirements for translocation
- Identify Matted Flax-lily and Arching Flax-lily plants to be salvaged
- Outline the criteria and process for the selection of suitable recipient site(s) for the translocated plants
- Provide details on pre- and post-translocation management actions for the salvage and recipient sites
- Establish clear and effective protocols for the salvage, translocation, propagation, management and monitoring of plants that must be removed prior to project construction
- Identify roles and responsibilities for the parties involved in the translocation process
- Establish benchmarks for translocation success
- Outline future reporting requirements and provide guidelines for potential contingency and adaptive-management measures during the monitoring period
- Satisfy regulatory requirements under Australian Government and Victorian Government legislation.

1.2 What is translocation?

Translocation is 'the deliberate transfer of plants or regenerative plant material from an *ex situ* collection or natural population to a new location, usually in the wild. It includes reintroduction, introduction, reinforcement, assisted migration and assisted colonization' (Commander *et al*., 2018). Commander *et al*. (2018) describes translocations as occurring for two reasons:

- to assist in the management and conservation of threatened plant species (here termed Conservation Translocation); and to
- ameliorate the impacts of urban, agricultural or industrial development on a threatened species (here termed Mitigation Translocation).

Mitigation Translocations occur when the source population is under immediate threat of destruction and needs to be moved (Commander *et al*., 2018). In the case of Matted Flax-lily and Arching Flax-lily and the North-East link project, this plan is considered a mitigation translocation plan.

1.3 Project description

North East Link ('the project') is a proposed new freeway-standard road connection that would complete the missing link in Melbourne's ring road, giving the city a fully completed orbital connection for the first time. North East Link would connect the M80 Ring Road (otherwise known as the Metropolitan Ring Road) to the Eastern Freeway, and include works along the Eastern Freeway from Springvale Road to near Hoddle Street.

The North East Link alignment and its key elements assessed in the Environment Effects Statement (EES) include:

- **M80 Ring Road to the northern portal** – from the M80 Ring Road at Plenty Road, and the Greensborough Bypass at Plenty River Drive, North East Link would extend to the northern portal near Erskine Road utilising a mixture of above, below and at surface road sections. This would include new road interchanges at the M80 Ring Road and Grimshaw Street.
- **Northern portal to southern portal** – from the northern portal the road would transition into twin tunnels that would connect to Lower Plenty Road via a new interchange, before travelling under residential areas, Banyule Flats and the Yarra River to a new interchange at Manningham Road. The tunnel would then continue to the southern portal located south of the Veneto Club.
- **Eastern Freeway** – from around Hoddle Street in the west through to Springvale Road in the east, modifications to the Eastern Freeway would include widening to accommodate future traffic volumes and new dedicated bus lanes for the Doncaster Busway. There would also be a new interchange at Bulleen Road to connect North East Link to the Eastern Freeway.

These areas are illustrated in Figure 1-1.

The project would also improve existing bus services from Doncaster Road to Hoddle Street through the Doncaster Busway, as well as pedestrian connections and the bicycle network, with connected walking and cycling paths from the M80 Ring Road to the Eastern Freeway. For a detailed description of the project, refer to EES Chapter 8 – Project description.

1.4 Vegetation within and adjacent to the Project boundary

Vegetation within the project boundary is predominantly located within the Gippsland Plain bioregion, and to a lesser extent the Highlands–Southern Fall and Victorian Volcanic Plain bioregions.

The northern parts of the project generally pass through areas that have been previously disturbed. The woodland and forest areas that remain have regenerated or have been re-planted, and are generally in poor to moderate condition. The exceptions to this are the larger intact areas of woodland within Simpson Barracks and a small area of Commonwealth land immediately south of Simpson Barracks, and to the north of Borlase Reserve. Simpson Barracks contains a relatively large area of remnant woodland/forest (EVC 55: Plains Grassy Woodland), particularly for this part of otherwise urbanised Melbourne.

Key areas of riparian and floodplain vegetation located within the project boundary are associated with the Yarra River and its tributaries, including Koonung Creek in the south and Banyule Creek near the centre of the project area. Vegetation in these areas generally consists of Floodplain Riparian Woodland (EVC 56) or Swampy Riparian Woodland (EVC 83). These areas contain a mature or developing canopy of River Red Gum *Eucalyptus camaldulensis*, which form remnant patches or occur as isolated scattered trees. The understorey shrub layer is generally species-

rich, although herbs and graminoids are largely absent due to the presence of high-threat weeds, including Wandering Trad *Tradescantia fluminensis*.

The project boundary also contains several areas of good quality remnant Plains Grassy Woodland (EVC 55) and Valley Grassy Forest (EVC 47), which are characterised by a canopy layer comprising several *Eucalyptus* species and a grassy understorey.

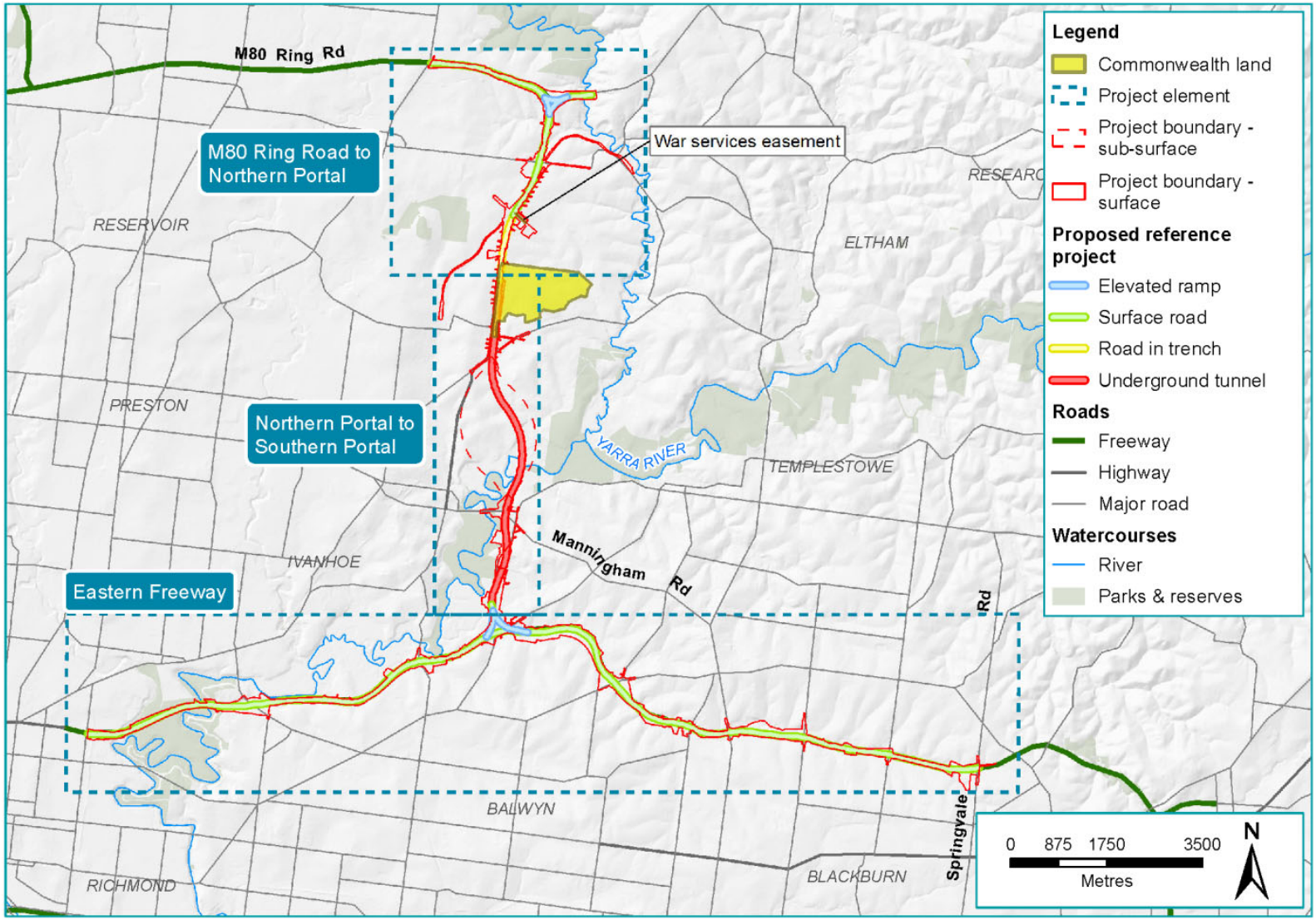

Figure 1-1 North East Link Reference Design overview

1.5 Matted Flax-lily background

1.5.1 Species description

The National Recovery Plan for the Matted Flax-lily *Dianella amoena* (Carter, 2010) describes Matted Flax-lily as:

> *...in the family Hemerocallidaceae (formerly included in the family Liliaceae) is a tufted, mat–forming perennial lily. Plants are rhizomatous and can form loose clumps up to 5 m wide. Rhizomes are yellow and slender, with shoots arising every 10–30 cm. Leaves are grey-green, dull crimson at the base, narrow and tapering, to 45 cm long by 12 mm wide, and broadly V-shaped, with a prominent abaxial keel along the midrib and loose clasping leaf sheaths. Blades, sheaths and midribs usually have small, irregularly spaced teeth. Leaves are deciduous in summer if plants are water-stressed (Gray & Knight 2001). The inflorescence is erect, 20–90 cm long, with a slender, arching scape that bears several bluish, star-shaped, nodding, sweetly fragrant flowers. Perianth segments are pale to deep blue-violet, recurved, elliptic, to 10 mm long by 3 mm, the outer tepals with five veins, the inner tepals with three veins. There are six stamens, to 7 mm long, with pale yellow filaments, orange strumae and pale lime-yellow anthers, while the style is whitish-translucent, to 6 mm long. Fruits are ovoid purple berries to 7 mm long, and seeds are shiny black and smooth, to 3 mm long. Flowering occurs from October to April* (description from Carr & Horsfall, 1995).

Typical images of the plant in various stages of growth and reproduction are shown in Plate 1a –d.

Plate 1a–d Matted Flax-lily in situ (Cameron Miller, Emerge Associates)

1.5.2 Conservation status

Matted Flax-lily is listed as Endangered under the Australian Government's *Environment Protection and Biodiversity Conservation Act 1999 (*'EPBC Act') and Critically Endangered

under the Victorian Government's *Flora and Fauna Guarantee Act 1988* ('FFG Act'). In 2010, a National Recovery Plan was prepared for the species, outlining recovery objectives and actions necessary to ensure the long-term survival of the species. The Recovery Plan identified the major current threats to the species as weed invasion and competition, habitat destruction and disturbance, and population fragmentation (Carter, 2010).

1.5.3 Habitat and ecology

In Victoria, Matted Flax-lily typically occurs in grassland and grassy woodland habitats with fertile, well-drained to seasonally-wet soils ranging from sandy loams to heavy cracking clays (Carr & Horsfall, 1995; Gray & Knight, 2001).

Matted Flax-lily is typically found in association with native grasses such as Common Wheat Grass *Anthosachne scabra*, Common Tussock-grass *Poa labillardierei*, Kangaroo Grass *Themeda triandra*, Grey Tussock-grass *Poa sieberiana*, Wallaby Grass *Rytidosperma racemosa* var. *racemosa*, and Weeping Grass *Microlaena stipoides* var. *stipoides*. In grassy woodland habitat, associated tree species include Blackwood *Acacia melanoxylon* and a variety of *Eucalyptus* species, including River Red Gum *Eucalyptus camaldulensis*, Long-leaved Box *E. goniocalyx*, Red Stringybark *E. macrorhyncha* subsp. *macrorhyncha*, Yellow Box E. *melliodora*, Swamp Gum *E. ovata*, Snow Gum *E. pauciflora* subsp. *pauciflora*, and Red Box *E. polyanthemos* subsp. *vestita*. Matted Flax-lily is also found in association with various introduced grasses and herbs (Carr & Horsfall, 1995; Gray & Knight, 2001; Carter 2010).

