ARBORICULTURAL ADDENDUM

Prepared For: Minter Ellison

Site Address: 1 Gatacre Avenue & 5 Allison Avenue
LANE COVE, NSW, 2066

Report Date: 19th September 2022

Figure 1: The property as seen from Aerial Imagery utilising sources including NearMap & NSW LRS Data.

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1 Contents

1 Introduction

1.1 Acknowledgement of Uniform Civil Procedure Rules:

1.1.1 This report has been prepared by Gordon Blues (the Arborist), Sole trader operating under the trading name of Blues Brothers Arboriculture at 22 Lauderdale Ave, Fairlight, NSW, 2094

1.1.2 The Arborist has read the *Uniform Civil Procedure Rules 2005* and agrees to be bound by it.

1.1.3 The Arborist holds the following qualifications applicable to these proceedings:

- Diploma level qualification of Arboriculture (AQF5 Arborist).
- Current professional member of ISA (Member: 284147) & a currently qualified TRAQ Consultant

1.2 Background

1.2.1 Blues Brothers Arboriculture has been engaged by the solicitor representing the developer to as an expert witness with regard to proceedings at the above address.

1.2.2 Information supplied and relied upon in the preparation of this report included:

- Original Arboricultural Impact Assessment (AIA) report produced by the Author, Dated 7th May 2021 and its inclusions.
- Detail Survey produced by Mitch Ayres Surveying Pty. Ltd; Reference 220804, Issue 2, Dated 31/08/2022.
- Architectural Suite of Plans produced by Rothelowman; Draft LEC Response issue, dated 14/09/2022 inclusive of, but not limited to:
    - Site Plan,
    - Demolition Plan,
    - Survey,
    - Floor Plans,
    - Elevations, an
    - Sections.

1.2.3 The use of these documents / sources is acknowledged with thanks.

1.2.4 In the interests of transparency, the originally supplied markup created for the original AIA using third party sources has been re-created for this report to ensure all data contained within is current.

1.2.5 A root mapping study was commissioned to ascertain the location of significant tree roots in response to one point of contention. The study was limited by site constraints:

- The location of the study area within the vicinity of service mains not limited to Gas, Water, & sewage.
- A densely compacted disturbed soil profile.

1.2.6 An over-the-fence assessment of neighbouring vegetation was additionally undertaken for the purposes of providing more accurate markups.

1.3 Definitions & Abbreviations:

1.3.1 ***The Standard*** refers to the Australian Standard AS4970:2009 – *Protection of trees on development sites.*

1.3.2 ***The site*** refers to the land within the proposed development site.

1.3.3 An ***Exempt Tree*** is a tree that is exempt from planning controls due to meeting Council's definition of exempt vegetation or trees. Exempt Trees may be removed irrespective of development and at any time without Council approval.

1.3.4 ***A significant root*** is defined as any woody root with a diameter of 30mm or larger.

1.3.5 ***AGL*** – Above Ground Level

1.3.6 ***LGA*** – Local Government Area.

1.3.7 ***DBH*** – Diameter at Breast Height; Approximately 1.4 metres above ground level measured in metres.

1.3.8 ***DGL*** – Diameter at Ground Level; Measured above the root flare / collar measured in metres.

1.3.9 ***TPZ*** – Tree Protection Zone. Calculated per the standard:

$$TPZ\ radius = 12\ \times DBH$$

1.3.10 ***SRZ –*** Structural Root Zone. Calculated per the standard:

$$SRZ\ radius = (DGL \times 50)^{0.42} \times 0.64$$

1.3.11 ***FFL***- Finished Floor Level.

1.3.12 ***RL*** – Reduced Level.

1.3.13 ***AGL*** – Above Ground Level

1.3.14 ***SEPP*** – State Environmental Planning Policy.

1.3.15 ***DBYD*** – Dial Before You Dig

1.4 Interrogation of supplied Data

1.4.1 As part of the scope of works, has overlaid both boundary identification & detail surveys for comparison and to show levels of existing encroachment.

1.4.2 Survey scaling and alignment occurred based on boundary annotations. There does not appear to be a discrepancy in the boundary information contained within.

1.4.3 Whilst it is acknowledged that each survey was undertaken with differing scopes of works, apparent discrepancies exist with some features (trees).

1.4.4 Based on my interpretation of the surveys:

- The location of the centre of Tree 11 differs by approximately 1.21m on an approximately East/West axis.
- The location of the centre of Tree 13 differs by approximately 26cm on an approximately NW/SE axis

1.4.5 TPZ encroachment values have been calculated based on spatial data contained within the new survey by Mitch Ayres Surveying.

1.4.6 Refer to Appendix 1 – Survey Comparisons for graphical representation.

2 Methodology

2.1 Root Mapping

2.1.1 Site attendance occurred on the 13th September 2022 to carry out the study.

2.1.2 The proposed line of excavation ('the study area') was derived from an interpretation of the survey in conjunction with architectural plans to ensure the most relevant data could be collected.

2.1.3 Tools used for the excavation of the study included:

- Shovels
- PlumBOSS Fibreglass ground probe.
- Makita 36v right-angle drill with soil auger attachment
- Steel rake
- Builder's tape,
- Leica DISTO X4 laser Distometer.
- Line marking paint.

2.1.4 Excavation along the study area was undertaken with care and attention to the likelihood of root discovery.

2.1.5 Surface roots observed during the set-out phase of the scope of works were uncovered for the purposes of identifying root diameters, depth of the root in the ground, and the direction of root growth.

2.1.6 Roots, where discovered, were shaved with a sharp blade to confirm if they are supporting life or deceased.

2.1.7 Due to the compacted nature of the soil, the soil auger was used to assist in the excavation of soils. This tool is not possible of causing significant root damage during use & is not effective in soils containing rocks.

2.1.8 Photographs of the study area were taken before, during & after the scope of works to document the discovery of roots. These images are shown in the appendices.

