TREE SURVEY
ARBORICULTURAL CONSULTANTS

ARBORICULTURAL IMPACT ASSESSMENT & TREE PROTECTION PLAN

Thornleigh Station Upgrade
Transport Access Program (TAP)

Version 1

Prepared for:

EMM Consulting Pty Ltd

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Document information

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Prepared by:	 **Phil Witten** Principal Arboricultural Consultant Registered Consulting Arborist No. 2458 AQF 5 | ISA | SRA-ANZ | AA | TRAQ | Adv.QTRA
Contact details:	☎ 0425 536 670 ✉ phil@treesurvey.com.au 💻 www.treesurvey.com.au

Document status

Document status	Date	Revision description
Draft v1	30/11/20	Draft issue for client review
Version 1	04/01/21	Final version

Abbreviations

Abbreviation	Description
AQF	Australian Qualifications Framework
AS	Australian Standards
DBH	Diameter at Breast Height
Id	Identification
m	Metre
mm	Millimetre
NDE	Non-Destructive Excavation
NO	Number
NSW	New South Wales
sp.	Species
SRZ	Structural Root Zone
TPZ	Tree Protection Zone
VTA	Visual Tree Assessment

Contents

1 Background

1.1 Introduction

Tree Survey was commissioned by EMM Consulting Pty Ltd to prepare an Arboricultural Impact Assessment (AIA) and Tree Protection Plan (TPP) for the proposed upgrade of Thornleigh Station. The upgrade is part of the Transport Access Program (TAP).

The purpose of this report is to:

- Identify the trees within and adjacent to the proposed disturbance footprint.
- Assess the current health and condition of the subject trees.
- Assess the potential impacts of the development on the subject trees.
- Evaluate the significance of the subject trees and assess their suitability for retention.

1.2 The proposal

The proposal involves an upgrade of Thornleigh Station, which would improve accessibility and amenities for customers. Key features of the proposal are summarised below:

- Construction and installation of three new passenger lifts, including lift landings with canopies for weather protection at the waiting areas.
- Modifications to the existing footbridge and stairs to accommodate new lift landings, including upgrades to tactiles, nosings, stair treads, and handrails as required on Platforms 1/2 and Platform 3.
- New stairs to enable lift construction on Railway Parade, including demolition of existing stairs.
- New interchange zone on Railway Parade including walkway regrading, kerb widening, an accessible car parking space, and an accessible kiss and ride.
- Construction of an accessible kiss and ride and one accessible car space on Railway Parade.
- Improved footpaths for pedestrian access from both Railway Parade and The Esplanade entrances.
- A proposed interchange zone including a new bus stop and shelter at The Esplanade, seating, and bike hoops.
- Accessible parking spaces in the commuter car park.
- BAZ canopy on Platform 3.
- Lowering of the waiting areas on Platforms 1, 2, and Platform 3.
- Provision of a Family Accessible Toilet and unisex Ambulant Toilet on Platform ½.
- Ancillary work including services relocation and/or adjustments, including lighting and communications systems (e.g., CCTV), stormwater drainage, line marking, retaining walls, and overhead wiring.
- Electrical upgrades.
- Landscaping and revegetation throughout the site area.

1.3 Documents and plans referenced

The conclusions and recommendations of this report are based on the Australian Standard, AS 4970-2009, Protection of Trees on Development Sites, the findings from the site inspections, and analysis of the following documents/plans:

- Site Survey Plan provided by EMM as a DWG file.
- Site Layout Plan provided by EMM as a DWG file.

The survey and site plan have been used as map layers in the **Arboricultural Impact Assessment** and **Tree Protection Plan**.

1.4 The subject trees

The subject trees were inspected on the 18th and 23rd of November 2020. A total of **57** trees were assessed and included in this report. The subject trees were assessed in accordance with a visual tree assessment (VTA) as formulated by Mattheck & Breloer (1994)[1], and practices consistent with modern arboriculture. The following limitations apply to this methodology:

- Trees were inspected from ground level, without the use of any invasive or diagnostic tools and testing. Trees within adjacent properties or restricted areas were not subject to a complete visual inspection (i.e., defects and abnormalities may be present but not recorded).
- Diameter at breast height (DBH) has been accurately measured using a diameter tape (where access to the trees was available). Tree height and canopy spread were estimated unless otherwise stated.
- Tree protection zones have been calculated in accordance with Australian Standard, AS 4970-2009, Protection of Trees on Development Sites using the DBH measurements.

A tree retention assessment has been undertaken in accordance with the Institute of Australian Consulting Aboriculturalists (IACA) Significance of a Tree, Assessment Rating System (see **Appendices**). Further information, observations, and measurements specific to each of the subject trees can be found in **Chapter 3**.

[1] VTA is an internationally recognised practice in the visual assessment of trees as formulated by Mattheck & Breloer (1994). Principle explanations and illustrations are contained within the publication, Field Guide for Visual Tree Assessment by Mattheck, C., and Breloer, H. Arboricultural Journal, Vol 18 pp 1-23 (1994).

2 Arboricultural Impact Assessment (AIA)

2.1 Impact assessment

There are two types of zones (as defined by AS 4970-2009) that need to be considered when undertaking an arboricultural impact assessment:

- **Tree protection zone (TPZ):** The TPZ is the optimal combination of crown and root area (as defined by AS 4970-2009) that requires protection during the construction process so that the tree can remain viable. The TPZ is calculated by measuring the diameter at breast height (DBH) and multiplying it by twelve (12). The resulting value is applied as a radial measurement from the centre of the trunk to delineate the TPZ.
- **Structural root zone (SRZ):** The SRZ is the area of the root system used for stability, mechanical support, and anchorage of the tree.

Encroachment within the TPZ is acceptable, providing that the arborist can demonstrate that the tree will remain viable. There are three (3) levels of encroachment (as defined by AS 4970-2009):

- **No encroachment (0%): No encroachment within the TPZ.**
- **Minor encroachment (<10%): The encroachment is less than 10% of the TPZ.**
- **Major encroachment (>10%): The encroachment is greater than 10% of the TPZ.**

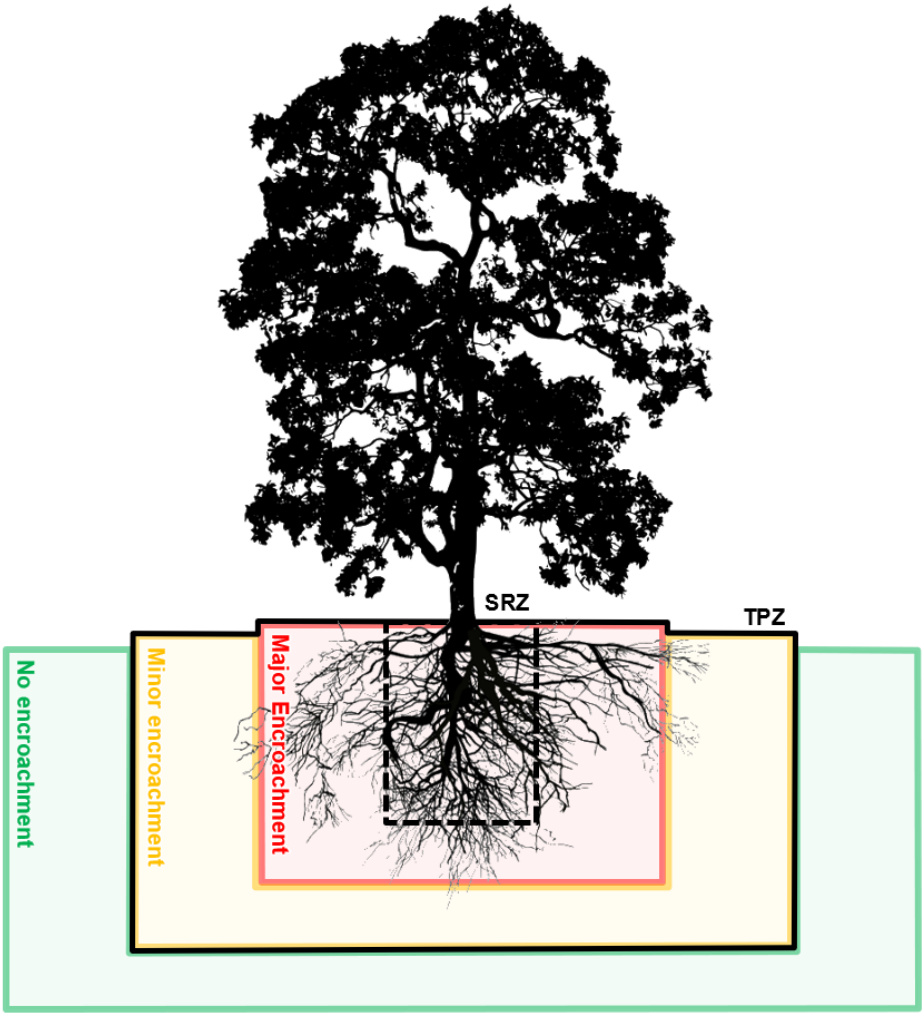

Figure 1: Indicative zones of encroachment within the TPZ

2.2 Mitigating the impacts

Encroachment within the TPZ should be compensated with a range of mitigation measures to ensure that impacts to the subject tree(s) are reduced or restricted wherever possible. Mitigation should be increased relative to the level of encroachment within the TPZ to ensure the subject tree(s) remain viable. The table below outlines requirements under AS 4970-2009, and mitigation measures required within each category of encroachment. These mitigation measures will only apply if trees are proposed to be retained.

Table 1: Mitigation measures

Encroachment	Mitigation Measures
No encroachment (0%)	• N/A
Minor encroachment (<10%)	• The area lost to this encroachment should be compensated for elsewhere, contiguous with the TPZ. • Detailed root investigations should not be required. • Tree protection must be installed.
Major encroachment (>10%)	• The project arborist must demonstrate the tree(s) would remain viable. • Root investigation by non-destructive methods may be required for any trees proposed for retention. • Consideration of relevant factors, including root location and distribution, tree species, condition, site constraints, and design factors. • The area lost to this encroachment should be compensated for elsewhere, contiguous with the TPZ. • The project arborist will be required to supervise any works within the TPZ. • Tree protection must be installed.

3 Results

Table 2 shows the results of the arboricultural assessment. The assessment criteria for tree significance, life expectancy, and priority for retention can be found in **Appendix I**. A summary of the proposed impacts are outlined below:

3.1 No encroachment

A total of **43** trees will be subject to no encroachment within the TPZ:

- **Retain:** A total of **43** trees are located outside of the proposed construction footprint. No impacts on these trees are foreseeable under the current proposal.
- **Remove:** No trees within the category of “no encroachment” are proposed to be removed.

3.2 Minor encroachment

A total of **4** trees will be subject to a minor encroachment of less than 10% within the TPZ:

- **Retain:** A total of **4** trees **(Tree 4, 16, 36, 38)** are located adjacent to the construction footprint. These trees will be subject to a minor encroachment of less than 10% within the TPZ. The encroachment is unlikely to impact the overall health or condition of these trees. Under the current proposal, these trees can be successfully retained.
- **Remove:** No trees within the category of “minor encroachment” are proposed to be removed.

3.3 Major encroachment

A total of **10** trees will be subject to a major encroachment of greater than 10% within the TPZ:

- **Retain:** A total of **3** trees **(Tree 1, 2, 3)** will be subject to a major encroachment within the TPZ. The encroachment is a result of the conflict between the TPZ and the disturbance footprint. This encroachment is considered to be a low impact encroachment for the following reasons:
  - The encroachment only impacts a small area of the TPZ.
  - The encroachment will comprise of low impact grading and landscaping work, which can be easily mitigated during the construction phase.

  Several site-specific mitigations for these encroachments have been outlined in **Chapter 4**. Under the current proposal, these trees can be successfully retained.
- **Remove:** A total of **7** trees **(Tree 17, 18, 19, 20, 21, 25, 26)** will be subject to a major encroachment within the TPZ. These trees are located within or directly adjacent to the construction footprint and cannot be retained under the current proposal.

