



## Arboricultural Impact Assessment

Tree/s Location: 1075 Horseshoe Bend Road, Torquay, 3228

Completed for: Santo Spirito Flowers

Inspection date: 28<sup>th</sup> January 2021

Date of report: 29<sup>th</sup> January 2021

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To Whom It May Concern.

On the 28th of January 2021, the services of *Future Tree Health* were provided in assessing trees located near the dam on site at 1075 Horseshoe Bend Road, Torquay, 3228. This report, as understood by the author is to be submitted to relevant parties regarding decline of several trees and any potential impact to the dam wall from trees present. Inspection was undertaken by Benjamin Keys under calm, sunny weather conditions.

As agreed, this tree report will provide the following information regarding trees assessed:

- Onsite inspection of trees using QTRA methods where relevant
- Tree Identification
- Measurements and photographs (DBH tape, height meter, iPad photographs)
- Observations of tree health and condition
- Expected impact on trees and structures (including TPZ/SRZ details)
- Professional recommendations for works (if any), and/or mitigation or changes to construction techniques to allow any significant trees to be retained in accordance with AS4970-2009 *Protection of trees on Development Sites*.
- Specifics, details, or recommendations as required by the determining authority.

**Please note:**

1. Prior to reading this report and subsequently following any advice, opinions, recommendations, or findings provided, you must hereby understand and agree to our *Terms of Advice and Service* as provided at the end of the report.
2. Report inclusions and exclusions, assessment methodology (QTRA) and specifics pertaining to Australian Standards referenced may also be found at the end of the document

Please find the tree report included below.

Kind Regards,

Ben Keys

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## 1.0. Executive Summary

On the 29<sup>th</sup> of January 2021, we inspected trees located near the dam wall on site at 1075 Horseshoe Bend Road, Torquay. This property operates as a commercial flower farm in close proximity to residential housing. There is a large dam on site in the south-eastern corner of the property, lined by trees on several sides.

### General findings:

1. Trees lining the inner eastern dam wall are *Salix x pendulina* (Weeping Willow).
2. Trees lining the outer eastern dam wall are a mix of *Pinus radiata* (Monterey Pine), *Hakea lissosperma* (Mountain Needlewood) and *Melaleuca armillaris* (Bracelet Honey Myrtle).
3. All dead Pine trees and those in decline have had fill (mud) dumped around their trunks and critical root areas. This has caused their death through 'suffocating' the root zones.
4. It is the opinion of the inspecting arborist that it is not possible for any trees in this area to compromise the dam wall via invasive root growth. This applies to both the Pine trees present and the Willows. This is explained in greater detail on page 10.
5. We recommend fill should not be placed near the root zones of any trees on site in the future. This is extremely detrimental to tree health.
6. We also recommend any juvenile Pine trees that have self-seeded on the dam wall (see image page 9) should be removed. These trees do have the potential to damage the dam wall as they grow larger.
7. *Pinus radiata* (Monterey Pine) is a listed Environmental Weed in Surf Coast Shire and no permit is required for its removal.

### 1.1. Purpose of this report

The purpose of this report is to provide the findings of an independent assessment of the trees occupying the aforementioned area and to provide an arboricultural impact assessment, impact mitigation advice and a risk of harm assessment. This report has been prepared in accordance with AS4970-2009 – *Protection of Trees on Development Sites* and AS4373-2007 – *Pruning of Amenity Trees*.

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## 2.0. Documents relevant to this report

- Australian Standard: Protection of Trees on Development Sites AS4970-2009
- Australian Standard: Pruning of Amenity Trees AS4373-2007
- Site proposal / Plans

### 3.0. Site Observations & Trees Present

#### 3.1. Site details

1075 Horseshoe Bend Road, Torquay is a rural property operating as a commercial flower farm.

Much of the land is under cultivation. The dam in the south-eastern corner is lined by trees on several sides.



### 3.2. Detail of site photo showing tree location(s)



### 3.3. Trees assessed

Only trees lining the eastern dam wall were assessed.

Trees inside the dam wall were healthy *Salix x pendulina* (Weeping Willow). These are a weed species commonly found around waterways in Victoria.