2.1.9 At the conclusion of works, all efforts were taken to replace soils in trenches and around roots to preserve site safety & minimise tree impacts.

2.2 Tree Identification

2.2.1 An 'over-the-fence' assessment was undertaken for trees on the neighbouring 7 Allison Avenue. The purpose of this exercise was to capture data of trunk DBH for the purposes of calculating TPZ area.

2.2.2 Access to the neighbouring property did not occur. This information is provided as a 'best effort' response given site access constraints.

3 Results

3.1 Root Mapping

3.1.1 Surface roots consistent with the Norfolk Island pine were quickly located during the set-out of the study area. Roots were exposed to the atmosphere but obscured from view by the existing ground cover and shrubs.

3.1.2 Clearing of existing vegetation and minor excavation revealed five significant roots within the vicinity. Roots are numbered in ascending order based on their distance from the existing driveway

Root ID	Diameter	Depth (Top of Root)	Alive?
1	145mm	0-3cm	Yes
2	165mm	0-5cm	Yes
3	85mm	0-4cm	Yes
4	80mm	3-6cm	Yes
5	70mm	0-18cm	Yes

3.1.3 The five roots detected were all seen to be heading towards the existing building.

3.1.4 Roots were all located on the surface, or if not, very close to it. This is likely due to heavy soil compaction beneath or the presence of building waste beneath.

3.1.5 The existing building showed minor sign of damage. Based on this, it is highly likely that tree roots have deflected on contact with the building's footings.

4 Questions raised

The following questions have been asked:

4.1.1 Question 1:

On the assumption that the existing "two storey cement rendered brick building", is to be demolished, please advise whether you consider the Norfolk Pine (T13) can be retained. That is, will the demolition of the building necessarily mean that the Norfolk Pine cannot survive? The location of the tree has been identified in the attached updated survey.

4.1.2 Question 1A

If the answer to question 1 is that the Norfolk Pine can remain safely intact following the demolition of the cement building, will the footprint of the proposed development (in particular the footprint of the basement) mean that the Norfolk Pine cannot remain safely intact following the construction and completion of the proposed development?

4.1.3 Question 2:

Secondly, can you please consider whether the proposed excavation works within the south eastern corner of the site and immediately to the boundary with 7 Allison Street will have an adverse impact on the trees on the neighbouring land at 7 Allison Avenue. Please note that the location of those trees has been surveyed on the attached, and the current intention as per the attached architectural drawings is to:

- a. leave the existing retaining wall on the boundary of 5 and 7 Allison Avenue as is; and
- b. build a further retaining wall within the development site as shown on the ground floor plan TP01.03(W).

5 Responses to Questions

5.1 Question 1:

On the assumption that the existing "two storey cement rendered brick building", is to be demolished, please advise whether you consider the Norfolk Pine (T13) can be retained. That is, will the demolition of the building necessarily mean that the Norfolk Pine cannot survive. The location of the tree has been identified in the attached updated survey.

5.1.1 The Tree in question is numbered as Tree 13 on the supplied AIA report. The Tree stood with an approximate height of 22m, a spread of 11m & had a measured DBH of approximately 61cm and a measured DGL of 67cm. During the inspection, extensive surface roots were visible within the SRZ area.

5.1.2 Relying on *AS4970:2009 – Protection of trees on development sites*, the TPZ radius for the tree was calculated at 7.3m radially from trunk centre. The SRZ radius was calculated at 2.8m radially from the trunk centre.

5.1.3 Demolition of the existing structure would occur on land within the TPZ area of the tree. Given the size of the tree, it is likely that the structure pre-dates the tree which has set roots along or beneath foundational walls.

5.1.4 The tree demonstrated a minor trunk bias to the North West before self-righting by 4m AGL. A trunk bias places additional significance on roots on the South-Eastern flank – being the construction side of the tree.

5.1.5 *AS4970:2009 – Protection of trees on development sites* defines *Major* encroachment at 10% of the TPZ by area. Any encroachment of the SRZ constitutes a *Major* encroachment. Encroachment is otherwise *Minor.*

5.1.6 The existing building is located well within the TPZ area of the tree, such that the existing building accounts for approximately 17.6% of the TPZ area - A *Major* encroachment per *the standard*. This value is more than permitted to be redistributed around the remaining TPZ area.

5.1.7 From the root mapping study, Structural roots exist against footings of the existing building. Impacts associated with demolition is likely to cause damage or severance to these roots which exist parallel or beneath existing footings. This could include a combination of:

- Permanent canopy dieback,
- Branch loss,
- Structural failure due to the severance of significant roots, or
- Tree Death

5.1.8 *Araucaria* species typically set a shallow, but wide root system due to their preferred habit in free-draining sandy soils, commonly seen along coastal fringes. The species is somewhat tolerant of root disturbances once established, but not on the scale likely to occur with the development.

5.1.9 It is my opinion that the tree cannot survive the proposed scope of development in a healthy or structurally sound condition:

- Damage to the root system is likely to occur during demolition. This will result in future health implications not limited to canopy dieback and or branch loss.
- The tree stands with a high lever-arch characteristic. Damage to the root system on the South Eastern flank during demolition or construction *will* increase the risk of catastrophic failure, risking human life and, or property, under a modest wind event.

5.1.10 Refer to Appendix 2 – Existing Encroachment Potentials & Appendix 5 – Root Mapping Diagram for graphical representation of the root system with respect to the existing & proposed buildings.

5.2 Question 1A:

If the answer to question 1 is that the Norfolk Pine can remain safely intact following the demolition of the cement building, will the footprint of the proposed development (in particular the footprint of the basement) mean that the Norfolk Pine cannot remain safely intact following the construction and completion of the proposed development?