3.4 Vegetation trimming

- Minor vegetation trimming may be required to accommodate site access and construction clearances. The locations for potential trimming are shown in the **Arboricultural Impact Assessment Maps**. Pruning specifications for these areas are outlined below:
  - Pruning must not exceed 10% of the overall canopy volume.

- No limbs greater than 150mm in diameter are to be removed.
- The final pruning cut shall be at the branch collar in accordance with AS4373-2007.

Table 2: Results of the arboricultural assessment

Id.	Botanical name	Height (metres)	Spread (metres diameter)	Health	Structure	Age class	Tree significance	Useful life expectancy	Priority for retention	DBH 1 (millimetres diameter)	DBH 2 (millimetres diameter)	DBH 3 (millimetres diameter)	DBH Combined (millimetres diameter)	DRB (millimetres diameter)	TPZ (metres radius)	SRZ (metres radius)	Encroachment	% Encroachment within TPZ	Other notes	Proposal
1	*Eucalyptus saligna*	32	16	Good	Good	Mature	High	Medium	High	800	-	-	800	850	9.6	3.1	**Major**	**12%**	The tree will be impacted by alterations to the footbridge and walkway	**Retain**
2	*Eucalyptus saligna*	32	16	Good	Good	Mature	High	Medium	High	800	-	-	800	850	9.6	3.1	**Major**	**12%**	The tree will be impacted by alterations to the footbridge and walkway	**Retain**
3	*Melia azedarach*	5	4	Good	Good	Semi-mature	Low	Medium	Low	150	-	-	150	150	2.0	1.5	**Major**	**23%**	The tree will be impacted by alterations to the footbridge and walkway	**Retain**
4	*Melia azedarach*	5	4	Good	Good	Semi-mature	Low	Medium	Low	150	-	-	150	150	2.0	1.5	**Minor**	**1%**	The tree will be impacted by alterations to the footbridge and walkway	**Retain**
5	*Syncarpia glomulifera*	7	4	Good	Good	Semi-mature	Medium	Medium	Medium	350	-	-	350	400	4.2	2.3	**No**	**0%**		**Retain**
6	*Corymbia citriodora*	10	4	Good	Good	Semi-mature	Medium	Medium	Medium	200	150	-	300	350	3.6	2.1	**No**	**0%**		**Retain**
7	*Acer negundo*	12	8	Good	Good	Mature	Medium	Medium	Medium	400	-	-	400	450	4.8	2.4	**No**	**0%**		**Retain**
8	*Casuarina glauca*	10	3	Good	Good	Semi-mature	Medium	Medium	Medium	150	150	-	200	200	2.4	1.7	**No**	**0%**		**Retain**
9	*Casuarina glauca*	22	8	Good	Good	Mature	Medium	Medium	High	700	-	-	700	750	8.4	2.9	**No**	**0%**		**Retain**
10	*Brachychiton acerifolius*	7	3	Good	Good	Semi-mature	Medium	Medium	Medium	150	150	100	200	200	2.4	1.7	**No**	**0%**		**Retain**
11	*Pinus radiata*	20	18	Good	Good	Mature	Medium	Medium	Medium	700	-	-	700	750	8.4	2.9	**No**	**0%**		**Retain**
12	*Betula pendula*	4	5	Fair	Fair	Semi-mature	Low	Medium	Low	200	-	-	200	200	2.4	1.7	**No**	**0%**		**Retain**
13	*Cinnamomum camphora*	4	3	Good	Fair	Semi-mature	Low	Medium	Low	150	-	-	150	150	2.0	1.5	**No**	**0%**		**Retain**
14	*Cinnamomum camphora*	4	3	Good	Fair	Semi-mature	Low	Medium	Low	150	-	-	150	150	2.0	1.5	**No**	**0%**		**Retain**
15	*Pittosporum undulatum*	4	3	Good	Fair	Semi-mature	Low	Medium	Low	250	-	-	250	300	3.0	2.0	**No**	**0%**		**Retain**
16	*Liquidambar styraciflua*	20	22	Good	Fair	Mature	Medium	Medium	Medium	750	-	-	750	800	9.0	3.0	**Minor**	**7%**	The tree will be impacted by alterations to car parking spaces	**Retain**
17	*Ligustrum lucidum*	5	4	Good	Fair	Semi-mature	Low	Medium	Low	350	-	-	350	400	4.2	2.3	**Major**	**10%**	The tree will be impacted by alterations to car parking spaces	**Remove**
18	*Cinnamomum camphora*	4	1	Good	Fair	Juvenile	Low	Medium	Low	100	-	-	100	100	2.0	1.5	**Major**	**32%**	The tree will be impacted by alterations to car parking spaces	**Remove**
19	*Cinnamomum camphora*	5	2	Good	Fair	Juvenile	Low	Medium	Low	150	-	-	150	150	2.0	1.5	**Major**	**36%**	The tree will be impacted by alterations to car parking spaces	**Remove**
20	*Cinnamomum camphora*	5	2	Good	Fair	Juvenile	Low	Medium	Low	150	-	-	150	150	2.0	1.5	**Major**	**64%**	The tree will be impacted by alterations to car parking spaces	**Remove**
21	*Brachychiton acerifolius*	5	2	Good	Good	Semi-mature	Low	Medium	Low	150	-	-	150	150	2.0	1.5	**Major**	**57%**	The tree will be impacted by alterations to car parking spaces	**Remove**
22	*Cinnamomum camphora*	4	4	Good	Fair	Semi-mature	Low	Medium	Low	100	100	100	200	200	2.4	1.7	**No**	**0%**		**Retain**
23	*Melaleuca quinquenervia*	4	2	Good	Good	Semi-mature	Medium	Medium	Medium	100	100	100	200	200	2.4	1.7	**No**	**0%**		**Retain**
24	*Melaleuca quinquenervia*	4	2	Good	Good	Semi-mature	Medium	Medium	Medium	100	100	100	200	200	2.4	1.7	**No**	**0%**		**Retain**
25	*Melaleuca quinquenervia*	6	4	Good	Good	Semi-mature	Medium	Medium	Medium	200	150	-	300	350	3.6	2.1	**Major**	**51%**	The tree will be impacted by alterations to the footbridge and walkway	**Remove**
26	*Cinnamomum camphora*	6	3	Fair	Fair	Semi-mature	Low	Medium	Low	150	-	-	150	150	2.0	1.5	**Major**	**94%**	The tree will be impacted by alterations to the footbridge and walkway	**Remove**
27	*Acacia baileyana*	3	3	Fair	Fair	Juvenile	Low	Short	Low	100	-	-	100	100	2.0	1.5	**No**	**0%**		**Retain**

Id.	Botanical name	Height (metres)	Spread (metres diameter)	Health	Structure	Age class	Tree significance	Useful life expectancy	Priority for retention	DBH 1 (millimetres diameter)	DBH 2 (millimetres diameter)	DBH 3 (millimetres diameter)	DBH Combined (millimetres diameter)	DRB (millimetres diameter)	TPZ (metres radius)	SRZ (metres radius)	Encroachment	% Encroachment within TPZ	Other notes	Proposal
28	*Acacia baileyana*	3	3	Fair	Fair	Juvenile	Low	Short	Low	100	-	-	100	100	2.0	1.5	**No**	**0%**		**Retain**
29	*Acacia baileyana*	3	3	Fair	Fair	Juvenile	Low	Short	Low	100	-	-	100	100	2.0	1.5	**No**	**0%**		**Retain**
30	*Acacia baileyana*	3	3	Fair	Fair	Juvenile	Low	Short	Low	100	-	-	100	100	2.0	1.5	**No**	**0%**		**Retain**
31	*Acacia baileyana*	3	3	Fair	Fair	Juvenile	Low	Short	Low	100	-	-	100	100	2.0	1.5	**No**	**0%**		**Retain**
32	*Acacia baileyana*	3	3	Fair	Fair	Juvenile	Low	Short	Low	100	-	-	100	100	2.0	1.5	**No**	**0%**		**Retain**
33	*Acacia baileyana*	3	3	Fair	Fair	Juvenile	Low	Short	Low	100	-	-	100	100	2.0	1.5	**No**	**0%**		**Retain**
34	*Acacia baileyana*	3	3	Fair	Fair	Juvenile	Low	Short	Low	100	-	-	100	100	2.0	1.5	**No**	**0%**		**Retain**
35	*Eucalyptus pilularis*	7	4	Good	Good	Semi-mature	Medium	Medium	Medium	350	-	-	350	400	4.2	2.3	**No**	**0%**		**Retain**
36	*Lophostemon confertus*	22	18	Good	Good	Mature	High	Medium	High	800	-	-	800	850	9.6	3.1	**Minor**	**3%**	The tree will be impacted by alterations to the bus stop	**Retain**
37	*Lophostemon confertus*	22	12	Good	Good	Mature	High	Medium	High	600	-	-	600	650	7.2	2.8	**No**	**0%**		**Retain**
38	*Lophostemon confertus*	22	16	Good	Good	Mature	High	Medium	High	700	-	-	700	750	8.4	2.9	**Minor**	**3%**	The tree will be impacted by alterations to the footbridge and walkway	**Retain**
39	*Eucalyptus resinifera*	26	12	Poor	Poor	Over-mature	Medium	Short	Low	450	-	-	450	500	5.4	2.5	**No**	**0%**		**Retain**
40	*Eucalyptus resinifera*	30	10	Good	Good	Mature	High	Medium	High	400	-	-	400	450	4.8	2.4	**No**	**0%**		**Retain**
41	*Eucalyptus resinifera*	30	14	Good	Good	Mature	High	Medium	High	550	-	-	550	600	6.6	2.7	**No**	**0%**		**Retain**
42	*Lophostemon confertus*	24	8	Good	Good	Mature	High	Medium	High	500	-	-	500	550	6.0	2.6	**No**	**0%**		**Retain**
43	*Lophostemon confertus*	23	8	Good	Good	Mature	High	Medium	High	450	-	-	450	500	5.4	2.5	**No**	**0%**		**Retain**
44	*Lophostemon confertus*	22	8	Good	Good	Mature	High	Medium	High	600	-	-	600	650	7.2	2.8	**No**	**0%**		**Retain**
45	*Lophostemon confertus*	20	8	Good	Good	Mature	High	Medium	High	750	-	-	750	800	9.0	3.0	**No**	**0%**		**Retain**
46	*Lophostemon confertus*	22	8	Good	Good	Mature	High	Medium	High	550	-	-	550	600	6.6	2.7	**No**	**0%**		**Retain**
47	*Lophostemon confertus*	20	8	Good	Good	Mature	High	Medium	High	650	-	-	650	700	7.8	2.8	**No**	**0%**		**Retain**
48	*Lophostemon confertus*	22	8	Good	Good	Mature	High	Medium	High	500	-	-	500	550	6.0	2.6	**No**	**0%**		**Retain**
49	*Lophostemon confertus*	20	8	Good	Good	Mature	High	Medium	High	400	-	-	400	450	4.8	2.4	**No**	**0%**		**Retain**
50	*Lophostemon confertus*	20	8	Good	Good	Mature	High	Medium	High	400	-	-	400	450	4.8	2.4	**No**	**0%**		**Retain**
51	*Lophostemon confertus*	20	8	Good	Good	Mature	High	Medium	High	550	-	-	550	600	6.6	2.7	**No**	**0%**		**Retain**
52	*Lophostemon confertus*	4	3	Good	Good	Juvenile	Low	Medium	Medium	150	-	-	150	150	2.0	1.5	**No**	**0%**		**Retain**
53	*Lophostemon confertus*	20	8	Good	Good	Mature	High	Medium	High	350	-	-	350	400	4.2	2.3	**No**	**0%**		**Retain**
54	*Lophostemon confertus*	20	8	Good	Good	Mature	High	Medium	High	500	-	-	500	550	6.0	2.6	**No**	**0%**		**Retain**
55	*Eucalyptus pilularis*	22	10	Good	Good	Mature	High	Medium	High	600	-	-	600	650	7.2	2.8	**No**	**0%**		**Retain**

