Project No: HYDE/LIGHTING/21 Report No: HYDEPARK/LIGHTING/AIA/A

ARBORICULTURAL IMPACT ASSESSMENT
TREE PROTECTION SPECIFICATION

Hyde Park (95% Progress)
Elizabeth Street, Sydney

Prepared for: CITY OF SYDNEY

23rd March 2023
Revision A

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1.0 INTRODUCTION

1.1 Background

1.1.1 This Arboricultural Impact Assessment Report and Tree Protection Specification was prepared for the City of Sydney in relation to the proposed installation of new lighting poles, inground up-lights, electrical/comms pits, underground cabling/conduits and CCTV cameras at Hyde Park. The purpose of this Report is to determine the impact of the proposed works on the trees, and where appropriate, recommend the use of sensitive construction methods and tree protection methods to minimise adverse impacts.

1.1.2 In preparing this Report, the authors have considered the objectives of the following:

- *Sydney Local Environmental Plan (2012)*
- *City of Sydney Register of Significant Trees (2013)*
- *City of Sydney Tree Guidelines for Pruning, Reporting and Using an Arborist (2020)*
- *Australian Standard 4970 Protection of Trees on Development Sites (2009)*
- *Australian Standard 4373 Pruning of Amenity Trees (2007)*
- *Australian Standard 2303 Tree Stock for Landscape Use (2015)*
- *Safe Work Australia Guide for Managing Risks of Tree Trimming and Removal Work (2016)*

1.1.3 This impact assessment is based on an assessment of the following supplied documentation/plans only:

- North Park Tree Retention Plan (Rev D) – prepared by AECOM, dated 06.03.23
- South Park Tree Retention Plan (Rev D) – prepared by AECOM, dated 06.03.23
- North Park Landscape Plan (softscape) (Rev C) – prepared by AECOM, dated 06.03.23
- South Park Landscape Plan (softscape) (Rev C) – prepared by AECOM, dated 06.03.23
- North Park Landscape Plan (hardscape) (Rev B) – prepared by AECOM, dated 06.03.23
- South Park Landscape Plan (hardscape) (Rev B) – prepared by AECOM, dated 06.03.23
- North Park Crossing Schedule - sheets 1-5 (Rev B) – prepared by AECOM, dated 06.03.23
- South Park Crossing Schedule - sheets 1-5 (Rev B) – prepared by AECOM, dated 06.03.23
- Landscape Details Sheet 1 (Rev C) - prepared by AECOM, dated 06.03.23
- Landscape Details Sheet 2 (Rev A) - prepared by AECOM, dated 06.03.23
- North Park Landscape Plan (planting) (Rev B) – prepared by AECOM, dated 06.03.23
- South Park Landscape Plan (planting) (Rev B) – prepared by AECOM, dated 06.03.23
- Planting Arrangement (Rev A) - prepared by AECOM, dated 06.03.23

Refer to Plans **(Appendix 1)**

1.2 The Proposal

1.2.1 The supplied plans show the proposed works include:

- Installation of new light poles and footings
- Installation of new inground services (cables/conduits)
- Installation of new pits
- Installation of new electrical switchboards, distribution boards and bollards
- Installation of new pavements
- Installation of new soft landscaping

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2.0 RESULTS

2.1 The Site

2.1.1 Hyde Park is sixteen (16) hectares in size and is Sydney's oldest park. It is divided into two (2) sections by Park Street forming Hyde Park North (bound by College Street, St James Road, Elizabeth and Park Street) and Hyde Park South (bound by Park Street, Elizabeth Street, Liverpool and College Street). Most of the park is bound by commercial uses along its northern and western sides, with a mix of commercial and residential use on its southern boundary and a combination of open space, religious and educational institutions and commercial uses bordering its eastern boundary.[1]

2.1.2 The principal geometry of the park is laid out along axes running north to south and east to west creating cruciforms focused on the alignment with Macquarie Street, key buildings at its boundaries (e.g. St Mary's Cathedral) and the major icons within the park, the Archibald Memorial Fountain and the ANZAC Memorial.[2] Hyde Park is characterised by a highly structured layout defined by the pathway networks, tree plantings, garden beds, monuments, fountains and pools, grassed open spaces, formalised entrances and boundary walls to the adjoining pedestrian and road networks.