Flowers are buzz-pollinated by the native Blue-banded Bee *Amegilla cingulata*. Fruits are readily formed but recruitment is often considered low or absent due to habitat disturbance and weed competition, with generally no seedlings produced. Instead, the species typically reproduces vegetatively through the production of rhizomes and ramets. The species can also be propagated by division (Carter, 2010; Ralph, 2003). However, given the size of some of the observed plants and their isolation from other plants within the project area, there is the potential that some of these have been produced through sexual reproduction and seed dispersal.

1.5.4 Current population and distribution

Matted Flax-lily is currently known to occur in Victoria and Tasmania. Approximately 2,500 plants are estimated to remain in the wild in Victoria, found in approximately 120 sites (Carter, 2010). Multiple populations are known from the northern suburbs of Melbourne, typically within remnant vegetation along roadsides and within rail corridors, in conservation reserves, and in translocation sites (Carter, 2010). The distribution of Matted Flax-lily at the time of writing the Recovery Plan is shown in Figure 1-2.

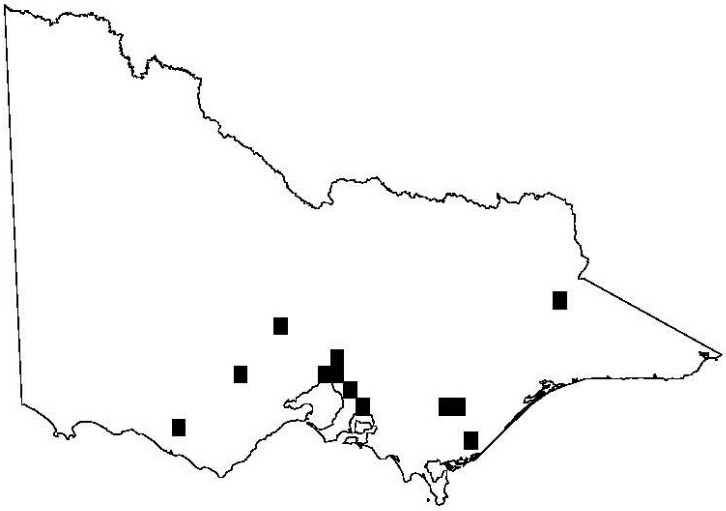

Figure 1-2 Distribution of Matted Flax-lily in 2010 (Carter, 2010)

It should be noted that the Recovery Plan is somewhat outdated, and since the expansion of Melbourne's urban growth boundary, additional records and sites have been found as demonstrated by a recent extract of Matted Flax-lily observations from NatureKit (DELWP, 2020), shown in Figure 1-3.

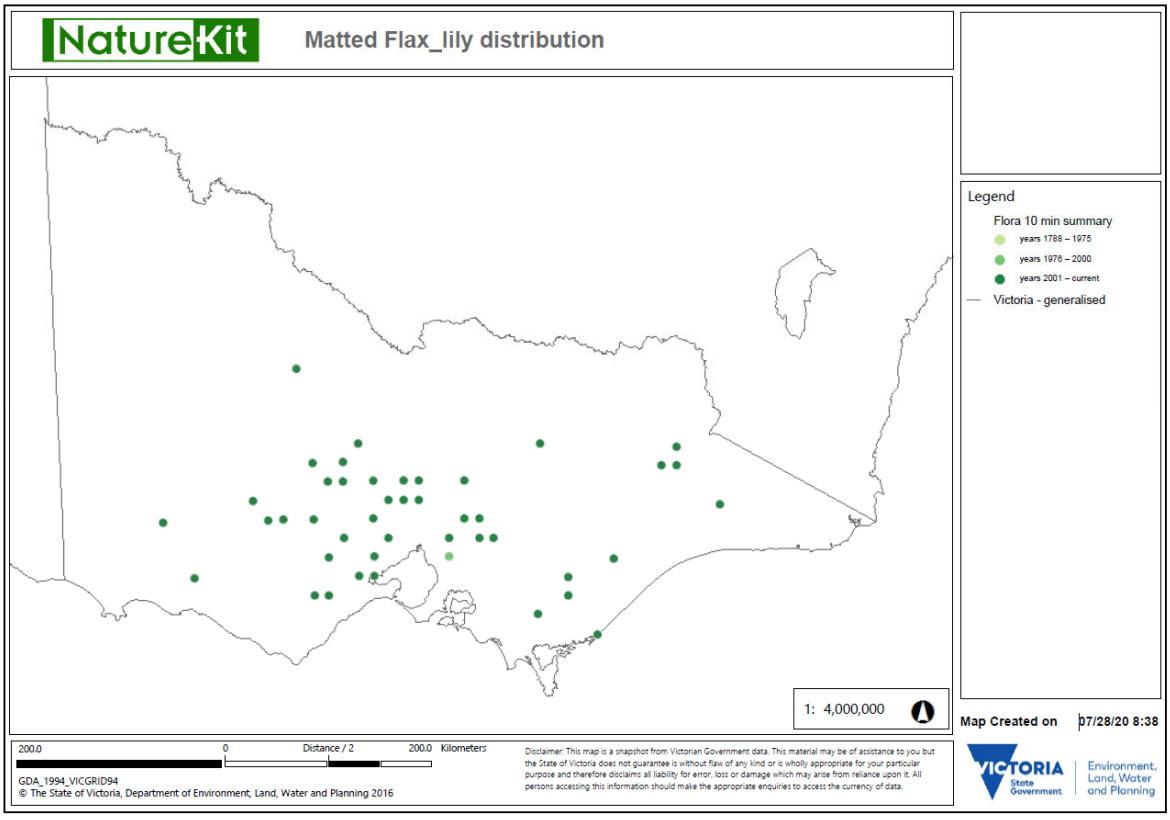

Figure 1-3 Current observations of Matted Flax-lily from 2000–2020 (DELWP, 2020)

1.5.5 Population and distribution within project area

Suitable habitats within the project area were initially surveyed between October and December 2017. Matted Flax-lily was identified at three sites within the project area defined for the project's EPBC referral (resulting in Approval No. 2018/8142):

- Commonwealth land (Simpson Barracks)
- M80 Ring Road reserve
- Hurstbridge rail line

Each of these sites was surveyed again at the following times:

- January 2019 detailed surveys for the EES/PER
- March 2020 conducted by the early works contractor (CPB)
- Between December 2019 and February 2020 ahead of the initial salvage event, and again in March, May and July 2020 of an area within Simpson Barracks immediately adjacent to the project boundary to verify impacts on Matted Flax-lily as a result of constructing a fire track and other works at the Barracks
- April 2021 ahead of the Simpson Barracks main salvage event.

Surveys since the EES/PER was completed in 2019 have indicated that the MFL population at Simpson Barracks is not static, and environmental and climatic conditions have seen the number of plants/patches both decline and increase over time. As a result of this, at the most recent survey in April 2021, the number of plants/patches at Simpson Barracks likely to be impacted by North East Link has increased.

Table 1-1 summarises the recent Matted Flax-lily observations along with observations from earlier surveys (for the EES/PER) and Figure 1-4 shows the mapped observations for individuals/patches recorded during targeted surveys for the project, as listed above. Overall, approximately 20 hectares of Matted Flax-lily habitat occurs within and immediately adjacent to the project boundary. Figure 1-5 shows previous mapped observations at Simpson Barracks (HLA, 2007).

Table 1-1 Results of the Matted Flax-lily survey for North East Link

Approximate number of plants/patches
Whole assessment (i.e. inside and outside of the project boundary)
332
Within the EPBC project area
139 (confirmed in recent surveys)

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0 10 20 30 40

Metres

Map Projection: Transverse Mercator
Horizontal Datum: GDA 1994
Grid: GDA 1994 MGA Zone 55

N

Legend

- Matted Flax-lily (April 2021)
- MFL - EES/PER (Jan 2019)
- MFL (Dec 2019 – Jul 2020)
- 2019 Assessment Area
- MFL - CPB (Mar 2020)

North East Link Project

Matted Flax-lily Locations M80

Job Number	31-35006
Revision	H
Date	19 May 2021

Figure 1-4
(Page 1 of 5)

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Data source: CIP Imagery - DELWP - 2020 | Roads, LGA, Watercourses, Rail - Vicmap - 2019 | Project Boundary, MFL Locations - GHD - 2021. Created by:zzuo

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Map Projection: Transverse Mercator
Horizontal Datum: GDA 1994
Grid: GDA 1994 MGA Zone 55

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- Matted Flax-lily (April 2021)
- MFL - EES/PER (Jan 2019)
- MFL (Dec 2019 – Jul 2020)
- 2019 Assessment Area
- MFL - CPB (Mar 2020)

NORTH EAST LINK PROJECT

North East Link Project

Job Number	31-35006
Revision	H
Date	19 May 2021

Matted Flax-lily Locations Hurstbridge rail line

Figure 1-4
(Page 2 of 5)

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Map Projection: Transverse Mercator
Horizontal Datum: GDA 1994
Grid: GDA 1994 MGA Zone 55

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Legend

- Matted Flax-lily (April 2021)
- MFL - EES/PER (Jan 2019)
- MFL (Dec 2019 – Jul 2020)
- 2019 Assessment Area
- MFL - CPB (Mar 2020)

NORTH EAST LINK PROJECT

North East Link Project

Job Number	31-35006
Revision	H
Date	19 May 2021

Matted Flax-lily Locations Hurstbridge rail line

Figure 1-4
(Page 3 of 5)

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Data source: CIP Imagery - DELWP - 2020 | Roads, LGA, Watercourses, Rail - Vicmap - 2019 | Project Boundary, MFL Locations - GHD - 2021. Created by:zzuo

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Metres

Map Projection: Transverse Mercator
Horizontal Datum: GDA 1994
Grid: GDA 1994 MGA Zone 55

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Legend

- Matted Flax-lily (April 2021)
- MFL - EES/PER (Jan 2019)
- MFL (Dec 2019 – Jul 2020)
- 2019 Assessment Area
- MFL - CPB (Mar 2020)

North East Link Project

Job Number	31-35006
Revision	H
Date	19 May 2021

Matted Flax-lily Locations Hurstbridge rail line

Figure 1-4
(Page 4 of 5)

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Data source: CIP Imagery - DELWP - 2020 | Roads, LGA, Watercourses, Rail - Vicmap - 2019 | Project Boundary, MFL Locations - GHD - 2021. Created by:zzuo