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56	*Acacia sp.*	3	3	Fair	Fair	Juvenile	Low	Medium	Low	100	-	-	100	100	2.0	1.5	**No**	**0%**		**Retain**
57	*Casuarina glauca*	6	2	Good	Fair	Juvenile	Low	Medium	Low	150	-	-	150	150	2.0	1.5	**No**	**0%**		**Retain**


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The subject trees
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Major encroachment
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SRZ (dashed line)
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Pavement resurfacing
Vegetation trimming
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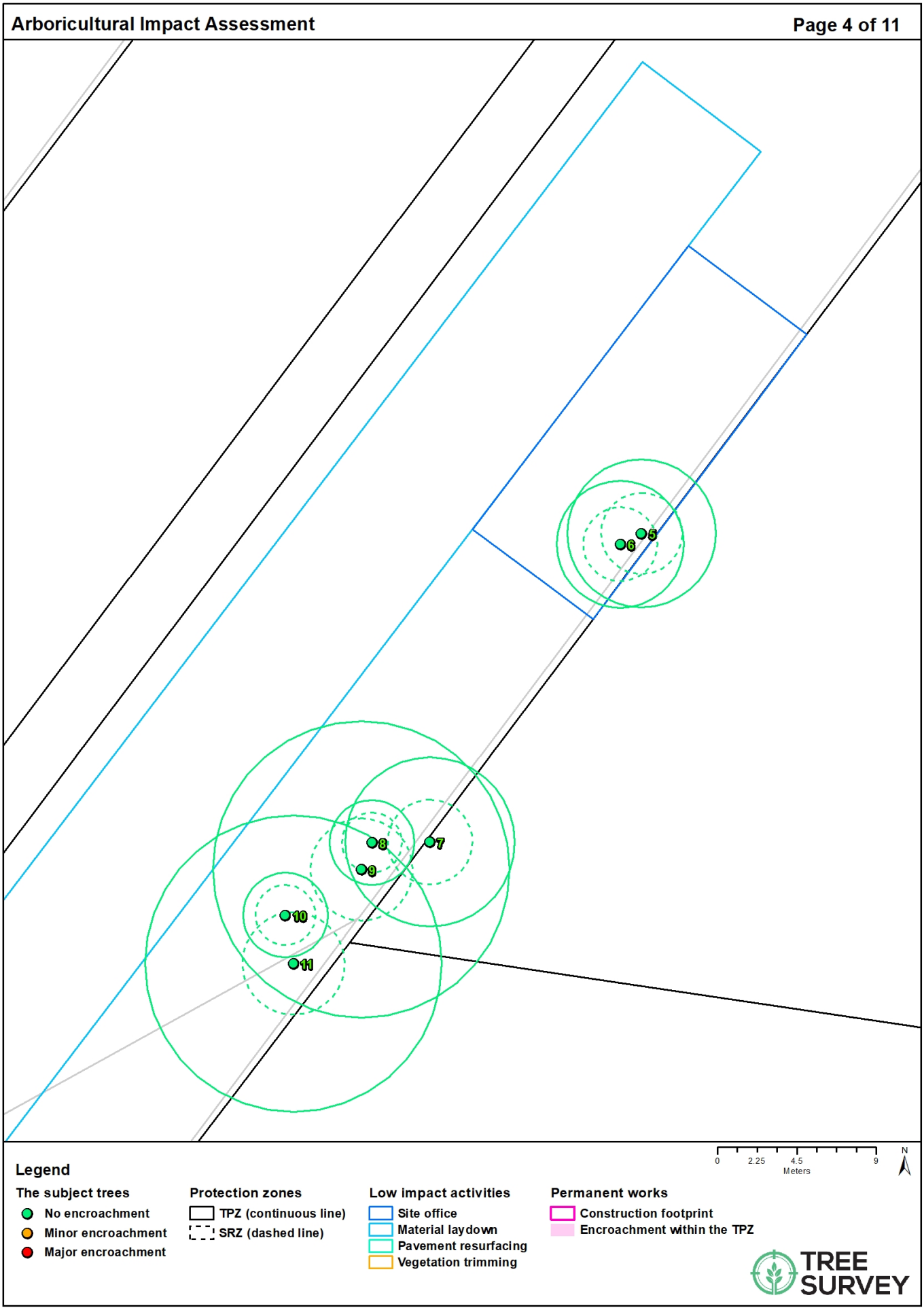
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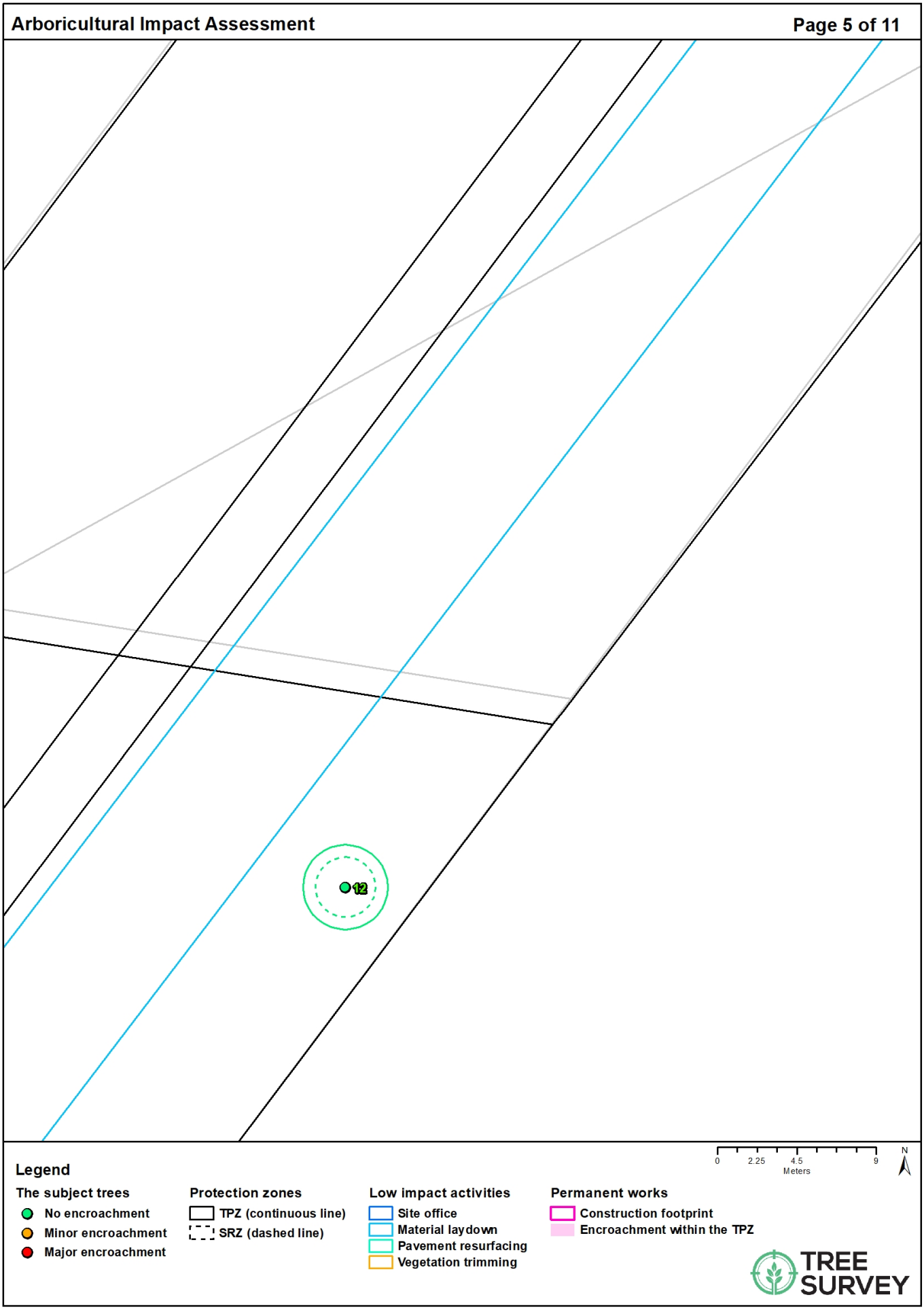
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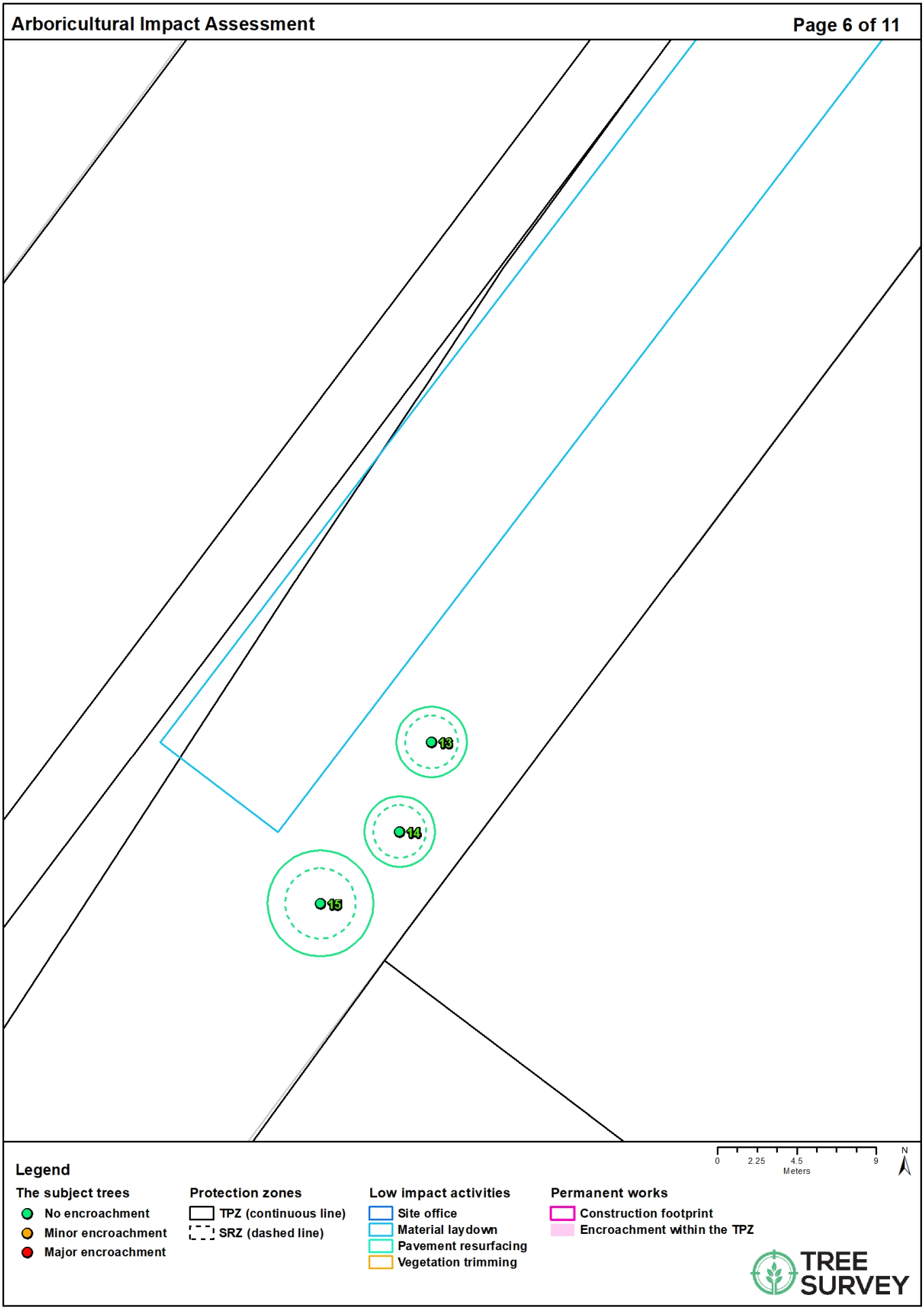
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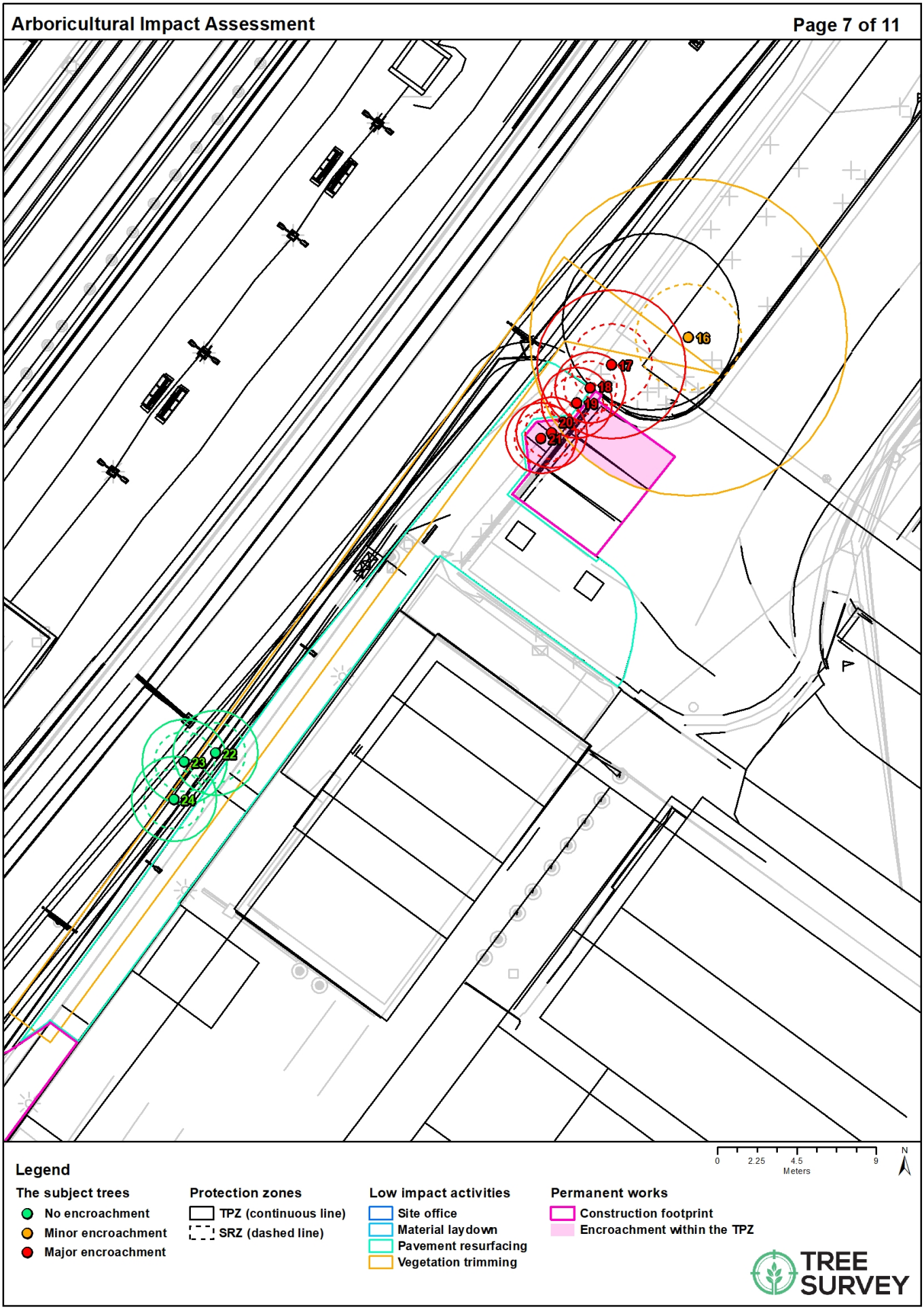
Vegetation trimming
Permanent works
Construction footprint
Encroachment within the TPZ
TREE SURVEY