2.1.3 Hyde Park is listed in Schedule 5 Environmental Heritage of the *Sydney Local Environmental Plan (2012)* (Item 11645) and is listed in the *State Heritage Register* (Item 01871).[3]

2.2 The Trees

2.2.1 The avenue of Hill's Figs, linking the Archibald Fountain in Hyde Park North and the ANZAC War Memorial in Hyde Park South, is the park's most significant historical element.[4] The avenue was planted in the early 1930s. A number of individual trees located in Hyde Park are also significant. There are eleven (11) *Ficus macrophylla* (Moreton Bay Fig) that were planted prior to 1928, at which time most of the other original plantings were removed to allow for construction of the underground railway.[5] One (1) of these trees is located in Hyde Park North, just north of the St James Railway Station entrance and the other ten (10) trees are located in Hyde Park South. One hundred thirty (130) trees within the park are listed on *City of Sydney Register of Significant Trees*.[6]

2.2.2 A Visual Tree Assessment[7] (VTA) was not undertaken in preparation of this report. The trees are intensively managed by the City of Sydney and the *Hyde Park Tree Management Plan (2006)* provides additional information on the trees and their growing environment.

2.2.3 Tree ID numbers used within this report are consistent with the Hyde Park Tree Management Plans (Events), dated 17.09.2020. The central avenue section of the park (north and south) contains numerous trees, the majority of which do not have ID numbers or Tree Protection Zone (TPZ)/Structural Root Zone (SRZ) areas shown on the plans. For the purpose of this Report, the entire central avenue has been treated as a single TPZ area.

[1] City of Sydney (2006)
[2] City of Sydney (2006)
[3] City of Sydney (2012), NSW Office of Environment & Heritage (2021)
[4] City of Sydney (2006)
[5] City of Sydney (2006)
[6] City of Sydney (2013)
[7] Mattheck & Breloer (2003)

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3.0 ARBORICULTURAL IMPACT ASSESSMENT

3.1 Australian Standard 4970 Protection of Trees on Development Sites

3.1.1 The proposed lighting/CCTV layout is extensive covering all areas of the park and falls within the TPZ and SRZ areas of many trees. *Australian Standard 4970 (2009) Protection of Trees on Development Sites (AS-4970)* defines the TPZ as the minimum area required for the viability of the tree over the long term whilst the SRZ is defined as the minimum area required for the stability of the tree.

3.1.2 The encroachments from the works within the TPZ areas have been classified as either:

- *Minor Encroachments* - an encroachment less than 10% of the TPZ area and outside of the SRZ, or
- *Major Encroachments* – an encroachment greater than 10% of the TPZ area and/or inside the SRZ

3.1.3 A *Minor Encroachment* is considered acceptable by AS-4970 when it is compensated for elsewhere and contiguous within the TPZ. *Major Encroachments* generally require root investigations undertaken by non-destructive methods or the use of tree sensitive construction methods.

3.1.4 The Tree Retention Plans (Rev D) have been annotated to indicate those works which represent *Major Encroachments* and tree sensitive methods in line with Clause 3.3.4 of AS-4970 will be required. Refer to Section 3.2 below. All Contractors (including sub-contractors) should be briefed prior to commencing the works. Regular spot checks should be undertaken by the Project Arborist where works are located in a TPZ area. Direct arboricultural supervision should be provided in SRZ areas or as annotated on the Tree Retention Plans (Rev D).

Refer to Plans **(Appendix 1)**

3.2 Tree Sensitive Methods & Tree Protection Measures

3.2.1 Tree Protection Fencing

It is assumed that all works associated with the project will be undertaken within a fenced works zone designed to exclude the public. No trees should be included within the fenced works zone. The sections of TPZ areas which fall within the fenced works zone should have ground protection installed in the form of road plates, ground mats or plywood sheeting to prevent soil compaction/surface root damage. Machinery should work from areas of ground protection or existing intact pavement at all times.

