TREE WISE MEN®
AUSTRALIA PTY LTD

28 February 2016

Kamal Asadkamal
Brookfield Multiplex Constructions Pty Ltd
Level 22, 135 King Street
SYDNEY NSW 2000

Dear Kamal,

RE: Arboricultural Assessment of Supporting Removal of Tree 130 Sydney Red Gum: MP10_0016 - "The Terraces" 2 Cooper Street, Paddington

Ref: 246MonTree130*[AR-RE-P-1008]*

1. Background

This Arboricultural Assessment has been prepared at the request of Brookfield Multiplex Constructions Pty Ltd (BMC) following review of Construction Drawings and the emergence of a number of construction/tree retention conflicts.

Tree 130 is a mature Sydney Red Gum, *Angophora costata* located adjacent to the currently occupied Residential Aged Care (RAC) building at "The Terraces". Currently the tree is to be retained as detailed in the *Project Approval (MP10_0016)* (Condition C4 by reference to the Arboricultural Impact Assessment report dated September, 2010 by Tree Wise Men® Australia Pty Ltd).

Tree Management Plan September, 2015 prepared for Construction Certificate (Condition B16) prepared by Tree Wise Men® Australia Pty Ltd recommends retention of Tree 130 but identifies likely construction-related conflicts evident in the Stage 2 *Footing and Bulk Excavation Plans* and Stage 2 *Site Establishment Plans*. Refer to Section 3 below for detail of these conflicts.

Google Maps image 26.11.15 showing Tree 130 following Stage 1 tree removals.

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2. Current Status of Tree 130 and the Surrounding Trees

The current characteristics of Tree 130 are summarised in the Tree Schedule excerpt below. See Attachment B for Definition of Terms used.

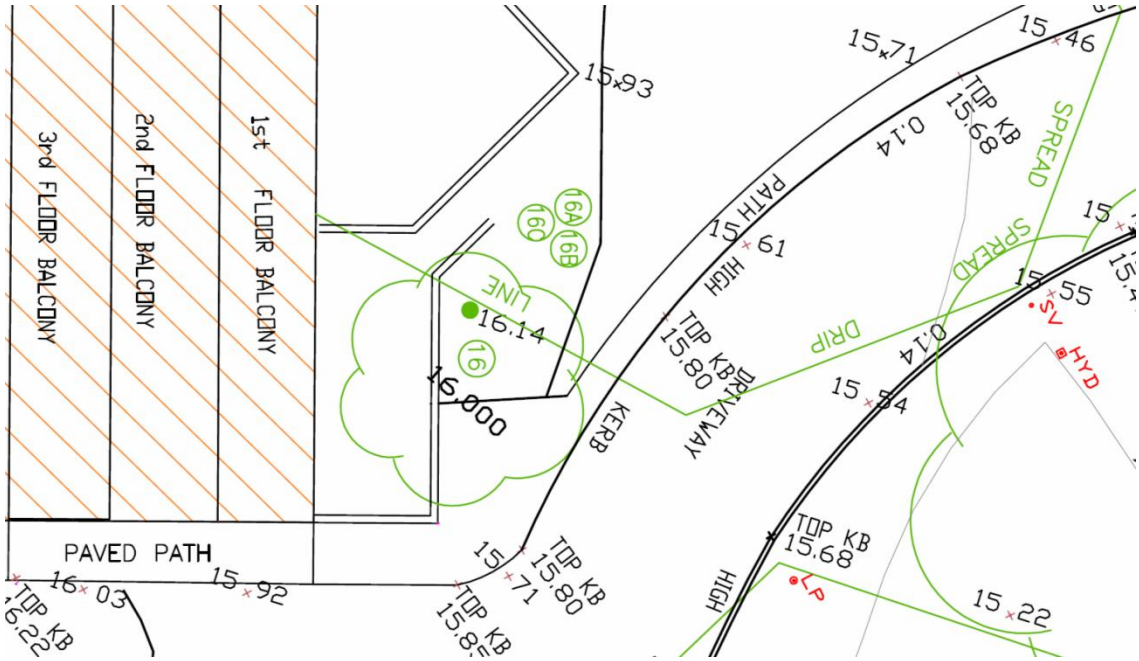
TREE No.	COMMON NAME/ GENUS SPECIES	DBH (m)	HEIGHT (m)	CANOPY RADIUS (m)	AGE CLASS	VIGOUR	CONDITION	SRZ RADIUS (m)	TPZ RADIUS (m)	ULE	©SIG RATING	©RETENTION INDEX	APPROVAL AS PER MP10_0016	TREE RETENTION STATUS @ DEC 2015	COMMENTS as at 7th December 2015 Inspection
130	Sydney Red Gum, *Angophora costata*	0.6	16	N7, S8, E8, W5	M	G	F	2.8	7.2	L	2	A	R+	R+	*Crown skewed to S over proposed Building. Proposed Carpark entrance to Brown Street Building within SRZ to be reviewed given excavation. Crown pruning required south side. Located within Stage 2 construction hardstand crane loading areas.*