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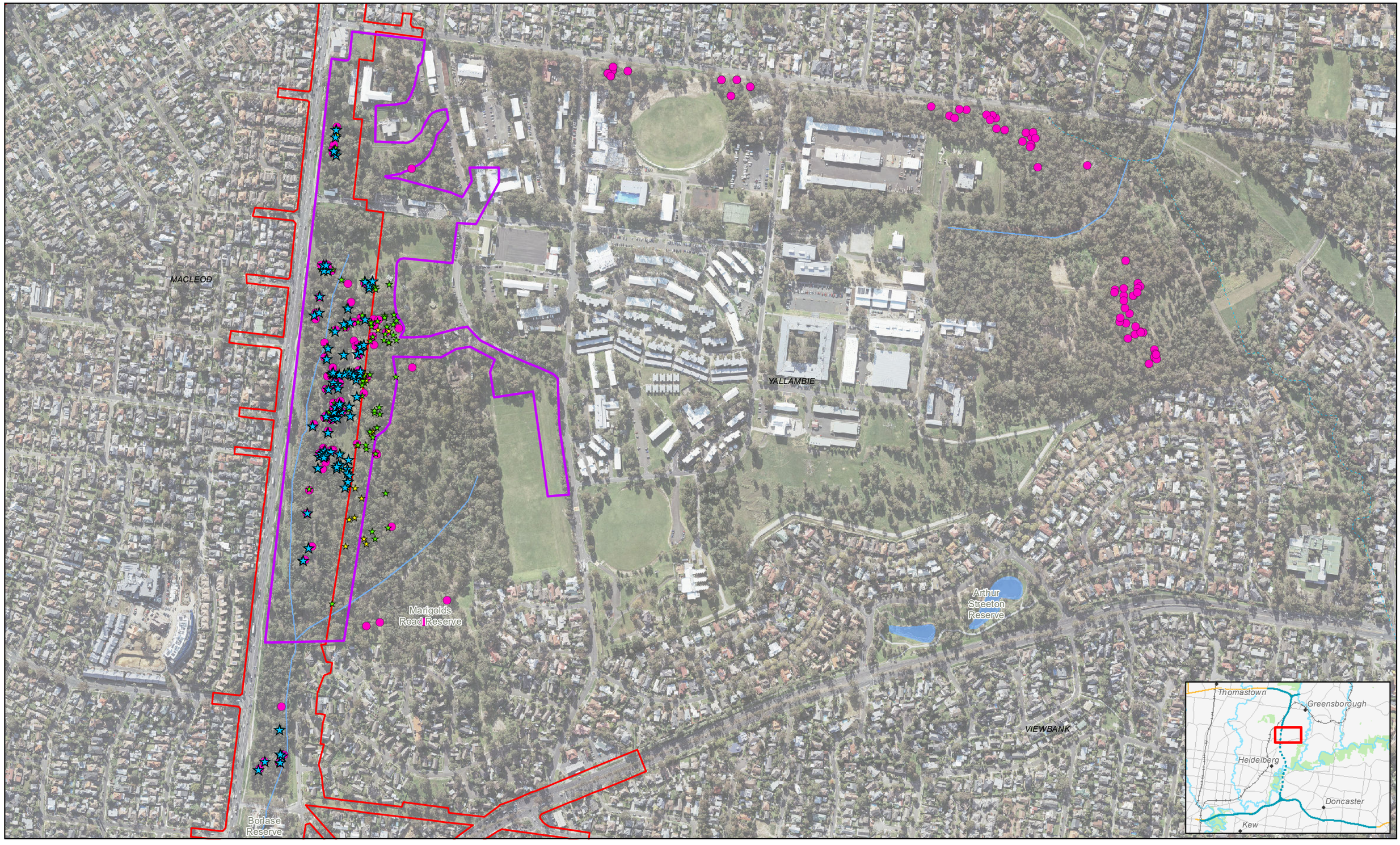

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Metres

Map Projection: Transverse Mercator
Horizontal Datum: GDA 1994
Grid: GDA 1994 MGA Zone 55

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Legend

- Matted Flax-lily (April 2021)
- MFL (Dec 2019 – Jul 2020)
- MFL - CPB (Mar 2020)
- MFL - EES/PER (Jan 2019)
- 2019 Assessment Area
- 2020 Assessment Area

North East Link Project

Job Number 31-35006
Revision H
Date 19 May 2021

Matted Flax-lily Locations Simpson Barracks

Figure 1-4
(Page 5 of 5)

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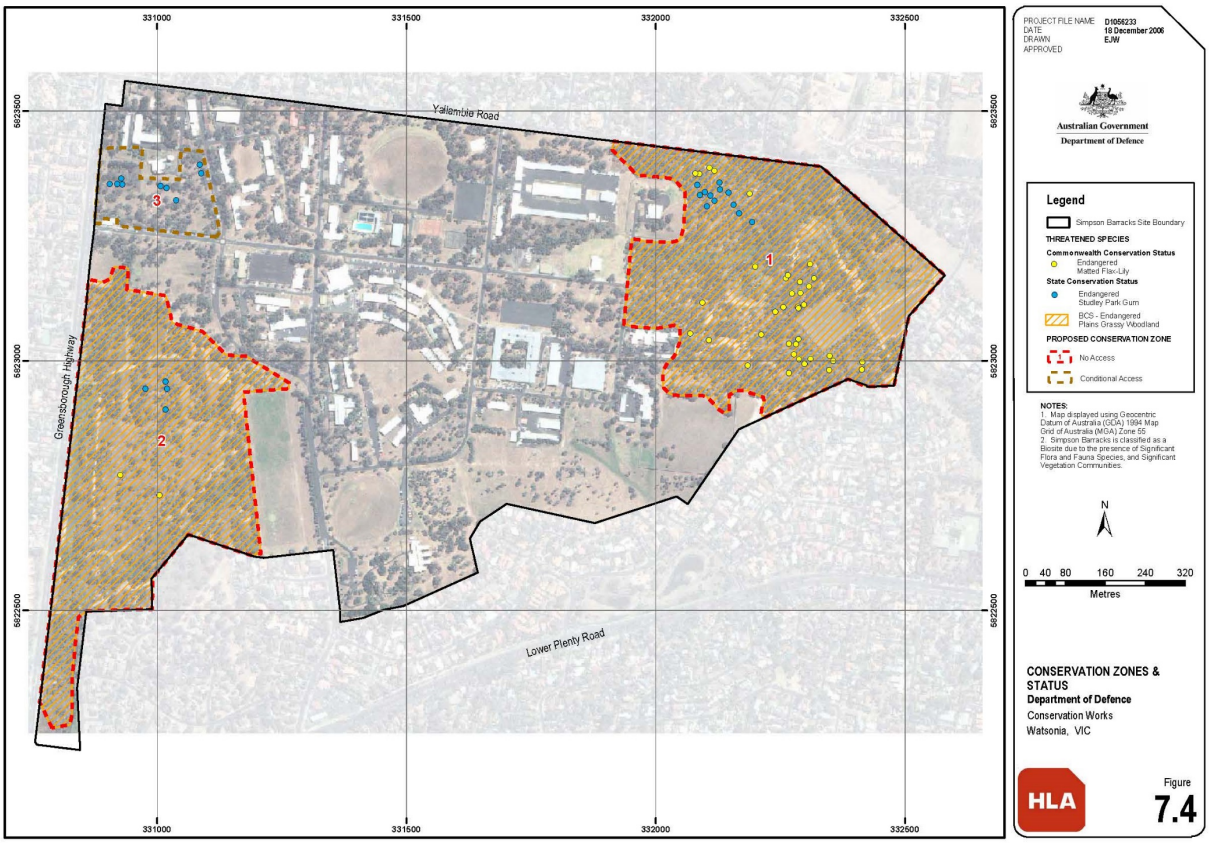

Figure 1-5 Previously mapped distribution of Matted Flax-lily within Simpson Barracks (HLA, 2007)

1.6 Arching Flax-lily background

1.6.1 Species description

Arching Flax-lily is a perennial graminoid that grows to 1.3-metres tall in solitary tufts or loose patches up to 40-centimetres wide. Its leaves are glaucous, rather thick-textured and firm, measuring 12 to 25 millimetres wide at midpoint when flattened. It flowers from November to December (Flora of Victoria, 2018). The leaves are known to have a prominent central rib. Flowers have an open pyramidal panicle to 30 x 60 centimetres with long spreading side branches and strongly fragrant flowers (Bull, 2014).

Typical images of the plant are shown in Plate 2.

Plate 2 a-b Arching Flax-lily in situ (Tim Wills, GHD)

1.6.2 Conservation status

Arching Flax-lily is not listed under the EPBC Act. It is listed as Critically Endangered under the FFG Act.

1.6.3 Habitat and ecology

In Victoria, Arching Flax-lily typically occurs in well-drained skeletal soils often associated with rocky outcrops, full sun and semi-shade (Bull, 2014). Once considered widespread over the volcanic plains, many populations are now small and isolated as a result of habitat clearance, grazing and disturbance.

1.6.4 Current population and distribution

Following urban expansion, many of the remaining populations of this species are very small and fragmented in Victoria, where it is mainly concentrated in the Victorian Volcanic Plain and Victorian Riverina bioregions (refer to Figure 1-6).

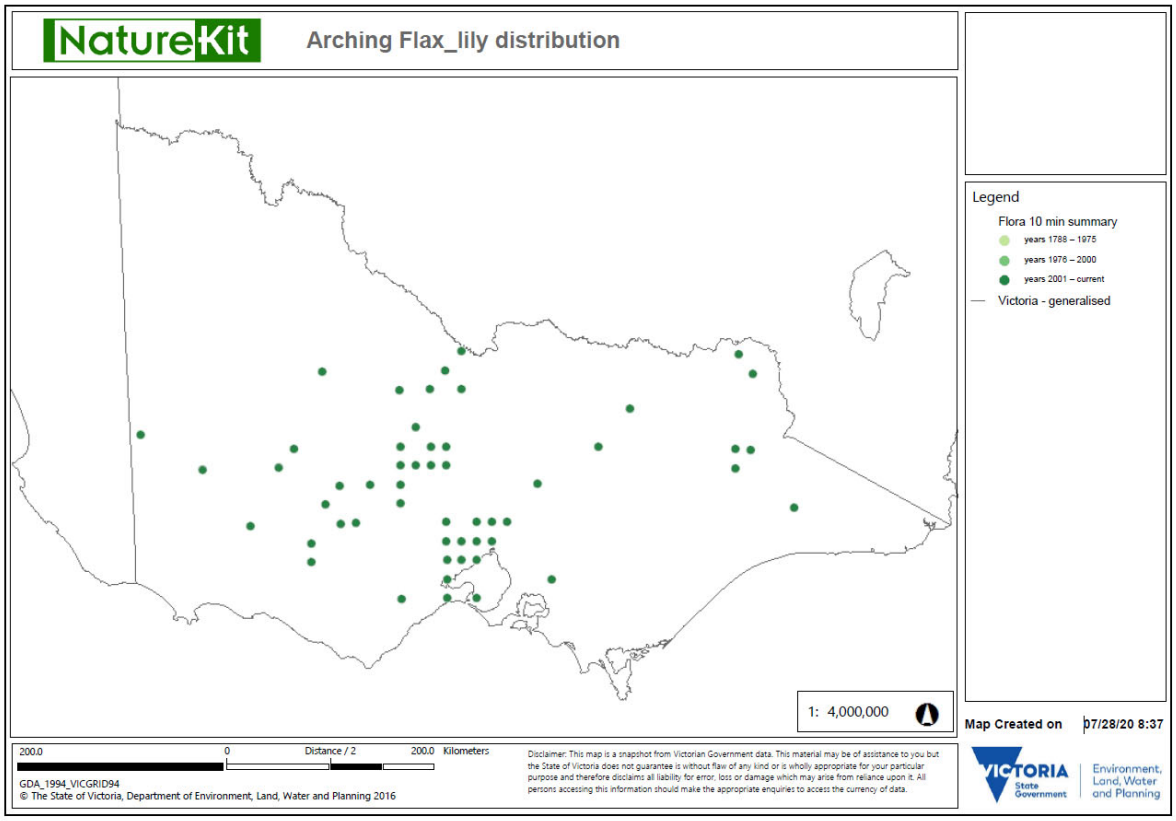

Figure 1-6 Current observations of Arching Flax-lily from 2000 – 2020 (DELWP, 2020)

1.6.5 Population and distribution within project area

Three individuals were identified within the project boundary on the north side of the Eastern Freeway, between Yarra Boulevard and the Yarra River on Crown land recognised as a Public Park and Recreational Zone. These locations are shown in Figure 1-7.

