

# **Arboricultural report**

- **To:** Nick Mattison, Project Planner, Civix s 9(2)(a)
- From: Andrew Barrell, Consultant Arborist Tree 3 Ltd s 9(2)(a)
- Date: 01 June 2021
- Re: 6-10 The Strand, 21 Hurstmere Road, and 33-45 Hurstmere Road, Takapuna Notable Tree

Development constraints assessment

# Introduction

- 1) I have been engaged to provide a preliminary assessment of constraints posed by trees on and adjacent to the site at 6-10 The Strand, 21 Hurstmere Road, and 33-45 Hurstmere Road, Takapuna ("the site") The full scope of works is as below:
  - a) Identify and clarify potential constraints posed by trees within and adjacent to the area of proposed works. (*Constraints will primarily relate to works around protected trees within the site and any trees on adjacent sites that could be impacted by proposed works*.)
  - b) Liaise with the project manager to ensure continuity between obligatory tree protection requirements and overall site design and layout.
  - c) Provide a preliminary written summary of identified constraints along with brief outline recommendations to adequately manage any relevant tree-related impacts associated with an initial design layout.

This assessment will be based initially on Australian Standard AS4970-2009 Protection of trees on development sites (AS4970). This standard refers in particular to two biometrics which are used to assess impacts on trees
the Structural Root Zone and the Tree Protection Zone (SRZ and TPZ - see definitions below). Measurements have been provided that have been overlaid on a scaled site plan to show these biometrics where relevant.

- 3) I visited the site on 3 February 2021. All inspection work was carried out by visual inspection from ground level and I had unrestricted access to the site and adjacent sites where necessary. The most significant tree with regards to this assessment of impacts is a Notable tree as detailed in *Schedule 10 – Notable Trees Schedule* of the Auckland Unitary Plan (AUP). This tree stands within the section of the site at 6-10 The Strand and is referenced in the *Notable Trees Overlay* as tree 1398.
- 4) I have arboricultural experience and qualifications, the details of which are summarised on my website at the following address: <u>http://tree3.co.nz/about-us/andy-barrel-cv/</u>. I have based this report on my site observations and the subsequent assessments have been made in light of my experience.



# **Background information**

# Location & tree details

5) Multiple trees are located around the periphery of the subject site however the tree most vulnerable to construction-related impacts is the Notable tree referenced above. Figure 1 is an annotated screenshot image taken from the Auckland Council (AC) Geomaps tool showing the site and approximate location of the Notable tree. Construction-related impacts on other trees beyond the proposed building footprint can be adequately managed by standard site management procedures and as such the details of these other trees have not been included within this assessment – it relates primarily to the potential impacts on the Notable tree.

Figure 1 – Screenshot of AC Geomaps tool showing overall site and general location of the Notable tree.

6) The tree in question is a Norfolk Island Pine (*Araucaria heterophylla*) that stands in excess of 25m tall with a radial canopy spread of approximately 8-9 metres, trunk diameter (at 1.4m above ground level) of 1070mm and basal diameter of 1150mm.

#### Industry and AUP standards

7) Australian Standard AS4970-2009 Protection of tree on development sites (AS4970) defines the Tree Protection Zone (TPZ) as a circular area around a tree with a radius equal to twelve times the stem diameter at 1.4m above ground level. This area should be appropriately managed to allow for the survival of the tree. In addition, AS4970 describes the Structural Root Zone (SRZ) as an area within a circle around the tree within which important roots will be present that are critical to the structural support of the tree although this metric is not so relevant in this context as it is anticipated there will be no disruption to this area.

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- 8) AS4970 states the following with regards to encroachments that affect over 10% of the TPZ: "If the proposed encroachment is greater than 10% of the TPZ or inside the SRZ, the project arborist must demonstrate that the tree(s) would remain viable. The area lost to this encroachment should be compensated for elsewhere and contiguous with the TPZ. This may require root investigation by nondestructive methods..."
- 9) In addition, the AUP refers to the Protected Root Zone (PRZ) which is defined as follows in Chapter J Definitions of the AUP:

"The circular area of ground around the trunk of a protected tree, the radius of which is the greatest distance between the trunk and the outer edge of the canopy. For columnar crown species the protected root zone is half the height of the tree."

10) Figure 2 below is an image of the tree (courtesy of Google Streetview) which shows the tree and its immediate surrounds. This image shows that the majority of the TPZ is covered with a combination of tarmac, footpaths and pavers with a relatively small percentage covered with grass/bare earth.





#### Current design

11) Figure 3 below shows the current layout as of 18 May 2021. Figure 4 shows an enlarged section which clarifies the extent of proposed works in close proximity to the tree. These figures indicate that 3% of the TPZ is affected by the building which presumably relates to the encroachment to the north of the tree. Note: in this situation the TPZ is approximately the same as the AUP definition of the PRZ.





Figure 3 – Current proposed site layout in relation to the Notable tree.

Figure 4 - Enlarged version of above plan showing proposed works in relation to the Notable tree.



12) In reality the actual footprint of the proposal does not represent a realistic estimate of TPZ that will be affected because any construction work will likely involve an overcut of at least 1m beyond the actual building footprint.



13) Figures 5 and 6 below show graphical representations of the extent of TPZ affected by the footprint of the building and ramp – Figure 5 shows the actual footprint and Figure 6 shows the footprint with an additional buffer zone of 1m to accommodate overcut/construction activity. These images and calculations are taken from the Proofsafe website (<u>https://proofsafe.com.au/tpz\_incursion\_calculator.html</u>) and serve to provide approximations of the extent of encroachments.



Figure 6 – TPZ encroachments relating to footprint of proposed layout plus 1m buffer zone.



