

28th November 2017

GHD
Level 15, 133 Castlereagh Street
Sydney NSW 2000

Attn: Mike Dean

Re: Retention of the *Eucalyptus tereticornis* (Forest Red Gum) located near the existing dam at 120-126 Hezlett Road, North Kellyville

Please find below a summary of my site visit on the 22/11/17 to 120-126 Hezlett Road, Kellyville (formerly known as 56-58 Hezlett Road) for the purpose of assessing the potential impacts from proposed construction, including the filling of the dam, on the nearby *Eucalyptus tereticornis* as part of the proposed development. I previously assessed this site on the 15/5/17 prior to the commencement of building design. This assessment is based on the impacts of the proposed landscape plan Revision K, dated 27/11/17.

This tree/group of trees growing in close proximity is of high significance in the surrounding landscape and a dominant canopy tree of the endangered Cumberland Plain Woodland ecological community, which is the indigenous vegetation of the area. The tree has frontline exposure to all varying wind conditions (**Image 8**). The Department of Planning NSW requires this tree to be retained and protected.

Due to its multi-trunked form, this tree was assessed as four separate trees in close proximity to one another, however it is undetermined whether these trees are currently one tree, or originally all part of one remnant tree. It is possible they are coppice growths arising from a single stump which has since died and decayed. In such cases, these growths may be supported by root systems which are attached chiefly to individual trunks. It is unknown what degree of interconnectivity there is at the base of the tree. This could only be further determined by further investigation by means of careful hand excavation to observe the extent to which the 'interconnecting' trees share the same root buttress. For the purpose of effective tree protection purposes, an indicative TPZ and SRZ is displayed on the plan- this TPZ and SRZ envelopes the extents of the individual TPZs and SRZs. This *Eucalyptus tereticornis* has been referred to as a single tree with multiple trunks throughout this project.

The soils in this area are from the Blacktown soil landscape group. They are generally soils on crests, upper slopes and well-drained areas; deep 150-300 cm Yellow Podzolic Soils. The landscape is characterised by gently undulating rises on Wianamatta Group shales and Hawkesbury shale. These soils are generally limited by moderately reactive highly plastic subsoil, low soil fertility, and poor soil drainage. The critical soil characteristics of this soil type for trees growing on this site include poor drainage.

Tree Impacts from the Proposed Development

After close observation of the exposed soil profile on the side of the dam and beneath the existing root buttress of the interconnecting tree trunks, it is determined that the base of the root buttress is 200mm above shale bedrock (**Images 1 & 2**). Based on this observation, the majority of the root mass is likely to only inhabit the soil to the southern side of the tree (**Image 8**). Therefore, filling to the proposed RL of +73.00 as per the landscape plan will not contribute to tree impact from the development.

If the material used to fill the dam consists of an appropriate material for the species which has adequate subsoil drainage in place, this will allow gaseous exchange and water infiltration, likely leading to future break out root growth to the north of the tree within the area filled. This will compensate for any root loss that will occur on the southern side of the tree.

Construction of a terraced retaining area is proposed 8.86m south from the tree, providing a 6.3% excavation encroachment within the tree protection zone. This encroachment will provide a low level of impact that is considered sustainable by the tree. The final cut of roots should result in a clean cut, using appropriate tools. Severing roots by earthmoving equipment is unacceptable as this results in tearing damage to roots, putting the tree at greater risk of root decay and/or structural instability. Following our advice, prior proposed plans have been amended accordingly to reduce the initial anticipated impact posed by excavation for the retaining area/structure.

The proposed recycled rubber pad landing for the plastic slide, 5.29m south from the tree will provide an additional encroachment of 1% within the tree protection zone from above grade surfaces. This impact is considered to be very low/negligible, given that this will require no excavation to install, and there is no soil contamination or significant compaction as a result of installing the landing pad.

There is a lateral branch extending over the existing dam to the north of the tree (**Image 3**). This will require pruning to provide pedestrian access, as this may become a hazard once the dam is filled.