3.2.2 Demolition Works

Demolition works within TPZ areas should utilise tree sensitive methods, ensuring demolition machinery/equipment does not contact any part of a tree. Structures within an SRZ can contribute to tree stability by providing ballast to the rootplate or acting as a stop to the overturning of the rootplate. Where required by the Project Arborist, existing underground structures and sub-base materials should be left in situ and reused.

3.2.3 Pavement surfaces to be demolished within the TPZ areas should be carefully broken up in small sections using a hand-operated pneumatic/electric breaker and waste material removed by hand/hand tools. Wheelbarrow movements for the removal of the pavement should remain on areas of existing intact pavement or ground protection only. Wheelbarrows shall not be positioned on the exposed surfaces and sub-base materials. Where pavement cutting is required within TPZ areas, the depth of the pavement surface should be established by a series of trial cuts undertaken outside of the TPZ areas. No over-cutting of the existing pavement surface is permitted.

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3.2.4 Wherever possible, existing sub-base materials within TPZ areas shall remain in-situ. Where the existing sub-base is to be removed, these works shall be undertaken by hand/hand tools ensuring that tree roots are retained and protected.

3.2.5 Mulch & Turf Removal

The removal of mulch and turf within SRZ areas should be undertaken using hand tools. For larger areas outside of the SRZ areas, mulch and turf may be carefully removed using a compact excavator. The compact excavator (<2T) should be fitted with a flat bladed bucket should be guided by a spotter at all times (<2T). The underlying soil profile must remain undisturbed. Exposed roots greater than 25mmø should be protected from damage.

3.2.6 Trenching

Trenching for conduit installation should be undertaken using a combination of hand and compact excavator methods. The compact excavator (<2T) should be fitted with a flat bladed bucket should be guided by a spotter at all times. Where roots greater than 25mmø are encountered, the spotter should expose these roots by hand excavation and the conduits should be installed under or around the roots. The pruning of roots greater 25mmø is only permissible when approved by the Project Arborist. Following installation of conduits/cables, excavated trenches should be backfilled with a certified 80/20 washed river sand/screened topsoil blend.

3.2.7 The supplied plans show conduits running through the SRZ areas of Trees 100N, 217N, 279N, 39S, 112S, 125S, 133S, 144S, 186S, 198S, 201S, 204S, 238S, 249S, 297S, 299S, 301S, 309S, 311S, 323S, 325S and 390S. To minimise the potential for damage to structural roots, conduit installation works should be undertaken using the excavation methods detailed above and should be directly supervised by the Project Arborist.

3.2.8 Footings

Where possible, existing footings within TPZ areas should either be retained and reused or decommissioned and left in situ to minimise disturbance of the soil profile. Where new footings are required, the footing location should be excavated (using the methods as outlined above) to a depth of 600mm. Where roots greater than 25mmø are encountered, the spotter should expose these roots by hand excavation for assessment by the Project Arborist. The pruning of roots greater 25mmø is only permissible when approved by the Project Arborist. Where significant roots are present which cannot be pruned, the footing location should be adjusted or modified accordingly.

3.2.9 Landscaping

The installation of plants within the TPZ areas should be undertaken using hand tools and roots greater 25mmø should be protected.

3.2.10 Hygiene Protocols

It should be noted that Hyde Park is widely affected by the plant pathogens *Phytophthora* and *Armillaria* and strict hygiene protocols should be implemented to prevent movement of potentially contaminated soils and plant material around the park or wider area. Excavated soils and plant material should be disposed of at a registered landfill site. On completion of each section of the works, all tools and machinery that have been in contact with soil should be washed down and disinfected with a 10% bleach solution to minimise the potential spread of soil borne pathogens. Washing down should be undertaken in-situ to prevent movement of soil and potential pathogens.

