



Arboricultural Impact Assessment Report

13 Martin Street BALLINA NSW 2478

Prepared for: Ballina Shire Council

Prepared on: 12 September 2019

Prepared by: Bronson Branch (Dip Arboriculture)

Doc No: 19/72987

12 September 2019

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40 cherry street • po box 450 • ballina nsw 2478
t 02 6686 4444 • f 02 6686 7035 • e council@ballina.nsw.gov.au

ballina.nsw.gov.au

Introduction

This report was requested by James Brideson, Natural Resource Officer, Ballina Shire Council to assess a Fig Tree and its potential damage to nearby structures and mitigation options pertaining to the tree. Cracks and concrete heaving are present in the drive way of the adjacent building at 13 Martin Street, Ballina.

Methodology

A Visual Tree Assessment was conducted from the ground only and no invasive or diagnostic techniques were used when examining the tree. VTA observes the external indications given by the tree at the time of inspection to determine health and the structural integrity of the tree.

A tangent height gauge was used to measure tree height. Diameter at Breast Height (DBH) and other site measurements were taken using a double sided 10m diameter/measuring tape.

DBH was measured at the narrowest point below the whorls or fork in the trunk.

SRZ was calculated by measuring the trunks diameter immediately above ground level.

TPZ and SRZ radius was calculated using the arborlogix.com.au calculator.

Fig tree roots were identified by scraping the tissues to promote sap bleed. Fig trees excrete a white latex sap as an identifying characteristic.

Observations

Species	DBH	Height	Crown spread	Health	Age	TPZ	SRZ
Ficus microcarpa var.hillii	1020mm	10m	17m	Good	mature	12.2	3.3

The tree is located in small area confined by the road 1m to the north and 3m to the west. An unsealed driveway passes 1.5m to the east of the tree. A block of flats is situated to the south, 9.5 meters from the base of the tree and within the trees drip line.

The tree appears in good health, abundant with fruit and healthy new growth, minor indication of pests and no diseases present at the time of inspection. The canopy is dense with no signs of dieback and less than 10% dead wood present.

Previous pruning cuts and some torn branches are evident on the northern side. Surface roots extending to the south have been scalped by mowing or foot traffic.

Several roots with an estimated diameter of 150-200mm were present at a distance of less than a metre from the base on the building.

A root 150mm in diameter and belonging to this tree was sighted approx. 19m away lifting the slab in the carpark of the building. Other damage to the concrete drive way slabs appears consistent with this as the heaving is commonly measured to height of 150mm.

Discussion

The Fig forms part of an avenue of commemorative plantings along Tamar Street. The Fig is also listed on the Ballina Shire Council Significant Tree Register. Development has encroached upon the tree from all sides over the years. (See appendix 2) 51% of the trees TPZ has been encroached by the road and a further 9% by the building. Leaving the tree with only 40% of its theoretical protection zone for root development, water and nutrient uptake. Yet the tree appears to be coping with this very well. The remaining grassed area underneath the tree and the lawn to the east are assumed to be the trees main source of water and nutrients.

It is assumed the trees roots have been opportunistic in colonising the area beneath the surrounding hard surfaces wherever air and water have been available. The impacts of this appear evident in the concrete slabs of the drive way and are presumed to increase as the trees roots expand further in the future.

Severing the roots outside the SRZ to install an impermeable root barrier would be the only feasible way to prevent further damage.

Fig tree roots are known to extend well beyond the drip line and for the root barrier, to give the best protection, it is proposed to continue past the boundary in front of the neighbouring property of No.36 Tamar St.

Excavations required to carry out the works would encroach upon the TPZ of the tree but remain outside the SRZ. The proposed site to excavate and severe the roots would be between 5.3m & 4.8m from the tree. This equates to 21% (98m²) of the TPZ and would be considered a major encroachment. If the proposed encroachment is greater than 10% this area should be compensated for elsewhere and continuous with the TPZ (Australian Standard 4970-2009 Protection of trees on development sites)

The impacts of development upon a tree can take several years to become evident. Damage to the root system is common cause of tree decline and death and is the most common form of damage associated with development sites. (AS 4970 p24).

