



Arboricultural report

To: Paul Kleynhams, Project Engineer, Cato Bolam Consultants s 9(2)(a)
From: Andrew Barrell, Consultant Arborist Tree 3 Ltd s 9(2)(a)
Date: 13 April 2021
Re: Brigham Creek Road & Kauri Road, Whenuapai – trees in riparian yard and wetland area
Arboricultural assessment & recommendations

Introduction

- 1) I have been engaged by Neil Construction Ltd (site owner) to provide an arboricultural assessment of trees within riparian margin and wetland areas at a combined site in Whenuapai that includes numbers 69, 71, 151, 150-152 and 155-157 Brigham Creek Road and 2-10 and 12 Kauri Road.
- 2) I visited the site on 16 March 2021 to assess the trees. Mr. Chris Kennedy (Engineering Design Manager, Neil Construction Ltd) was present during this visit to clarify the extent of the area to be evaluated. Weather conditions were fair to inclement and all assessment work was carried out by cursory visual inspection from ground level.
- 3) The aim of this report is as follows:
 1. *Provide an assessment of the trees within the riparian yard (assumed to extend 10m either side of the watercourse) and wetland area within the site as shown on the supplied plans;*
 2. *Provide recommendations as to which trees should be removed or retained to maintain and enhance the functionality and integrity of the riparian margin and wetland area.*
- 4) My observations, assessments, recommendations and conclusions are set out below.
- 5) I have arboricultural experience and qualifications, the details of which are summarised on my website at the following address: <http://tree3.co.nz/about-us/andy-barrel-cv/>. I have based this report on my site observations and the subsequent recommendations have been made in light of my experience.

Background information

- 6) The area in question is shown on the image in Figure 1 below and represented by the purple shading. The majority of the assessments in this report relate to land located to the south of Brigham Creek Road (numbers 69, 71, 151 and 155-157). Assessments relating to the land to the north of Brigham Creek Road are less detailed and relate primarily to the nature and condition of the existing vegetation assemblage.

Figure 1 – Extent of area of assessment (purple shading within red outline).