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3.3 Crown Impacts

3.3.1 Trees 104N, 117N, 179N, 212N, 43S, 118S and 352S will require minor pruning to provide clearance from new light poles. The majority of the works could be undertaken from ground level with a manual pole pruner/pole saw or for larger diameter branches, from an elevated working platform.

Refer to Plates **(Appendix 2)**

3.3.2 Pruning works should be carried out by a Practicing Arborist. The Practicing Arborist should hold a minimum qualification equivalent (using the Australian Qualifications Framework) of Level 3 or above, in Arboriculture or its recognised equivalent. The Practicing Arborist should have a minimum of 3 years' experience in practical Arboriculture. Pruning work should be undertaken in accordance with *Australian Standard 4373: Pruning of Amenity Trees (2007), Safe Work Australia Guide for Managing Risks of Tree Trimming and Removal Work (2016)* and other applicable legislation and codes.

3.3.3 It should be noted that pruning requirements were initially assessed on site based on the 50% and 75% plans. Exact light pole locations were not marked out on the ground as part of the pruning assessment. The pruning requirements outlined within this Report were based on a desktop review of the 95% plans only with no site assessment undertaken. In the event that minor conflict with light poles is identified at the time of installation, additional pruning requirements should be determined by the Project Arborist.

4.0 LIMITATIONS & DISCLAIMER

TreeiQ takes care to obtain information from reliable sources. However, TreeiQ can neither guarantee nor be responsible for the accuracy of information provided by others. Plans, diagrams, graphs and photographs in this Arboricultural Report are visual aids only and are not necessarily to scale. This Report provides recommendations relating to tree management only. Advice should be sought from appropriately qualified consultants regarding design/construction/ecological/heritage etc issues.

This Report has been prepared for exclusive use by the client. This Report shall not be used by others or for any other reason outside its intended target or without the prior written consent of TreeiQ. Unauthorised alteration or separate use of any section of the Report invalidates the Report.

Many factors may contribute to tree failure and cannot always be predicted. TreeiQ takes care to accurately assess tree health and structural condition. However, a tree's internal structural condition may not always correlate to visible external indicators. There is no warranty or guarantee, expressed or implied that problems or deficiencies regarding the trees or site may not arise in the future. Information contained in this report covers only the trees assessed and reflects the condition of the trees at the time of inspection. Additional information regarding the methodology used in the preparation of this Report is attached as Appendix 1. A comprehensive tree risk assessment and management plan for the trees is beyond the scope of this Report.

Reference should be made to any relevant legislation including Tree Management Controls. All recommendations contained within this Report are subject to approval from the relevant Consent Authority.

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5.0 BIBLIOGRAPHY & REFERENCES

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Safe Work Australia (2016), *Guide for Managing Risks of Tree Trimming and Removal Work.*