Fig trees are known to have a high tolerance to disturbance and the ability to adapt to changes in the landscape. The fig at 13 Martin St. is a healthy tree with good vigour that has shown previous tolerance to disturbance within its root zone without any current indication of stress or signs of decline. It is my opinion that the tree will cope with the incursion and loss off roots provided the correct protection is given to the remaining area surrounding the trees.

Recommendations

The turfed areas to the east and west are to become part of the TPZ. The total sum of these areas amounts to 123m² (See appendix1) compensating for the 98m² incursion (App.2) to install the root barrier. These areas are provided for the benefit of the tree and its root system and any further development should be restricted to exclude hard surfacing and compaction in these areas as they are important sources of water and nutrients to the tree.

Fig tree roots are robust and 1000um grade non permeable root barrier should be installed to specifics as detailed in Appendix.3 With the addition of a concrete or timber capping to pinch 80-100mm of barrier above ground level to preventing it from being sucked into the earth and breached by surface roots.

Installing the barrier will require trenching to a depth of 1m along the northern edge of the existing footpath 5.3m from the trunk of the tree. The trench should be between 300-500mm in width. Dial before You Dig plans must be adhered to. The trench is proposed to continue west of the boundary of No.36 Tamar and 13 Martin Streets for a distance of 20m. A 2m clearance given to avoid the Telstra pit and lines located on the boundary. Works are proposed to continue in an easterly direction for a further 7m in front of No.36 Tamar St.

Roots with a diameter up to 200mm would need to be severed to install the barrier. These roots are determined to be mostly feeder and partially structural.

All roots should firstly be identified using careful excavation techniques (such as vacuum excavation) then neatly severed using clean sharp tools such as a reciprocating or hand saw. AQF level 5 Arborist is required to supervise all works and ensure they are carried out to Australian Standards. Any tree roots exposed during excavations should be kept moist until they can be reburied. Dampened hessian cloth wrapped around larger roots or draped over and into the trench will aid in reducing moisture loss and prevent roots from drying out.

The use of a beneficial soil fungicide such as Trichoderma would aid the recovery of severed roots. Trichoderma sp. establish in the root zone crowding out harmful pathogens reducing the risk of infection to the tree.

Following works the tree requires monitoring at regular 6 month intervals for a minimum period of 2 years. This should be carried out by an AQF L5 arborist to assess the impacts and monitor for signs of decline. At this time the root barrier should be checked for signs of breach.

The tree would benefit from enclosing the area beneath, between the footpath and roadside curb with garden edging to a height of 150mm allowing it to be backfilled with mulch.