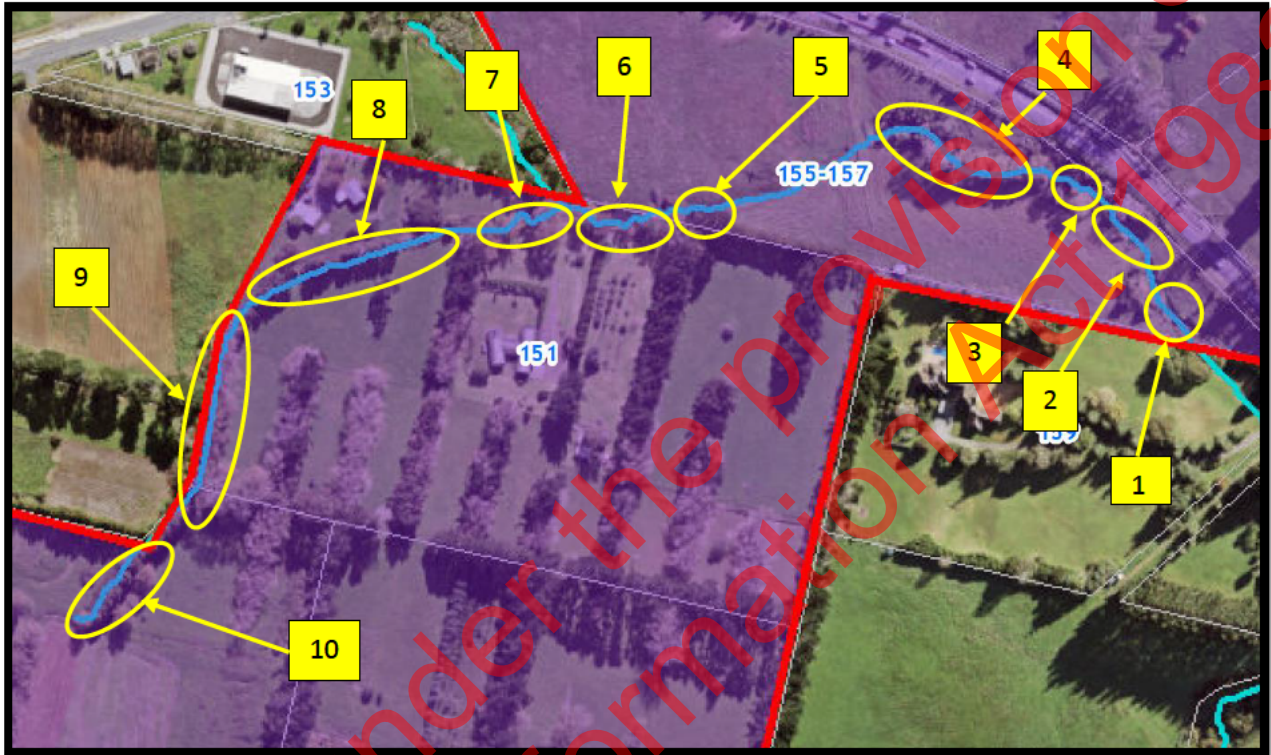


- 7) **Assessment rationale.** The assessment has been based primarily on identifying trees that are either directly interfering with the functionality of the water course or are likely to do so within the short term future (i.e. within the next two to four years). *Functionality* in this context has been understood to mean allowing a relatively uninterrupted flow of water along the watercourse and bears no relation to the provenance of individual trees (i.e. whether they are indigenous or exotic). In addition and with regard to the area to the north of Brigham Creek Road (numbers 150-152 Brigham Creek Road and 2-10 and 12 Kauri Road) the assessment has focused on the existing vegetation and its contribution to the *ecological integrity* of the wetland area. *Ecological integrity* in this particular context refers to the prevalence of indigenous species whereas the *functionality* component of the assessment makes no distinction between indigenous and exotic species, it relates purely to the level of disruption to water flow posed by identified trees.
- 8) Assessments relating to maintaining and enhancing the functionality and integrity of riparian margins have been based on the concept of future-proofing the tree population from primarily biosecurity issues and, to a lesser degree, changes in climate and any associated disruptions that may cause. Current ecological doctrine dictates, in general terms, for the blanket removal of exotic species, regardless of any ecosystem services they may provide. The key to future-proofing tree populations in the 21st century is maximising the diversity of species and to significantly limit the diversity of species simply because of their provenance does not represent the most effective option for maximising the useful life expectancy of a tree population. Kauri dieback and Myrtle rust are just two current biosecurity threats that expose the vulnerability of native-only tree populations. Consequently the assessments in this report relating to the suitability of trees for retention or removal are based on the benefits or disadvantages those trees bring to the general tree population; any species-specific references are made based on the profile (characteristics) of that species, not the provenance.

Assessments

- 9) Figure 2 is an annotated version of Figure 1 and provides a general overview of the vegetation assemblages around the riparian margin to the south of Brigham Creek Road; the wetland area to the north is shown separately in Figure 3. The following comments summarise and clarify the information shown in Figure 2 with regards to general information about species and scale of vegetation in each area and any associated impacts on watercourse integrity.

Figure 2 – Overview of vegetation assemblages.



- 10) In the following sections references are made to removal of weed species; it has been assumed that any such weed removal will include appropriate levels of erosion control, restoration planting and ongoing weed control to prevent reinfestation and maintain the integrity of the watercourse and its banks. The main aim of this report is to provide guidance for the tree management requirements associated with the management of this watercourse and as such the finer detail of any replanting/erosion control/weed management issues are considered beyond the scope of this report.

11) **Area 1.**

Vegetation description: This area contains mostly exotic weed species including bamboo (*Bambusa* species), brambles (*Rubus* species), privet (*Ligustrum* species) and willow (*Salix* species). The larger plants (willow and bamboo) are up to 8m tall and the remaining plant cover has created a dense coverage over the bank and into the actual watercourse itself.

Assessment: The lower vegetation is covering most of the bank either side of the watercourse and is also growing up through the lower branches of the willow trees, effectively shading the area beneath and providing ideal circumstances for weed colonisation to continue. It is also clogging up the watercourse which will cause silt to gather and more weeds to grow, effectively blocking the watercourse. The eventual outcome of this process is that the watercourse will become colonised by trees (likely to be willows) and cease to function as a watercourse.