5.2.1 Supplied sections 2-4 in architectural sheet TP03.05 show a proposed retaining wall to be constructed between the Gatacre Ave Boundary & the outside edge of the basement retaining wall. This wall is shown with an approximate height of 3m on sections.

5.2.2 Plans propose an additional 26.4% encroachment of the TPZ area in total (6.6% for the basement, 19.8% for the ground floor).

5.2.3 The outside edge of basement excavation is proposed approximately 10cm outside of the SRZ area. Excavation of soils on the ground floor will occupy approximately 35% of the tree's SRZ.

5.2.4 The proposed encroachment is significantly *Major* per *AS4970:2009 – Protection of trees on development sites.*

5.2.5 Root severance is *guaranteed* to occur during the excavation of footings to accommodate the proposed development.

5.2.6 The tree is susceptible to high lever-arch loading due to the height of the tree and observed exposures during site attendance. With the loss of roots, it is unlikely that the tree could remain stable during a modest wind event.

5.2.7 It is my opinion the tree cannot be safely retained with the current proposed development.

5.2.8 Excavation of soils to accommodate the retaining wall is within the SRZ area and is likely to destabilise the tree. *AS4970:2009 – Protection of trees on development sites* states the "SRZ is the area required for tree stability. A larger area is required to maintain a viable tree".

5.2.9 The loss of tree roots on the tension side of the tree poses elevated risk of catastrophic tree failure which could be immediately realised during excavation posing an imminent risk to human life, and, or property.

5.2.10 Refer to Appendix 3 – Proposed Encroachment Potentials for graphical representation.

5.3 Question 2

Secondly, can you please consider whether the proposed excavation works within the south eastern corner of the site and immediately to the boundary with 7 Allison Street will have an adverse impact on the trees on the neighbouring land at 7 Allison Avenue. Please note that the location of those trees has been surveyed on the attached, and the current intention as per the attached architectural drawings is to:

- a. leave the existing retaining wall on the boundary of 5 and 7 Allison Avenue as is; and
- b. build a further retaining wall within the development site as shown on the ground floor plan TP01.03(W).

5.3.1 It is understood that design revision has occurred since the date of the original AIA report. Sections and plans indicate the retaining wall within the vicinity has been built with a boundary offset of approximately 1m.

This revision places approximately 2-2.5m of offset between the trees.

5.3.2 DBH values for neighbouring trees shown on the recently supplied detail survey & boundary identification correlate with minimal levels of TPZ encroachment is likely to occur with the proposed development.

5.3.3 These trees, shown on supplied plans with an N* prefix were mostly palms and smaller shrubs of low landscape significance. A thorough assessment was not undertaken for these trees due to limited access.

5.3.4 *AS4970:2009 – Protection of trees on development sites* states the TPZ area for palms and other monocotyledons should not be less than 1m outside the crown projection.

5.3.5 Encroachment of smaller TPZ areas is likely to also incorporate the SRZ areas likewise since it is common for trees of this size to present with SRZ areas slightly smaller than TPZ areas.

Despite this, the small sizes of the trees mean it is unlikely that the proposed retaining wall with increased boundary offset will cause any permanent damage to these trees.

5.3.6 Long term survival of these trees is likely & can be supported with additional watering or treatment with a product such as SeaSol® per directions during construction.

5.3.7 Retention of the loose packed dry stone / rubble wall & concrete retaining wall on the boundary of the site & the construction of a new retaining wall with greater construction offset is supported.

5.3.8 Refer to the spreadsheet within Appendix 4 – Neighbouring Tree Identification & Encroachment for further information regarding the trees.

6 Appendix 1 – Survey Comparisons

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AVENUE

AVENUE

PACIFIC HIGHWAY

BM NAIL TOP KERB
RL 95.93 (AHD)
WEST SURVEYS 14.10.20

BM NAIL IN TOP OF KERB RL:95.93 (AHD)

0.26

T13

T14

T15

GRASSING

LEANING TREE

GARDEN

CONCRETE DRIVEWAY

CONCRETE SURFACE

AWNING ABOVE CONCRETE DRIVEWAY

TREE SHOWN TAKEN FROM CENTRE OF LEANING TREE BETWEEN MID POINT OF TRUNK (0.75) OVER BASE (0.40)