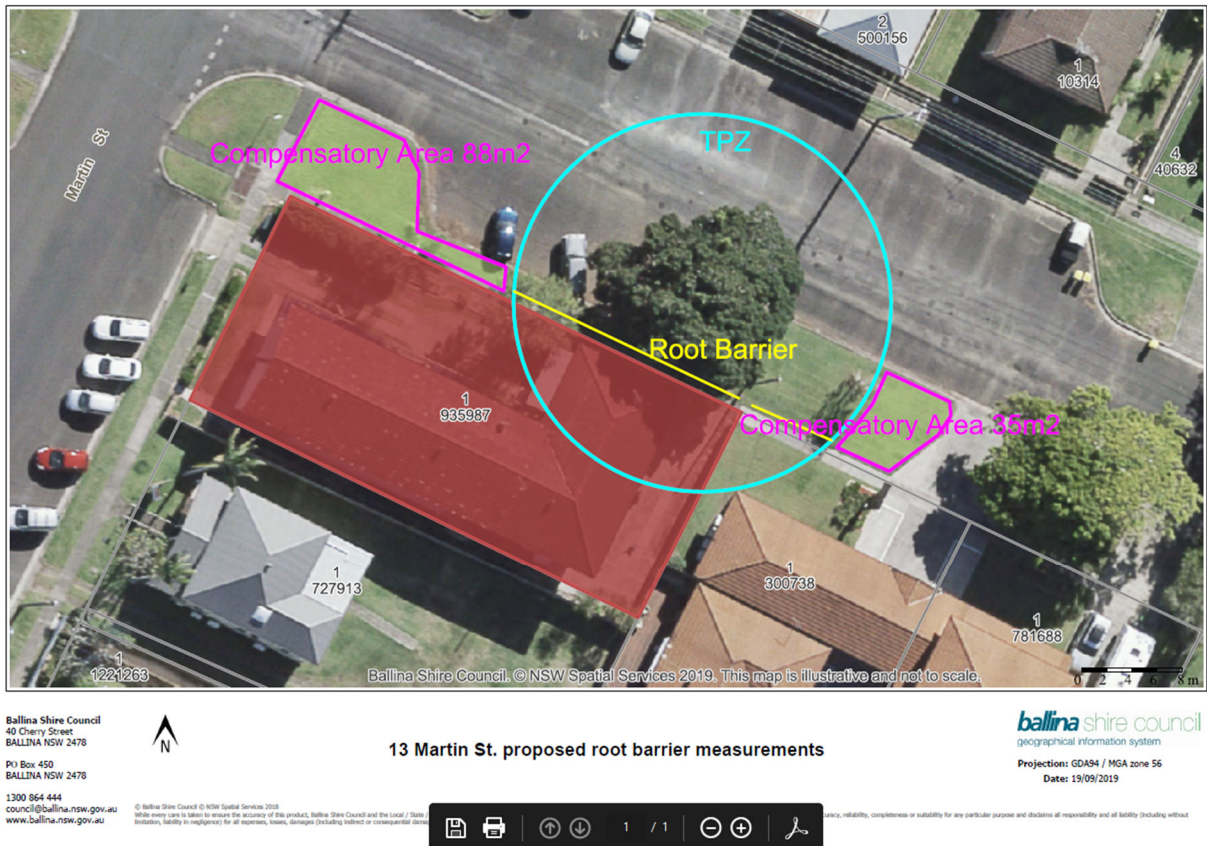
This would aid in retaining moisture in the soil and reducing compaction in the SRZ. Dressing with a layer of compost below the mulch would improve soil quality and provide nutrients.

Conclusion

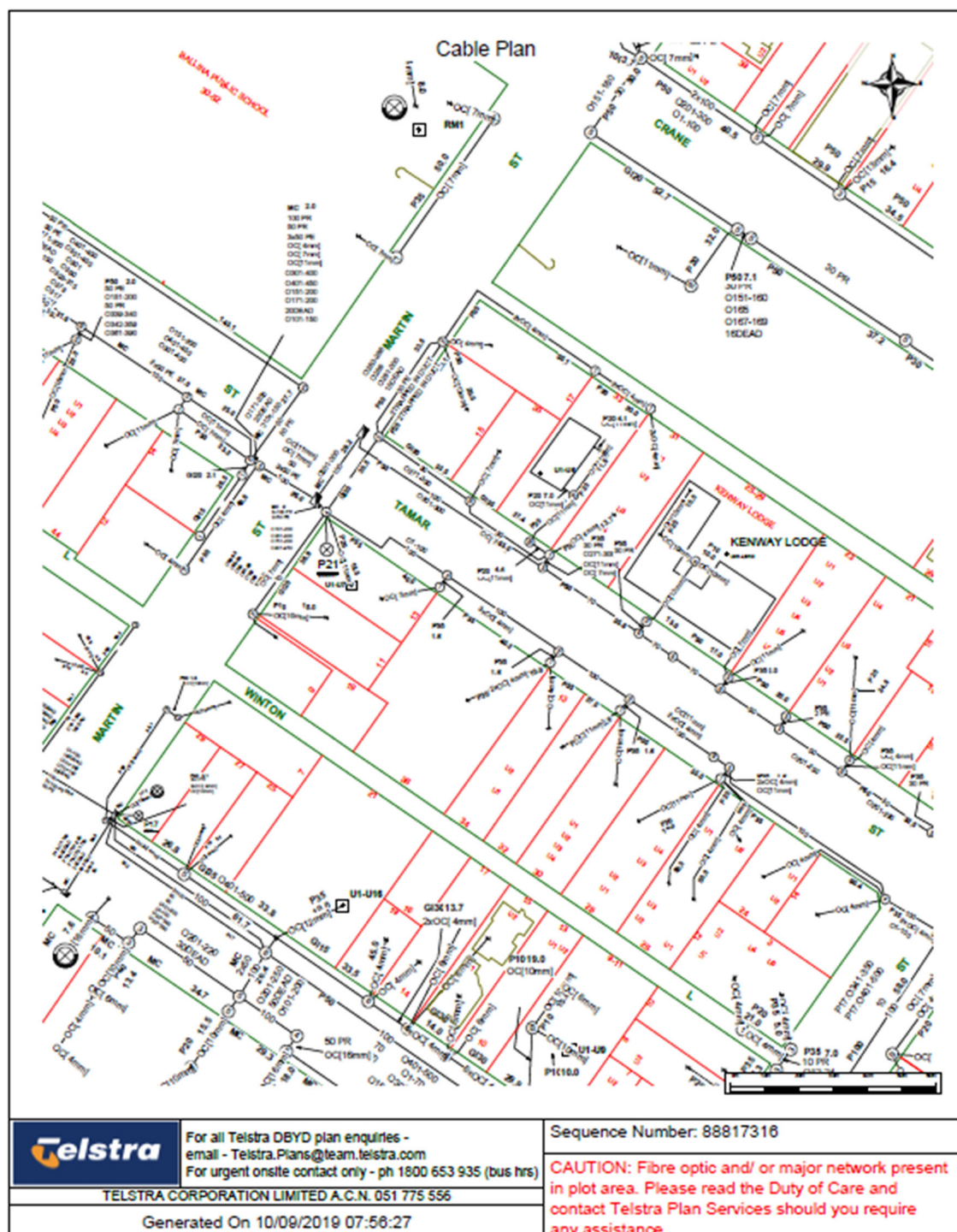
Root barrier is considered a necessary and viable option. The tree plays an important role in the character of the street. Every effort should be made to ensure the effects from proposed works upon the tree are minimised and that future development give consideration to the health of the tree. The tree is in a vigorous state and has demonstrated past tolerance for disturbance within the TPZ and SRZ. However some decline in the trees health is to be expected from the works.