Standards Australia (2009), *Protection of Trees on Development Sites AS-4970*

Standards Australia (2007), *Pruning of Amenity Trees AS-4373*

Standards Australia (2015), *Tree Stock for Landscape Use AS-2303*

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6.0 APPENDICES

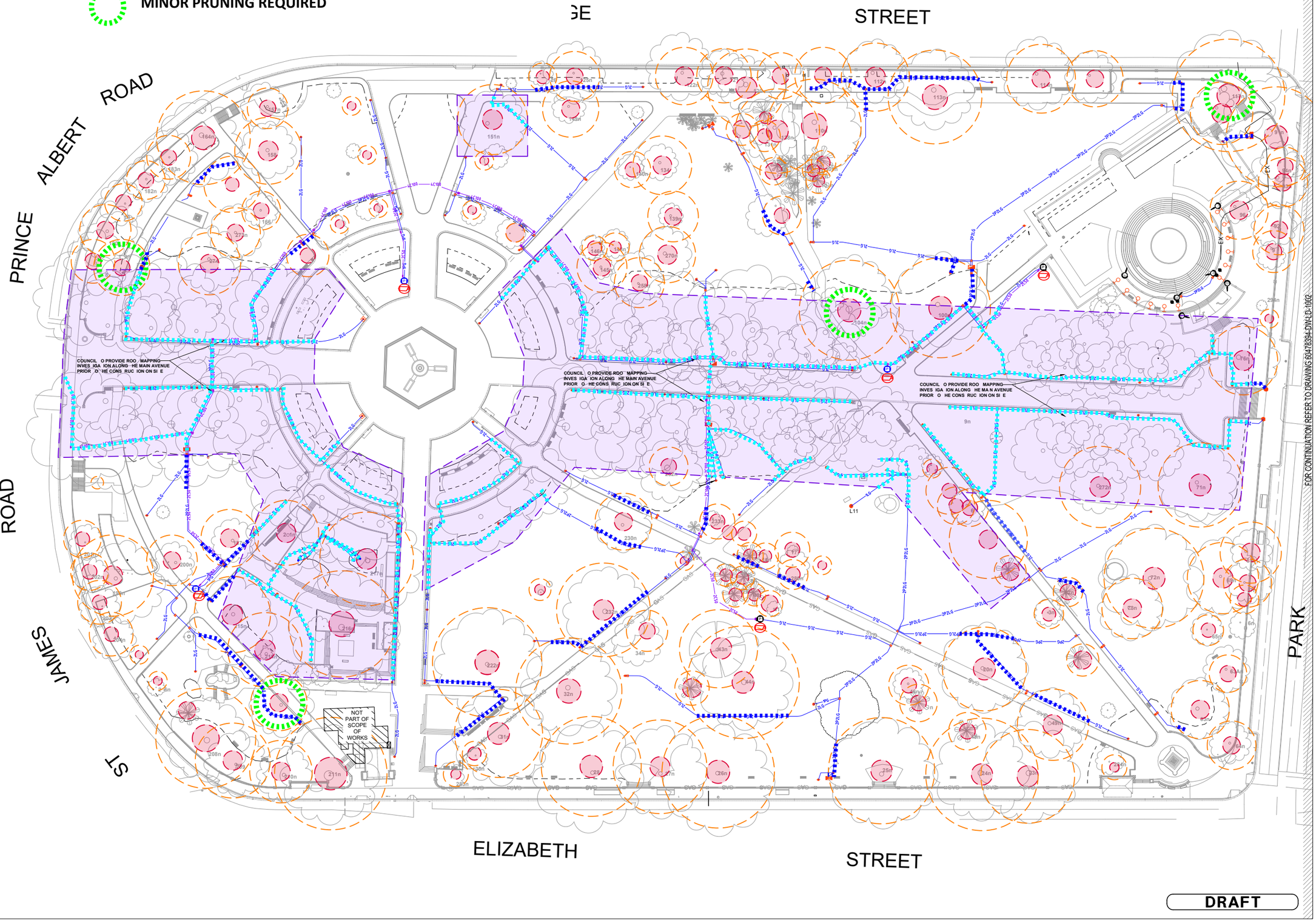
Appendix 1: Plans

ISO B1 707mm x 1000mm

TREE SENSITIVE EXCAVATION AREA
(BREIFING BY PROJECT ARBORIST REQUIRED)

TREE SENSITIVE EXCAVATION AREA
(DIRECT SUPERVISION OF PROJECT ARBORIST REQUIRED)

MINOR PRUNING REQUIRED



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LIGHTING DESIGN

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LEGEND

- EXISTING TREE
- EXISTING PALM TREE
- REE PRO EC ION ZONE — TO BE READ N CONJUNCTION WITH ARBORISTS REPORT AND SPECIFICATION
- S RUC URAL ROO ZONE — TO BE READ N CONJUNCTION WITH ARBORISTS REPORT AND SPECIFICATION
- FU URE EVEN EXCLUSION ZONE — TO BE TREATED AS A LARGE INTERCONNECTED TPZ ZONES FOR ALL TREES WITHIN THIS ZONE. TO BE READ IN CONJUNCTION WITH ARBORISTS REPORT AND SPEC F CATION