TWO STOREY CEMENT RENDERED BRICK BUILDING TILE ROOF No. 1

BITUMEN SURFACE

GRASS

HEDGE

GM

38.25

229°

301°

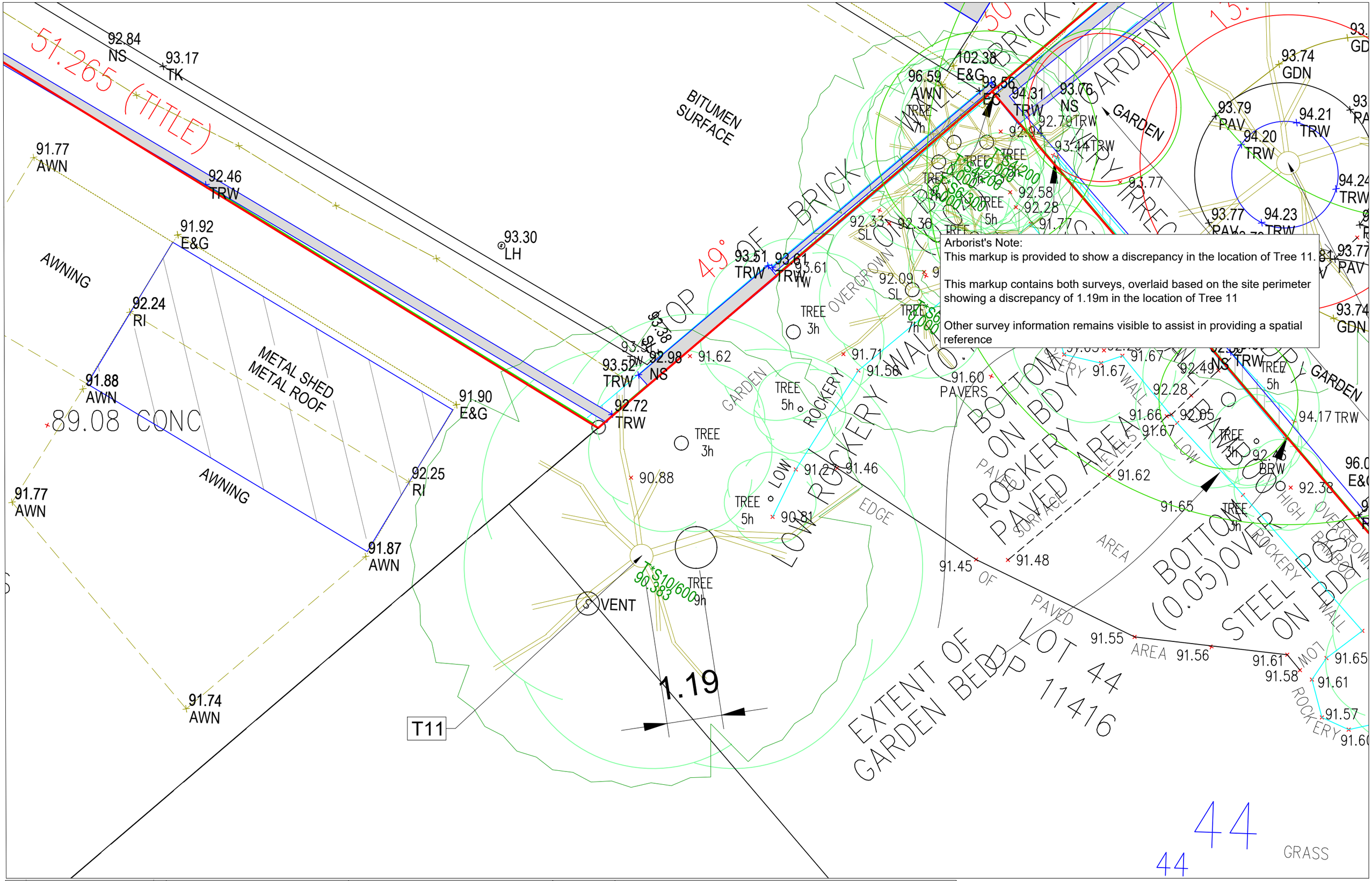
96.67 CL
96.56 VC
96.59 EC
96.46 TK
96.68 SI NS
96.94 NS
96.98 EC
96.77 TPIT
96.70 TPIT
96.83 EC
97.03 SL
97.68 EC
97.70 EC
97.77 EC
98.38 NS
99.26 TRW
97.59 SL
97.60 SL
100.55 AWN
101.40 AWN
102.28 E&G
97.33 SL
97.56 PAT
97.27 SL
97.03 NS
100.58 AWN
103.40 RI
97.72 EC
100.56 AWN
97.72 SL
101.38 AWN
97.86 PAT
97.33 SL
103.20 E&G
96.76 SL
97.59 EB
102.22 E&G
97.49 SL
97.13 EB
96.72 SL
96.70 SL
95.49 CL
95.65 TK
95.82 NS
95.68 EC
95.47 EC
95.48 NS
95.61 TRW
95.61 TRW
95.06 TRW
94.97 TRW
94.40 SL
94.26 SL
95.08 TRW
95.07 TRW
94.41 SL
94.98 TRW
95.24 NS
95.63 TRW
95.11 NS
96.80 VER
94.24 TRW
93.87 SL
93.99 TRW
93.82 EC
93.77 SL
93.76 SL
96.83 VER
99.71 VER
T*S10/500 0.060
T*S7/700 0.060
T*S8/400 0.060

Arborist's Note:
This markup is provided to show a discrepancy in the location of Tree 13.

This markup contains both surveys, overlaid based on the site perimeter showing a discrepancy of 0.26m in the location of Tree 13

Other survey information is provided for spatial reference.

Blues Bros ARBORICULTURE	Blues Brothers Arboriculture PO BOX 102, BALGOWLAH NSW 2094 0439991122 www.bluesbros.com.au gordon@bluesbros.com.au	Title: Survey Comparison 1 Project: LEC Gatacre Ave.dwg	Revision: 01 Plot Date: 20/09/2022	Key: Tree Protection Zone (TPZ) Structural Root Zone (SRZ) Canopy Spread Encroachment Area



Arborist's Note:
This markup is provided to show a discrepancy in the location of Tree 11.

This markup contains both surveys, overlaid based on the site perimeter showing a discrepancy of 1.19m in the location of Tree 11

Other survey information remains visible to assist in providing a spatial reference

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Title:	Revision:
Survey Comparison 2	01
Project:	**Plot Date:**
LEC Gatacre Ave.dwg	20/09/2022

Key:
- Tree Protection Zone (TPZ)
- Structural Root Zone (SRZ)
- Canopy Spread
- Encroachment Area