Arboricultural Impact Assessment
Page 7 of 11
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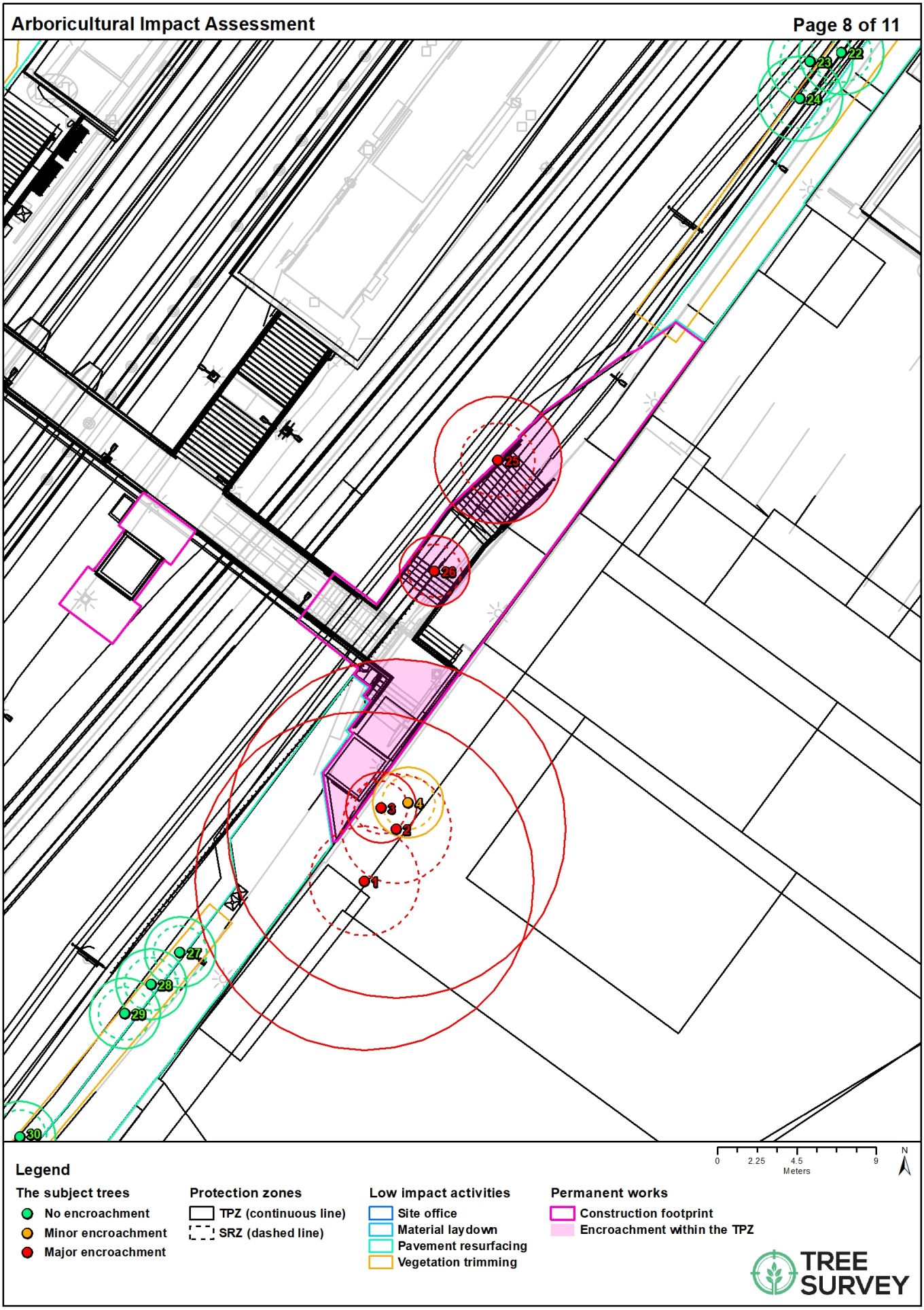
The subject trees
No encroachment
Minor encroachment
Major encroachment
Protection zones
TPZ (continuous line)
SRZ (dashed line)
Low impact activities
Site office
Material laydown
Pavement resurfacing
Vegetation trimming
Permanent works
Construction footprint
Encroachment within the TPZ
TREE SURVEY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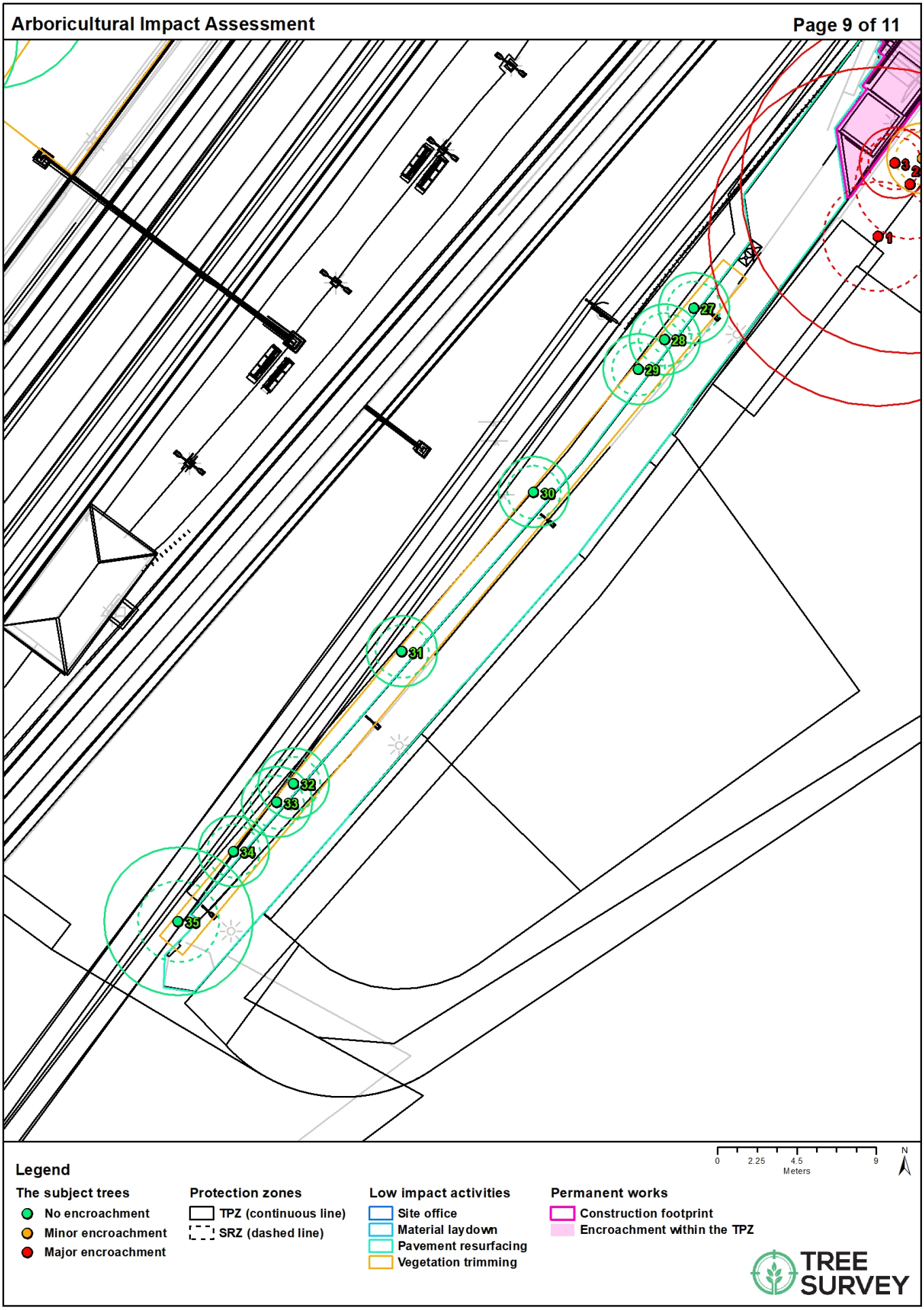
The subject trees
No encroachment
Minor encroachment
Major encroachment
Protection zones
TPZ (continuous line)
SRZ (dashed line)
Low impact activities
Site office
Material laydown
Pavement resurfacing
Vegetation trimming
Permanent works
Construction footprint
Encroachment within the TPZ
TREE SURVEY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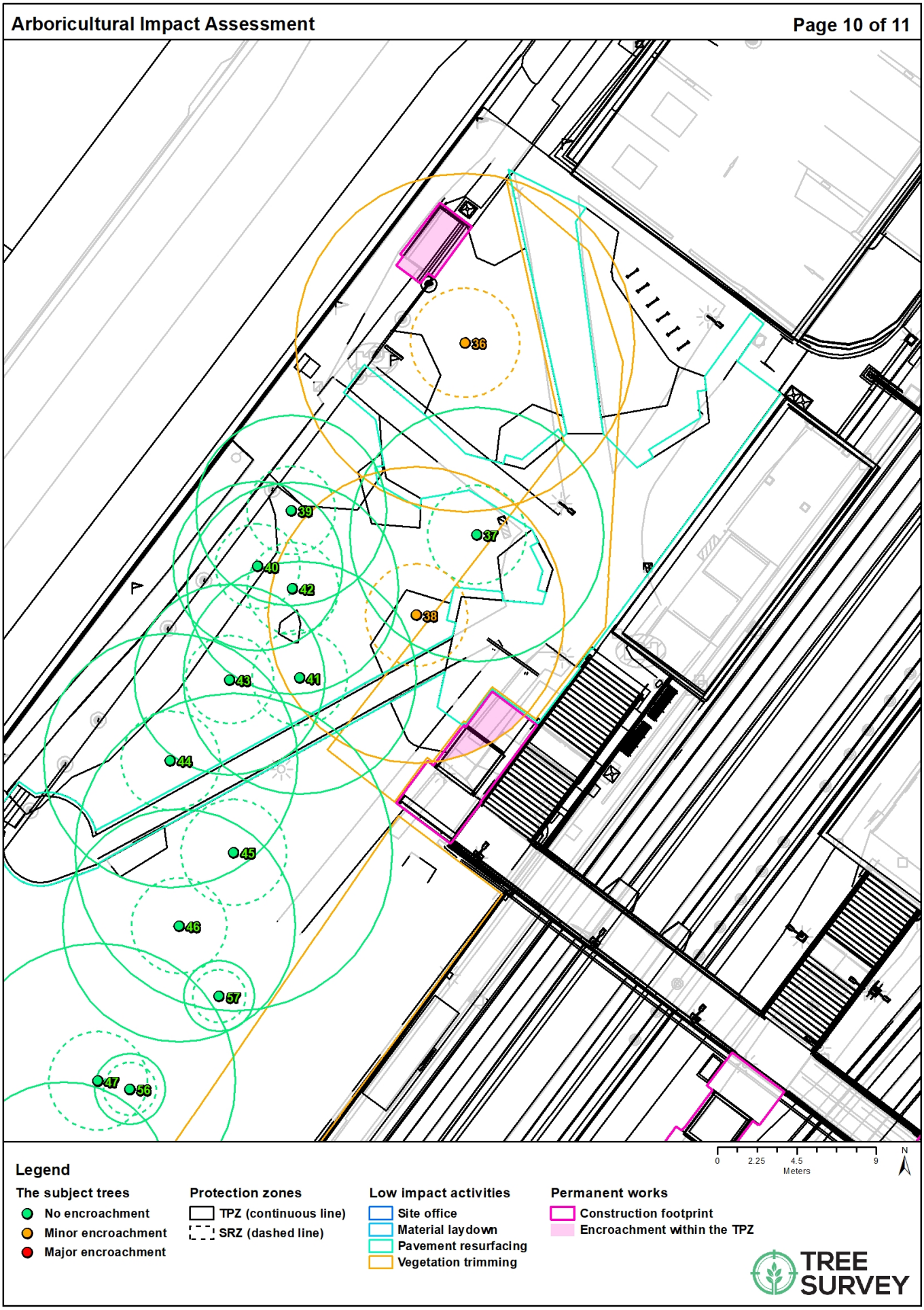
The subject trees
No encroachment
Minor encroachment
Major encroachment
Protection zones
TPZ (continuous line)
SRZ (dashed line)
Low impact activities
Site office
Material laydown
Pavement resurfacing
Vegetation trimming
Permanent works
Construction footprint
Encroachment within the TPZ
TREE SURVEY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Page 10 of 11
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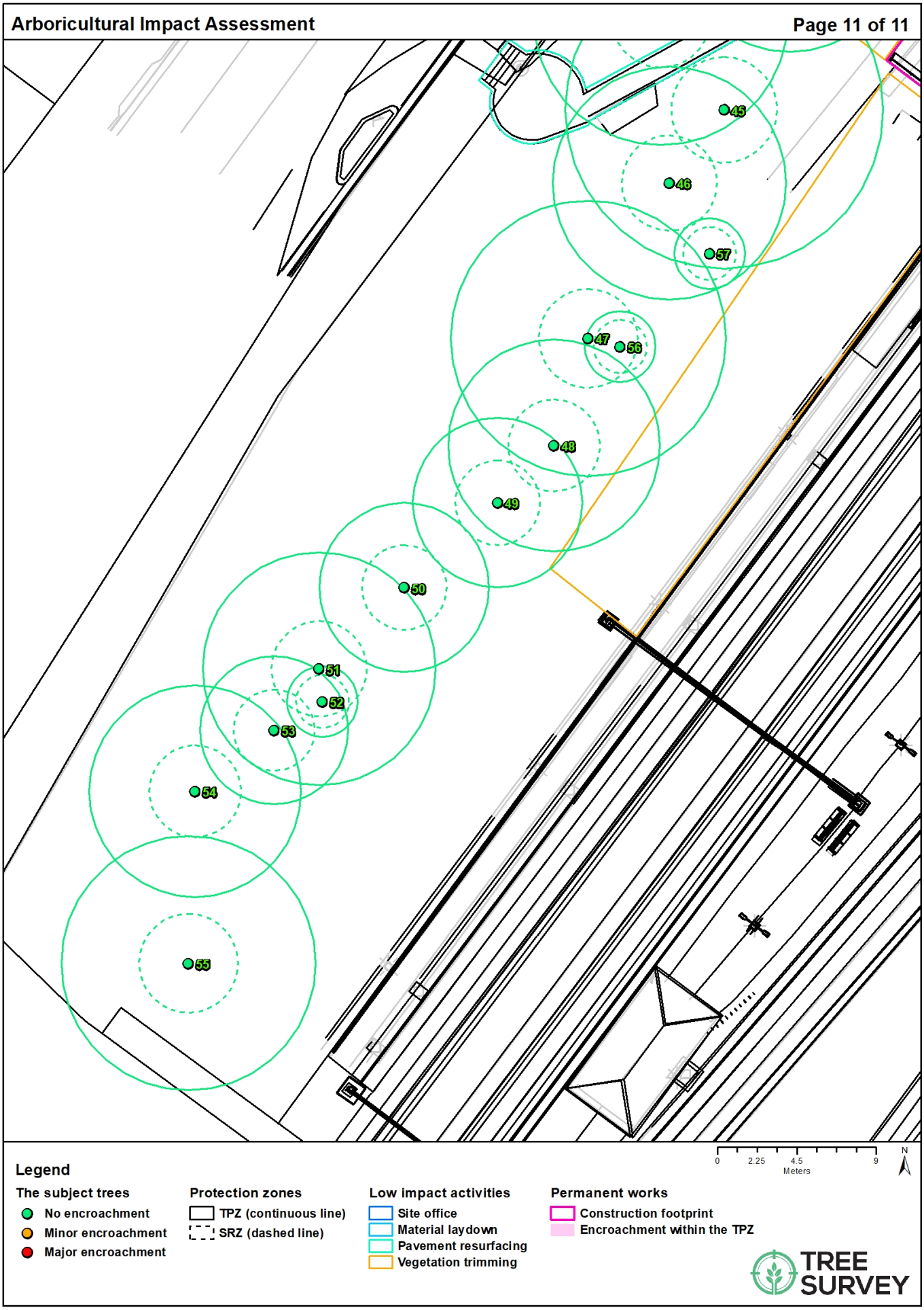
The subject trees
No encroachment
Minor encroachment
Major encroachment
Protection zones
TPZ (continuous line)
SRZ (dashed line)
Low impact activities
Site office
Material laydown
Pavement resurfacing
Vegetation trimming
Permanent works
Construction footprint
Encroachment within the TPZ
TREE SURVEY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Page 11 of 11
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The subject trees
No encroachment
Minor encroachment
Major encroachment
Protection zones
TPZ (continuous line)
SRZ (dashed line)
Low impact activities
Site office
Material laydown
Pavement resurfacing
Vegetation trimming
Permanent works
Construction footprint
Encroachment within the TPZ
TREE SURVEY