Recommended actions: Blanket clearance of weed species from this area will result in exposed banks and a clear waterway. This clearance should extend at least 3m from either bank, preferably further if possible, and appropriate riparian planting and erosion control measures should be established as soon as possible to consolidate the bank, prevent erosion and prevent future clogging of the watercourse by unwanted species colonisation.

12) **Area 2.**

Vegetation description: This area contains a selection of exotic trees including poplars (*Populus* species), alders (*Alnus* species) and Acmena (*Acmena smithii*) ranging in height from 7-15m. Minor amounts of exotic weed species understory was present but not in significant concentrations.

Assessment: The majority of species in this area are exotic trees and do provide ecosystem services including soil stabilisation, shade, habitat and shelter and as such their presence is considered to provide a measure of benefit to the functionality of the watercourse. Removal due to provenance is not considered to represent the best outcome from an arboricultural perspective as those ecosystem services would be lost immediately and only recovered after a lengthy establishment period of any new planting. None of the trees appeared to be conflicting with the functionality of the watercourse.

Recommended actions: Localised weed control of lower-level exotic weed coverage where the weeds threaten to enter the watercourse in conjunction with replanting where necessary to avoid erosion and recolonisation by weeds.

13) **Area 3.**

Vegetation description: This area extends westwards from the existing crossing and consists of a dense blanket of honeysuckle (*Lonicera* species), bramble and remnants of a fallen willow tree.

Assessment: The dense coverage of weed species is encroaching into the watercourse and also climbing through the branches of the fallen willow. This encroachment compromises the functionality of the watercourse and will only get worse if not addressed as soon as reasonably possible.

Recommended actions: Blanket clearance of weed species from this area will result in exposed banks and a clear waterway. This clearance should extend at least 3m from either bank, preferably further if possible, and appropriate riparian planting and erosion control measures should be established as soon as possible to consolidate the bank, prevent erosion and prevent future clogging of the watercourse by unwanted species colonisation.

14) **Area 4.**

Vegetation description: This area contains many mature exotic trees including poplars, willows, pine (*Pinus* species), wattle (*Acacia* species), alders, grevillea (*Grevillea robusta*), casuarina (*Casuarina cunninghamiana*) ranging up to 15m in height. In addition there are native trees including totara (*Podocarpus totara*), rimu (*Dacrydium cupressinum*), cabbage tree (*Cordyline australis*) and karo (*Pittosporum crassifolium*), up to 8m tall. The understory contains random pockets of assorted native regeneration as well as gorse (*Ulex europaeus*) and willow weed (*Persicaria maculosa*). There is also a fallen limb within the watercourse, originating from a nearby grevillea tree. This limb is approximately 8m long and has a maximum diameter of about 250mm. The western section of this area appears to have been planted with native species however there is a diverse range of both native and exotic mature species present, all of which are providing ecosystem service as described in earlier sections of this report.

Assessment: The mature tree cover is not compromising the functionality of the watercourse and is providing ecosystem services. Native regeneration is occurring within the shade of these trees however the willow weed in particular is established within the watercourse and will eventually clog it completely. The fallen limb will trap material and result in blockages to the water flow.

Recommended actions: Removal of the willow weed and the fallen limb are priorities in this area. This should be carried out as soon as reasonably practicable and include removal of any other weed species that is encroaching into the watercourse. This clearance should extend as far from the edge of the watercourse as circumstances allow but should result in removal of invasive weeds from at least 3m from the stream edge to reduce the likelihood of recolonisation and be carried out in conjunction with appropriate replanting, erosion control and ongoing weed management.

- 15) The gap between Area 4 and Area 5 is covered in pasture with no trees. No arboricultural management is recommended in this area however the grass may need to be managed to prevent encroachment into and subsequent blocking of the watercourse.

16) **Area 5.**

Vegetation description: Four mature pines in excess of 15m tall stand in this area along with poplars and willows up to 12m tall. There are three mature willow trees that have fallen over adjacent to these pine trees. The fallen willows have created a 1m-high berm with their root systems which has effectively blocked the watercourse. These willows have trunk diameters in excess of 400mm and are upwards of 8m tall.