The indications of this may take several years to become evident and continued monitoring is required.

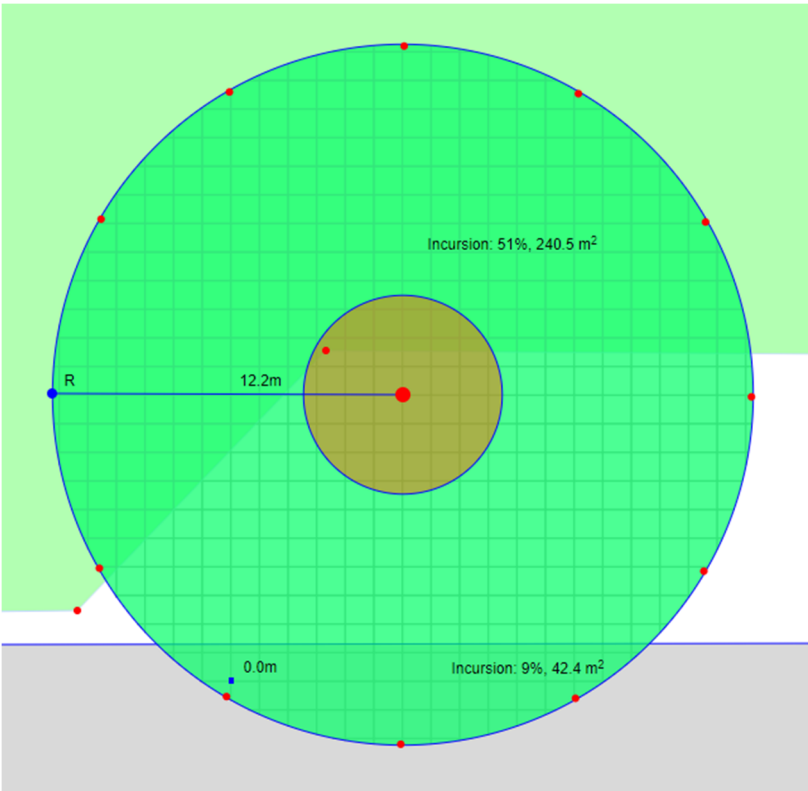
Appendix 1: Root Barrier Location



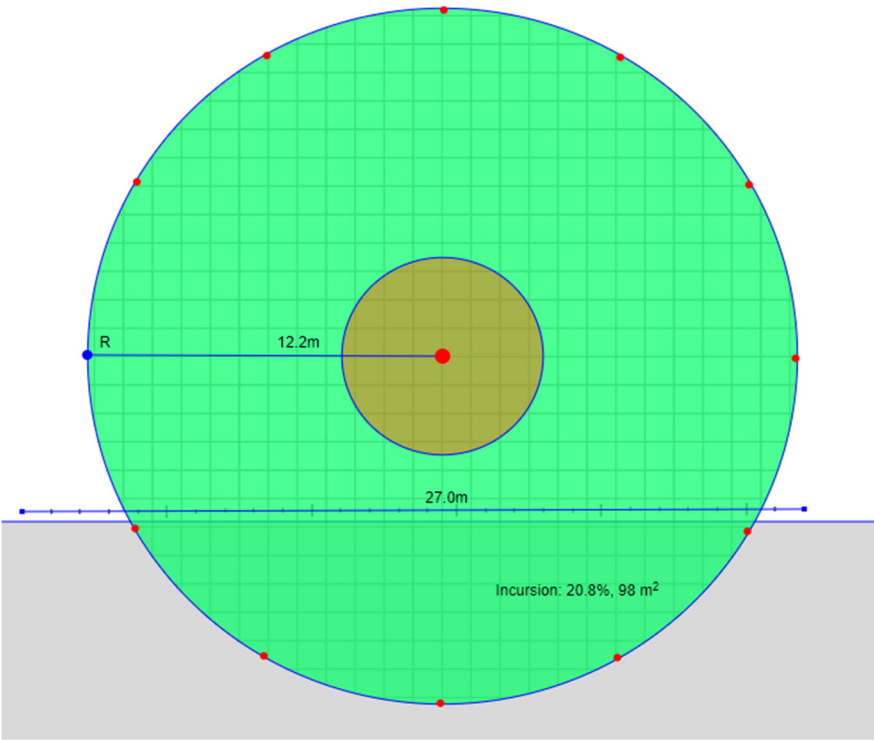
Appendix 2: Service Locations



Appendix 3: TPZ incursion calculator showing development (road & footpath)

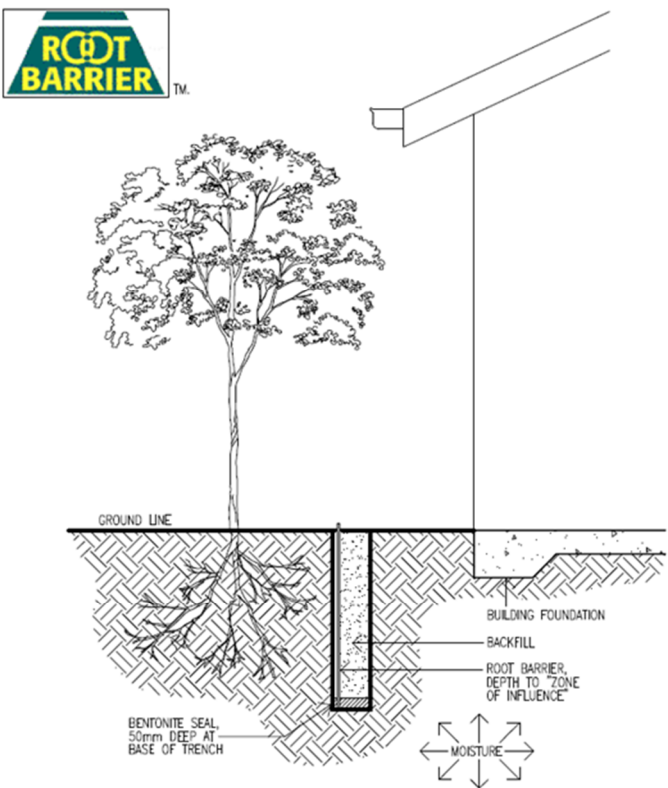


Shaded areas indicate extent of existing development.



TPZ incursion calculator showing extent of proposed root barrier works.