4 Tree Protection Measures

The following section provides measures that are to be adopted in site establishment, construction, and following construction.

4.1 Standard tree protection measures

Trees proposed for retention: A total of **50** trees are proposed for retention. The following recommendations apply to these trees:

- **Tree protection fencing:** Tree protection fencing must be established at the locations shown in the tree protection plan (see Figures below, labeled pages 1 to 11). Existing fencing, site hoarding, or structures (such as a wall or building) may be used as tree protection fencing, providing the TPZ remains isolated from the construction footprint. Specifications for the tree protection fencing are as follows:
    - Temporary mesh panel fencing (minimum height of 1.8m).
    - Installed prior to site establishment and remain intact until the completion of works.
    - Protective fencing must not be removed or altered without the approval of the project arborist.
    - Prominently signposted with 300mm x 450mm boards stating, “NO ACCESS - TREE PROTECTION ZONE.”
    - Certified and inspected by the project arborist.

    Where approved works are required within the TPZ, fencing may be setback to provide construction access. Trunk, branch, and ground protection shall be installed and must comply with Australian Standard, AS 4970-2009, Protection of Trees on Development Sites. Any additional construction activities within the TPZ of the subject trees must be assessed and approved by the project arborist.
- **Restricted activities within the TPZ:** The TPZ is an area that is isolated from the work zone to ensure no disturbance or encroachment occurs in this zone. Activities generally excluded from the TPZ (**unless otherwise approved under the development consent**) include, but are not limited to:
    - Machine excavation and trenching.
    - Ripping or cultivation of the soil.
    - Storage of building materials, waste, and waste receptacles.
    - Disposal of waste materials and chemicals including; paint, solvents, cement slurry, fuel, oil, and other toxic liquids.
    - Movement and storage of plant, equipment, and vehicles.
    - Soil level changes, including the placement of fill material.
    - Mechanical removal of vegetation.
    - Affixing of signage or hoardings to trees.
    - Other physical damage to the trunk or root system.
    - Any other activity likely to cause damage to the tree.

- **Site inspections:** In accordance with the Australian Standard, AS 4970-2009, Protection of Trees on Development Sites, inspections must be conducted by the project arborist at the following key project stages:
    - **Prior to construction:** Prior to any work commencing on-site (including demolition, earthworks, or site clearing) and following the installation of tree protection.
    - **During construction:** A minimum of once per month during the construction phase.
    - **After construction:** After all major construction has ceased, following the removal of tree protection.

4.2 Site-specific tree protection measures

The following tree protection measures relate specifically to **Tree 1, 2, 3, 4, 16, 36,** and **38:**

- **Arborist supervision:** Excavations within the tree protection zone should be carried out under the supervision of the project arborist (see **Tree Protection Plan**).
- **Root pruning:** Any conflicting roots (<50mm in diameter) identified during the supervised excavations shall be pruned using clean, sharp secateurs or a pruning saw to ensure a clean cut, free from tears. All root pruning must be documented and carried out by the project arborist.
- **Excavations:** No over-excavation, battering, or benching shall be undertaken beyond the footprint of any structure unless approved by the project arborist

4.3 Vegetation trimming

Minor vegetation trimming may be required to accommodate site access and construction clearances. Pruning specifications for these areas are outlined below:

- Pruning must not exceed 10% of the overall canopy volume.
- No limbs greater than 150mm in diameter are to be removed.
- The final pruning cut shall be at the branch collar in accordance with AS4373-2007.
- All tree pruning work is to be carried out by an arborist with a minimum AQF Level 3 qualification in Arboriculture, in accordance with *Australian Standard AS 4373-2007, Pruning of Amenity Trees* and the *NSW WorkCover Code of Practice for the Amenity Tree Industry (1998).*

If proposed vegetation trimming does not meet the specifications outlined above, the project arborist must undertake an assessment of impacts on a case by case basis.