Assessment: The willows are continuing to grow in their horizontal orientation and will only increase their spread over the surrounding area. The berm formed by their uplifted root structures will only consolidate further if no intervention occurs and the functionality of the watercourse will be irreparably compromised.

Recommended actions: Removal of the willows and their elevated root structures are priorities in this area. This work should entail complete removal of all the stem and canopy material and also the root structures. Once this material has been removed from site the watercourse may be reprofiled and then replanted with appropriate riparian species and adequate erosion controls put in place. This should be carried out as soon as reasonably practicable.

17) **Area 6.**

Vegetation description: This area contains a selection of exotic trees including poplars, willows and oaks (*Quercus* species) ranging in height from 7-10m. Minor amounts of exotic weed species understory was present but not in significant concentrations apart from willow weed at the western end of the section – this was present in significant concentrations within the watercourse.

Assessment: The majority of species in this area are exotic trees and do provide ecosystem services including soil stabilisation, shade, habitat and shelter and as with Area 2, their presence is considered to provide a measure of benefit to the functionality of the watercourse. Removal due to provenance is not considered to represent the best outcome from an arboricultural perspective as those ecosystem services would be lost immediately and only recovered after a lengthy establishment period of any new planting. None of the trees appeared to be conflicting with the functionality of the watercourse. The willow weed was established within the watercourse in significant enough concentrations to justify intervention to maintain the integrity of the watercourse.

Recommended actions: Remove willow weed as soon as reasonably practicable. Ongoing monitoring to check for developing watercourse conflicts from adjacent trees and roots.

18) **Area 7.**

Vegetation description: This area contains mature willows and poplars up to 10m tall in the eastern section and a dense coverage of assorted weed species towards the western end including privet, willow weed, tobacco plant (*Solanum mauritianum*) and bramble. The weed cover in the western section completely covers the watercourse whereas the poplars and willows to the east are not affecting the watercourse at this point in time.

Assessment: The trees in the eastern section of this area do provide ecosystem services including soil stabilisation, shade, habitat and shelter and as with Area 2, their presence is considered to provide a measure of benefit to the functionality of the watercourse. Removal due to provenance is not considered to represent the best outcome from an arboricultural perspective as those ecosystem services would be lost immediately and only recovered after a lengthy establishment period of any new planting. None of the trees appeared to be conflicting with the functionality of the watercourse. The dense weed cover in the western section is completely covering the watercourse and presumably (it could not be viewed due to the dense nature of the plant cover) affecting the flow of water.

Recommended actions: Blanket removal of the weed coverage in the western section of this area should occur as soon as reasonably practicable. As with the other areas, appropriate levels of erosion control, replanting and weed management will be required to ensure the ongoing integrity of the watercourse.

19) **Area 8.**

Vegetation description: This area contains approximately 26 mature cypress (*Cupressocyparis* species) trees ranging in height from 12-15m. All these trees stand on the northern side of the watercourse.

Assessment: Removal of these trees due to provenance is not considered to represent the best outcome from an arboricultural perspective as any ecosystem services they provide would be lost immediately and only recovered after a lengthy establishment period of any new planting. None of the trees appeared to be conflicting with the functionality of the watercourse. That said, there is scope to establish appropriate ground cover beneath the trees and on each side of the watercourse to provide soil stabilisation and ecological benefits over the longer term.

Recommended actions: Ongoing monitoring to check for developing watercourse conflicts but no immediate intervention recommended. Infill planting with appropriate riparian species is recommended as part of the long term management strategy for the entire riparian section where areas are exposed or barren, as is the case in this particular section of the site and with Area 9.

20) **Area 9.**

Vegetation description: This area contains approximately 30 mature poplar and willow trees ranging in height from 12-15m. All these trees stand on the northern side of the watercourse.

Assessment: Removal of these trees due to provenance is not considered to represent the best outcome from an arboricultural perspective as any ecosystem services they provide would be lost immediately and only recovered after a lengthy establishment period of any new planting. None of the trees appeared to be conflicting with the functionality of the watercourse. That said, there is scope to establish appropriate ground cover beneath the trees and on each side of the watercourse to provide soil stabilisation and ecological benefits over the longer term.