Table1: Tree 130 Tree Schedule Excerpt

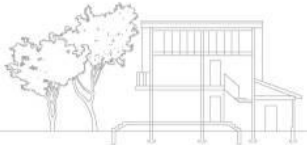
Tree 130 is a ©Retention Value *A* tree by virtue of its ©Significance Rating of *2* and Useful Life Expectancy (ULE) of *Long*. The ©Significance Rating of *2* is due to its size, this tree species being protected under the Woollahra TPO and being an Australian native species. The *Fair* Condition is a reflection of the trunk lean, crown skew and possible root confinement by existing walling (Photos A and B). The tree is growing within 1m of brick walling with likely root restriction or confinement resulting from the wall footings.

The crown symmetry of Tree 130 has been influenced by the older and larger adjacent trees predominantly Tree 127 (Port Jackson Fig, *Ficus rubiginosa* Photo C).

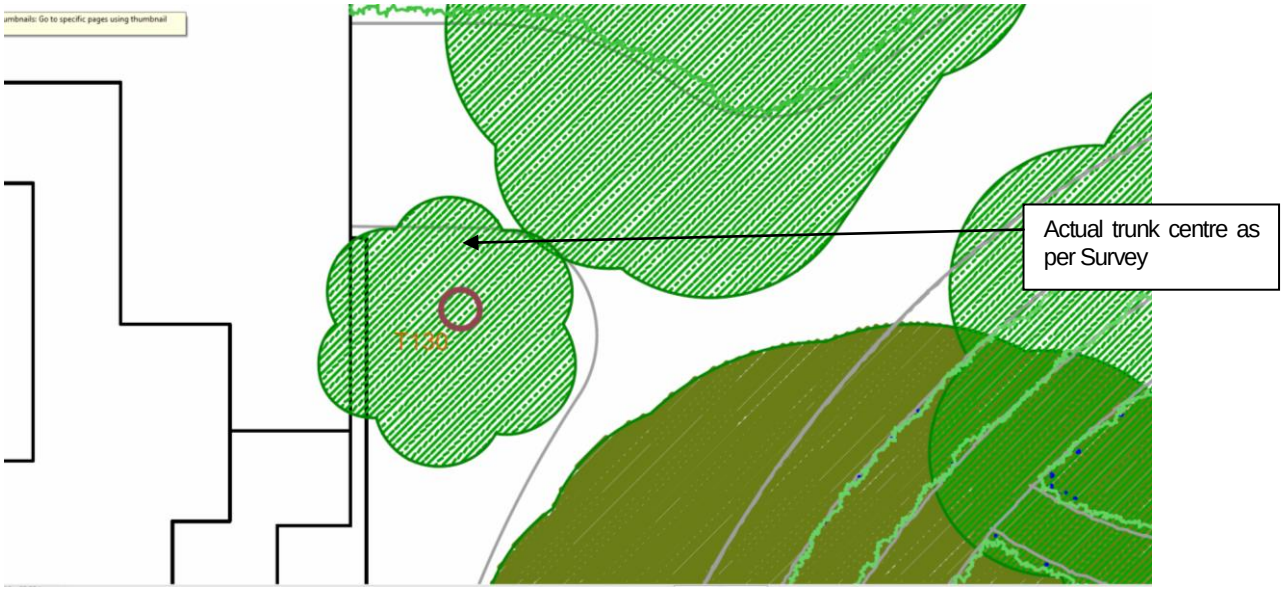
The assessment of the impact of the proposed building works on the tree in the Arboricultural Impact Assessment report for the DA (Ref: 246DAIA, September 2010) was in error. The close proximity of the trunk of the tree to the proposed Driveway ramp to the basement was not accurately assessed. The earlier tree number (#16) on the Survey was misinterpreted by some as the trunk of the tree. The actual trunk centre is at ERL 16.14 as indicated.