14) Figure 6 represents a more realistic estimate of TPZ area that will be affected by the proposed layout. According to this image the ramp will implicate 19.4% of the TPZ and the building to the north will implicate another 6% which results in 25.4% (or 131.4m<sup>2</sup>) of TPZ affected by the proposed layout. There are no SRZ encroachments.

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#### Assessment

- 15) **Root zone disruption**. The tree appears to be in reasonably good health in spite of most of the TPZ being covered with tarmac and footpaths. Assuming the proposal compromised the abovementioned 25% of TPZ area, if the TPZ were to be ameliorated so that it provided a more root-friendly environment it is conceivable that this scale of root zone disturbance could be adequately tolerated and mitigated with the possibility that there would be an overall improvement in the growing environment. This would ideally be achieved by removal of all foreign objects from within the TPZ area (tarmac, kerbing, footpaths etc.) and applying a layer of aged wood chip mulch to the exposed area to a depth of 75-100mm which would be maintained for at least three years post-construction.
- 16) The ideal solution would be to exclude any structures from within this mulched TPZ area however there would be scope to install infrastructure (footpaths, steps, decking, planters etc.) in this area provided it was done in a root-friendly manner i.e. placed on grade with no excavations (or only very minor excavations) and in a manner that avoided compaction of underlying roots.
- 17) So, whilst the industry standard (AS4970) indicate that anything affecting over 10% of the TPZ requires compensation elsewhere contiguous with the TPZ, this is unlikely to be achievable in what is a very constrained location however, amelioration and improvement of existing root zone area could provide similar benefits i.e. an improvement in the overall rooting environment of the tree. As such the extent of root zone compromised by this current design is of a scale that will be able to be adequately mitigated by reinstatement of the maximum area of TPZ to mulched surface/fully permeable (as opposed to the current status which has only a very small percentage as fully permeable).
- 18) This conclusion is based on the assumption that it will be possible to reinstate the maximum area of TPZ to a mulched covering, with any infrastructure within this area being subject to robust root-friendly design parameters.
- 19) *Canopy disruption*. Extrapolation from the image in Figure 4 indicates that the closest encroachment towards the canopy of the tree occurs to the north. In this area the building is at least 2m from the outer edge of the canopy. This only implicates a very small section of the canopy and, for the remaining canopy footprint beyond this area, the building footprints are located at least 5m or more from the canopy.
- 20) The most significant canopy encroachment is obviously the area with 2m clearance between the canopy and nearest building. In this situation there is adequate room to enable scaffolding to be used without causing a significant impact on adjacent limbs. Minor tip trimming may occur if necessary (which would only likely amount to no more than 1m off the end of the closest limbs) and many limbs can simply be pushed aside and temporarily shielded by plywood cladding on the scaffolding to prevent interference with work activities (see additional comments below about maintenance pruning). The remaining areas around the periphery of the canopy have adequate space to enable construction-related activities to occur with no conflict with branches.
- 21) With regards to managing ongoing conflicts between growing limbs and adjacent buildings, there will be a requirement in future to carry out minor maintenance pruning on the relatively small northern section of canopy where it comes close to the building. This may entail some tip reduction of lateral limbs by approximately 1-2m. This would provide adequate clearance from the building for conceivably several years before any ongoing pruning would be required.
- 22) From a logistical viewpoint, this pruning would ideally be carried out prior to construction works so that a mobile elevated work platform could be deployed to enable precise cuts to be made at the branch tips.

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- 23) It would be very difficult to achieve the required accuracy and quality of pruning cuts by use of climbers in the tree. It would, on the other hand, be relatively easy to set up a mobile platform during the early stages of any demolition/construction works to enable this pruning to be carried out in a manner that achieves the best outcome for the tree. This would also provide initial clearance for scaffolding installation and further reduce the likelihood of any limb damage occurring during this process.
- 24) The distance of the remaining buildings from the tree indicate that any other pruning (apart from the pruning described above) will not be required for many years, probably decades. As such this level of intervention reflects a reasonable compromise to manage the conflicts that inevitably arise between mature trees and the built environment.

# Conclusions

- 25) Some root zone area of the Notable tree will be lost as a result of the proposed design layout for this project. The anticipated scale of root zone loss will be able to be adequately mitigated by amelioration of the existing root zone area to improve the growing environment for underlying roots to the extent that any adverse impacts on tree health will be insignificant over the longer term.
- 26) Canopy conflicts will be limited in the first instance to minor tip encroachments into space on the northern side of the tree that may be occupied by scaffolding during construction works; the remaining buildings are located suitably distant from the canopy that no conflicts are anticipated for many years.
- 27) Remedial trimming may be carried out on this northern aspect of the tree prior to construction works so that a mobile elevated work platform can be deployed. This will have the double benefits of enabling the work to be done with the highest level of accuracy and achieving clearance for both scaffolding and the future building which in turn will avoid the need for any further intervention for many years.
- 28) Remaining trees beyond the site boundaries can be protected from any construction-related impacts by the application of robust site management procedures during demolition and construction works.
- 29) These constraints are standard issues that commonly arise in conjunction with development proposals and they can be dealt with by standard tree and environmental management procedures so that adverse impacts on any implicated tree can be minimised to acceptable and tolerable levels.

# Recommendations

30) A comprehensive Tree Management Plan (TMP) should be produced to manage any impacts on trees implicated by this proposal. This TMP should contain information relating to but not limited to any canopy pruning that may be required, root zone area treatments before, during and after construction works, specific design parameters for any structures that are proposed within root zone areas and recommendations for management of the tree/s and associated root zone area/s during demolition/construction works.

Please feel free to contact me if you require further clarification of any of the above points.

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