Recommended actions: Ongoing monitoring to check for developing watercourse conflicts but no immediate intervention recommended. Infill planting with appropriate riparian species is recommended as part of the long term management strategy for the entire riparian section where areas are exposed or barren, as is the case in this particular section of the site.

21) **Area 10.**

Vegetation description: This area contains mature casuarina and poplar trees up to 15m tall on the eastern side of the watercourse along with random pockets of privet adjacent to and within the watercourse itself.

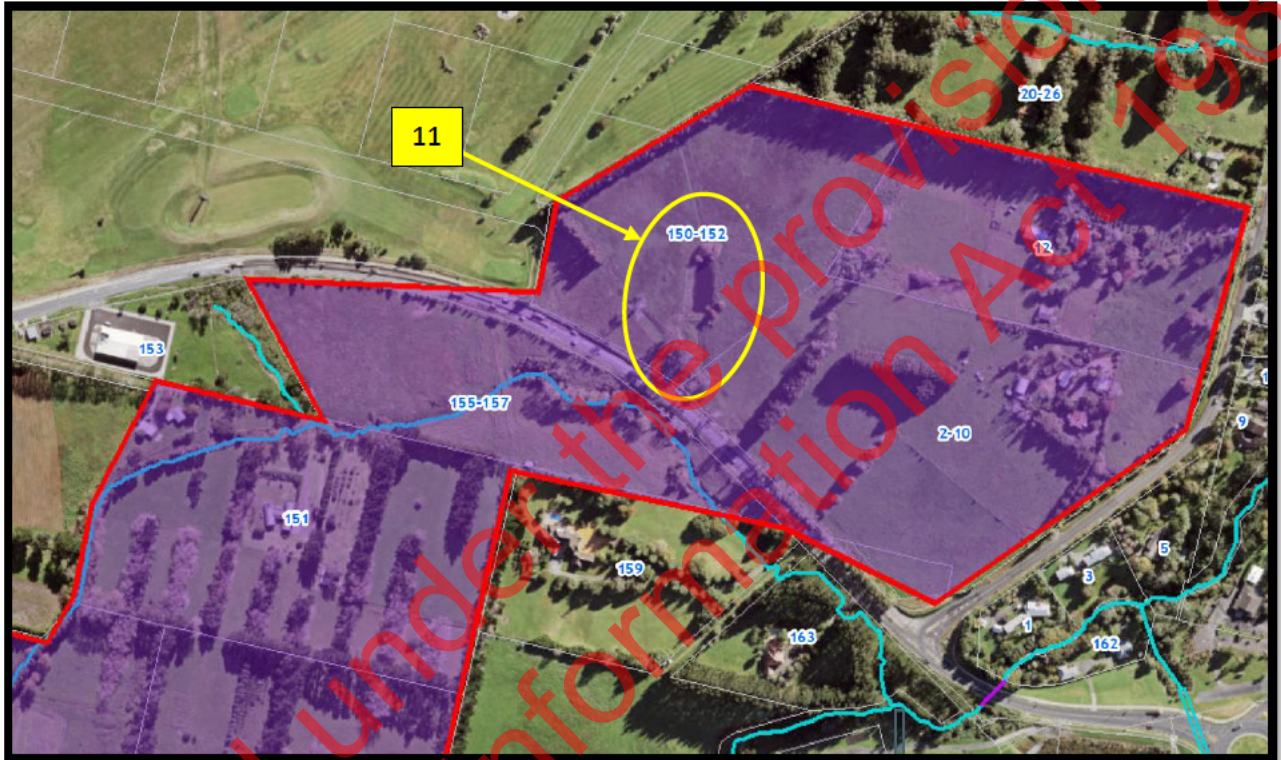
Assessment: The larger trees are having no noticeable adverse impact on the functionality of the watercourse however some of the privet is blocking it.

Recommended actions: The privet within and immediately adjacent to the watercourse in this area should be removed as soon as reasonably practicable. No other intervention is required at this stage beyond the overall long term management strategy for the riparian area.

22) Area 11 .

Vegetation description: Figure 3 below shows the area associated with a watercourse on the northern side of Brigham Creek Road. This is the only section of the site where the Auckland Council Geomaps viewer shows the presence of a significant overland flow path and as such the remainder of the site has been excluded from this assessment. There are 12 over-mature pine trees up to 25m tall and in varying stages of collapse, two swamp cypress (*Taxodium distichum*) approximately 8m tall, several willows and groundcover consisting of kikuyu grass (*Pennisetum clandestinum*), gorse, bramble, tobacco plant and great bindweed (*Calystegia sylvatica*).