7 Appendix 2 – Existing Encroachment Potentials

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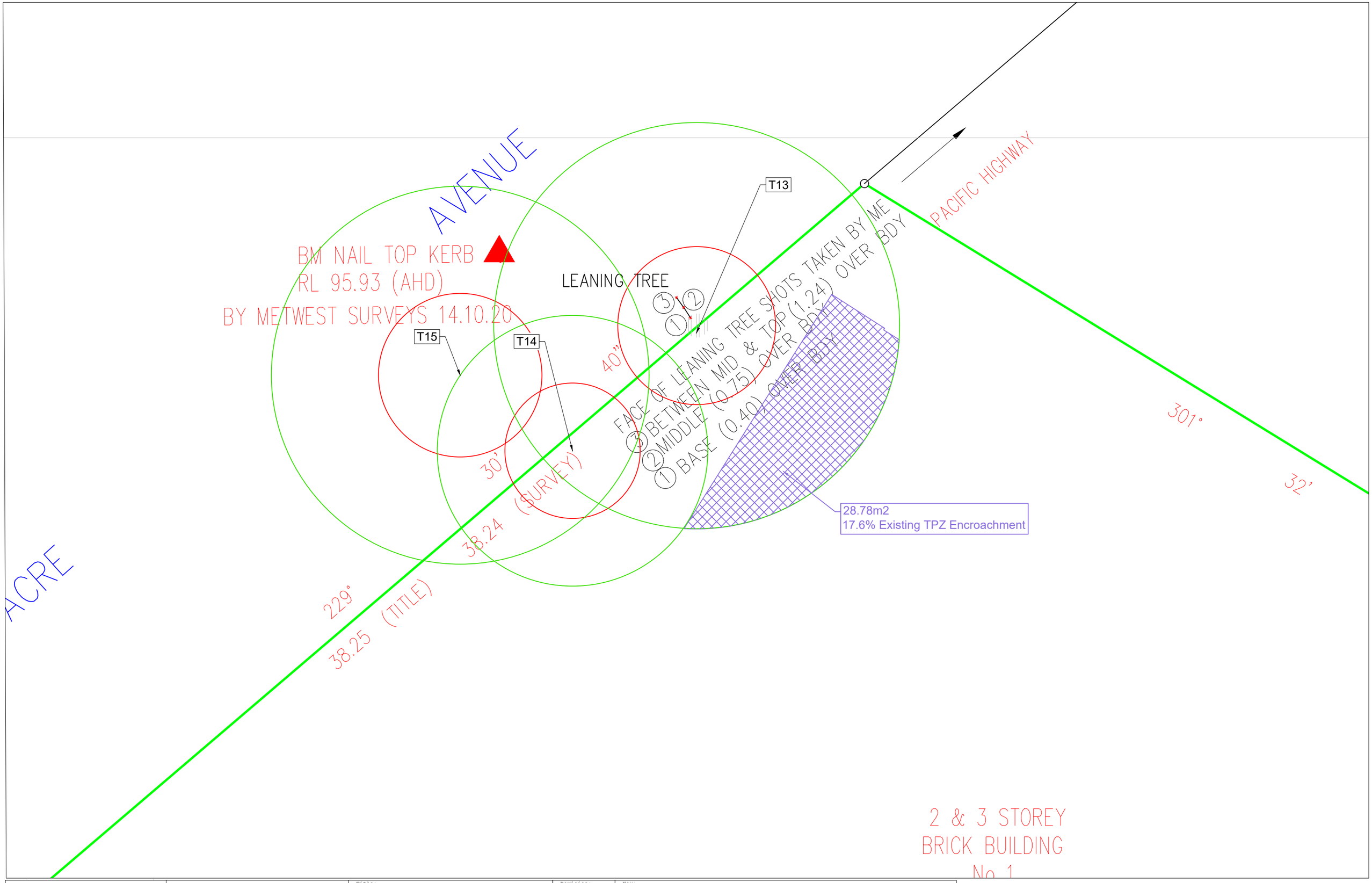

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Title: Existing Encroachment

Project: LEC Gatacre Ave.dwg

Revision: 01

Plot Date: 20/09/2022

Key:
- Tree Protection Zone (TPZ)
- Structural Root Zone (SRZ)
- Canopy Spread
- Encroachment Area

8 Appendix 3 – Proposed Encroachment Potentials

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Title: Proposed Basement Encroachment

Revision: 01

Project: LEC Gatacre Ave.dwg

Plot Date: 20/09/2022

Key:

- Tree Protection Zone (TPZ)
- Structural Root Zone (SRZ)
- Proposed Encroachment
- Existing Encroachment

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Title: Proposed Ground Encroachment

Revision: 01

Project: LEC Gatacre Ave.dwg

Plot Date: 20/09/2022

Key:
- Tree Protection Zone (TPZ)
- Structural Root Zone (SRZ)
- Proposed Encroachment
- Existing Encroachment