REFER O ELEC RICAL PACKAGE FOR DE AILS

- LIGHT POLE WITH PAD FOOTING
- LIGHT POLE WITH PILE FOOTING
- WALL BRACKET MOUNTED LUMINAIRE
- INGROUND UPLIGHT
- EVENT POWER BOLLARD.
- EXISTING MAIN SWITCHBOARD
- EXISTING DISTRIBUTION BOARD
- SERVICES SWITCHBOARD/EQUIPMENT
- ELECTRICAL PIT, TYPE VARIES, LID FINISH VARIES, REFER TO ELECTRICAL PACKAGE
- 2LG / 2P2LG / 1P2LG / 1PG / 2PG — ELECTRICAL CONDUIT, TYPE VARIES, REFER TO ELECTRICAL PACKAGE

REFER O C PACKAGE FOR DE AILS

- ICT CONDUIT, TYPE VARIES, REFER TO ICT PACKAGE
- ICT PIT, TYPE VARIES, REFER TO ICT PACKAGE
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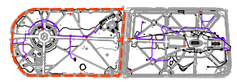
PROJECT MANAGEMENT INITIALS

JC	AA	MA
DESIGNER	CHECKED	APPROVED

ISSUE/REVISION

D	06/03/2023	95% DETAILED DESIGN
C	05/08/2022	75% CONCEPT DESIGN
B	22/06/2022	50% CD - FOR ARBORIST INFO
A	10/06/2022	50% CONCEPT DESIGN
I/R	DATE	DESCRIPTION

KEY PLAN



PROJECT NUMBER

60613074

SHEET TITLE

ELECTRICAL & LIGHT NG SERVICES
NORTH PARK
TREE RETENTION PLAN

SHEET NUMBER

60613074-DW-LD-1001

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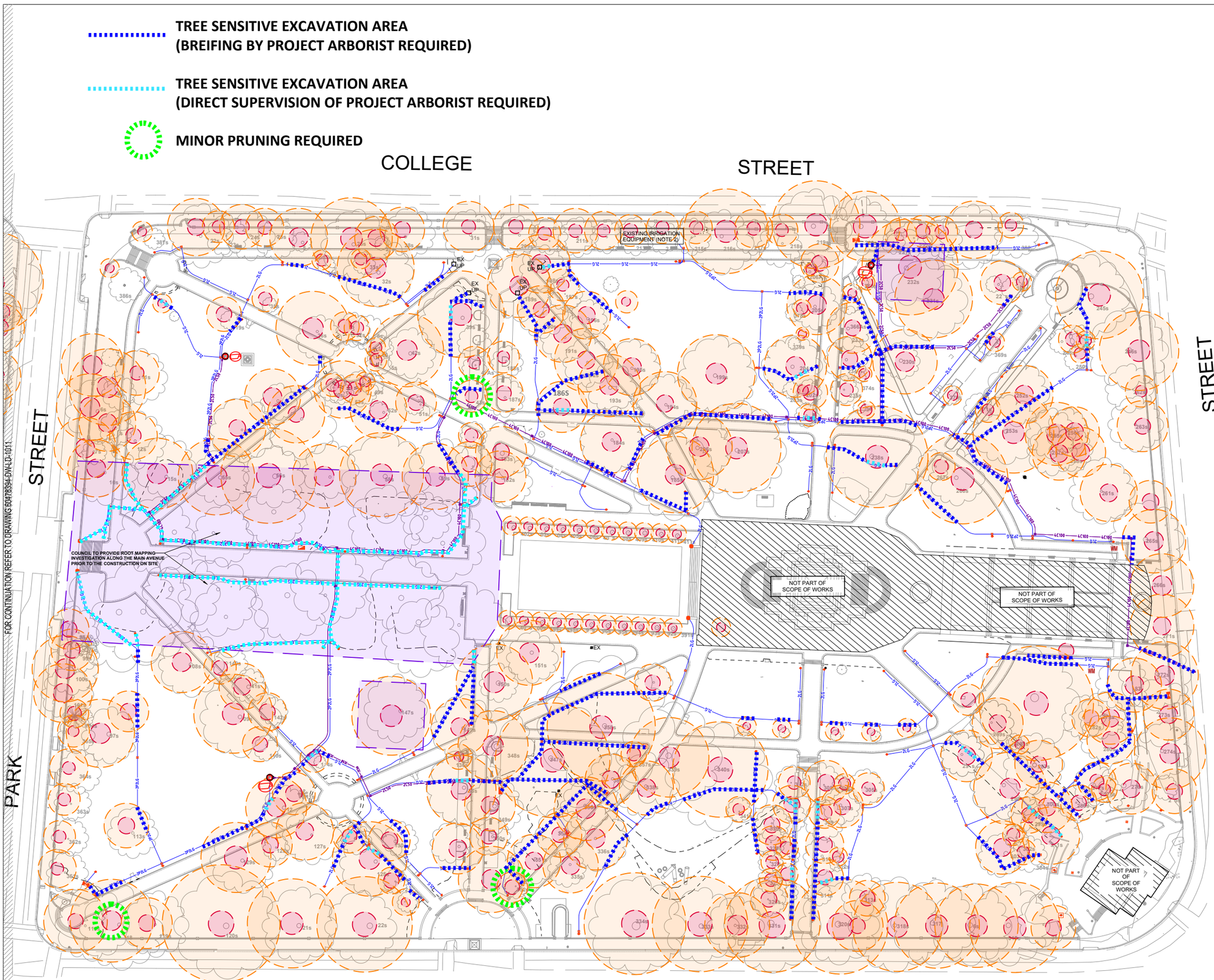
STREET