Excerpt from Survey Ref: 10358, July 2006 by Clement & Reid.

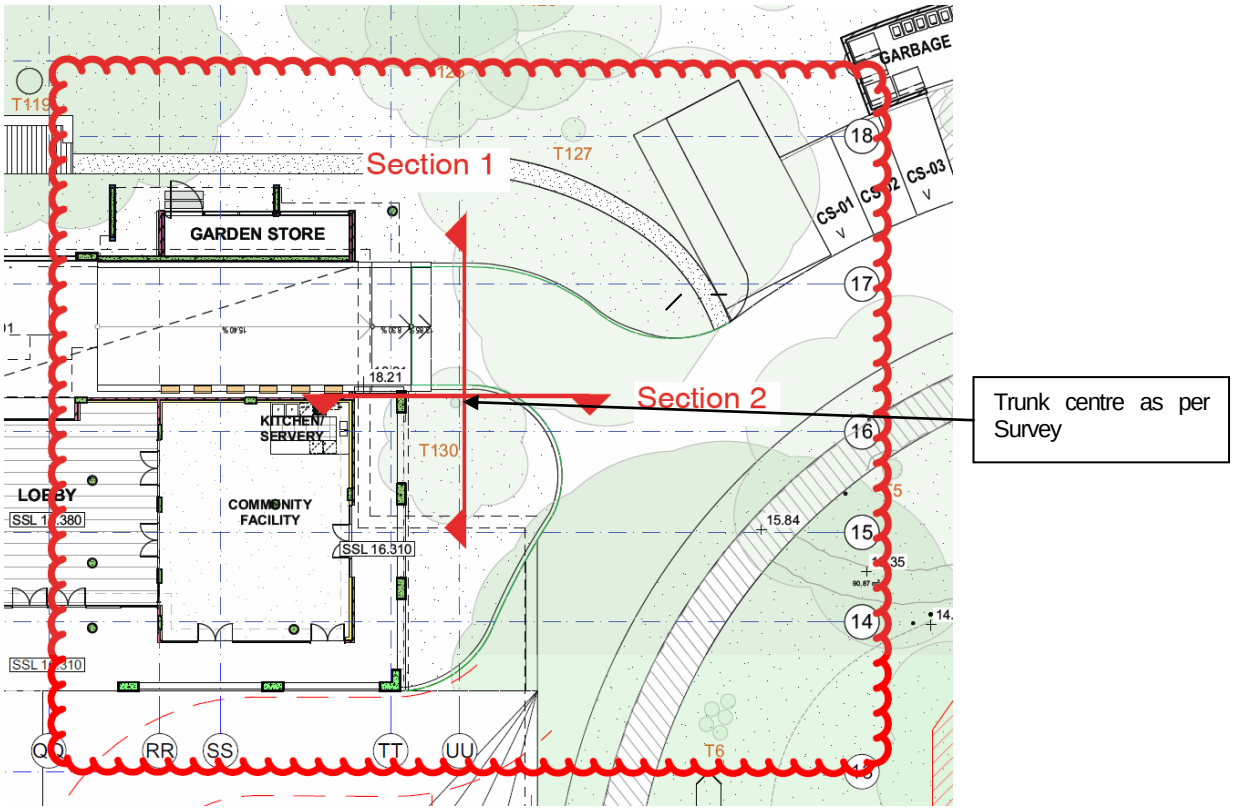


The JPRA Architectural set, *Rev. P11, 7.09.10* reviewed for the AIA, September, 2010 had the trunk shown as the tree number rather than the trunk centre, marginally further from the proposed ramp than shown on the current Drawings.



Excerpt from *Site Plan, DA101 Rev. P11* by JPRA.

The current construction drawings show the actual trunk location well within the Structural Root Zone (SRZ) (2.8m) of the tree. In fact the excavation needed for the Driveway ramp down to the Basement is within 1m of the base of the tree and will result in root cutting on the tension side of the tree.