4.4 Trees proposed for removal

Trees proposed for removal: A total of **7** trees are proposed for removal. All trees will require offsetting in accordance with the Transport for NSW Vegetation Offset Guide (DMS-SD-087). A total of eighteen (18) replacement trees are required to be planted in accordance with this guideline.

All tree removal work is to be carried out by an arborist with a minimum AQF Level 3 qualification in Arboriculture, in accordance with Australian Standard AS 4373-2007, Pruning of Amenity Trees, the Work Health and Safety Act 2011, and Work Health and Safety Regulations 2017.


Tree Protection Plan
Page 1 of 11
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The subject trees
Retain (50)
Remove (7)
Protection zones
TPZ (continuous line)
SRZ (dashed line)
Tree protection measures
Arborist supervision
Tree protection fence
TREE SURVEY

Tree Protection Plan

Legend

The subject trees
- Retain (50)
- Remove (7)

Protection zones
- TPZ (continuous line)
- SRZ (dashed line)

Tree protection measures
- Arborist supervision
- Tree protection fence

TREE SURVEY


Tree Protection Plan
Page 3 of 11
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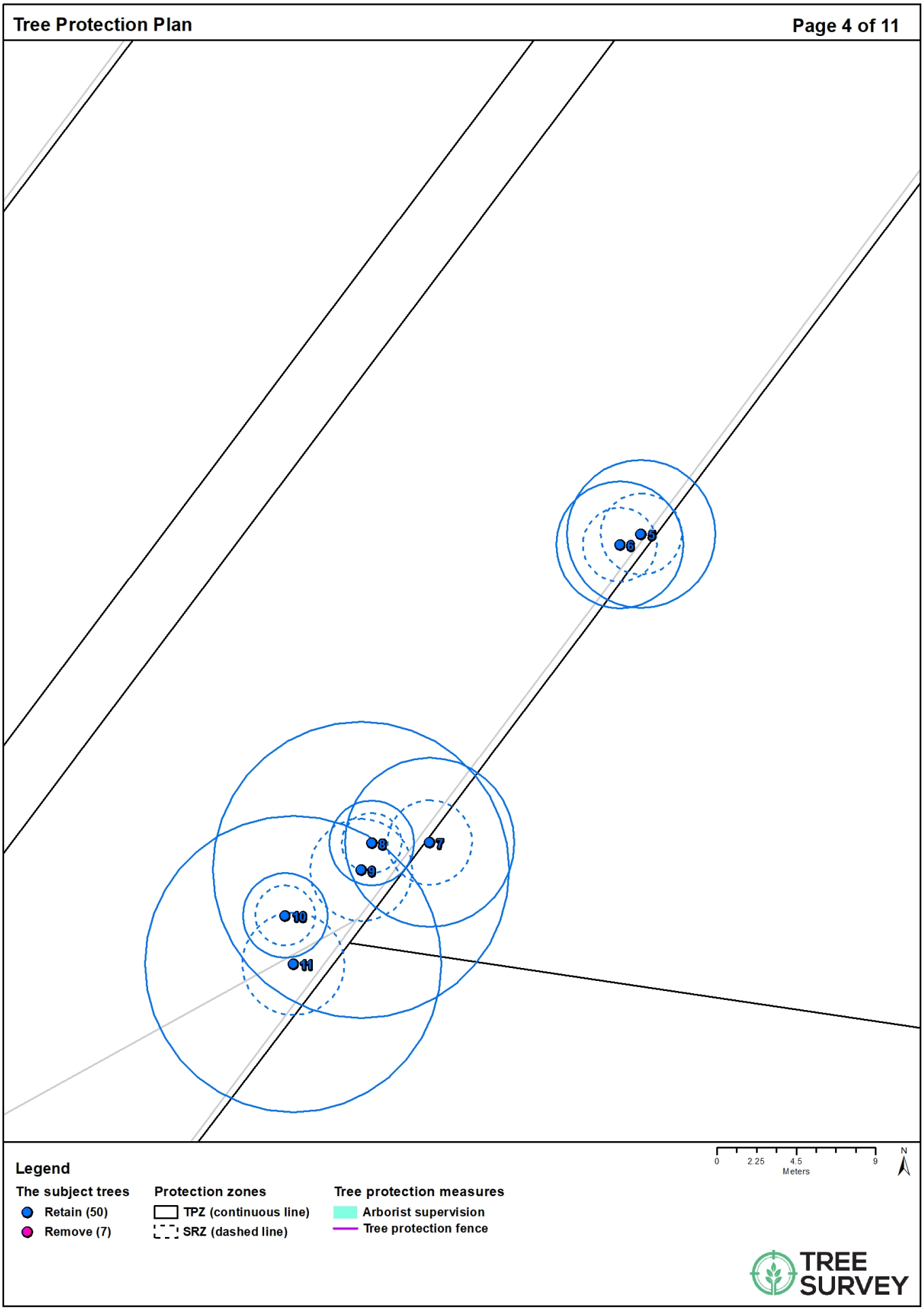
The subject trees
Retain (50)
Remove (7)
Protection zones
TPZ (continuous line)
SRZ (dashed line)
Tree protection measures
Arborist supervision
Tree protection fence
TREE SURVEY


Tree Protection Plan
Page 4 of 11
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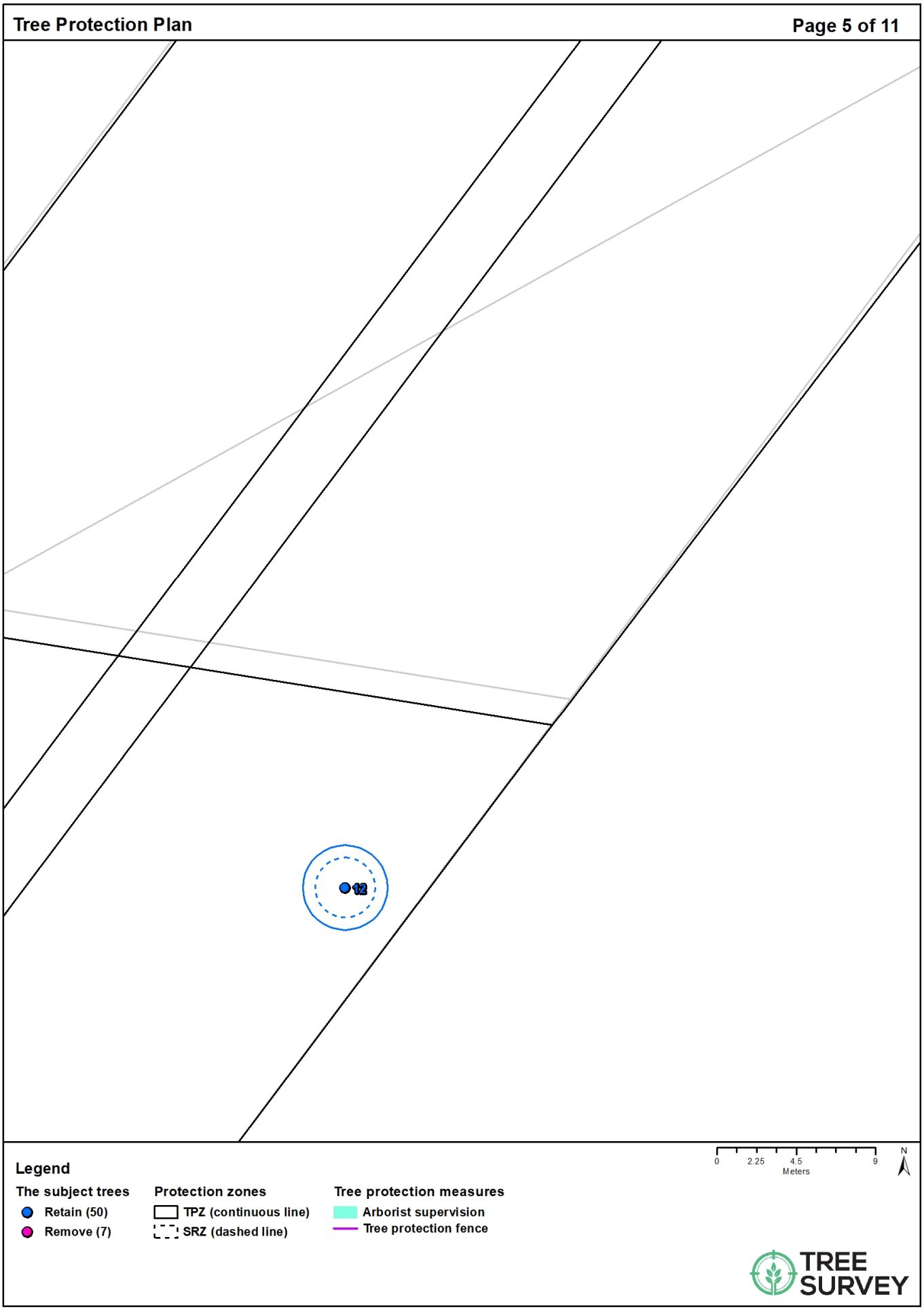
The subject trees
Retain (50)
Remove (7)
Protection zones
TPZ (continuous line)
SRZ (dashed line)
Tree protection measures
Arborist supervision
Tree protection fence
TREE SURVEY


Tree Protection Plan
Page 5 of 11
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The subject trees
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Protection zones
TPZ (continuous line)
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Tree protection measures
Arborist supervision
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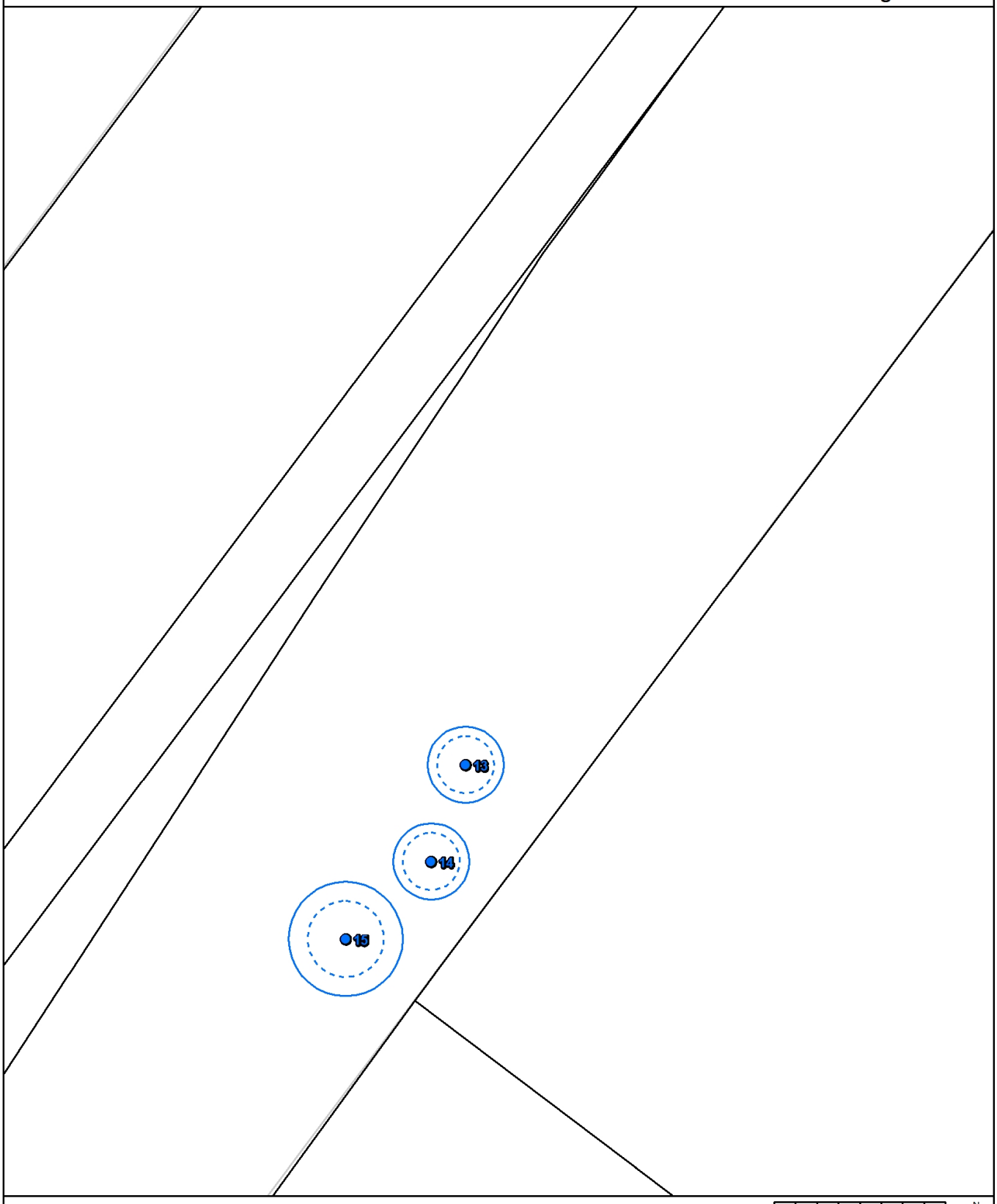
TREE SURVEY