Paper Size A3

0 10 20 30 40

Metres

Map Projection: Transverse Mercator
Horizontal Datum: GDA 1994
Grid: GDA 1994 MGA Zone 55

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Legend

- Arching Flax-lily locations (July 2018)
- 2019 Assessment Area

North East Link Project

Job Number	31-35006
Revision	C
Date	04 Aug 2020

Arching Flax-lily Locations

Figure 1-7

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Data source: CIP Imagery - DELWP - 2018 | Roads, LGA, Watercourses, Rail - Vicmap - 2018 | Project Boundary, MFL Locations - GHD,AECOM, BLA - 2018. Created by:zzuo

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2. Regulatory setting and approvals

This section summarises the regulatory environment and permit requirements that relate to the translocation of Matted Flax-lily.

2.1 Environment Protection and Biodiversity Conservation Act 1999

NELP referred the North East Link project to the then Commonwealth Department of the Environment and Energy (DoEE) (now the Department of Climate Change, Energy, the Environment and Water (DCCEEW)) on 17 January 2018 for assessment under the *Environment Protection and Biodiversity Conservation Act 1999* ('EPBC Act').

On 13 April 2018 the delegate for the Minister for the Environment and Energy determined that the project is a 'controlled action' that has the potential to have a significant impact on the environment on Commonwealth land and on Matters of National Environmental Significance (MNES). The decision notice also advised that the project would be assessed through a Public Environment Report (PER).

The ecological assessment prepared for the project's EPBC referral concluded the project would likely have a significant impact on Matted Flax-lily based on its potential to fragment an existing population and remove habitat to the extent the species is likely to decline. A decision was made on 12 December 2019 resulting in the granting of EPBC Approval No. 2018/8142.

When considered as part of a development proposal, translocation may be proposed as a mitigation measure, particularly for Matted Flax-lily. DoEE (2016) states '*The rhizomatous nature of Matted Flax-lilies allows plants to be translocated. Translocation has occurred at a number of sites*'. Conditions 2 and 3 of EPBC Approval No. 2018/8142 require implementation of a number of salvage and translocation measures to mitigate the removal of the identified plants/patches. Translocation plans/strategies are factored into the approval decisions under section 133 of the EPBC Act to address any residual impacts MNES (DSEWPaC, 2013). Given that translocation measures are recognised to reduce residual impacts, ultimately this can lead to a reduction in required offsets. Under EPBC Approval No. 2018/8142, no offsets for residual impacts to this MNES are required.

2.1.1 Application of Commonwealth outcomes-based policy

The Australian Government has developed policy and guidance on outcomes-based conditions under the EPBC Act. Outcomes-based conditions specify the environmental outcome that must be achieved by an approval holder without prescribing how that outcome should be achieved. Outcomes-based conditions allow approval holders to be innovative and achieve the best environmental outcome at the lowest cost, while increasing the public transparency of the required environmental outcomes.

With this in mind, a proposed environmental outcome that specifically relates to Matted Flax-lily was developed, as well as measures to achieve this outcome. The proposed outcome for Matted Flax-lily detailed in this Salvage and Translocation Plan, are summarised in Table 2-1.

Table 2-1 Proposed outcome for Matted Flax-lily

Outcome
Matted Flax-lily populations directly impacted by North East Link must be translocated in accordance with a Salvage and Translocation Plan prepared to the satisfaction of the Department of Agriculture, Water and the Environment. There must be a net gain in the number of Matted Flax-lily plants/patches due to North East Link, measured by comparing the pre-impact and 10 year post-impact number of Matted Flax-lily plants/patches within the North East Link project boundary and approved translocation recipient sites. **Purpose of proposed outcome** As direct impacts on Matted Flax-lily would be unavoidable, the purpose of this proposed outcome is to require that Matted Flax-lily impacted by North East Link are successfully translocated so there is no net loss in their overall numbers or decline in the species due to North East Link.

2.1.2 Commonwealth offsets

Offsets are required under the EPBC Act to compensate for any residual impacts to MNES once avoidance and mitigation measures have been considered (DSEWPaC, 2012). An offset must deliver an overall conservation outcome that improves or maintains the viability of the MNES and should be tailored specifically to the attribute of the MNES that is to be affected.

Translocation measures for Matted Flax-lily are recognised as a successful and viable method to reduce residual impacts to negligible levels. In this context, and considering that recent nearby projects (e.g. Mernda Rail Extension Project, Epping-South Morang Extension Project) comprising substantial removal of this species have not required offsets, EPBC Approval No. 2018/8142 also does not require offsetting of the negligible residual impacts. It is anticipated that any other actions required under the EPBC Act would be treated similarly.

2.2 Flora and Fauna Guarantee Act 1988

DELWP requested that FFG permits be obtained for salvage of Matted Flax-lily on land that is or would become State land as a result of the Project. FFG Permit No. PPR/2020/004 was issued on 27 February 2020 for the salvage of up to 20 Matted Flax-lilies to facilitate a new boundary fence for a land transfer between the Commonwealth and the State at Simpson Barracks. FFG Permit No. PPR/2021/028 was issued on 13 August 2021 for the salvage of 103 Matted Flax-lilies for the clearing of land within the State transferred land at Simpson Barracks. A further permit will be required for salvage works of both Matted Flax-lily and Arching Flax-lily within the Project boundary as a result of the main project works. No FFG permit would be required for any Matted Flax-lily salvage on Commonwealth land that will remain Commonwealth land.

Under section 48 of the FFG Act, a permit is required from the Secretary of DELWP for the translocation of flora listed under the Act. As agreed with DELWP (pers. comm. Simon Denby (Port Phillip Region), 12 and 18 February 2020), site-specific management plans will be submitted with the application for and effectively approved by the issuing of a Translocation permit under the FFG Act."

2.3 Permits and approvals

Before undertaking the proposed salvage and translocation of the Matted Flax-lily and Arching Flax-lily, NELP would:

- Seek approval from DCCEEW to salvage and translocate Matted Flax-lily (ref. to EPBC Approval 2018/8142, and any further approvals required for works)
- Obtain any relevant permits from DELWP pursuant to the FFG Act for the translocation of listed flora.

3. Translocation management plan

3.1 Translocation activities

Salvage and translocation will be undertaken by NELP, a division of the Major Transport Infrastructure Authority, on behalf of the State of Victoria. This section summarises the activities that would be undertaken to translocate the Matted Flax-lily[1]. Further detail is provided in Sections 4 to 7.

3.1.1 Salvage

Construction timing depends on the timing of planning and environmental approvals and procurement, and is indicatively envisaged to start in 2020. It is proposed that salvage of Matted Flax-lily plants and/or patches identified in the pre-clearance survey would occur shortly before construction commencement in that area. Salvaged material would be propagated in a nursery with demonstrated suitable experience with native plants (and preferably with Matted Flax-lily), and translocated to the selected recipient sites provided that:

- Plants have recovered from the disturbance of the salvage process, which is most readily identified by the new vegetative growth
- A sufficient number of clones have been propagated from the salvaged plants so the required number of individuals are able to be planted to satisfy any required mitigation

It is proposed that, where possible, whole plants (or sufficient material to produce the clones required) would be salvaged at least six weeks before construction works started, allowing for the salvage of any additional material if required. If sufficient material is not present, more clones may need to be produced from a lesser number of individuals, as discussed in Section 4.3.

Translocation would be completed under the supervision of a suitably qualified or experienced botanist/ ecologist approved by DELWP and the botanist/ecologist would generally follow the Guidelines for the Translocation of Threatened Plants in Australia (Commander *et al*., 2018) as applicable. The selection of a suitably qualified botanist/ecologist to undertake salvage supervision activities would be the responsibility of the organisation coordinating the salvage work.

3.1.2 Nursery management

ABZECO has been engaged to manage the salvage and propagation of Matted Flax-lily. They have extensive experience in salvage and translocation of MFL, having previously undertaken Matted Flax-lily salvage, propagation, nursery management, delivery to receptor sites, planting and ongoing management for a number of projects over the last 15 years including for LXRA.

3.1.3 Recipient site management

Recipient sites would be identified in accordance with the process outlined in Figure 5-1.

The ongoing management of each recipient site after translocation would be undertaken for 10 years following initial translocation, or until long-term performance benchmarks were met (see Section 7.1).

General management requirements are described in Section 5 and site-specific requirements would be developed once the recipient sites were identified.

[1] It should be noted that Arching Flax-lily will be treated in the same way as Matted Flax-lily within this Plan. Therefore, generally, specific controls for Arching Flax-lily are not provided unless stated otherwise.

3.2 Management responsibilities

Projected responsibilities of each party are summarised in Table 3-1.

Table 3-1 Translocation program responsibilities

Activity	Responsibility	Monitoring and reporting
Plant salvage and nursery management		
Pre-clearance survey	NELP	NELP
Nursery selection	NELP[2]	NELP
Plant salvage	ABZECO on behalf of NELP	NELP
Nursery management until translocation completed	ABZECO on behalf of NELP	NELP
Nursery management of "insurance" plants (after translocation)	NELP* until no contingency management required. NELP from no contingency management required to year 10.*	NELP
Recipient site management		
Site preparation	NELP*	NELP
Planting	NELP*	NELP
Management: Years 1 to 10	NELP*	NELP

** NELP will engage a suitably qualified contractor*

3.3 Timing and schedule

The initial Matted Flax-lily salvage event occurred on 1 April 2020 for plants along the new boundary fence of Simpson Barracks, in accordance with EPBC Approval 2018/8142 and FFG permit PPR/2020/004. Further salvage for the fire/patrol track at Simpson Barracks occurred on 2 September 2020. The remaining Matted Flax-lilies within Simpson Barracks were salvaged on 23-24 August 2021, with the remainder of Matted Flax-lilies within the Project Boundary to be salvaged in 2022/2023 after project design has been finalised.

The optimal time for salvage and translocation is when Matted Flax-lily is not flowering or fruiting, daily maximum temperatures are low, soil moisture is high, and the corresponding increase in vegetative growth means the species can be easily identified in the field. Matted Flax-lily typically begins flowering in October and finishes setting seed by the end of April. Mean daily maximum temperatures in the project area are lowest during winter (June-August), which is also the season of most consistent rainfall (i.e. the highest mean number of days of rainfall per month). Conducting salvage and translocation between winter and early spring enhances the chance of success, primarily because the plants are more resilient to disturbance at this time, and because this timing allows for a longer period of beneficial growing conditions before the arrival of summer heat. Therefore, it is the preference that salvage would occur during winter or early spring before construction started, but provided that rainfall and other climatic conditions are suitable. Salvage and translocation may occur outside this time period if climatic conditions are conducive and/or if supplemental watering and monitoring were conducted to ensure the survival of the plants. Based on the current project timelines, salvage occurred in autumn (complete) and early spring 2020 (complete) and expected to occur again in 2021/22.

[2] In consultation with DCCEEW

The exact timing of salvage and other translocation actions is yet to be determined. Table 3-2 summarises the timeline for translocation activities relative to the initial salvage event.