Trees outside the dam wall included:

- *Pinus radiata* (Monterey Pine) - approximately 6 were dead, a further 2-3 in decline. These are an Environmental Weed in Surf Coast Shire.
- *Hakea lissosperma* (Mountain Needlewood) – one dead, one in decline.
- *Melaleuca armillaris* (Bracelet Honey Myrtle) – in poor health.

All dead *Pinus* and those in decline have had fill (mud) dumped around their trunks and critical root areas. This appears to have been dumped over the dam wall and has slid down the bank. Approximate depth of fill appears to be 0.6-1m on average. Live trees do not have fill at base.

Both *Hakeas* and also the *Melaleuca* have also had fill dumped in their root areas. Their slower decline suggests they were able to handle this impact better, but will likely die back eventually.



### 3.4. Site photos



Outer dam  
wall showing  
dead Pines  
and live trees  
either side.



View from  
top of dam  
wall toward  
dead Pines.





Inner dam  
wall lined by  
Willows.



Close up of  
Willows showing  
extensive surface  
roots.



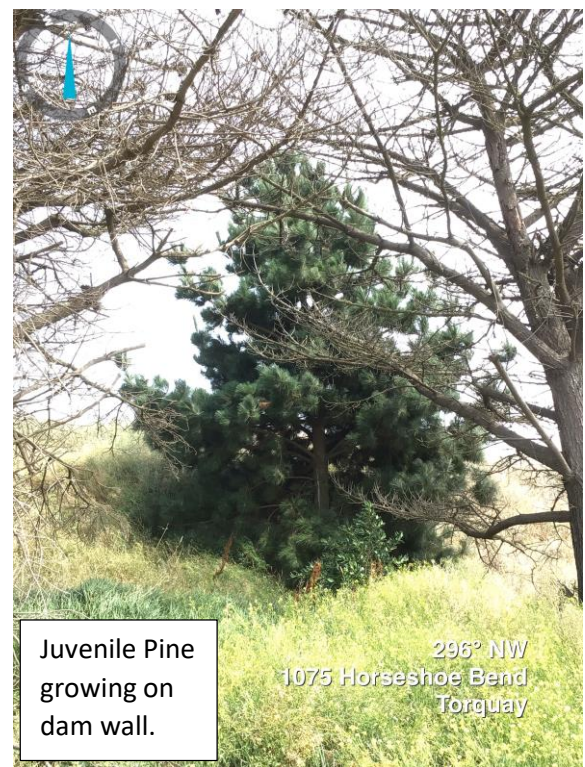
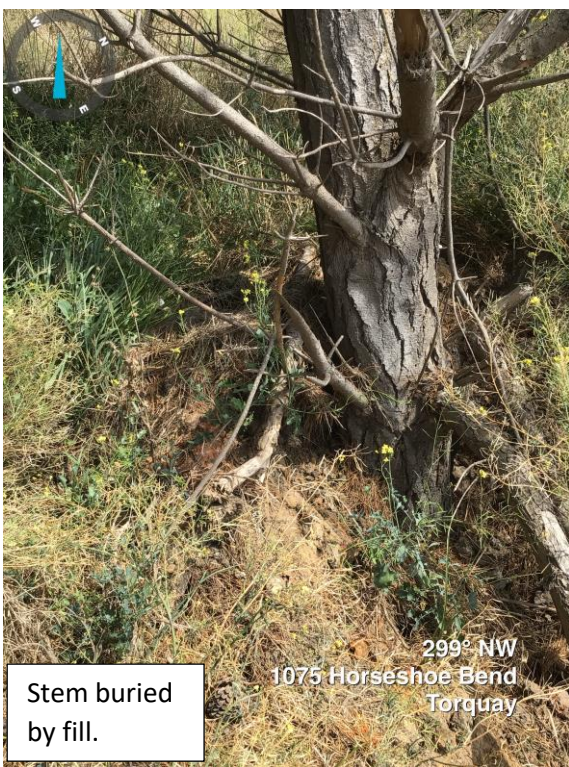
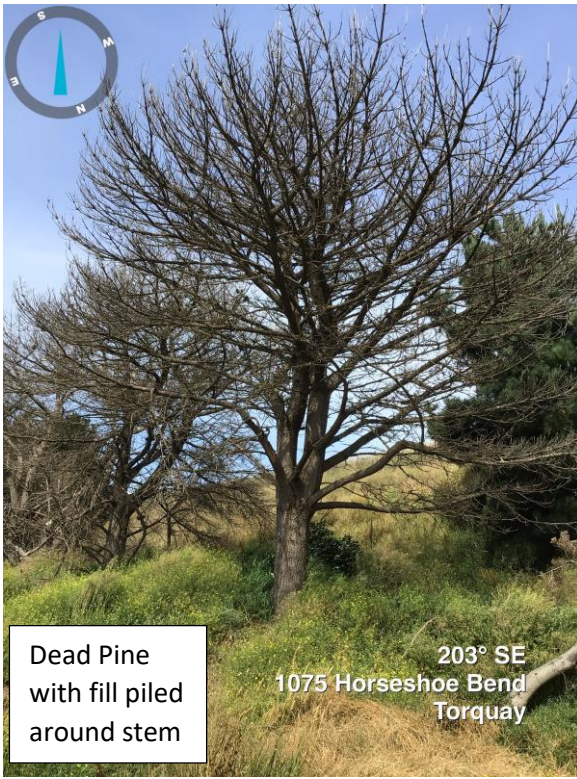