Tree Protection Plan



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The subject trees
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- Remove (7)

Protection zones
- TPZ (continuous line)
- SRZ (dashed line)

Tree protection measures
- Arborist supervision
- Tree protection fence

TREE SURVEY

Tree Protection Plan

Legend

The subject trees
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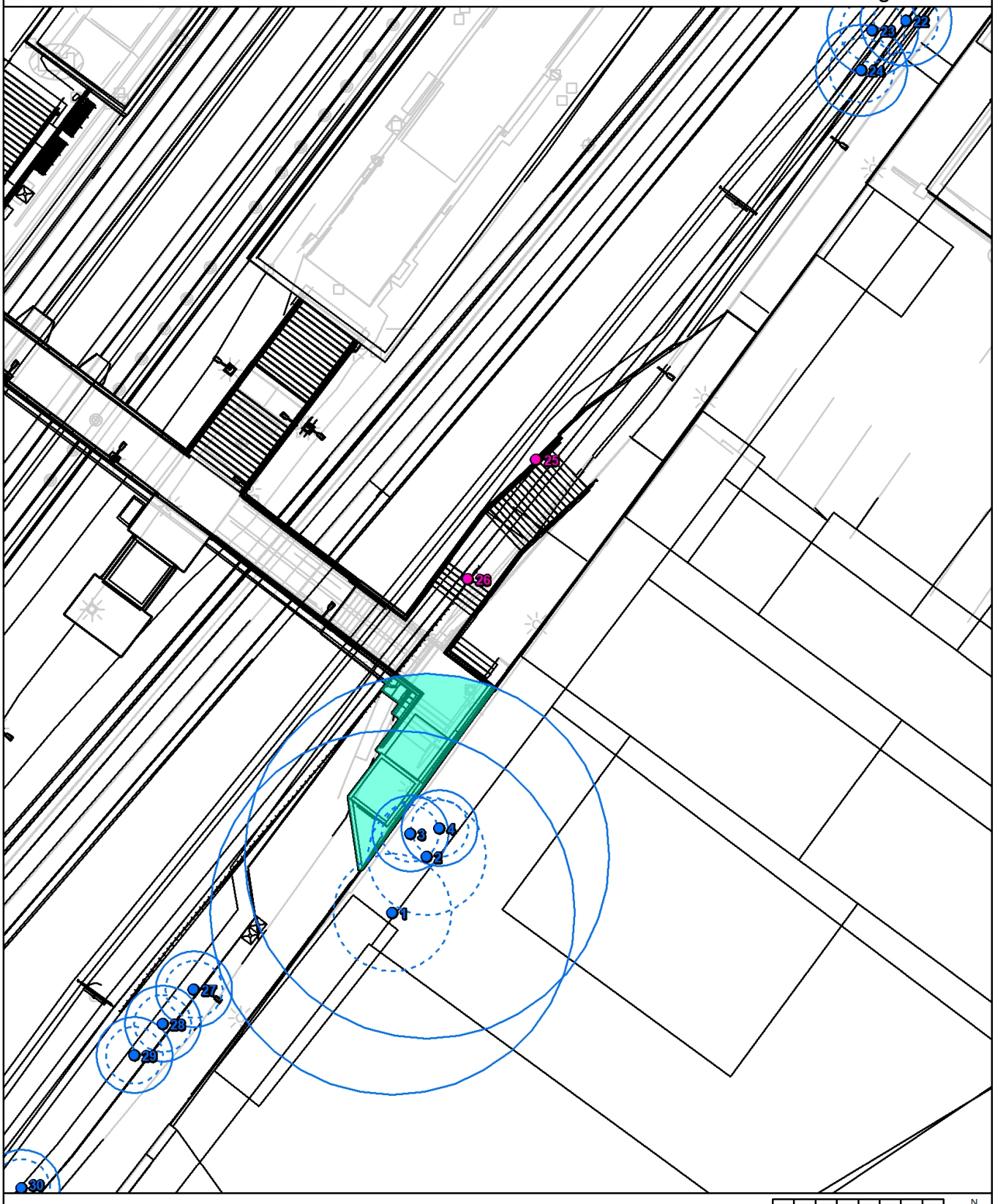
Protection zones
- TPZ (continuous line)
- SRZ (dashed line)

Tree protection measures
- Arborist supervision
- Tree protection fence

TREE SURVEY

Tree Protection Plan



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Protection zones
- TPZ (continuous line)
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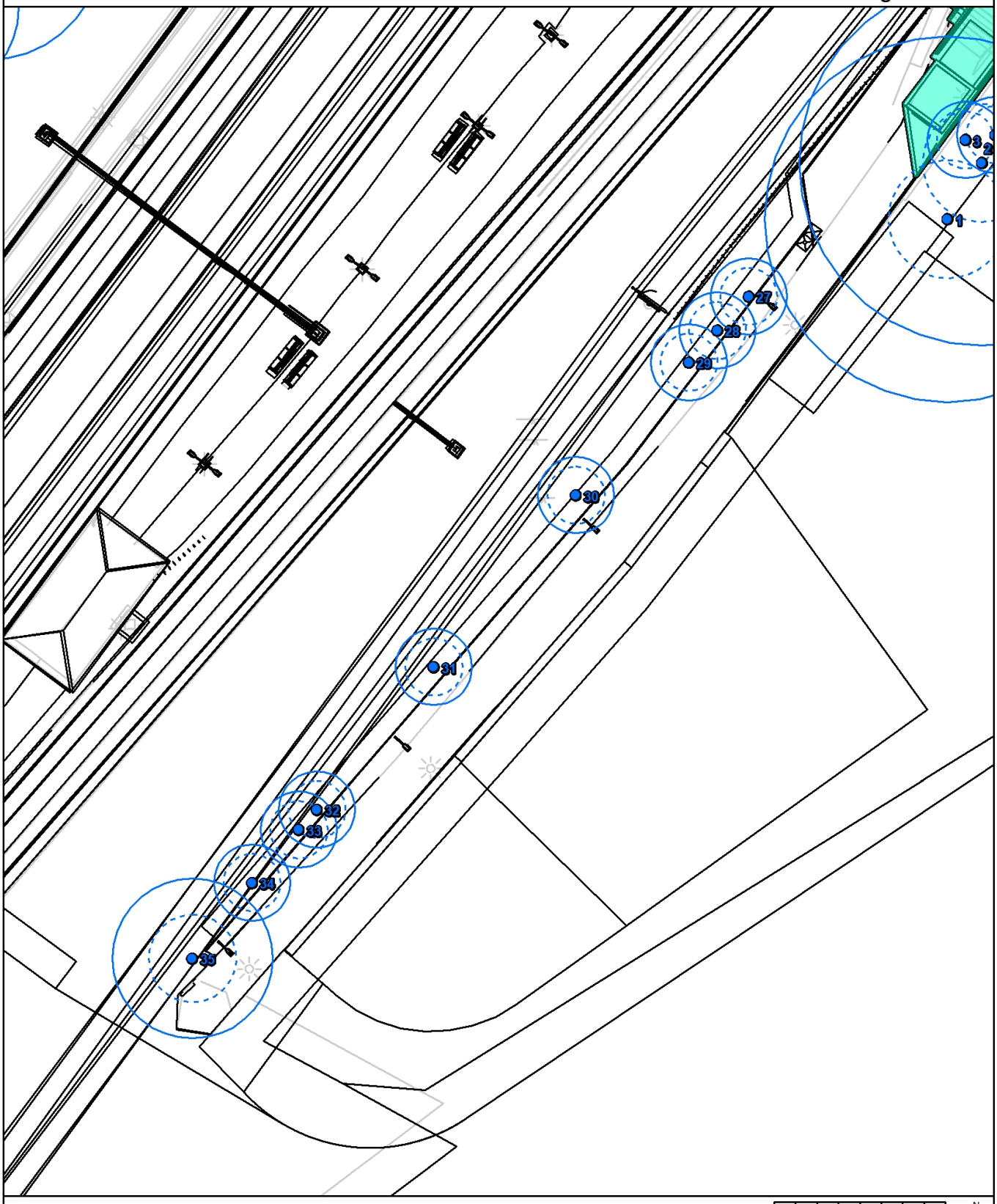
Tree protection measures
- Arborist supervision
- Tree protection fence

TREE SURVEY

Tree Protection Plan



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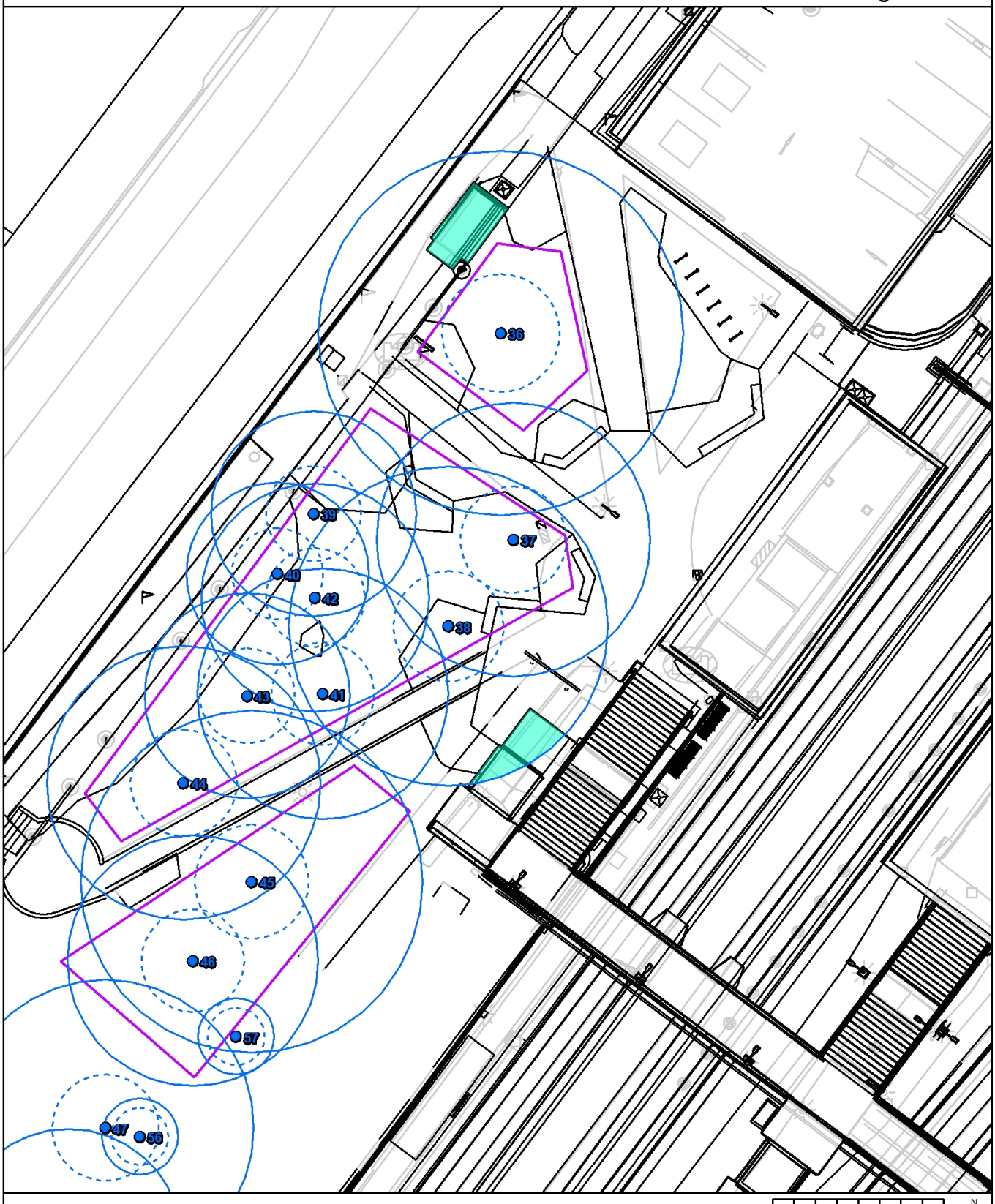
Tree protection measures
- Arborist supervision
- Tree protection fence