Table 3-2 Summary schedule for translocation

Task	Action	Timeframe
1	Pre-clearance surveys of salvage site, including installation of protective fencing around plants to be salvaged	At least 2 months prior to construction
2	Identification of a suitable nursery	Within 3 months before salvage
3	Pre-translocation watering - undertake an appropriate watering schedule to maintain plant health and optimise translocation success	Assessment of plants to be translocated approximately 1 month before removal
4	Salvage of plants to be translocated as identified in Pre-clearance surveys	Prior to start of construction
5	Labelling of plants	During salvage and propagation at nursery
6	Propagation of clones (six per plant)	After transport of salvaged material to the nursery and then as needed during nursery management period
7	Nursery management	For up minimum of five years and up to 10 years following salvage, or until long-term performance criteria have been met
8	Preparation of a Management Plan for the recipient sites	Within 6 months before planting of salvaged material
9	Physical preparation of the recipient sites	Minimum of 6 months before planting of salvaged material
10	Initial translocation to recipient sites to include 4 clones of each plant (where possible) and 2 retained as a safety net in the nursery	Preference is within the 1st year of nursery management period (subject to site conditions) but no longer than 2 optimal planting seasons Optimal time is for translocation is winter-early spring
11	Active recipient site management	For 10 years following initial translocation or until long-term performance criteria have been met
12	Monitoring period	Periodically for 10 years following salvage, or until long-term performance criteria have been met (monitoring schedule provided in Section 7)
13	Replacement plantings	As needed for 10 years following initial translocation; optimal time is winter-early spring
14	Reporting	Reports after salvage and initial translocation, and then annually for 10 years or until long-term performance criteria have been met. Reports to be delivered to DCCEEW and DELWP see Section 7
15	Adaptive management measures	As needed during 10-year monitoring period, or until long-term performance criteria are met
16	Evaluation of long-term performance criteria	At end of 5th year following initial translocation. Further evaluation annually for years 5-10

4. Salvage and translocation

Survival rates for Matted Flax-lily that have been translocated for other developments in the local area have been high. The most relevant and recent examples are the South Morang Rail Extension Project and Melbourne Wholesale Markets. In addition, the Mernda Rail Extension Project has also been granted approval to translocate plants, although while these have been salvaged they are yet to be translocated. It is understood that the plants (clones) in the nursery are doing very well. Provided certain safeguards are in place, the translocation procedure is generally considered low risk.

This document incorporates protocols and procedures that have been informed by the translocation plans prepared for the Mernda Rail Extension Project (AECOM, 2016) and other translocation plans prepared for recent projects in Victoria, and have therefore been proven to be effective for the species in the local area. Measures to be implemented for the management and monitoring of the translocated plants are detailed in Section 7.

4.1 Pre-clearance surveys

The detectability of Matted Flax-lily plants and/or populations is known to vary significantly within and between seasons, and numbers of plants in a defined area can fluctuate markedly. This presents some difficulty both when defining a number of individuals to be impacted, but also provides uncertainty around the final number of Matted Flax-lily that are able to be salvaged and translocated. As such, it is proposed that a pre-clearance survey is implemented before construction works started (at least two months prior to construction). The aim of this survey is to identify the individuals to be translocated and confirm the total number of plants to be salvaged and translocated.

The pre-clearance survey would utilise the following methodology:

1. All patches identified by previous surveys would be located by differential GPS, and any deviations from previously recorded locations and/or additional patches identified during the salvage recorded using the GPS unit
2. Each patch or plant would be marked with a red flag by a qualified botanist. The flag nominates the individual is considered suitable for salvage
3. Appropriate protective fencing would be installed around each patch to protect the plants from damage before translocation
4. A qualified botanist would survey the area post-salvage to ensure all plants identified for translocated have been salvaged
5. A tally of plants would be recorded and mapped
6. The final removal number would be updated, and provided to DCCEEW and DELWP

4.2 Proposed end-uses of salvaged plants

The Matted Flax-lilies salvaged from within the project disturbance area will be divided, propagated and managed to reproduce vegetatively (that is, clone) to establish a nursery population of a sufficient number of plants to allow for a variety of end-uses, including as back-up material for each salvaged patch in case of plant mortality within the recipient sites. Establishing a nursery population would also provide an appropriate amount of time to prepare the recipient site(s) (such as weed control, fencing and vermin control) to maximise the probability of the clones surviving after replanting.

It is the intent that six clones are created from each plant, although this number may vary depending on the quality of the salvaged material. Where sufficient material cannot be obtained to generate six clones (for example small ramets/plants < 10 X 10 centimetres), a whole plant may be initially removed with the view to clone this plant in the nursery at a later date. Alternatively, where more than six clones can be created, this would be undertaken to increase the number of clones available for translocation and insurance.

The proposed end-uses of the propagated material include:

- Four clones would be grown at the nursery until the following winter-spring planting season, or until they become sufficiently established in the nursery, at which point they would be translocated to the recipient sites (proving suitable climatic conditions prevail).
- Two clones would be retained at the nursery for five to ten years. This material would be used as insurance to provide replacement plants in the case of losses of plants at the recipient site. All clones from the Matted Flax-lily plants and patches salvaged in April 2020 may be retained as part of this insurance population. If, at the end of the five-year period, not all these plants had been used for replacement planting, they would be provided to Parks Victoria and/or other local agencies or organisations for revegetation projects in the region.

The goals of these proposed end-uses are:

1. To ensure the proposed performance benchmarks are met at the recipient site (see Section 7.1).
2. Once those performance benchmarks have been met, to provide additional plants for other projects to expand the population and distribution of the Matted Flax-lily within Victoria.

4.3 Salvage protocol

An experienced or qualified botanist/ecologist would oversee the salvage of all plants identified by the pre-clearance surveys as being suitable for translocation. Vegetative material of viable Matted Flax-lily plants within the proposed project disturbance area would be removed and salvaged utilising the following procedure:

1. Plants would be watered the day before the removal if required, or for several days if conditions are dry, to loosen the soil and to ensure the plants are not water-stressed during salvage and transport.
2. All patches previously marked with a red flag during the pre-clearance survey would be removed and recorded on a monitoring sheet. It is proposed that only enough material (attached ramets and rhizomes) is collected to generate the six clones. Any excess plant material can be left *in situ*.
3. For each patch removed, the extent (length and width) would be measured, recorded and a photo taken along with an estimation of the height of ramets.
4. Material would be dug from the ground by hand using suitable equipment that has been cleaned of dirt and debris before each day's removal work.
5. Plants/divisions should be excavated as intact clumps, so that sufficient soil is maintained around the root system to keep roots from exposure and desiccating. This would be achieved by wrapping the clump of roots in a wet hessian or similar material until plants are potted-up at the nursery.

6. Patches would be separated into divisions of a size that fits the transport container (polystyrene box or similar sealed container) to allow for ease of handling and transport. Care would be taken to ensure that sufficient root material was included with each division and that ramets were not separated from their attached rhizome/root base, to the extent practicable. Ideally, small plate-sized material would be left intact (approximately 14-centimetre diameter pots). If smaller pieces of rhizomes or ramets accidentally become separated from the larger divisions, these may be gathered and taken to the nursery, as Matted Flax-lily can be propagated from relatively small pieces of vegetative material.
7. Plant material other than Matted Flax-lily would be removed from the salvaged material prior to transport to the nursery.
8. All vegetative material removed would be labelled by patch and division identifiers, using small aluminium 'dog-tag' labels attached with wire, and recorded on a tracking form according to the system described in Section 4.4 (below), to monitor the number of divisions created and to facilitate identification and tracking upon arrival at the nursery.
9. Depending on soil moisture levels, the excavated divisions may need to be hand-watered so the soil is moist before transport.
10. Once all plants were lifted from the ground and placed into transport containers, they would be promptly transported to the nursery.

Consideration would be given to the preservation of material for the purpose of genetic testing, subject to further consultation with DCCEEW and DELWP.

4.4 Labelling

The correct labelling of all salvaged material needs to be undertaken so that plants can be identified and tracked throughout the entire removal, propagation, translocation and monitoring process.

Plants would be labelled with small metal labels at the salvage site during the removal and division process, using a numeric system that identified the patch and field division number. For example, the divisions from Patch 01 would be labelled 01-01, 01-02, 01-03 and so on.

At the nursery, the plants would be further divided to a size appropriate to the propagation containers – 14 to 24-centimetre diameter pots (6 to 10-inch pots) or other suitable propagation containers. The metal dog-tag would be replaced with a staked metal nursery label, and the side of the pots also labelled with a permanent marker. The nursery label would include the patch number and, in place of the two-digit field division number, use a three-digit nursery clone number (01-001, 01-002) to simplify tallying of the total number of divisions taken from the parent plant.

4.5 Propagation and nursery management

All plants to be grown at the nursery would be potted in a medium specifically designed for propagating native plants. Where achievable, six clones would be created to allow for four to be planted at the recipient site after one year, and two to be retained in the nursery as potential replacement plants in the case of mortality at recipient sites. All clones from the Matted Flax-lily plants and patches salvaged in April 2020 may be retained in the nursery as part of the insurance population.

After the clones were potted, they must be managed correctly to maximise survival and good health within the nursery environment. Appropriate management would depend on conditions and the length of stay in the nursery. Watering, fertilisation, and disease and pest control would need to be undertaken to maximise survival and sufficient growth over the nursery management period. Disease and pest control in the nursery would be important so that no diseases or pests were introduced to the recipient site during delayed translocation. Correct hygiene procedures should be practiced at all times within the nursery. Any plants suspected of being infected by a pathogen or disease should be treated according to nursery guidelines or destroyed and disposed of appropriately to avoid spread of the pathogen/disease. Plants suspected of carrying a pathogen/disease or having pests would not be introduced to the recipient site. Weeding of pots would also be undertaken periodically and before translocation.

Generally, Matted Flax-lilies do well within a nursery environment and may spread to fill their container. If plants become pot-bound, further division and correct labelling would be undertaken.

Nursery populations would be monitored by a qualified botanist every six months in the first two years, and annually thereafter during the life of the program. Results of the nursery monitoring would be included in the translocation program's annual report (see Section 7.5).

Before planting into the recipient site, plants need to be 'hardened-off' (exposed to conditions similar to those at the recipient site) gradually so they are not stressed by a sudden change in watering regime, sun and wind exposure, or temperature. Before the plants are translocated into the recipient site(s), the health and readiness of the plants for translocation must be inspected and approved by the project botanist.

4.6 Planting procedure

The translocation to the recipient site would occur once plants were established within the nursery and conditions at the site (such as climate, soil moisture and weed control) are favourable. The ideal time to conduct translocation is during winter or early spring, when temperatures are cool and rainfall is more consistent. Planting would be overseen by an experienced or qualified botanist/ ecologist approved by DELWP. Planting of the plants/clones at the recipient site would be accomplished by adopting the following practices:

1. Holes would be pre-dug systematically and filled with water the day before translocation occurs; the holes would be dug roughly twice as wide and slightly deeper than the pot in which the material is grown in. The holes should be laid out in a loose grid formation or as agreed with the land manager, with plants spaced 3-5 metres apart, to assist in later monitoring of the plants. Holes should be placed so as to avoid impacts to existing native vegetation at the site, to the extent practicable.

   Holes should also be placed so they are not too close to any perimeter fence, any large trees or other vegetation that would excessively shade the translocated plants or compete with them for water or nutrients. The spoils from the hole should be broken down into small clumps and mixed with a small amount of weed-free planting medium to serve as backfill during planting.

2. The pre-dug planting holes would be re-filled with water just before the translocation to moisten and soften the surrounding soil and facilitate quick root growth. Any high-threat weeds not already removed from the area immediately around the hole should also be removed at this time.