Upon closer inspection of the tree's structure on the 22/11/17, defects were sighted on the south-western trunk that will be of great concern once the occupancy of the surrounding area is increased as a result of the proposed school. The trunk referred to as Tree 1A on the data sheet, has inclusions (structural defects that cause weakness and possible internal decay) at 0.5m and 2.5m bifurcations (**Images 4, 5 & 6**) that have the potential to fail during severe weather during stages of prolonged stress that may be suffered by the tree during construction and/or periods of drought. There is also a cavity at the smaller diameter stem's base (**Images 4 & 5**) which is also of concern once the occupancy of the surrounding area is increased. This cavity is considered to be a structural defect. No habitat was observed within the

cavity, and there were no other cavities/hollows observed to be within the tree's crown during the ground-based tree assessment.

If this trunk (Tree 1A) is to remain, the likelihood of failure would potentially increase due to unforeseen loss of vigour and changes in the surrounding area, if construction impacts are excessive and negligence to tree protection measures are not put in place. Removing this trunk with the identified defects, to ground level would eliminate the risk of this part of the tree causing injury or damage.

This pruning would result in a 25-30% loss of combined crown and associated sugar reserves that would have a moderate but sustainable impact on the tree. The pruning is unlikely to compromise the overall structure or increase the likelihood of failure of the remaining crown and the tree would remain prominent in the surrounding landscape. The final cut should be approximately 200mm above ground level without stump grinding the root plate (**Image 7**).

Once removed, the tree should be monitored and subject to annual risk assessment by an AQF Level 5 Arborist, as the proposed development will establish this area to be a school playground, where its pedestrian occupancy rate will increase indefinitely.

Recommendations

The *Eucalyptus tereticornis* can be retained. The filling of the dam, proposed retaining structure and tree pruning will be sustainable by the tree with the following tree protection measures required to reduce the anticipated impacts from the proposed development:

- A Project Arborist is to be appointed to supervise all works within the TPZ.
- Hand excavation should be undertaken along the nearest line of cut and to the anticipated depth for the retaining wall, under supervision of the project arborist. This will allow the location of tree roots greater than 30mm which can then be pruned cleanly using appropriate tools. Severing roots by earthmoving equipment is unacceptable.
- Soil suitable for the growth of this species should be used for fill in the dam to reflect the existing soil profile as much as possible and with adequate drainage to avoid a water table higher than the water level of the existing dam.
- Tree pruning of the tree trunk 'Tree 1A' and the lateral branch above the existing dam should be undertaken by a Level 3 Arborist. The final cut of 'Tree 1A' should be approximately 200mm above the existing ground level without stump grinding the root plate. Please refer to the images regarding pruning and the Tree Location Plan that indicates which trunk is to be removed.

- Tree protection fencing must be installed as per the Tree Location Plan. This area is to remain enclosed and isolated from all construction activities for the duration of the development, only to be temporarily reduced in area to allow the instalment of the plastic slide and landing pad. The fencing will partially enclose part of the dam once it has been filled to reduce compaction to this area in an effort to encourage future root growth. Once installed, the tree protection fencing is to be inspected by the project arborist prior to the commencement of construction.
- The current layout shown in the draft proposed stormwater drainage plan Revision F, dated 15/09/17 does not show any additional encroachment to the tree from stormwater. The final proposed plans should be subject to review by an AQF Level 5 Arborist for potential tree impacts if the stormwater layout is amended to be within the tree protection zone.
- No hollows or cavities providing habitat were observed to be within the tree's crown during the ground-based tree assessment.
- Following the completion of construction, the tree should be monitored and subject to annual risk assessment by an AQF Level 5 Arborist. As the proposed development will be school, the *NSW DEC Tree Management Guidelines* considers open play areas, such as will be the area where the tree is located, and are considered as 'Moderate use areas'. The removal of the tree trunk with defects has been recommended on the basis that this tree part will be of greater risk post-development.

Care has been taken to obtain all information from reliable sources. All data has been verified as far as possible. However Luke Davis - Consulting Arborist can neither guarantee nor be responsible for the accuracy of information provided by others. Unless stated otherwise:

- Information contained in this report covers only the tree/s examined and reflects the health and structure of the tree at the time of inspection. The documented, observations, results, recommendations and conclusions given may vary after the site visit due to environmental conditions. Liability will not be accepted for damage to person or property as a result of natural processes, unforeseeable actions or occurrences.
- The inspection was limited to visual examination from the base of the subject tree without dissection, excavation, probing or coring; and
- There is no warranty or guarantee, expressed or implied, that problems or deficiencies of the subject tree may not arise in the future.