Excerpt from *Level 01 Plan A-P-1103, Rev 10* by JPRA. Refer to Attachment C of detail of Sections 1 and 2.

The External Works Sections Drawing *A-P-1116, Rev 2* by JPRA has been marked up by Brookfield Multiplex Site Manager 3.12.06 (Attachment C) to accurately show the proposed excavation and the actual lean of the tree.

Section 1 shows the existing ground lines and proposed cut required for the Driveway ramp. Substantial cut for the proposed Driveway ramp is required at the base of the trunk to the west well inside the SRZ. Section 2 shows the cut required for the Basement (Grid line 15) within the Tree Protection Zone (TPZ) (7.2m) and excavation for the Basement (Grid line TT) within the SRZ. The tree will be destabilised by these combined excavation works within the SRZ, particularly given the lean of the tree away from Driveway ramp line of cut.

The crown of the tree is skewed to the south as indicated in Photo C, in the Survey excerpt above and as indicated in the External Works Sections markup (Attachment C). Substantial crown pruning would be required to allow for the proposed building facade and the scaffold required for the construction. As indicated in Section 2 (looking west) scaffolding is required in line with the base of the trunk. Even if the building were to be constructed without external scaffolding, the southern-most leader would need to be pruned to the main junction at approximately 3m above ground level and all the southern branches would need to be pruned to provide reasonable building clearance. This extent of crown pruning would render the tree significantly disfigured such that its ULE would be reduced and the landscape amenity provided by the tree would be lost.

4. Summary

Removal of Tree 130, Sydney Red Gum, *Angophora costata* is supported for the following reasons:

- The rootzone impact assessment for the AIA, September, 2010 was in error given the misinterpretation of the actual trunk centre.
- Significant excavation is required within the Structural Root Zone (SRZ) to the west (Driveway ramp) and south (Basement walling) which will destabilise the tree.
- The crown pruning required for the new building and scaffolding is substantial and will impact significantly on the tree form, ULE and amenity value.
- A replacement native tree species should be added to the Landscape Plan for a suitable location on the site.
- Appropriate approval for tree removal should be obtained to amend the Project Approval.

Peter Castor
DIRECTOR
Attachment A: Photos
Attachment B: Definition of Terms
Attachment C: External Works Sections A-P-1116, Rev 2 Markup 3.12.16

Attachment A: Photos

Photo A: Tree 130 looking southwest showing significant trunk lean to the south and close proximity to existing walling.

Photo B: Tree 130 looking west showing proximity to existing walling and overhang of existing building.

Photo C: Tree 130 looking east showing crown skew to south over existing and proposed building.

Attachment B: Definition of Terms

COMMON NAME/GENUS SPECIES CULTIVAR – Common names can vary with selected texts. Where species is unknown, "*sp.*" indicated after genus. Where cultivar is unknown "*cv*" indicated after species.

DBH – Diameter at Breast Height. Tree trunk diameter measured at breast height (1.4 metres above ground level). Fabric diameter tape is used which assumes a circular cross section. Multiple measurements indicate multiple trunks. Where DBH measurement cannot be taken at 1.4m the height at which it has been taken is indicated.

CANOPY SPREAD RADIUS – Average canopy radius (widest + narrowest ÷ 2). Circular canopy depictions on Tree Plan/Survey are indicative only. Where canopy spread was significantly skewed, all four cardinal point measurements were recorded.

AGE CLASS – Immature (IM), Semi-mature (SM), Mature (M), Over-mature (OM). Assessment of the tree's current Age. A **Mature (M)** tree has reached a near stable size (biomass) above and below ground. Trees can have a *Mature* age class for >90% of life span. **Over-mature (OM)** trees show symptoms of irreversible decline and decreasing biomass.

VIGOUR – Good (G), Fair (F) or Poor (P). The general appearance of the canopy/foliage of the tree at the time of inspection. Vigour can vary with the season and rainfall frequency. A tree can have *Good* vigour but be hazardous due to *Poor* condition. A tree in *Good* vigour has the ability to sustain its life processes. Vigour is synonymous with health.

CONDITION – Good (G), Fair (F) or Poor (P). The general form and structure of the trunk/s and branching. Trunk lean, trunk/branch structural defects, canopy skewness or other hazard features are considered.