STREET

PARK

LIVERPOOL

ELIZABETH STREET



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AECOM

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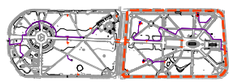

PROJECT NUMBER

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SHEET TITLE

ELECTRICAL & LIGHT NG SERVICES
SOUTH PARK
TREE RETENTION PLAN

SHEET NUMBER

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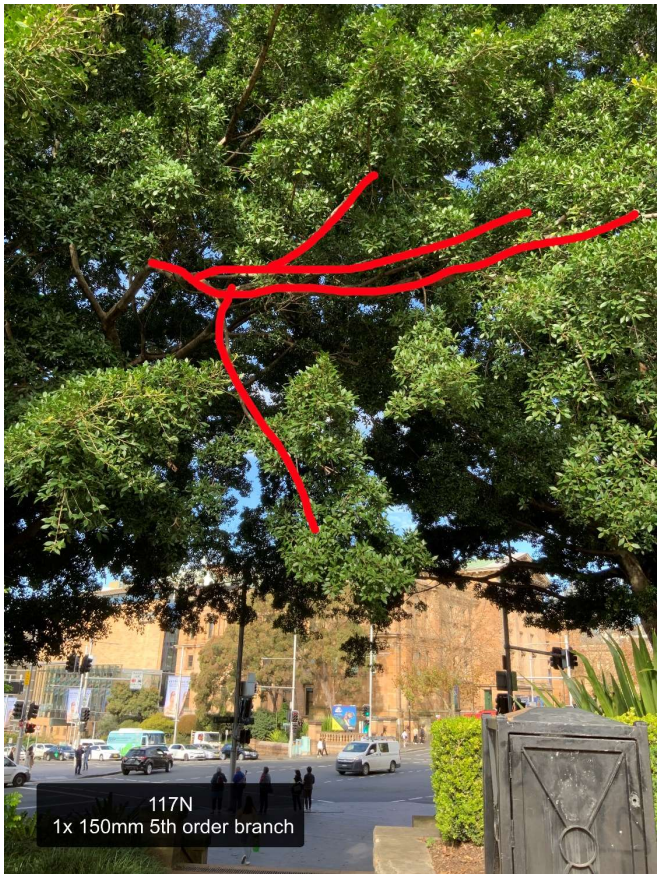
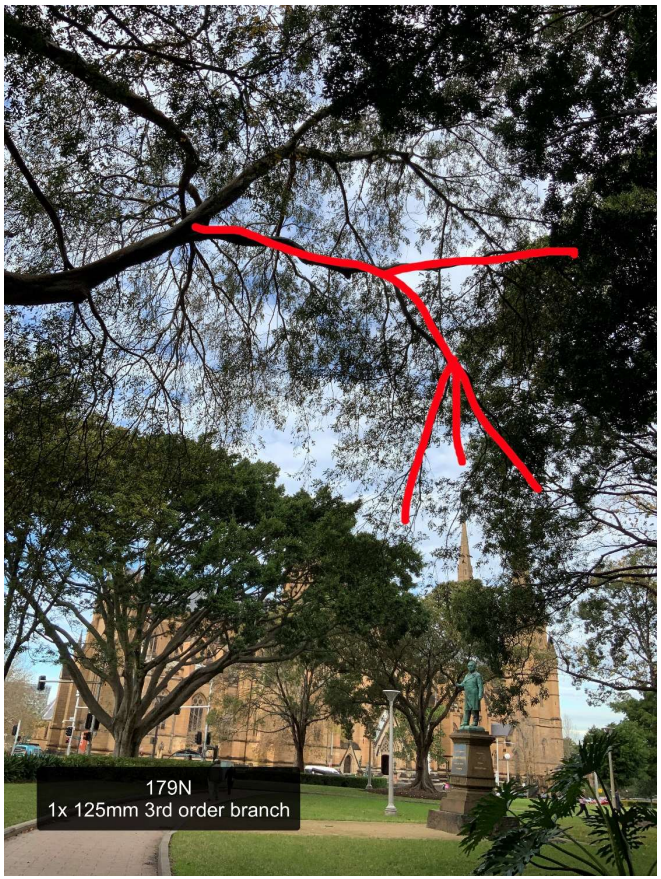
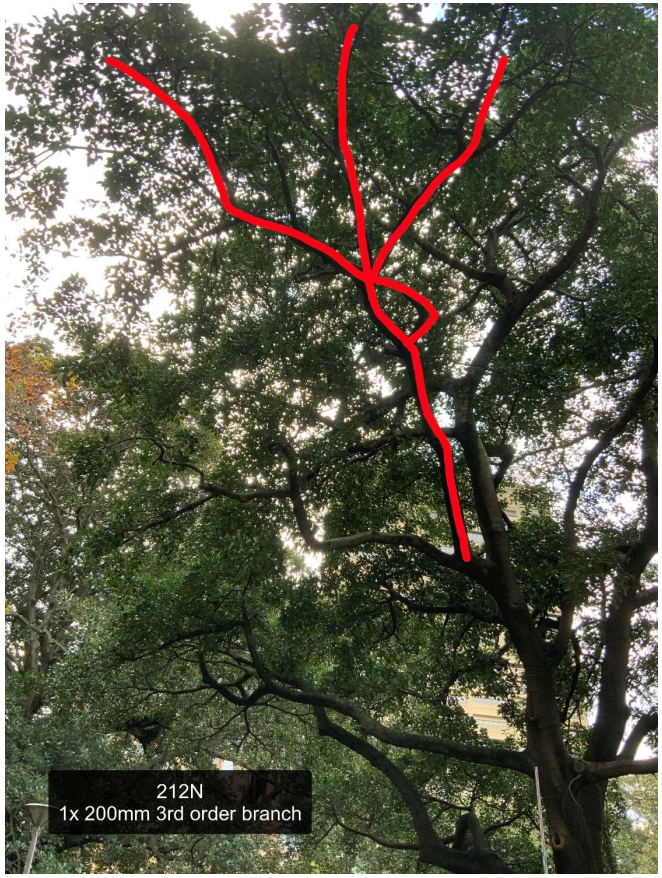
Appendix 2: Plates



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43S
1x 50mm 4th order branch


118S
1x75mm 5th order branch


352S
1x100mm 3rd order branch