3. The potted plants would be well watered before translocation.

4. After being transported from the nursery, the plants would be laid out systematically at pre-identified recipient holes. The plants would be arranged so that divisions planted next to each other are from different parent plants to facilitate cross-pollination and enhance genetic diversity within the recipient site.
5. Care should be taken when removing the material from the pot to avoid damage to the plant and to keep the planting medium intact around the root system. If the plant is root-bound, the outer layer of roots may be loosened by hand or with pruning shears, taking care to not cause excessive damage to the roots.
6. The translocated material should be placed in the centre of the planting hole at a sufficient depth so the top of the root ball sits slightly lower than the surrounding soil surface, to create a slight basin to capture water.
7. The backfill material would be placed around the root ball and tamped down slightly so it is packed around the root ball and no large air pockets remain. Care should be taken to minimise disturbance of the root ball and avoid over-compacting the soil during backfilling. To avoid crown rot, the backfill soil should not cover the crown of the plant.
8. The area around the plant would be covered with a 7–10-centimetre layer of certified weed-free mulch consisting of organic material (such as wood chips or pea straw). Mulch should not cover the crowns of the plants. If considered appropriate and necessary, weed matting would also be considered to supress the establishment of weeds.
9. The plant would be watered-in immediately after placement in the hole. Watering should continue until the soil in the planting depression is saturated, taking care not to displace the mulch when watering.
10. The plant would be labelled according to the nursery number, using a small metal label attached to a metal stake embedded in the ground, and the location of the plant recorded using a differential GPS.
11. Immediately following translocation, the basal diameter and height of each clump and the number of ramets per clump would be measured to establish a baseline for monitoring the success of translocation. Reference photos would also be taken of the recipient site after the translocation episode is complete, to serve a visual baseline for subsequent monitoring, and the photo point location recorded using GPS.

5. Translocation recipient site selection

Before translocation, an appropriate recipient site(s) must be identified. As the aim of the translocation is to 'reduce the risk of extinction' (Commander *et al*., 2018), the selection of a suitable recipient site is highly important.

In-principle approval of this Plan and the proposed recipient sites (subject to approval of site-specific management plans) was provided by DELWP (pers. comm. Simon Denby) on 12 February 2020. These sites are discussed in Section 5.1 onwards. Formal approval of site-specific management plans will be provided as part of the FFG permit process for the translocation. DCCEEW will be consulted via submission of this Plan which details translocation sites that have been selected by previously provided procedures described within this plan. Site-specific management plans will be provided to DCCEEW once appropriate and effective management measures reflecting those used at other successful translocation sites have been agreed with DELWP, Council and Parks Victoria."

In considering whether a site is a suitable translocation recipient site, a key consideration is the presence, historical or otherwise, of Matted Flax-lily at that site. A site that has remained undisturbed following recent extinction of the species, or where the species is present in low numbers in otherwise suitable habitat and is not currently protected through relevant planning controls is considered to be the best option.

Securing such an area for active ecological management in perpetuity would provide a strong ecological benefit for the species. Whilst the presence of an existing, large and self-sustaining population at a potential recipient site may indicate the habitat would be suitable for translocated plants, there is a risk the addition of more plants to the site may adversely affect the current population, and so this should be avoided. However, translocation to sites with existing self-sustaining populations and/or sites which are already under active conservation management can be undertaken in circumstances that would benefit the species and the community or ecosystem at the site, and where no other more suitable sites are available.

A number of criteria would be considered when identifying potential recipient sites for the Matted Flax-lilies to be translocated. Selection factors for consideration are documented in Figure 5-1 and are based on criteria presented in Commander *et al.* (2018).

Site-specific management plans will be developed for the selected recipient sites. DELWP has requested these plans cover:

- Management objectives
- Planting area, procedures, numbers and locations
- Securing long-term protection
- Access and fencing
- Planting and watering
- Pest animal and plant control
- Biomass control actions
- Enhancement planting
- Scheduling.

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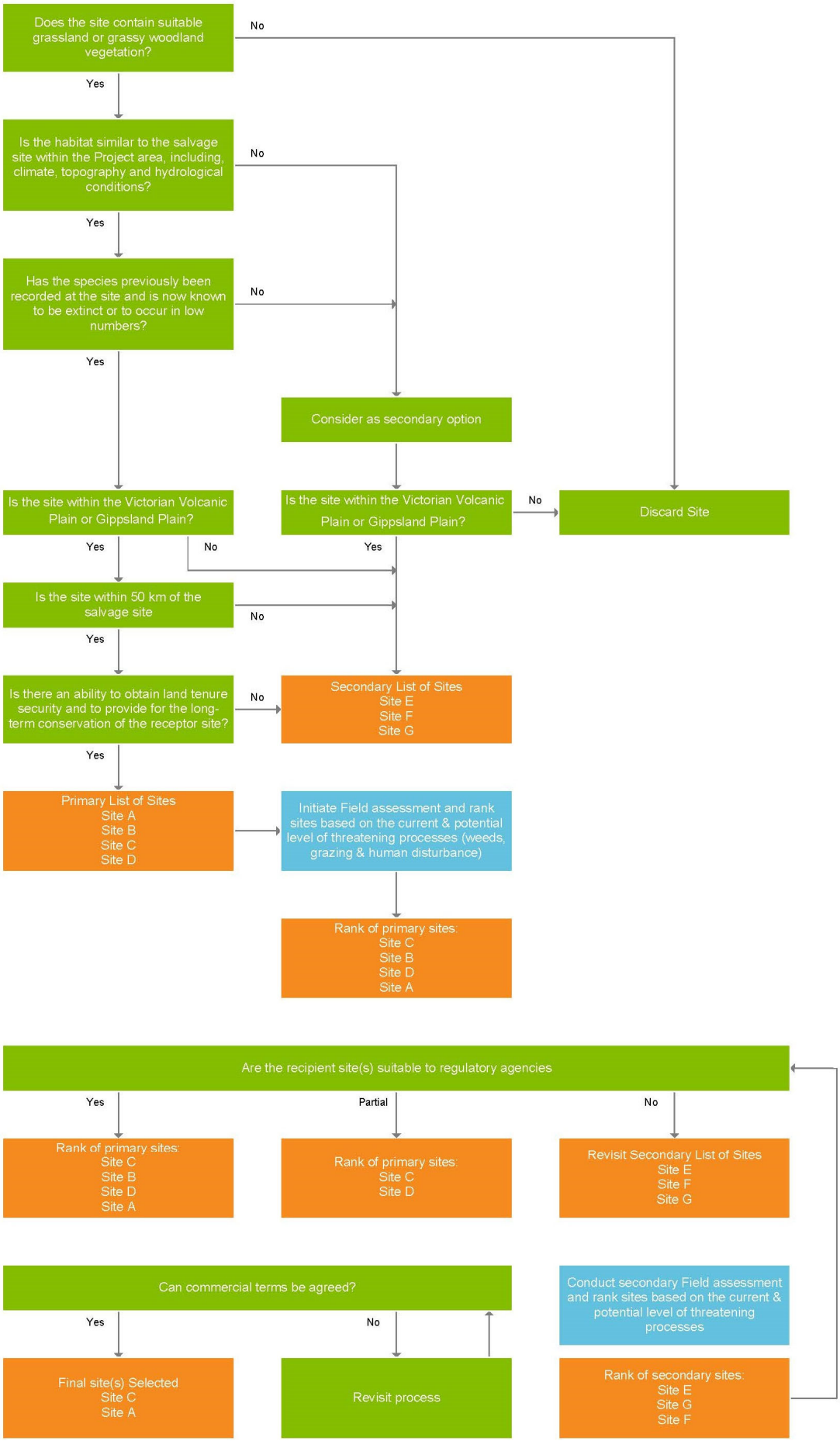

Figure 5-1 Recipient site selection flowchart

5.1 Potential recipient sites

NELP has completed investigations of nine potential recipient sites within the City of Whittlesea, City of Banyule, City of Darebin and/or in the eastern section of Simpson Barracks, including:

- Southern Redgum Reserve, Enterprise Drive, Bundoora
- Marigold Reserve, Yallambie
- 185 Bridge Inn Road, Wollert
- Mernda Village Conservation Reserve (East of Brahe Drive), Mernda
- Harry Pottage Reserve, Macleod
- Wildflower Patch (Gresswell Forest Nature Conservation Reserve), Macleod
- Cherry Street Reserve, Macleod
- Forensic Drive, Macleod
- Simpson Barracks

Of these, two were considered preferable:

- Cherry Street Reserve, Macleod.
- Wildflower Patch (Gresswell Forest Nature Conservation Reserve), Macleod.

Further information on these preferred sites is presented below and mapped in Figure 5-2.

Paper Size A4

0 110 220

Metres

Map Projection: Transverse Mercator
Horizontal Datum: GDA 1994
Grid: GDA 1994 MGA Zone 55

N

Legend

- MFL - EES/PER (Jan 2019)
- MFL - CPB (Mar 2020)
- MFL (Dec 2019 – Jul 2020)
- MFL (April 2021)
- Primary Sites
- 2020 Assessment Area
- 2019 Assessment Area

North East Link Project

NORTH EAST LINK PROJECT

Job Number	31-35006
Revision	B
Date	17 Aug 2022

Potential Matted Flax-lily Recipient Sites

Figure 5-2

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Data Sources: CIP Imagery - DELWP - 2021 | Cadastre, Roads, Planning Zones - Vicmap - 2021 | NELP data - 2022 Created by:zzuo

Paper Size A4

0 110 220

Metres

Map Projection: Transverse Mercator
Horizontal Datum: GDA 1994
Grid: GDA 1994 MGA Zone 55

N

Legend

- Primary Sites
- 2019 Assessment Area

North East Link Project

Job Number	31-35006
Revision	B
Date	17 Aug 2022

Potential Matted Flax-lily Recipient Sites

Figure 5-2

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Data Sources: CIP Imagery - DELWP - 2021 | Cadastre, Roads, Planning Zones - Vicmap - 2021 | NELP data - 2022 Created by:zzuo

5.1.1 Cherry Street Reserve, Macleod

Cherry Street Reserve is within the Gippsland Plain bioregion and managed by Darebin City Council. This site contains areas of fenced off native vegetation surrounded by more weedy areas (mown) and well used pedestrian pathways. There is a *Eucalyptus camaldulensis* overstorey, dominated by smaller recruiting individuals, with a dense midstorey of *Acacia* ssp. and *Cassinia* sp. In the better quality areas, the ground layer was dominated by Kangaroo Grass, Wallaby Grass and Weeping Grass. Other groundstorey species included Spear Grass, Small-leaved Clematis *Clematis microphylla,* Black-anther Flax-lily, Nodding Saltbush, Wattle Mat-rush, Cotton Fireweed and a variety of lilies (Luke Sandham, Darebin Council pers comm).

Large patches of introduced grasses, including Kikuyu, Brome *Bromus* sp. and Plantain are present through the site adjacent to the fenced native vegetation. The sites identified by Darebin City Council are in transition zones between good quality areas of native vegetation and patches of introduced grasses, shown in Plate 3.

Cherry Street Reserve is Darebin City Council's most important bushland reserve. There is significant investment in weed control and thinning out eucalypt regeneration, which shades out the understorey. The site is adjacent to suburban housing, to the Harry Pottage Reserve, and contains walking paths the mains of which is fenced. One area to the south east of the reserve had bitumen throughout the soil surface in the open part of the site, which would not be suitable for translocation. There has been some soil movement across the site.

A soil sample was taken at each of the proposed translocation locations in Cherry Street Reserve, as outlined in Table 5-1.