SRZ RADIUS – Structural Root Zone. The area around a tree required for tree stability. Earthworks should be prohibited within the SRZ. The area is calculated from the formula and graph at Figure 1 of *AS4970-2009.* The SRZ graph has been adapted from the work of Claus Mattheck (1994). DBH + 10% has been used for the calculation of SRZ. Where DBH is measured at grade or at a height other than 1.4m above grade, 10% has not been added.

TPZ RADIUS – Tree Protection Zone. Radial offset (m) of twelve times (12x) trunk DBH measured from centre of trunk (for trees less than 0.3 metre DBH minimum TPZ is 2.0 metres). To satisfactorily retain the tree, construction activity (both soil cut and fill) must be restricted within this offset. TPZ offsets are rounded to the nearest 0.1 metre. Existing constraints to root spread can vary. Generally an area equivalent to the TPZ should be available to the tree post development. Encroachment occupying up to 10% of the TPZ area is acceptable without detailed rootzone assessment. Encroachments greater than 10% require specific arboricultural assessment.

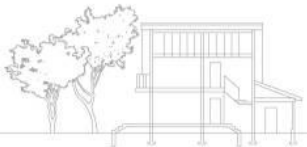
ULE – Useful Life Expectancy. The length of time from the date of inspection that the Arborist estimates the tree will live and provide a useful positive contribution to the landscape amenity of the site. ULE ratings are **Long** (retainable for 40 years or more), **Medium** (retainable for 16-39 years), **Short** (retainable for 5-15 years) and **Removal** (tree requiring immediate removal due to imminent risk or absolute unsuitability).

©SIG. RATING – ©Significance Rating Scale (see notes over)

©RETENTION INDEX (see notes over)

TREE RETENTION STATUS AT 7 DECEMBER, 2015 INSPECTION taking into account the nominated Variations. Trees are identified as *Retain (R), Retain + (R+)*.

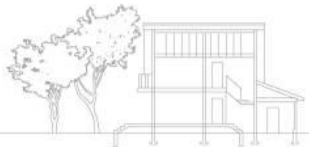
COMMENTS – Comments relating to the location, surroundings and hazard potential of the trees at the time of inspection and where applicable the reason for removal.



©SIG. RATING – ©Significance Rating Scale. A site specific qualitative evaluation of a tree relative to the existing land use developed by Tree Wise Men® Australia Pty Ltd. Takes into consideration the impact of the tree on the surrounding landscape, streetscape and bushland. Rarity, habitat value, historical/cultural value and structural form of the tree are considered in this rating system. It is possible for a tree to have a *Short* ULE and a ©Significance Rating of 1. Likewise it is possible for a tree to be given a *Long* ULE and a ©Significance Rating of 4 (e.g. weed species). The ©Significance Ratings used in this Report are as outlined in Table 1.

Table 1: ©Significance Rating Characteristics

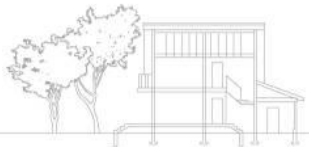
Rating	Significance	Characteristics (some or all)
©Sig. Rating 1	**Exceptional**	▪ Major contribution to site amenity ▪ Remnant specimen ▪ Heritage Listed ▪ Listed on Significant Tree Register ▪ Threatened Species ▪ *Good* vigour and condition ▪ Cultural significance ▪ Possible habitat tree for threatened fauna ▪ Excellent, well formed specimen ▪ Rare or unusual species ▪ Large above ground biomass ▪ Unique within the site and surrounds
©Sig. Rating 2	**High**	▪ Considerable contribution to site amenity ▪ Remnant specimen ▪ *Good* vigour and condition ▪ Threatened Species ▪ Cultural significance ▪ Possible habitat tree for threatened fauna ▪ Well formed specimen ▪ Rare or unusual species ▪ Large or moderate above ground biomass ▪ Other specimens with similar characteristics within the site and surrounds
©Sig. Rating 3	**Moderate**	▪ Minor contribution to site amenity ▪ Remnant or planted ▪ *Fair* or *Poor* vigour and condition ▪ Potential for growth ▪ Well formed or asymmetrical form ▪ Other specimens with similar characteristics within the site and surrounds
©Sig. Rating 4	**Low**	▪ Small/poor specimen ▪ *Poor* vigour and condition ▪ Inappropriate for the location ▪ Minor contribution to landscape amenity ▪ Easily replaced ▪ Weed species or TPO Exempt ▪ Hazardous ▪ Previously ©Sig. Rating 5 tree