Figure 3 – Area 11, to north of Brigham Creek Road.



Assessment: The general appearance of this area indicates it has been subject to grazing by stock for an extended timeframe and no indigenous plants or trees were observed in the area. Overall it consisted of random exotic tree and weed species, none of which would be considered appropriate for retention within a wetland environment.

Recommended actions: This area in effect represents a blank canvas with regards to restoration to any kind of viable wetland environment. All the vegetation present was exotic with no species observed that would be beneficial to establishing or maintaining an indigenous wetland environment therefore at this point in time there would be no adverse ecological impacts associated with removal of the existing vegetation on this section of the site with regards to effects on indigenous biodiversity. If it were to be restored to wetland status an appropriate restoration plan would be required from a suitably qualified ecological specialist.

Summary of recommendations

23) The recommendations in the previous section have been allocated priority ratings as per the following and summarised in Table 1 below:

- **Level 1** – to be carried out as soon as reasonably practicable, ideally within the next twelve months;
- **Level 2** – to be carried out within the next 1-3 years;
- **Level 3** – to be carried out as and when appropriate as required by any specified long term management objectives for the area. This will require ongoing assessment to monitor the condition of existing vegetation and assess if and when intervention is required to achieve specified management objectives, whatever they may be.

Table 1 – Summary of recommendations and suggested priority ratings.

Area #	Recommended works	Priority
1	Blanket clearance of all groundcover weeds and exotic tree species	1
2	Localised weed control	2
3	Blanket clearance of all groundcover weeds and fallen exotic trees	1
4	Removal of fallen limb from watercourse and removal of willow weed and any other groundcover weeds from within the watercourse	1
5	Removal of 3x fallen willow trees and reprofiling of watercourse	1
6	Removal of willow weed from watercourse	2
7	Blanket removal of groundcover weeds from western section of area	1
8	Monitor for ongoing conflicts between trees and watercourse	3
9	Monitor for ongoing conflicts between trees and watercourse	3
10	Remove privet from within and immediately adjacent to watercourse	2
11	Treat in accordance with agreed long term management objectives	3

24) The primary arboricultural management recommendations relate to the removal of the limb from the watercourse in Area 4 and removal of the three fallen willows and associated reprofiling of the watercourse in Area 5. The remaining recommendations relate more to maintaining the integrity and functionality of the watercourse and are focused more on ecological restoration processes than arboricultural principles.

25) These remaining recommendations would be subject to refinement by appropriate disciplines to provide adequate erosion protection, restoration planting specifications and ongoing weed control and as such are beyond the scope of an arboricultural report.

Conclusions

- 26) Priority arboricultural works required to maintain the functionality of the watercourse on this site consist of removal of debris (fallen limb in Area 4) and removal of fallen trees and root systems and reprofiling (Area 5). This should be carried out as soon as reasonably practicable in order to maximise the integrity of the watercourse.
- 27) The nature and scale of any further and ongoing arboricultural intervention is not predictable at this stage and will need to be assessed by ongoing inspections which will presumably form part of an overall management strategy for the riparian margins.
- 28) Non-arboricultural intervention will be required to maintain watercourse integrity (such as removal of willow weed and other ground cover weed species).
- 29) The area to the north of Brigham Creek Road contains no vegetation worthy of consideration for retention with regards to restoring or maintaining wetland status and/or enhancing indigenous biodiversity.
- 30) From an arboricultural perspective the retention of exotic trees is just as worthy as the retention of indigenous trees. Any ongoing management strategy for the riparian margins on this site should be cognisant of the proven fact that species diversity is a key component to future-proofing tree populations and as such the current ecological doctrine of removing exotic species simply because they are not indigenous is not only short-sighted but compromises the sustainability and long term viability of any tree population. As such, the retention of existing exotic trees should be considered in any ongoing management strategy for these riparian areas to the south of Brigham Creek Road.

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

Andrew Barrell

Director, Tree3 Ltd



13 April 2021