Appendix 4: Typical root barrier installation specifics



ROOT BARRIER FOR TREES

**DESIGN & INSTALLATION GUIDELINES
(INCLUDING TYPICAL)**

NORMALLY PLACED BETWEEN THE TREE AND WHATEVER YOU WISH TO PROTECT. TRY **NOT** TO SURROUND THE TREE. OUR PREFERRED METHOD IS PLACING THE ROOT BARRIER ALONG BESIDE THE PATH, BUILDING, PIPE ETC. SO THAT THE TREE ROOTS CAN NOT GAIN ACCESS TO THE STRUCTURE. **TO STABILISE MOISTURE IN REACTIVE CLAYS UNDER THE STRUCTURE A DEEPER BARRIER IS REQUIRED.**

DEPTH
DETERMINED BY AERATION OF THE SOIL. IN "NORMAL" UNDISTURBED SOIL VERY LITTLE GROWTH OCCURS DEEPER THAN 1 METRE.

SEAL
SODIUM BENTONITE OR OTHER ROOT GROWTH INHIBITOR IS USED TO SEAL THE BOTTOM OF THE TRENCH AND BIND THE BOTTOM OF THE ROOT BARRIER TO THE UNDISTURBED SOIL. IN SUMMARY, TAKE THE BARRIER DOWN TO SOIL THAT NOTHING CAN GROW IN AND BIND THE ROOT BARRIER TO IT.

LENGTH
SUFFICIENT TO STOP THE ROOTS GOING AROUND THE EDGE OF THE BARRIER, NORMALLY 1 OR 2 METRES OUTSIDE THE DRIP LINE OF THE TREE.
INSTALL ROOT BARRIER IN ONE PIECE.

TREE CARE
WORKING IN FROM THE DRIP LINE, (THE EDGE OF THE LEAVES) THE CLOSER YOU GET TO THE TRUNK THE HIGHER THE RISK OF DAMAGING OR DESTABILISING THE TREE. 50% OF THE DISTANCE FROM THE DRIP LINE TO THE TRUNK (20% OF THE TREE'S TOTAL ROOT PLATFORM) IS REGARDED AS THE CLOSEST YOU CAN CUT WITHOUT MAJOR RISK TO PLANTS HEALTH. IF IT IS NECESSARY TO CUT CLOSER THAN HALFWAY TOWARDS THE TRUNK, IT WOULD BE ADVISABLE TO ENGAGE THE SERVICES OF AN ARBORIST TO ASSESS THE TREE PRIOR TO THE WORK BEING CARRIED OUT, AND TO HELP NURSE THE TREE THROUGH THE PERIOD OF INSTALLATION.

BARRIER PLACEMENT

1. DIG A 100mm WIDE TRENCH TO THE REQUIRED DEPTH, INSERT ROOT BARRIER. ENSURE 50mm OF ROOT BARRIER IS LEFT ABOVE FINISHED GROUND HEIGHT (THIS IS TO ALLOW FOR SETTLEMENT AND MAY BE TRIMMED OFF LATER).
2. TRIM EXPOSED TREE ROOTS TO LEAVE A CLEAN CUT, TREAT WITH FUNGICIDE IF REQUIRED.
3. BACK FILL THE BASE OF THE TRENCH PLACING A LAYER OF BENTONITE, THEN BACK FILL USING SPOIL FROM THE TRENCH.
4. ROOT BARRIER SHOULD BE TRIMMED TO JUST BELOW LAWN MOWER HEIGHT BUT ABOVE GROUND (TOP OF ROOT BARRIER MUST BE EXPOSED ON COMPLETION).

ROOT BARRIER SUPPLY AND/OR COMPLETE INSTALLATION AVAILABLE, CONTACT ROOT BARRIER, PHONE 1300 136 644. WWW.ROOTBARRIER.COM.AU

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Image: <https://rootbarrier.com.au>

Appendix 5: Tree images



Fig Root heading under footpath on northern side of building. *B. Branch 10/09/2019*



Carpark slabs lifted 150mm by visible root. *B. Branch 10/09/2019*



Fig root visible 19m from tree. B. Branch 10/09/2019



Grass area in front of No.26. Compensation for TPZ incursion. B. Branch 10/09/2019

Glossary of Terms

DBH: Diameter at breast height

TPZ: Tree Protection Zone; A specified area above and below ground and at a given distance from the trunk set aside for the protection of the trees roots and crown.

SRZ: Structural Root Zone; The area around the base of the tree required for the trees stability in the ground.