Weeds growing  
on mounded  
soil beneath  
dead tree.



Soil/fill dumped  
around root  
zone of Pines.







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## 4.0. Discussion of root zones and impact on dam wall

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Within this report we have been asked to provide an opinion regarding the possibility of Pine tree roots compromising the dam wall on this site.

**Location of roots** – Generally, the roots of most trees will be found in the top 30-60cm of soil. This is the most nutrient-rich layer and it is also where oxygen levels are the highest.

Roots are opportunistic and develop where water and nutrients are most easily available – that is, in the uppermost layers of soil.

Keeping this in mind, it is unlikely that the roots of any of the Pine trees or Willows lining this dam wall would seek to burrow *into* the dam wall itself. There is insufficient oxygen and water available at such a depth underground - it does not make any sense for the tree to develop its roots in this manner.

**Spread of roots** – The Australian Standard for Protection of Trees on Development Sites (AS4970-2009) uses the following formula to calculate tree root zones: Diameter of trunk x 12 = radius of Tree Protection Zone (TPZ).

The TPZ is the theoretical area of root spread that should be protected from construction disturbance in order for a tree to remain viable. While this is just a theory/formula, it is also mandated as an Australian Standard, so it can be said to provide some guide as to possible root spread.

Most of the Pine trees lining the dam wall have trunk diameter measurements of between 30-60cm, with one outlier measuring 96cm across. Based on AS4970, this gives an approximate root radius extending toward the dam wall of 3.6-7.2m, with the largest tree possibly extending as much as 11.5m toward the dam wall.

**Opinion** - Given the distance of these trees from the outer wall and the width of the dam wall overall (25-30m wide, approximately), it is the opinion of the inspecting arborist that *it is not possible* for any extended lateral roots of these pine trees to cause any structural damage to the wall itself.

**Cause of tree death** – As explained above, tree roots commonly develop in the uppermost layers of soil, because this is where nutrients, oxygen and water are easily available.

If this critical root zone should suddenly be buried by means of fill or mud applied around the base of the tree, these roots can no longer access those key elements required for tree survival.

*This is what has occurred on this site.* Excess fill has been dumped over the dam wall and has run downhill to rest among the root zones of multiple Pine trees. Given it was likely wet soil when applied, this fill has effectively blocked any oxygen from reaching the roots, as well as preventing future surface water uptake. This has caused six Pines to die, while others are heavily declined and will likely die also.



## 5.0. General retention notes

Regarding trees intended for retention, the following information is essential for consideration.

1. Works must not enter the SRZ under any circumstances. Doing so may destabilise the tree, leading to potential total tree failure.
2. **Any tree removal is to be undertaken only with prior-approved written consent from the determining authority or under appropriate licence and undertaken by the determining authority.**
3. Tree protection fences should be installed around all trees for retention to ensure ongoing health and vitality where relevant.
4. In general, works should encroach no closer to the centre of the trunk than 10% of the total TPZ area in order to maintain tree health and viability (this is minor, acceptable encroachment).
5. Should works or access be required within or close to critical root zones the presence of a project arborist is required in conjunction with an approved TPMP.