If you have any other queries please do not hesitate to contact me directly.

Regards,

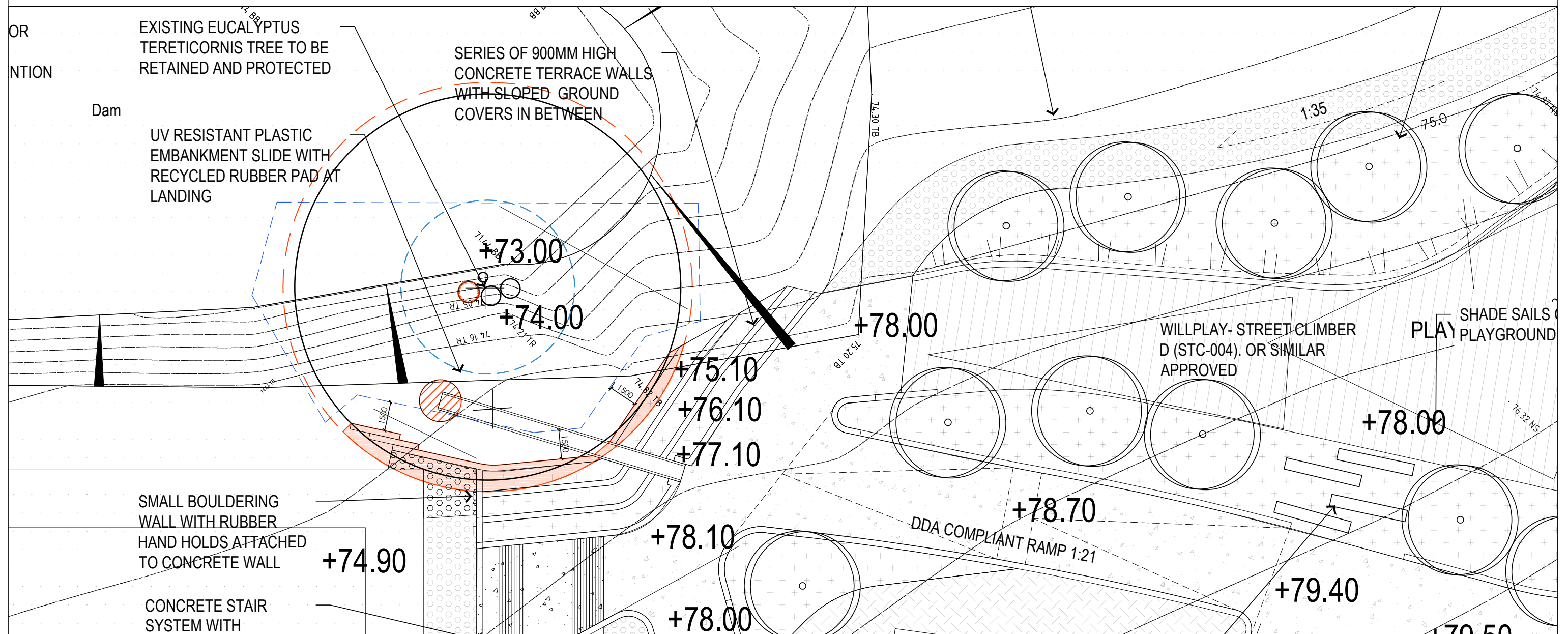
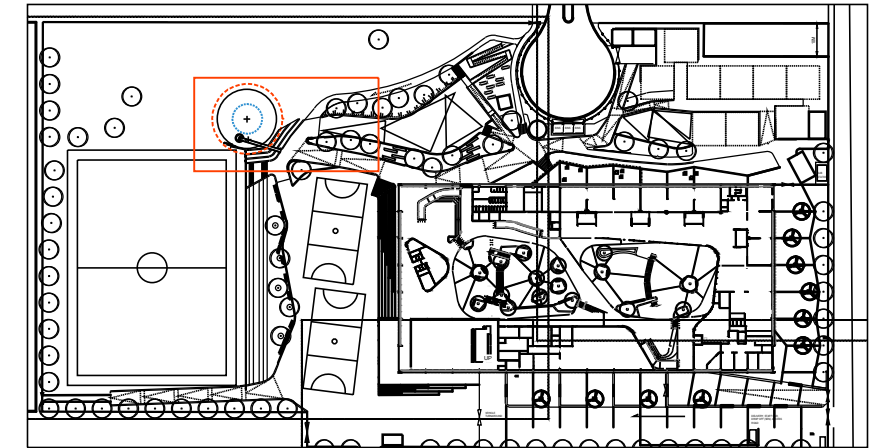
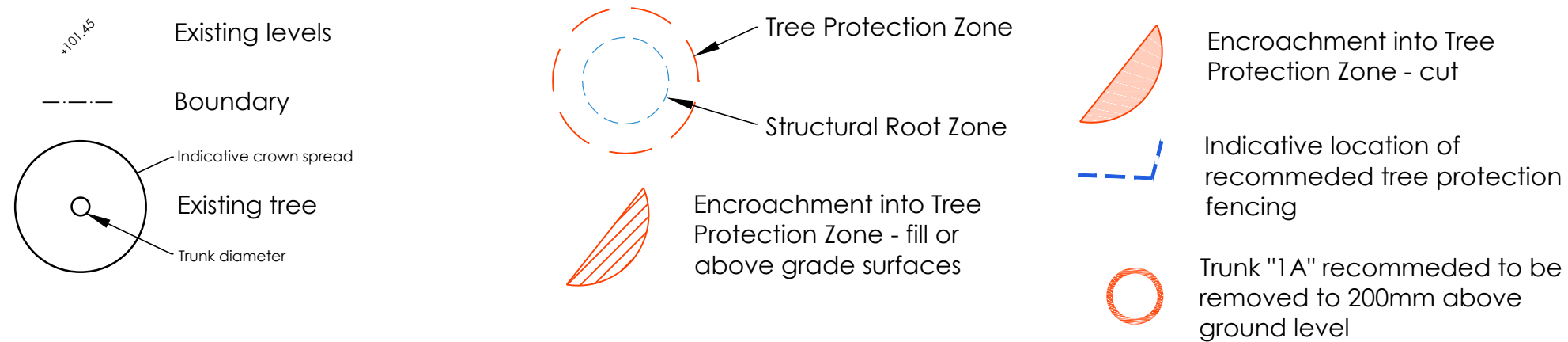