Table 5-1 Soil samples, Cherry Street Reserve

Pit 1 Horizon A1: 0-12 centimetres deep, colour light brown, texture a clay loam (lumps of clay) Horizon A2, 12-16 centimetres deep, colour yellow-brown, texture a light clay	**Pit 4** Horizon O1, 0-1 centimetres deep, colour pale grey, exposed soil Horizon A1, 1-17 centimetres deep, colour brown, texture a silty clay loam (clay fragments)
Pit 2 Horizon A1, 0-15 centimetres deep, colour grey-brown, texture a clay loam Horizon A2, 15-20 centimetres deep Horizon A3, 20-26 centimetres deep Horizon A4, 26-30 centimetres deep, colour pale grey, texture a clay loam sand (fine and powdery)	**Pit 5** Horizon A1, 0-18 centimetres deep, colour brown, texture a clay loam
Pit 3 Horizon O1, 0-7 centimetres deep, organic matter Horizon A1, 7-20 centimetres deep, colour grey-brown, texture a sandy clay loam Horizon A2, 20-23 centimetres deep, colour darker orange-brown, texture a higher clay content	

Plate 3 A. Proposed locations for translocation (green polygons). B. Fenced off native grassy woodland in the north-west of the reserve. C. Southern most translocation site, open area contains bitumen

Suitability as a translocation site

There are current records of Matted Flax-lily on site according to Council. The site occurs in the Gippsland Plain bioregion and the soil is suitable for Matted Flax-lily. The locations within Cherry Street reserve chosen as potential translocation sites vary in their suitability, primarily due to variation in the amount of native vegetation present. The majority of locations occur in areas predominantly cleared of native vegetation and dominated by introduced grasses. The locations considered suitable for translocation of Matted Flax-lily and Arching Flax-lily are shown in Plate 3A.

5.1.2 Wildflower Patch (Gresswell Forest Nature Conservation Reserve), Macleod

Gresswell Forest Nature Conservation Reserve (NCR) is within the Gippsland Plain bioregion and has been managed by Parks Victoria since 2012. Gresswell Forest NCR is the eastern area of the greater Gresswell NCR and provides connectivity to Yarra River to the southeast, Darebin Creek to the west and Plenty River to the north (Parks Victoria 2020). The Wildflower Patch is

located in the north of Gresswell Forest NCR, bordered by Central Track and Swamp Gum Track, with a particularly diverse ground layer. A kangaroo exclusion fence was erected in 2017 around the Wildflower Patch as part of Wildflower Patch Restoration Project Plan (Tim Carver, Parks Victoria, pers. comm.). There is a River Red Gum *Eucalyptus camaldulensis* and Swamp Gum *Eucalyptus ovata* co-dominant overstory to the west and a River Red Gum and Yellow Box *Eucalyptus melliodora* co-dominant overstory to the east.

The geology of Gresswell Forest NCR is mixed as the boundary between Gippsland Plain and Victorian Volcanic Plain bioregions is less than 2 km away. This results in a complex of floristic communities characteristic of both bioregions (Parks Victoria 2020).

Plate 4 A. Proposed location for translocation (orange polygon). B. Fenced off native grassy woodland. C. Kangaroo exclusion fence that surrounds Wildflower patch.

Suitability as a translocation site

Matted Flax-lily was identified as occurring on site during the field assessment. There are no current or historical records of Arching Flax-lily according to the VBA. The site occurs in the Gippsland Plain bioregion and contains suitable vegetation of good quality. There is an existing kangaroo exclusion fence to reduce grazing pressure. Wildflower Patch is considered a biodiversity hotspot, and has consequently received considerable support to improve vegetation quality. This site is considered suitable for translocation of Matted Flax-lily and Arching Flax-lily.

5.2 Rank of sites

Following the process outlined in Figure 5-1 nine sites were considered as potential recipient sites. However, in response to comments from the regulators and stakeholders a further refinement in the selection process has been considered; that is, a preference for sites within the Gippsland Plain bioregion rather than the Victorian Volcanic Plain. This requirement reflects the fact that the majority of losses of Matted Flax-lily occur within the Gippsland Plain. In addition, an additional field assessment was completed in June 2019 to re-assess the suitability of potential sites based on their general characteristics, vegetation attributes, size and potential for edge effects and management intent (for conservation purposes). Following discussion with potential public land managers, two sites within the Gippsland Plain bioregion were selected, Wildflower Patch (Gresswell Forest NCR) and Cherry Street Reserve, which both meet all criteria in Figure 5-1.

5.3 Next steps

Site visits to the two recipient sites involving NELP, NELP's ecologists, DELWP and relevant representatives from Darebin Council (Cherry Street Reserve) and Parks Victoria (Wildflower Patch) took place in December 2019 and August 2022, respectively. Discussions have been ongoing between NELP's ecologists and Darebin Council and Parks Victoria regarding the drafting of site-specific management plans. Once finalised, these will form the basis of the FFG permit required for translocation, and also formal agreements between NELP, Council and Parks Victoria.

6. Recipient site management

Before and following translocation, management and maintenance activities at the recipient site would be required to control threatening processes, and improve the health, growth and survivorship of the translocated plants.

This section provides broad management activities required across the selected recipient sites to achieve a successful translocation program. To ensure the longevity of recipient sites, the sites would require a holistic management approach to improve the ecological value of the entire site rather than focusing just on the health of translocated plants. In some cases, this would involve enhancing and restoring parts of the recipient site not directly related to the translocated plants.

Management responsibilities and site security information is presented in Section 3.2.

6.1 Watering

Watering of translocated plants at the recipient site would be undertaken to ensure that plants established quickly and survived through dry periods during the establishment phase (considered here to include the first summer endured by the planted material). Supplementary watering can be critical to the survival of plants during the first year, and particularly the first summer after translocation, when they are still establishing their root systems and are more prone to drought-stress. The frequency and volume of watering required during this period is dependent on a number of factors, including the time of year that translocation occurs, rainfall, temperature, soil type and topography. After the plants have lived through the first summer, supplemental watering would unlikely be required unless the plants showed signs of water-stress.

A suggested watering schedule is outlined in Table 6-1. The schedule may be modified based on the time of planting as well as monitoring of weather conditions, soil moisture, and the condition of the translocated plants at the recipient site. The quantity of water used for each watering episode would be sufficient to promote survival of the translocated plants, as informed by monitoring of soil moisture and the condition of the plants at the recipient site.

Table 6-1 Watering requirements for translocated plants

Months after planting	Period between significant rainfall events[1] that will trigger watering	Watering schedule
0–3	1 week	Weekly[2]
3–9	2 weeks	Weekly
9–21	1–2 months	Monthly
21–36	1–2 months	Only if plants display signs of stress

[1]A 'significant rainfall event' will be defined as ≥20 mm of rainfall within a 24-hour period; rainfall and watering records will be included the project monitoring reports.
[2]More frequent monitoring may be required in the first months if planting occurs outside of the preferred winter to early spring.

6.2 Weed control

Control of high-threat weeds within and adjacent to the location(s) of transplanted Matted Flax-lilies would be undertaken before translocation. This includes woody, grassy and herbaceous weeds.

After an initial weed control effort before translocation, an ongoing weed control program would occur biannually at times of the year when weeds were germinating and actively growing (autumn and spring). Spring weed control timing is critical so that high-threat weeds can be targeted before setting seed. The weed control methods would include undertaking spot-spraying using broad-leaf and grass selective herbicide. Woody weeds would be removed using the cut-paint method and germinates treated with a broad-leaf selective herbicide. The alternate use of selective herbicides reduces the likelihood of off-target damage, increases the ability of applicators to target broad-leaf weeds amongst indigenous grasses, and assists exotic grass control amongst indigenous herbs.

Noxious weeds would be maintained at <1% cover within five metres of any planted material within the first five years of management. To achieve this, carefully targeted spot-spraying with selective herbicides must only be undertaken at distances greater than 50 centimetres away from translocated plants. Mulching and hand weeding would be required to remove weeds within 50 centimetres of translocated plants.

Herbicide application must only be undertaken during conditions considered suitable by an experienced operator, and all operators must be familiar with the range of exotic and indigenous species present on site. Before application, the contractor would be informed of the locations of the translocated plants, and instructed in the identification of Matted Flax-lily and other sensitive native species occurring at the recipient site. This would ensure that plants are not affected by off-target application or overspray.

Nursery stock would be inspected before planting to avoid introducing weeds to the recipient site, and additional weed control undertaken at the recipient site before and after the replanting of the salvaged material. Monitoring of weed levels at the recipient site would be performed according to the monitoring schedule outlined in Section 7.3, with weed control actions as needed according to the monitoring results and associated observations of environmental conditions.

6.3 Pest animal control

If rabbits and/or hares were present within fenced recipient areas, or posed a threat to isolated plants, a combination of habitat removal, warren destruction and baiting would need to be undertaken where supported by the land manager.

Baiting would ideally be undertaken in late summer to mid-autumn when populations are naturally low, and repeated each year as required. Baiting can also be undertaken during winter and spring, although this may not be as effective if there is high availability of natural feed (potentially reducing the desirability of baits). Given translocation sites are within close proximity to neighbouring properties, roadsides and pedestrian paths, appropriate warning signage must be erected at access points and along fence lines prior to laying baits. Sites would need to be revisited four days after baiting to remove uneaten baits and again 12 days after laying baits to remove any dead carcasses. Uneaten baits and carcasses must be buried to a depth of at least 500 millimetres in cleared areas outside recipient sites.

Surveys for rabbits and active warrens at recipient sites would be undertaken at least twice yearly, and any warrens located fumigated and destroyed. Following each warren treatment, affected areas would be re-sown with indigenous grasses and follow-up weed control undertaken as required.

6.4 Biomass control

An integrated biomass control program would be implemented with the aim of reducing competition for light, nutrients and moisture from grassy weeds. In the later stages of the management plan, biomass control would reduce competition (thatching) from native grasses and promote understorey species diversity. A mixture of low impact techniques would reduce biomass and may include low intensity burning, slashing, spraying and hand removal. Techniques would vary between recipient site(s) due to management protocols required by the respective site managers.

Any proposed burns would be carried out during autumn (cool burn) with the aim of reducing competition from annual grassy weeds and to encourage germination of native understorey herbs and graminoids.

Cut grass would be removed from recipient sites where this has the potential to smother translocated plants (a hand mower with a catcher may be used if appropriate for parts of each site). For lower quantities of biomass, a brush cutter would be used as this would likely disperse grass in the process of slashing.

Care would be taken to protect translocated Matted Flax-lilies and other newly established plants during slashing. Before a plot was slashed, each Matted Flax-lily would have a fluorescent flag placed near its base or several flags placed around the edge of the colony for plants consisting of numerous ramets. High quantity areas of biomass within translocated plants would be removed by hand to prevent damage or cause significant disturbance to the Matted Flax-lilies.

Spring slashing would occur before exotic grasses and herbs setting seed to prevent seed spread.

6.5 Fencing

The design and construction of fencing would ensure the exclusion of herbivores known to occur in the vicinity and which pose a potential threat to the translocated plants at each recipient site. Decisions on fencing type would be made following the identification of recipient site(s), as existing fencing may vary and the nature of the herbivore threats may differ.

Fences would be inspected on a regular basis after translocation, including during the project monitoring events conducted, and maintained as necessary. The translocated plants would also be monitored for evidence of grazing, and additional measures, such as use of cages or tree guards for individual plants, may be implemented as necessary. Additional pest fauna controls, such as bait traps for snails or similar pests, would also be implemented if the need was indicated by monitoring.

On occasion, herbivore control may be too difficult to achieve and individual plants may be caged. This would be considered as an option if other herbivore control was not effective.