## 6.0 References

1. Bardgett, R, 2005, *The Biology of Soil : A Community and Ecosystem Approach*, Oxford University Press, New York
2. Costello, L, Perry, E, Matheny, N, Henry, J, Geisel, P, 2003, *Abiotic disorders of landscape plants : a diagnostic guide*, Oakland, Calif. : University of California, Agriculture and Natural Resources
3. Draper, D, Richards, P, 2009, *Dictionary for Managing Trees in Urban Environments*, CSIRO Publishing, Collingwood
4. James et al, 2014, *Tree Biomechanics Literature Review: Dynamics*, Arboriculture & Urban Forestry 2014. 40(1): 1–15, International Society of Arboriculture
5. Harris, R, 1992, *Arboriculture : Integrated Management of Landscape Trees, Shrubs, and Vines*, 2<sup>nd</sup> edn, Prentice Hall Career & Technology, New Jersey
6. Mathney & Clark, 1994, A photographic guide to the evaluation of hazard trees in urban areas, International Society of Arboriculture, Champaign, Il.
7. Moore, G.M., 2003, Crown Thinning and Weight Reduction, Proceedings, ISAA Conference, Annual
8. Standards Australia, 4970-2009 – *Protection of Trees on Development Sites*.
9. Standards Australia 4373-2007 – *Pruning of Amenity Trees*
10. Urban, J, 2008, *Up By The Roots : Healthy Soils and Trees in the Built Environment*, International Society of Arboriculture.

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## 7.0. Report exclusions

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This assessment/report did not include the following:

1. Below ground inspection (includes: location, condition and/or integrity of roots; condition of inaccessible parts of trunk; property or asset conflicts and/or damage due to roots).
2. Soil profile test (includes levels of compaction if any)
3. Detailed aerial tree inspection observations/findings (Visual Tree Inspection was conducted from the ground)
4. Abiotic disorder certainty (resulting from groundwater analysis, gas leak investigations, etc.).
5. Certainty of presence/identity of biotic agents (pests, pathogens). Where present, biotic agents must be sampled and sent for lab analysis, a process not included in this commission.
6. Certainty of decay present (if any) within the tree (tree was inspected from the outside only, meaning the condition and integrity of the xylem - wood - within the tree cannot be ascertained).

## 8.0. Australian Standard 4970-2009: Protection of Trees on Development Sites

This report has been prepared in accordance with Australian Standard 4970-2009: Protection of Trees on Development Sites. Where proposed works are within the vicinity of trees, this standard is used to determine acceptable distances of works from trees via the calculation of Tree Protection Zones (TPZ) and the Structural Root Zone (SRZ).

A tree protection zone is calculated ( $DBH \times 12$ ) to establish the acceptable proximity of works, equipment, and construction practices/procedures from an existing tree. Following this, the erection of isolation fencing, the tying of branches, tree protection measures or instalment of tree protection zone signage may be required. This ensures the tree is protected for the duration of the works. The proposed works must not encroach within the tree protection zone unless this encroachment is less than 10% of the TPZ, is previously agreed upon and compensation of additional TPZ area (% of encroachment) is added to the TPZ.

Structural Root Zone (SRZ) refers to the structural roots within closer vicinity to the trunk which are required by the tree to remain upright. Encroachment into the SRZ of an existing tree is not permitted. Works conducted within the SRZ may destabilise the tree, requiring removal to avoid subsequent tree failure.



## 9.0. Approach to acceptable risk within QTRA (Quantified Tree Risk Assessment)

QTRA is a risk assessment method which aims to limit the risk of harm or damage from trees while also maintaining and promoting the benefits of trees. All trees were assessed using this method.

### Assessment method

1. Tree defects, size health, condition, form, vitality, structure, past works, abiotic & biotic influences.
2. Target. Where no target (people or property) is present, a risk assessment is not required.
3. Occupancy of people/property within the target area. This is calculated using averages of occupancy over a one-year period.
4. Probability of failure is calculated using all information from point 1 above
5. A quantified risk assessment probability (Risk of Harm) for a period of 12 months is reached.