Luke Davis

Consulting Arborist

Dip. Hort, Arboriculture
Cert III Arboriculture
Cert III Hort, Parks & Gardens
QTRA

LEGEND



REVISION		DESCRIPTION		DRAWN	CHECK	DATE	ADDRESS		PROJECT		
A	B	SUBMITTED TO CLIENT FOR COMMENT		LD	AM	22-05-17	 PO Box 8136, Baulkham Hills, NSW 2153 Ph: (02) 9680 7713 Fax: (02) 9680 7705 Email: info@arboreport.com.au Web: www.arboreport.com.au Member of the Institute of Australian Consulting Arboriculturists (IACA)		NEW DEVELOPMENT		
		SUBMITTED TO CLIENT FOR TREE RETENTION ADVICE		LD	AM	28-11-17			TREE LOCATION PLAN		
							CLIENT		SCALE: N.T.S. @ A3 ISSUE: DA SHEET: T - 01		
							GHD		DRAWN: LD CHECK: AM DATE: 28-11-17 REVISION: B		
							1. Do not scale from drawings 2. Verify all measurements on site 3. Notify ecodesign of any inconsistencies 4. Copyright © arboreport. All rights reserved 5. Drawing remains the property of arboreport		6. All work to comply with relevant Australian Standards or Building Code of Australia 7. All work to be performed by a suitably qualified tradesperson 8. For application purposes only - NOT FOR CONSTRUCTION		