TREE SURVEY

Tree Protection Plan



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The subject trees
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- Remove (7)

Protection zones
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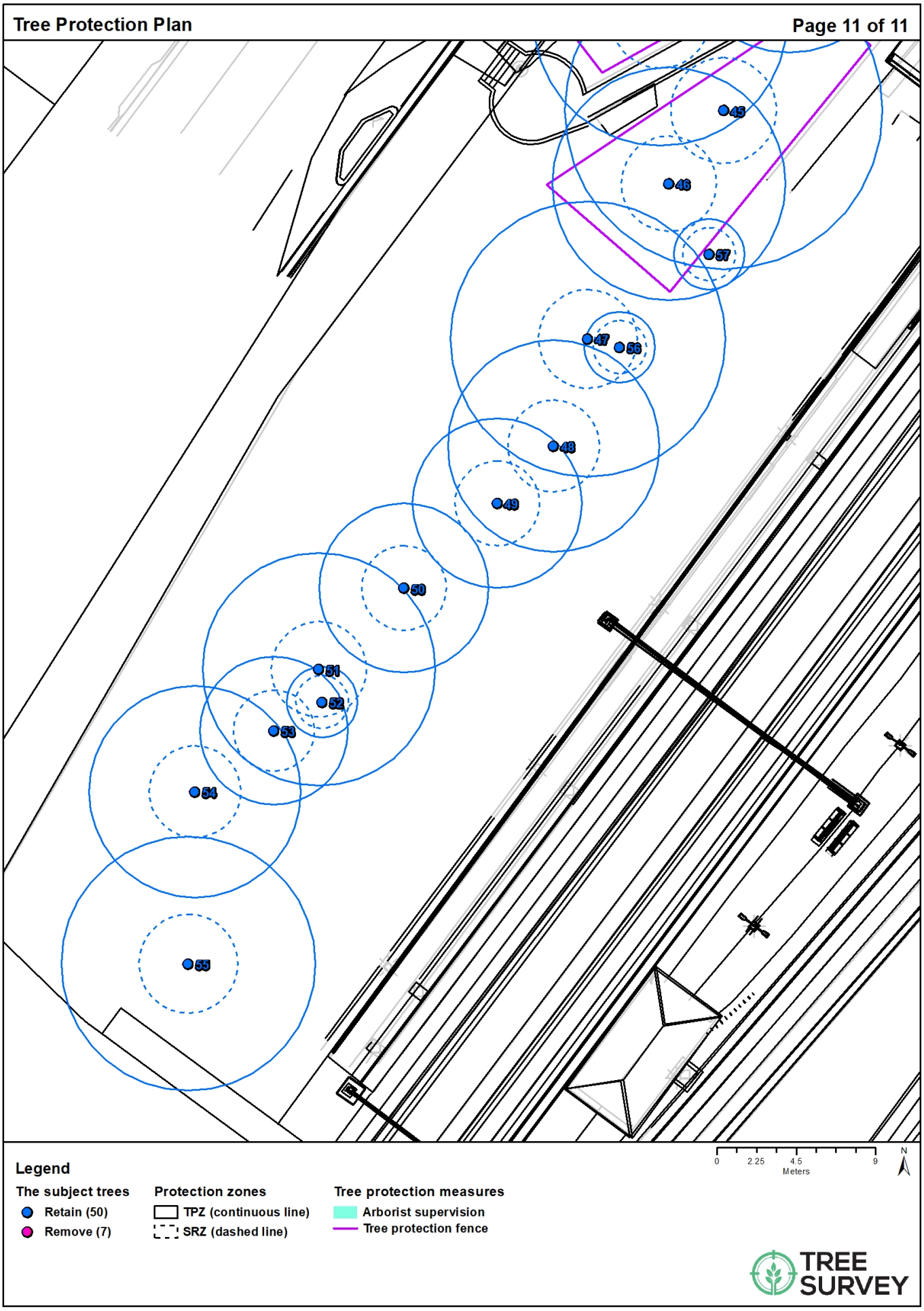
Tree protection measures
- Arborist supervision
- Tree protection fence

TREE SURVEY


Tree Protection Plan
Page 11 of 11
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Legend
The subject trees
Retain (50)
Remove (7)
Protection zones
TPZ (continuous line)
SRZ (dashed line)
Tree protection measures
Arborist supervision
Tree protection fence
TREE SURVEY

Appendix I **- STARS© assessment matrix**

The retention value of a tree or group of trees is determined using a combination of environmental, cultural, physical, and social values.

- **Low:** These trees are not considered important for retention, nor require special works or design modification to be implemented for their retention.
- **Medium:** These trees are moderately important for retention. Their removal should only be considered if adversely affecting the proposed building/works, and all other alternatives have been considered and exhausted.
- **High:** These trees are considered important for retention and should be retained and protected. Design modification or re-location of building/s should be considered to accommodate the setbacks as prescribed by Australian Standard, AS4970-2009 Protection of trees on development sites.

This tree retention assessment has been undertaken in accordance with the Institute of Australian Consulting Aboriculturalists (IACA) Significance of a Tree, Assessment Rating System (STARS). The system uses a scale of High, Medium, and Low significance in the landscape. Once the landscape significance of a tree has been defined, the retention value can be determined. Each tree must meet a minimum of three (3) assessment criteria to be classified within a category.

Tree Significance - Assessment Criteria

Low Significance	Medium Significance	High Significance
The tree is in fair-poor condition and good or low vigour. The tree has form atypical of the species The tree is not visible or is partly visible from the surrounding properties or obstructed by other vegetation or buildings The tree provides a minor contribution or has a negative impact on the visual character and amenity of the local area The tree is a young specimen which may or may not have reached dimensions to be protected by local Tree Preservation Orders or similar protection mechanisms and can easily be replaced with a suitable specimen The tree's growth is severely restricted by above or below ground influences, unlikely to reach dimensions typical for the taxa in situ – tree is inappropriate to the site conditions The tree is listed as exempt under the provisions of the local Council Tree Preservation Order or similar protection mechanisms The tree has a wound or defect that has the potential to become structurally unsound.	The tree is in fair to good condition The tree has form typical or atypical of the species The tree is a planted locally indigenous or a common species with its taxa commonly planted in the local area The tree is visible from surrounding properties, although not visually prominent as partially obstructed by other vegetation or buildings when viewed from the street The tree provides a fair contribution to the visual character and amenity of the local area The tree's growth is moderately restricted by above or below ground influences, reducing its ability to reach dimensions typical for the taxa in situ	The tree is in good condition and good vigour The tree has a form typical for the species The tree is a remnant or is a planted locally indigenous specimen and/or is rare or uncommon in the local area or of botanical interest or of substantial age. The tree is listed as a heritage item, threatened species or part of an endangered ecological community or listed on council's significant tree register The tree is visually prominent and visible from a considerable distance when viewed from most directions within the landscape due to its size and scale and makes a positive contribution to the local amenity. The tree supports social and cultural sentiments or spiritual associations, reflected by the broader population or community group, or has commemorative values. The tree's growth is unrestricted by above and below ground influences, supporting its ability to reach dimensions typical for the taxa in situ – tree is appropriate to the site conditions.
Environmental Pest / Noxious Weed		
The tree is an environmental pest species due to its invasiveness or poisonous/allergenic properties. The tree is a declared noxious weed by legislation		
Hazardous / Irreversible Decline		
The tree is structurally unsound and/or unstable and is considered potentially dangerous. The tree is dead, or is in irreversible decline, or has the potential to fail or collapse in full or part in the immediate to short term.		

Useful Life Expectancy - Assessment Criteria			
Remove	**Short**	**Medium**	**Long**
Trees with a high level of risk that would need removing within the next 5 years. Dead trees. Trees that should be removed within the next 5 years. Dying or suppressed or declining trees through disease or inhospitable conditions. Dangerous trees through instability or recent loss of adjacent trees. Dangerous trees through structural defects, including cavities, decay, included bark, wounds, or poor form. Damaged trees that considered unsafe to retain. Trees that could live for more than 5 years but may be removed to prevent interference with more suitable individuals or to provide space for new planting. Trees that will become dangerous after removal of other trees for the reasons.	Trees that appear to be retainable with an acceptable level of risk for 5-15 years. Trees that may only live between 5 and 15 more years. Trees that may live for more than 15 years but would be removed to allow the safe development of more suitable individuals. Trees that may live for more than 15 years but would be removed during the course of normal management for safety or nuisance reasons. Storm damaged or defective trees that require substantial remedial work to make safe and are only suitable for retention in the short term.	Trees that appear to be retainable with an acceptable level of risk for 15-40 years. Trees that may only live between 15 and 40 more years. Trees that may live for more than 40 years but would be removed to allow the safe development of more suitable individuals. Trees that may live for more than 40 years but would be removed during the course of normal management for safety or nuisance reasons. Storm damaged or defective trees that require substantial remedial work to make safe and are only suitable for retention in the short term.	Trees that appear to be retainable with an acceptable level of risk for more than 40 years. Structurally sound trees located in positions that can accommodate future growth. Storm damaged or defective trees that could be made suitable for retention in the long term by remedial tree surgery. Trees of special significance for historical, commemorative, or rarity reasons that would warrant extraordinary efforts to secure their long-term retention.

Tree Significance

Useful Life Expectancy	High Significance	Medium Significance	Low Significance	Environmental Pest / Noxious Weed	Hazardous / Irreversible Decline
Long >40 years					
Medium 15-40 years					
Short <1-15 years					
Dead					

Legend for Matrix Assessment

	Priority for retention (High): These trees are considered important for retention and should be retained and protected. Design modification or re-location of building/s should be considered to accommodate the setbacks as prescribed by the Australian Standard AS4970 Protection of trees on development sites. Tree sensitive construction measures must be implemented if works are to proceed within the Tree Protection Zone.
	Consider for retention (Medium): These trees may be retained and protected. These are considered less critical; however, their retention should remain priority with the removal considered only if adversely affecting the proposed building/works, and all other alternatives have been considered and exhausted.
	Consider for removal (Low): These trees are not considered important for retention, nor require special works or design modification to be implemented for their retention.
	Priority for removal (Low): These trees are not considered important for retention, nor require special works or design modification to be implemented for their retention.

Reference

IACA, 2010, IACA Significance of a Tree, Assessment Rating System (STARS)
Institute of Australian Consulting Arboriculturists
Australia, www.iaca.org.au