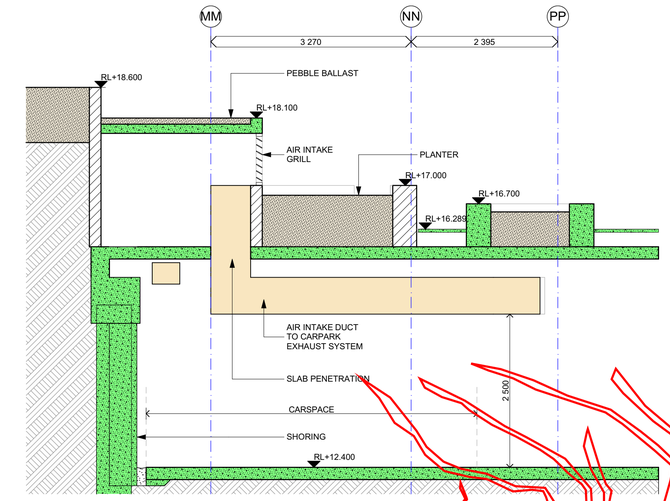
©RETENTION INDEX. A site specific assessment of an individual tree's retention value developed by Tree Wise Men® Australia Pty Ltd. Incorporating ULE and ©Significance Rating each tree is allocated a ©Retention Value of A, B, C or D. The ©Retention Index values can be described as follows:

©Retention Value A	**Should be retained**	▪ Major redesign may be required (e.g. movement of building footprint, re-alignment of roadway).
©Retention Value B	**Could be retained**	▪ Minor redesign may be required (e.g. level changes, pavement detail).
©Retention Value C	**Could be removed**	▪ Should not constrain proposed development.
©Retention Value D	**Should be removed (irrespective of development layout**.)	▪ Should not constrain proposed development. ▪ **Remove ULE** should be removed irrespective of development layout.
	Should be removed or permanently fenced off	▪ Should not constrain proposed development ▪ **Short ULE** could be retained pending landscape proposal.

©Retention Index		**©Significance Rating**			
		1	**2**	**3**	**4**
ULE Rating	**Long (40+ years)**	**A**		**B**	**C**
	Medium (15-40 years)				
	Short (5-15 years)	**B**		**C**	**D**
	Remove (< 5 years)	**D**			