### Risk of harm

Levels of risk are ranked within QTRA in four categories based on increases/decreases in probability

1. High risk/Unacceptable risk =  $1/1 - 1/1K$  **RED**
2. Medium risk/Unacceptable to impose on others without discussion –  $1/1K-1/10K$  **ORANGE**
3. Low risk/Generally acceptable –  $1/10K-1/1M$  **YELLOW**
4. Broadly acceptable –  $<1/M$  **GREEN**

### Acceptable risk

Acceptable risk is not zero risk. Trees and tree populations come with benefits and inherent risks. As shedding organisms, trees do drop branches. Trees also have thresholds of tolerance to levels of extreme force such as wind (similar to buildings and man-made structures). When these levels are exceeded due to environmental factors or changed circumstances, trees or tree parts can fail. QTRA aims at assessing identifiable risk and its probability of failure leading to the risk of harm, based on presented aspects combined with target and occupancy. In this way, the benefits of trees can be promoted and maintained, and the risks managed and/or removed where necessary.

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## 10.0. Terms of advice and service

Prior to reading this report and subsequently following any advice, opinions, recommendations, or findings provided, you must hereby understand and agree to the following:

- This assessment and subsequent report findings are the culmination of research combined with the professional opinion of a qualified consulting arborist. Our consultants pride themselves on independent reports. This report has not been produced to support a particular motive, produce a desired value, or predict a desired occurrence. All findings are reported without bias towards certain parties or results.
- To the authors knowledge, all facts, assessment techniques and material presented is current and accurately researched. Opinions expressed within this report are supported by current research.
- This report contains sketches, photographs, plans, and/or diagrams. These are for illustrative use only and should not be considered to scale unless stipulated otherwise.
- *Future Tree Health* and its representatives will assume that all information divulged to them regarding legal matters, ownership of property or titles is correct. Any properties or projects will be considered to be compliant to relevant codes, legislation, and/or appropriate regulations.
- *Future Tree Health* has gone to every professional length to ensure data and information provided is correct, reliable, and accurate. Data or information provided by third parties is considered outside the control of our consultants and neither they, nor *Future Tree Health* will be held responsible for discrepancies or inaccuracies.
- Representatives of *Future Tree Health* are not required to give testimony or appear in court as a result of this tree report. An expert opinion may be presented by *Future Tree Health* where further arrangements are made, however, this is not a requirement or contractual obligation of this report.
- *Future Tree Health* and its representatives will not be held responsible for occurrences outside the consultants' control.
- This report is the product of a tree assessment, undertaken at the specific time and date listed on the Cover Page, within specific weather and environmental conditions. Thus, all information expressed within is relevant to this time, and date only. As a result, *Future Tree Health* will be in no way held responsible for damages, matters, occurrences, or other issues occurring after this inspection was completed. Following the inspection, all aspects pertaining to the tree/s and site/s in question are considered out of the control of *Future Tree Health*.
- Alterations or loss of this report will result in the entire report being deemed invalid.
- Publication and ownership rights of this report remain with *Future Tree Health*, and no file sharing, hard copy sharing, unauthorised publication or other unintended use will be undertaken without gaining prior consent from *Future Tree Health*.
- This report will not include or pertain to matters other than those aforementioned within the introductory letter and will not include any items listed within the 'Report exclusions' section.
- *Future Tree Health* cannot guarantee that any opinions expressed will come to fruition, and will not be held responsible should matters discussed either eventuate or fail to do so.

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## 11.0. Disclaimer

- *Future Tree Health* and its representatives are qualified professionals and we take great care to provide information that is accurate, knowledgeable, and reliable. You hereby agree to the extent of the law that we will not be held responsible (regardless of liability theory) for occurrences or advice, due to direct, indirect or negligent actions (using professional opinions, experience, or information – including information from third parties) which lead to or are perceived to lead to: any loss or damage (monetary, or otherwise), perceived loss, perceived damage; injury; revenue changes; aesthetic changes; and/or lifestyle impacts. We do not provide warranties or guarantees.

This disclaimer is governed by the law in force in the State of Victoria, Australia.