9 Appendix 4 – Neighbouring Tree Identification & Encroachment

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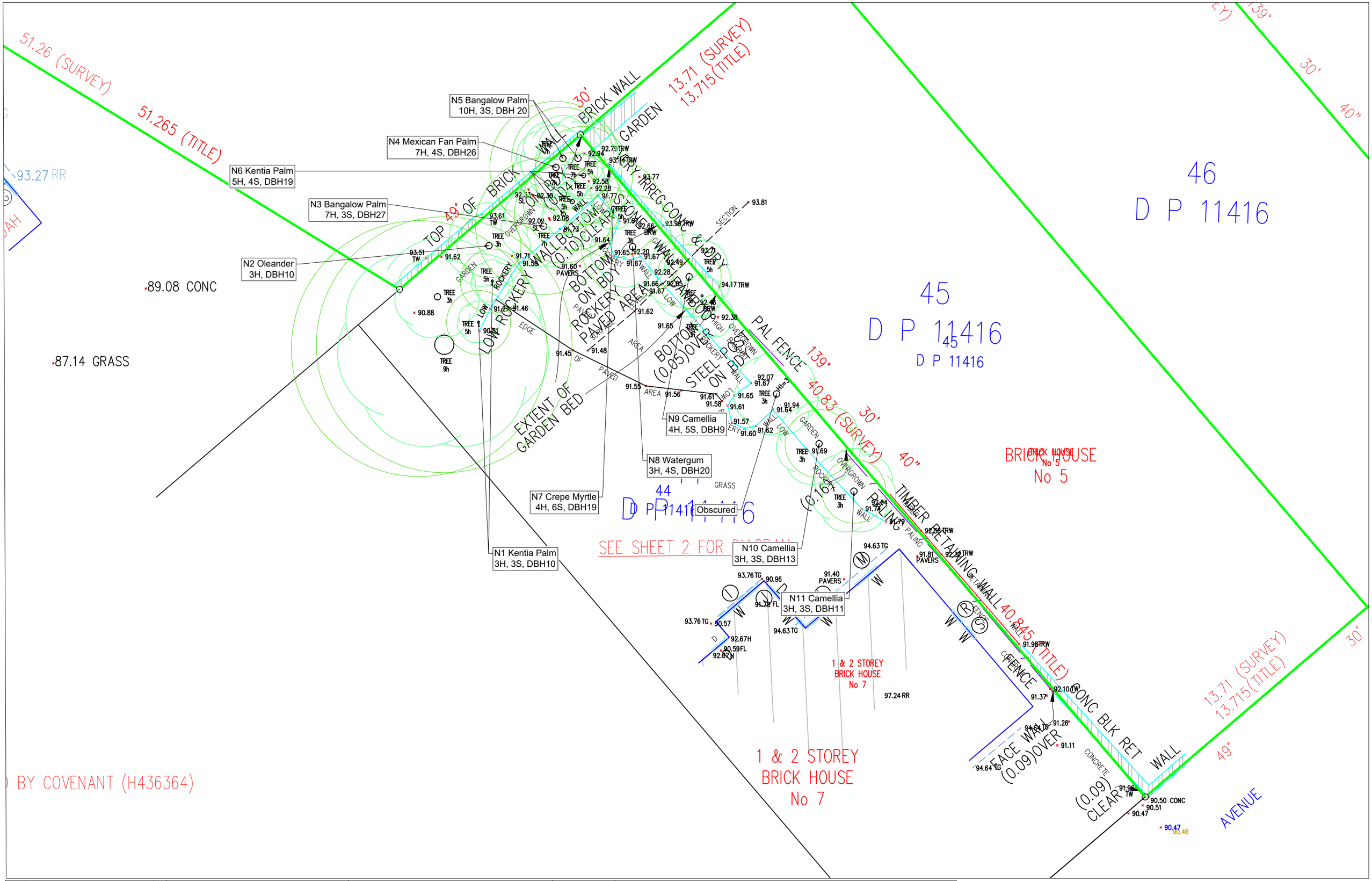
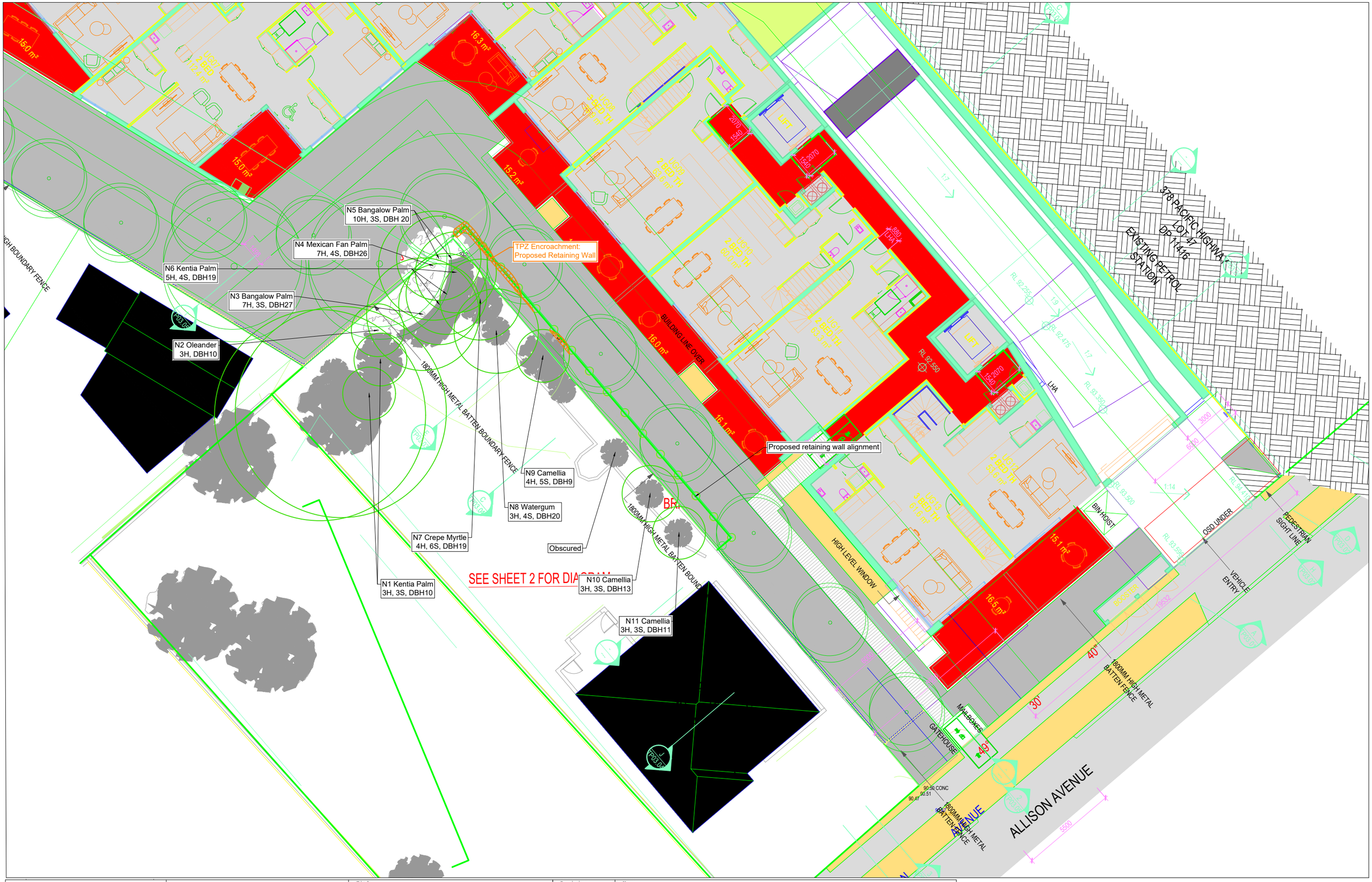
Tree Data Summary - 1 Gatacre Ave & 5 Allison Ave, Lane Cove - Assessed 13/10/2020 & 13/09/2022																	
Tree ID	**Species**	**Height (m)**	**Canopy dims n/s in metres**	**DBH (cm)**	**DGL (cm)**	**Foliage condition**	**Maturity**	**Trunk type**	**Trunk lean**	**Canopy Balanced**	**Past Pruning**	**Stability**	**Vigour**	**Canopy deadwood**	**Significance value**	**Notes**	**TPZ (M) Radius**
N1	*Howea forsteriana* (Kentia Palm)	3	3	10													1.2
N2	*Nerium oleander* (Oleander)			10													1.2
N3	*Archontophoenix cunninghamiana* (Bangalow Palm)	7	3	27													3.2
N4	*Washingtonia robusta* (Mexican Fan Palm)	7	4	26													3.1
N5	*Archontophoenix cunninghamiana (Bangalow Palm)*	10	3	20													2.4
N6	*Howea forsteriana (Kentia Palm)*	5	4	19													2.3
N7	*Laegerstroemia indica* (Crepe Myrtle)	4	6	19													2.3
N8	*Tristaniopsis laurina* (Watergum)	3	4	20													2.4
N9	*Camellia sp.* (Camellia)	4	5	9													1.1
N10	*Camellia sp.* (Camellia)	3	3	13													1.6
N11	*Camellia sp.* (Camellia)	3	3	11													1.3