Attachment C: Markup 3.12.16 of External Works Sections A-P-1116, Rev 2



3 EXTERNAL WORKS SECTION 1
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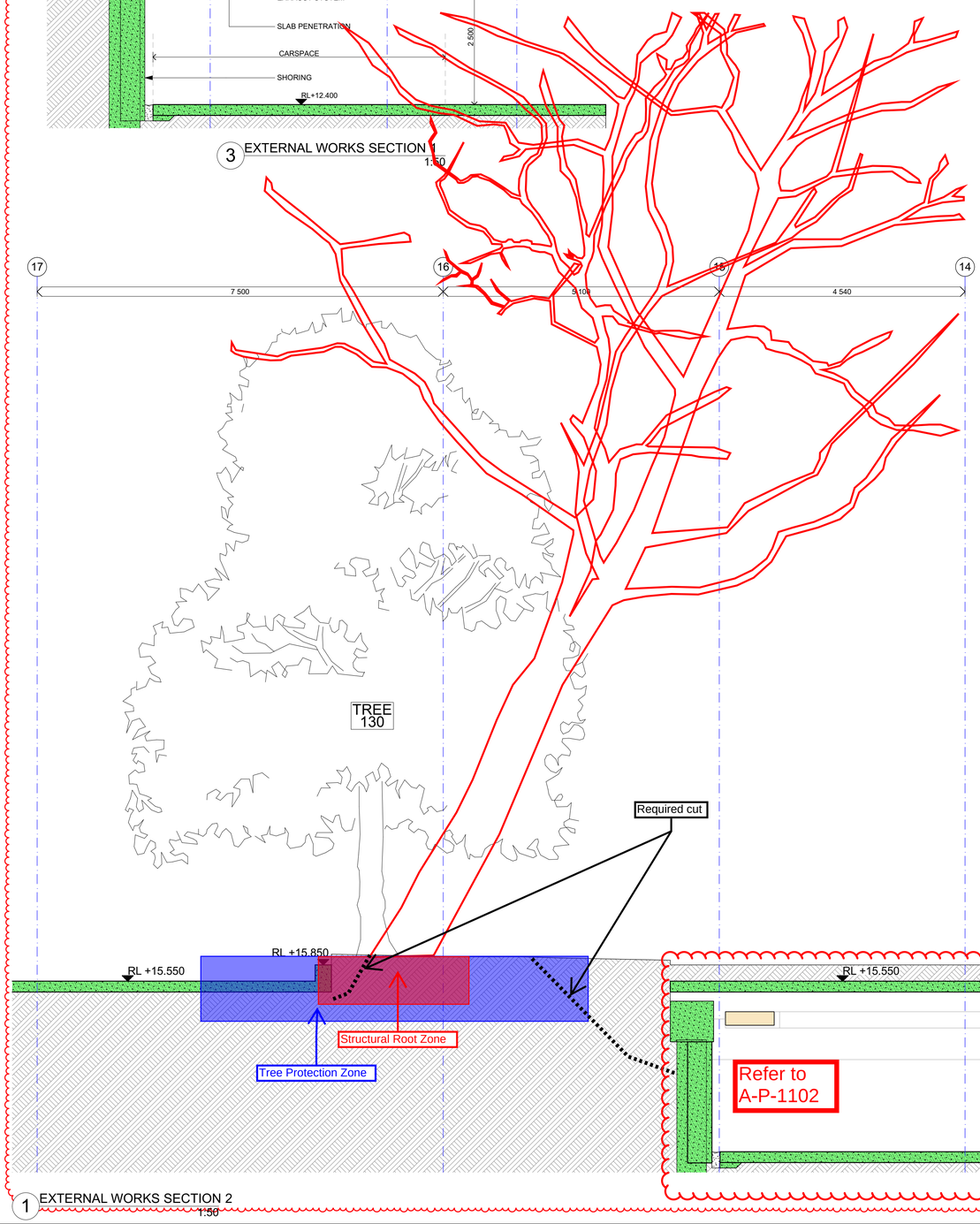

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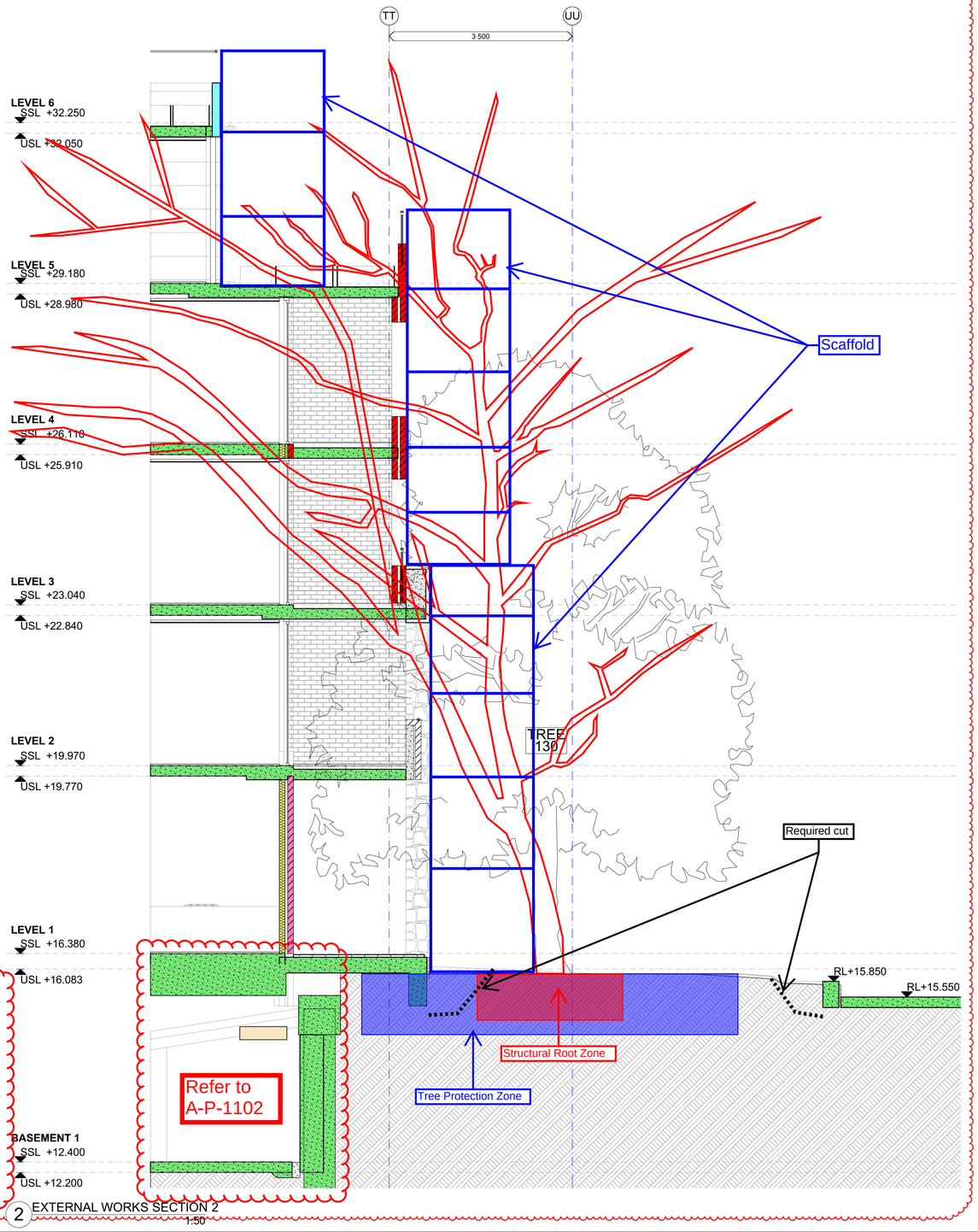

2 EXTERNAL WORKS SECTION 2
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Brookfield Multiplex Constructions Pty Ltd

This document has been reviewed for design intent.

In accordance with the Consultants and/or Brookfield Multiplex comments, the drawing is:

A ☐ **Satisfactory**

B ☐ **Satisfactory Subject to Comments**

C ☐ **Not Satisfactory - Check comments and resubmit**

This submission has been reviewed for general conformance against the project requirements and industry best practice it does not relieve the contractor of their responsibility for ensuring their work is complete, accurate and correct as per their contractual agreements.

Site Engineer Kamal Asadkamal **Date** 3/02/2016

REVISIONS

1	21/12/15	PRELIMINARY ISSUE
2	28/01/16	PRELIMINARY ISSUE

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Presbyterian Aged Care