6.6 Enhancement planting

Recipient sites may be selectively revegetated with local indigenous plants particular to the relevant EVC. Plants chosen would predominately be from understorey lifeforms and consist of herbs, groundcovers, daisies, lilies and graminoids to assist with weed suppression and potentially attracting pollinators. Understorey plants suitable for enhancement planting are listed in Table 6-2.

Areas that have been removed of woody, herbaceous and grassy weeds may require revegetation with indigenous grasses to provide competition against colonising weeds. Areas containing existing understory grasses would require supplementing with herbs, groundcovers, daisies and lilies to improve species diversity.

Enhancement planting would be scheduled to occur in year two and beyond to allow targeted weed control and to provide optimum opportunity for translocated Matted Flax-lilies to establish.

Table 6-2 Understory species suitable for enhancement planting

Common name	Scientific name
Shrubs	
Sweet Bursaria	*Bursaria spinosa*
Hedge Wattle	*Acacia paradoxa*
Groundcovers	
Berry Saltbush	*Atriplex semibaccata*
Kidney Weed	*Dichondra repens*
Purple Coral-pea	*Hardenbergia violacea*
Running Postman	*Kennedia prostrata*
Berry Saltbush	*Atriplex semibaccata*
Daisies	
Clustered Everlasting	*Chrysocephalum semipapposum*
Wiry Buttons	*Leptorhynchos tenuifolius*
Lilies	
Chocolate Lily	*Arthropodium strictum*
Grasses	
Common Wallaby-grass	*Rytidosperma caespitosa*
Brown-back Wallaby Grass	*Rytidosperma duttoniana*
Clustered Wallaby-grass	*Rytidosperma racemosa*
Australian Wheat Grass	*Anthosachne scabra*
Wattle Mat-rush	*Lomandra filiformis*
Spiny-headed Mat-rush	*Lomandra longifolia*
Weeping Grass	*Microlaena stipoides*
Velvet Tussock-grass	*Poa morrisii*
Large Tussock-grass (volcanic plains form)	*Poa labillardieri*

7. Monitoring and reporting

Monitoring of the translocated plants as well as the conditions at each recipient site would be required to identify key threatening processes, determine whether additional management actions are necessary, track the health, growth and survivorship of the translocated plants, and demonstrate whether performance benchmarks and regulatory requirements were being met.

Monitoring would be performed by a qualified botanist familiar with Matted Flax-lily biology and ecology. As detailed in Section 7.3, monitoring at the recipient site(s) would include the documentation of threatening processes, such as water stress, pest animals and signs of grazing, weed infestation and other site disturbances. In addition, the condition, growth rates, reproduction, and survivorship of the translocated material would be monitored.

7.1 Performance benchmarks

The translocation process does stress salvaged plants, and without active management, most plants would be unlikely to survive. Successful translocation of Matted Flax-lily has occurred within Victoria, with the first two years following re-planting seen as the most critical period for plant establishment. Once planted material has survived for a period of five years, it is considered established at that location and is otherwise part of the broader ecosystem in which it has been planted (Commander, 2018). However, each salvage and translocation operation needs to be carefully planned, managed, and monitored so that plants successfully become established at the recipient site within the agreed-upon timeframe.

The overall goals of the proposed Matted Flax-lily translocation program are to ensure that genetic diversity of the species is conserved and that the population affected by the project is re-established into suitable habitat and managed for the survival and reproduction of this species. Individual performance criteria have been created to assess the translocation program's progress towards meeting those goals. The following performance criteria are derived from Vallee *et al.* (2004) with adaptation to suit the circumstances of the current project and species to be translocated. The criteria are divided according to the phase of the proposed translocation program:

Propagation and nursery management:

1. The required number of transplants were available for the proposed translocation
2. Correct labelling and documentation was maintained throughout the propagation and nursery management period
3. Techniques for successful propagation of Matted Flax-lily developed through past translocation projects in Victoria were tested and/or advanced
4. A genetically representative collection was maintained

Habitat and threat management:

1. Good-quality habitat was restored or maintained within the recipient site
2. Management and maintenance activities were carried out at suitable intervals and to the required standard
3. Threatening processes, including weed invasion, were eliminated or effectively controlled

Translocation criteria (1 to 10 years):

For the translocation of each species:

1. At least 85 percent of transplanted clones survived, including representatives from the range of genetic individuals salvaged
2. The translocated populations displayed similar growth, development and vigour as naturally occurring populations
3. Transplants survived to a reproductive stage (producing flowers and fruit)
4. If plants didn't survive to reproductive stage, then the plants were replaced
5. Regeneration occurred in the translocated individuals (since the recruitment of Matted Flax-lily through seed is thought to be rare, the production of ramets at a rate similar to naturally occurring populations is considered sufficient to meet this criterion)
6. The number of individuals within the population was stable, or had increased by natural (including vegetative) recruitment
7. Adequate levels of genetic diversity were maintained

The number of surviving plants at the end of the 10-year monitoring program that are needed to meet the long-term success criteria would depend on the number of clones propagated and planted out. Condition and success of the clones would continue to be monitored for up to 10 years with the aim of achieving 85 per cent survival of clones by the fifth year. If performance targets are met within five years, it is envisaged that a significantly reduced monitoring program could be developed for the remaining five years[3]. Should 85 percent survival not be achieved at the end of five years, contingency planning would be initiated (refer Section 7.2).

7.2 Contingency and adaptive management

A sufficient number of clones would be propagated and retained in the nursery to replace any losses of the translocated plants at the recipient sites to ensure 100 percent genetic survivorship of salvaged material. This is critical to the success of the approach. Based on previous translocation programs, Matted Flax-lily can be successfully propagated in a nursery setting and a large number of clones can often be produced from a single parent plant.

The primary criteria for triggering replanting would be plant mortality at the recipient sites, based on the judgement of the project botanist. Plants in poor health and/or which are not sufficiently growing either in width or number of ramets should first be watered before being considered for replacement.

The health and survivorship of the translocated plants would be monitored according to the protocol described in Section 5.3, and if the translocated population appears to be declining and/or performance benchmarks were not being met, the root cause of the decline would be assessed, and further adaptive management measures developed in consultation with DELWP. If the root cause is determined to be an aspect of the management of the recipient sites (such as insufficient watering or weed control), then modifications to site management would be evaluated and implemented as needed. In addition, if survivorship criteria were not being met, the number of clones in the nursery can be increased by creating further divisions of established nursery stock so that sufficient clones were available to replace losses. If contingency measures were implemented (at the end of the five-year monitoring period), the monitoring period would be extended until the 10- year period. Performance measures and contingency measures are presented in Table 7-1.

[3] This program would place a greater focus on the monitoring and management of threats to maintain the population rather than intensely monitoring population dynamics, recruitment and alike.

Table 7-1 Performance management and contingency planning

Year for completion of Activity	Standard to be achieved	Contingency
Pre-planting	• 100% salvage of pre-clearance plants • Where achievable six clones to be created to replace salvaged plants	• If the six clones cannot initially be established, additional clones to be produced when plant mass is sufficient • Two clones maintained in nursery conditions
End of 1st year	• >85% survivorship	• Do nothing and continue to monitor
	• <85% survivorship	• Replant up to 85% survivorship of 4 clones
End of 2nd year	• >85% survivorship	• Do nothing and continue to monitor
	• <85% survivorship	• Replant up to 85% survivorship of 4 clones
End of 3rd year	• >85% survivorship	• Do nothing and continue to monitor
	• <85% survivorship	• Replant up to 85% survivorship of 4 clones
End of 4th year	• >85% survivorship	• Do nothing and continue to monitor
	• <85% survivorship	• Replant up to 85% survivorship of 4 clones
End of 5th year	• Achieved a performance target of at least 85% of clones surviving? • If this is the case the salvage and translocation plan is declared a success.	• No contingency management required • Amend monitoring program years 5-10 • Actively manage sites to 'maintain' population through threat management.
Years 5-10	• If the performance target has not been met at the end of a 5-year period continue with replanting strategy for a further five years.	• Review the existing strategy and explore options to improve success rates • Replant with 'insurance clones' as required to achieve performance target and monitor until performance target achieved

Note: This table will be modified and updated to reflect the starting point at the time of salvage. This will allow % targets to be converted to actual targets.

7.3 Monitoring schedule

Generally, monitoring would need to occur more frequently immediately following replanting to confirm that new transplants were establishing themselves at each site. Monitoring can be undertaken less frequently once the plants become established. Therefore, monitoring would be conducted weekly for the first month after replanting, monthly during the second through fifth month, and then quarterly through the remainder of the two-year period. Monitoring would be conducted on a six-monthly basis up to five years. At the end of the five-year period a review is proposed to tailor the management and monitoring program for the remaining five years.
A reduced monitoring program would be implemented for Years 5 -10. This schedule may be revised, with approval of DCCEEW and DELWP, depending on establishment rates and achievement of performance benchmarks. A final site assessment would be conducted at the end of the tenth year after the initial translocation event to confirm that performance benchmarks have been met. The reporting schedule for providing the results of the monitoring to DCCEEW and DELWP is discussed below in Section 7.5.

7.4 Monitoring protocol

Monitoring at the recipient site would be undertaken or overseen by a qualified botanist approved by DELWP. Monitoring would also be undertaken in consultation with land managers (e.g. Council biodiversity officer). Monitoring would include the following components:

1. A population count of all translocated Matted Flax-lilies at the site.
2. An assessment of the growth and condition of the plants for four 25 m^2 quadrats set up in established locations that are easily locatable and repeatable. Quadrat monitoring would be conducted each summer, when the plants are most actively growing. Information to be collected would focus on plant health and cover, but also consider other information such as plant reproduction, weed abundance and diversity, grazing impacts and other issues.
3. Photo point monitoring at established locations showing representative views of the translocated population. Photos would be taken each quarter.
4. A general site assessment and threats analysis for the entire recipient site.

A monitoring form would be completed for each monitoring event to record the results of the monitoring, including:

- Location and population of individual plants
- Plant cover and growth (basal diameter and height of each patch, number of ramets per patch)
- Presence of flowers and/or fruits and height of inflorescence or infructescence
- Evidence of herbivory or pathogens
- Presence and cover of weed species
- Other potential or occurring threats or management issues
- Maintenance or corrective actions completed or recommended

7.5 Reporting

NELP would submit an initial report summarising the results of the salvage and nursery propagation to DCCEEW and DELWP within three months after salvage. A report would also be provided after the initial translocation and again after the first three months of monitoring. A summary report would be prepared each year for 10 years.

The reports would discuss the survivorship and growth of the plants and include information on conditions at the recipient site and the nursery and an assessment of the status of the translocation program relative to the established performance benchmarks. The report would also discuss occurring or potential threats or management issues and any maintenance or corrective actions taken or proposed. The reports would include rainfall and watering data, the monitoring forms for each monitoring event and the quarterly photos taken from each established photo point.

A final report would be provided after the tenth year and include an analysis of whether the translocation program had achieved the long-term performance benchmarks, or whether further management and monitoring was required, and a summary of lessons learned and recommendations for future translocation programs.

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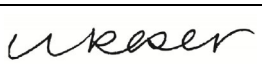
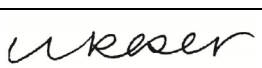
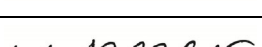
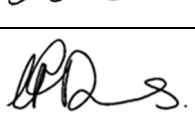
Rev 2	J Moyses	J Harman	M Roser		02/06/2021
Rev 3	J Harman	M Roser	M Roser		05/08/2021
Rev 4	J Harman	M Roser	M Roser		12/10/2021
Rev 5	JLamb	TWills	CForrest		30/11/2022

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