NO#	Genus	Species	Common Name	Height	Spread	Trunk				DBH	DRB	SRZ	TPZ	Age	Health	Crown	Signifi-	Form				Comments
						Dia	Dia 2	Dia 3	Dia 4									Am	Eco	Form		
1A	Eucalyptus	tereticornis	Forest Red Gum	19	20	235	530	395		702	1090	3431	8424	M	G	F-Av	H	H	H	M, CD	Western stem. Species is part of the Cumberland Plain Woodland native vegetation. Clump of remnant trees. Deadwood less than 5% of crown, up to 50mm in diameter. Growing on slope/edge of dam on shale soil profile. Branch from Tree 1B is extending horizontally over dam	
1B	Eucalyptus	tereticornis	Forest Red Gum	19	20	450				450	500	2474	5400	M	G	F-Av	H	H	H	CD	Northern stem	
1C	Eucalyptus	tereticornis	Forest Red Gum	19	20	395	460			607	1000	3309	7284	M	G	F-Av	H	H	H	M, CD	Southern stem	
1D	Eucalyptus	tereticornis	Forest Red Gum	19	20	230	710			747	1000	3309	8964	M	G	F-Av	H	H	H	M, CD	Eastern stem	
Indicative TPZ				10600																		
Indicative SRZ				4500																		



Image 1 – Photo taken from north/dam side of tree, showing shale beneath the root buttress of the tree

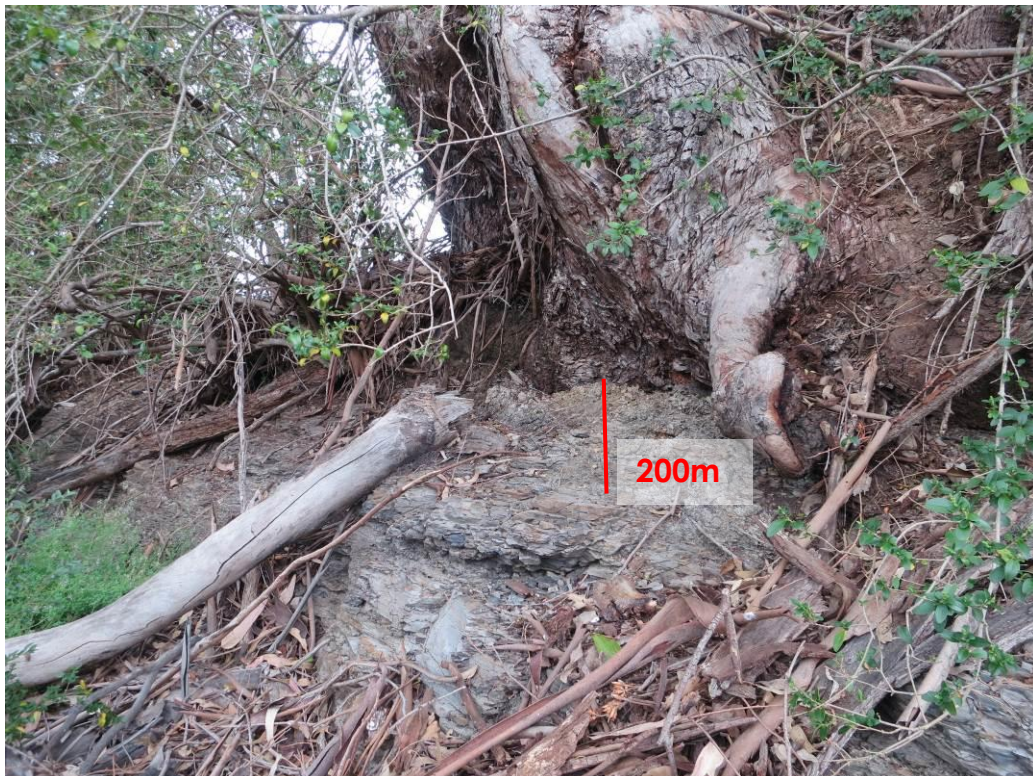


Image 2 – Shale beneath the root buttress of the tree, 200mm below.



Image 3 – Photo taken from south-west, showing lateral branch over dam that will require removal



Image 4 – Photo taken from south-east, showing location of structural defects (1, 2 & 3)



Image 5 –Structural defects 2 & 3, near base of tree. Inclusion (2) and cavity (3)



Image 6 –Structural defect 1 at 2.5m from ground. Inclusion (1)



Image 7 –Recommended location of cut to remove tree part with defects, indicatively 200mm above natural ground level



Image 8 –Photo of tree taken from west, showing exposure, landscape significance and indicative assumed area of tree's root system (yellow area)