Brookfield MULTIPLEX

BM

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DOCUMENT REVIEW - BROOKFIELD MULTIPLEX
- ❑ A - Acceptable for Construction
- ❑ B - Acceptable for Construction subject to comments. Correct & Resubmit
- ❑ C - Unacceptable for Construction. Correct & Resubmit for Review
- ❑ D - Drawing on Hold

Reviewed .....Date .....
These documents have been reviewed for conformity with design intent. Acceptance does not mean approval of dimensions, sizes or weights nor does it relieve the subcontractor and/or the Consultant from responsibility for errors, omissions or compliance with the obligations and/or requirements of the Contract and/or Subcontract.

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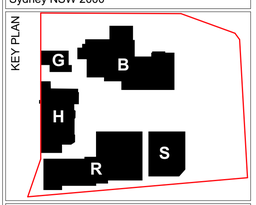
KEY PLAN



PROJECT:
The Terraces
Seniors Living and Residential Aged Care Facility
74 Brown Street Paddington NSW 2021

DRAWING TITLE:
EXTERNAL WORKS SECTIONS

DOCUMENT CONTROL STATUS:
PRELIMINARY

PROJECT NO:
2014063
DRAWN BY:
JPRA

PROJECT NORTH

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DRAWING NO: **A-P-1116** REV: **2**
PLOTTED: 28/01/2016