Data not captured - limited scope of works.



Blues Bros ARBORICULTURE	Blues Brothers Arboriculture PO BOX 102, BALGOWLAH NSW 2094 0439991122 www.bluesbros.com.au gordon@bluesbros.com.au	Title: Tree ID 7 Allison Ave Project: LEC Gatacre Ave.dwg	Revision: 01 Plot Date: 20/09/2022	Key: Tree Protection Zone (TPZ) Structural Root Zone (SRZ) Canopy Spread Encroachment Area



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Title: Encroachment 7 Allison Ave

Project: LEC Gatacre Ave.dwg

Revision: 01

Plot Date: 20/09/2022

Key:
- Tree Protection Zone (TPZ)
- Structural Root Zone (SRZ)
- Canopy Spread
- Encroachment Area

10 Appendix 5 – Root Mapping Diagram

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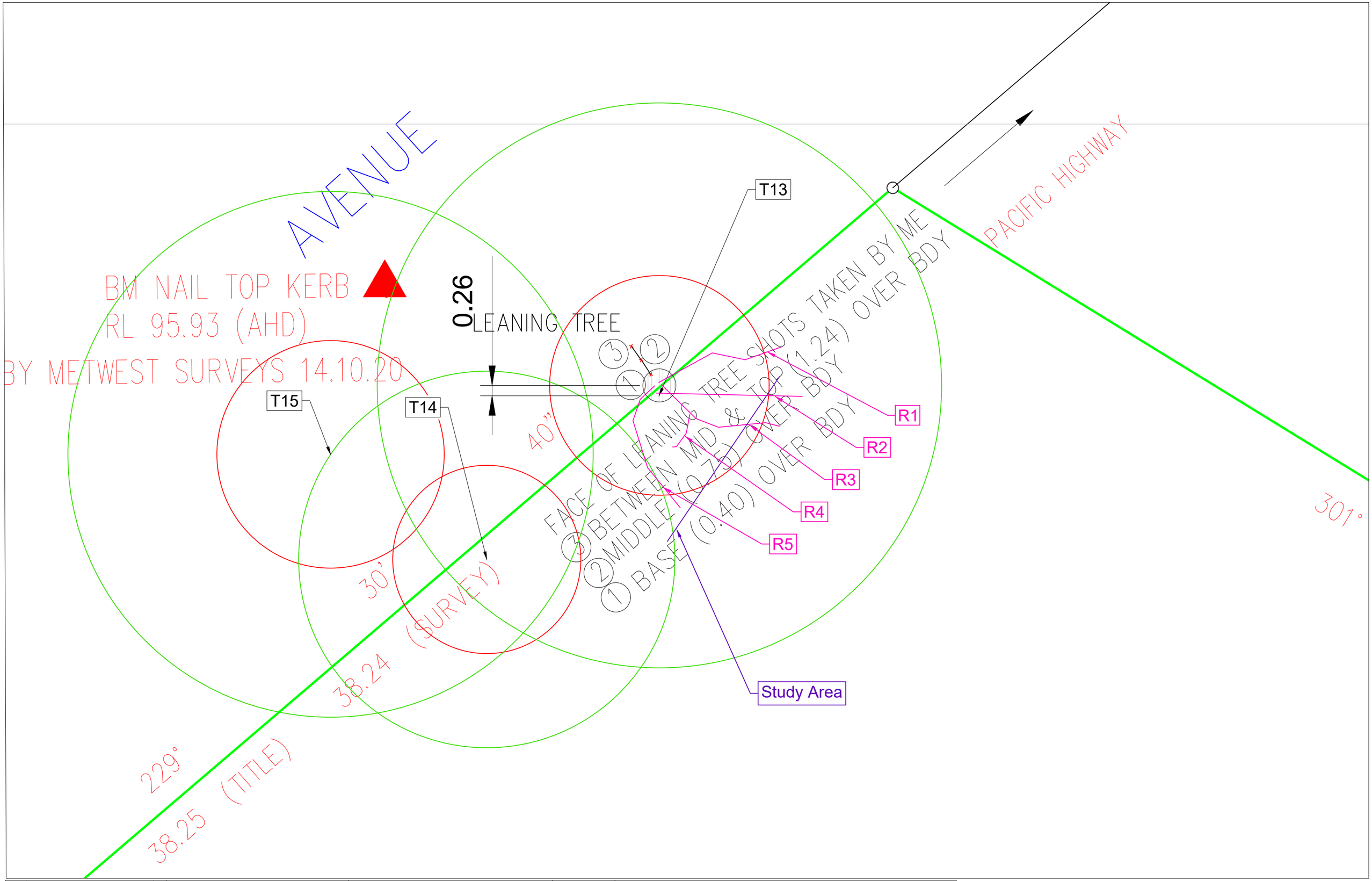
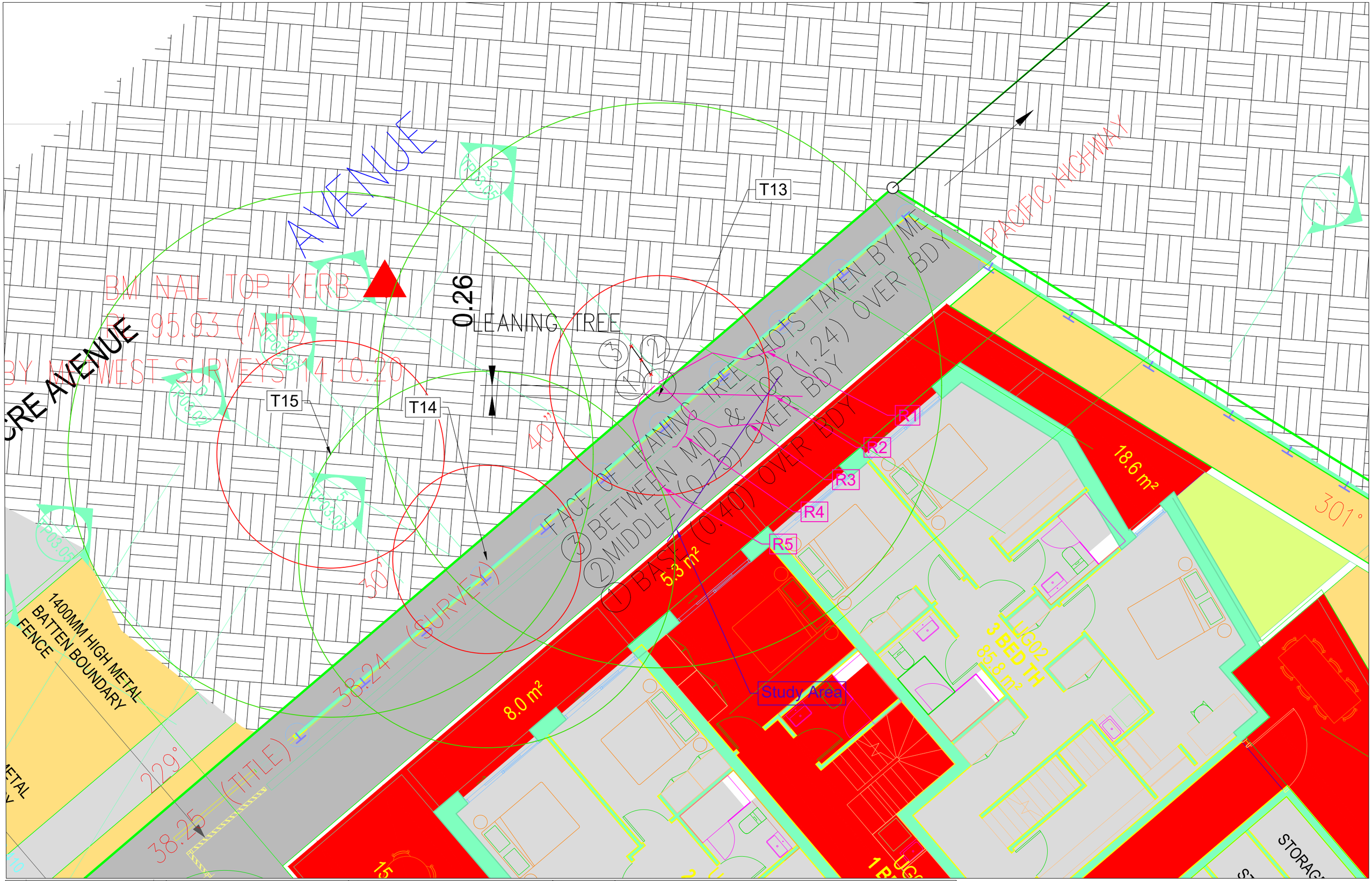


Blues Bros ARBORICULTURE	Blues Brothers Arboriculture PO BOX 102, BALGOWLAH NSW 2094 0439991122 www.bluesbros.com.au gordon@bluesbros.com.au	Title: Root Mapping Study Project: LEC Gatacre Ave.dwg	Revision: 01 Plot Date: 20/09/2022	Key: Tree Protection Zone (TPZ) Structural Root Zone (SRZ) Roots Found (Heading and identification number) Study Area (Trench alignment)



Blues Bros ARBORICULTURE	Blues Brothers Arboriculture PO BOX 102, BALGOWLAH NSW 2094 0439991122 www.bluesbros.com.au gordon@bluesbros.com.au	Title: Root Mapping Study + Arch Project: LEC Gatacre Ave.dwg	Revision: 01 Plot Date: 20/09/2022	Key: Tree Protection Zone (TPZ) Structural Root Zone (SRZ) Roots Found (Heading and identification number) Study Area (Trench alignment)

11 Appendix 6 – Photographs

Image 1: The root mapping study area prior to excavation.

Image 2: The study area mid-excavation.

Image 3: Tree roots as discovered. Roots were marked with white line marking paint for contrast in photos.

Image 4: Vegetation on neighbouring property as seen.

Image 5: A panorama of vegetation as seen from within the site.