December 7, 2016

Housing Authority
Level 3, 169 Hay Street
East Perth WA 6004

ATTENTION: **Prisca Taylor**

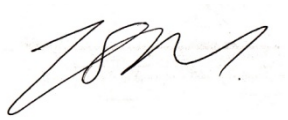
Re: **Assessment of Trees at 15 Harwood Street, Hilton**

Dear Prisca

Further to your request, and my inspection of the identified trees at 15 Harwood Street, Hilton the following is a brief of my findings on their condition.

I look forward to continuing to aid you in this project, and if you have any queries regarding the findings of this document, or if I can be of further assistance, please do not hesitate to contact me.

Yours sincerely



JASON ROYAL

Dip. Arboriculture (UK)
Tech. Arbor A

Assessment of Identified Trees at 15 Harwood Street, Hilton

Prepared For

Housing Authority

ARBOR logic

Contents

1. Terms Used

The following terms have been commonly used in this report:

"Trees" meaning the trees that were identified to be assessed and are the subject of this report

"TPZ" meaning 'Tree Protection Zone'; the area where the majority of the Tree's root mass is considered likely to be found and therefore the area required to be protected

Any works required in this zone are considered likely to have some potential to impact the Tree.

"AS 4970" meaning Australian Standards 4970; Protection of Trees on Development Sites

"AS 4373" meaning Australian Standards 4373; Pruning of Amenity Trees

"Plan" meaning the plan provided by the Housing Authority showing the property where the Trees are situated and identifying the location of the Trees; Crossland & Hardy Pty Ltd plan 8209-01 Rev D

2. Purpose

a. Undertake an inspection of the identified trees in the identified properties based on the plan provided,

b. Provide information on each tree with regards to its:

- Species,
- Its general condition (height, DBH, canopy spread, health and structural condition),
- Is nominated tree protection zone, any comment deemed pertinent to each tree, and
- An image of the tree, and
- An opinion on its retention value in the context of a development of the area around it

c. Identify any design or construction implications that would be necessary to ensure successful retention and preservation of any trees considered to be suitable for retention

d. Provide any ongoing management considerations for each tree to be considered.

3. Particulars and Limitations to this Assessment

The information and opinions provided in this document are based on:

a. The findings from the visual observations of the Trees; November 25, 2016.

All observations were undertaken from ground level.

It should be noted that no exploratory excavations were undertaken as part of my assessment to verify the actual root spread of each of the identified Trees. As such the allocation of root protection zones has at this stage been based on the physical size and condition of the Tree and the known root zone morphology of specimens of the Tree's given species in the sort of soil profile considered to be typical to this area of Western Australia.

4. Assessment Methodology Applied

The identified Trees were assessed in accordance with 'visual tree assessment' methods[1] and principles.

This is a method based on the sciences of tree biology, physiology, tree structure, and tree bio-mechanics.

It is a method widely used by arborists worldwide to identify visible signs on trees that provide an indication as to its health and structural properties at the time of inspection.

The overall health of each Tree was adjudged from an inspection of its leaf, overall percentage of leaf mass present in the canopy of the tree, and the presence (or absence) of any pest or disease factor that could have an effect on the overall health of the tree.

The structural integrity of each tree was determined from a visual inspection of its main stem, primary (and secondary) branch unions to determine the presence of any areas considered to be a structural 'defect' or 'imperfection' such as unions with included bark, swelling, or noticeable splitting at them.

Symptoms of decay, growth patterns and defects are identified and assessed as to their potential to cause whole tree, part tree or branch failure, and where considered necessary further investigation by way of the use of sounding techniques was utilised to determine the presence and general extent of any areas of cavity or associated decay within a tree's main stem structure.

The tree's root plate area was also inspected to identify any visible signs of root plate, movement, cracking or heave from which a determination of the in-ground stability of the tree can be ascertained. It is however important to note that there are limitations in verifying the in-ground stability of a tree based on a 'one-off' cursory visual observation; particularly if the inspection is undertaken during a period of 'fine' weather with little to no wind; as was the case during this assessment.

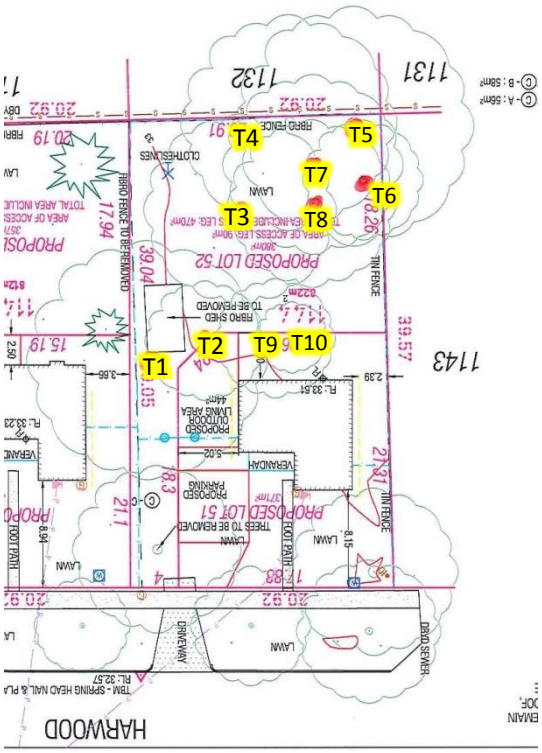
Species suitability for use in an urban area, and if the identified Tree is of a species that can be subject to the sudden branch failure phenomenon, or shows evidence of a history of branch failure, or looks to be a potentially problematic based its current structural condition was also considered as part of the assessment process when considering the Tree's suitability to the proposed development.

With regards to any future development the known natural species traits of the given tree and its ability to cope with disturbances to its root zone that typically occur as part of a development process, as well as its ability to cope with the new parameters that are commonly created by an urban development (i.e. decreased soil oxygen due to compaction, increased un-seasonal watering from irrigation, increased pollution, increased radiated heat/light from urban infrastructure (roads, walls, buildings etc.) are all also taken into consideration.

[1] Field Guide for Visual Tree Assessment (VTA); The Body Language of Trees, A Handbook for Failure Analysis; C Matteck, H Breloer

5. Summary of Key Observations on the Trees

5.1 Ten Trees were identified and inspected during the assessment; identified on a copy of the Plan below.



5.2 **Trees #1** was identified as a Brazilian Pepper (*Schinus terebinthifolius*). It shows to be in good health and has what is considered to be a typical structural form for a specimen of this species. It was noted to have a very low widespread canopy particularly on the northern side, and as a result was considered to be providing a good visual screen from the adjacent property.

5.3 **Tree #2** was identified as a Yellow Elder (*Tecoma stans*). It looked to be a mature specimen, possibly in the order of 30-40 years old and its canopy condition suggests that it may have limited life span remaining.

5.4 **Tree #3** was identified as a Jacaranda (*Jacaranda mimosifolia*). It looked to be a mature specimen possibly in the order of 40-50 years old. It was noted to be in good health and structural form and was considered to be a good specimen of its species with good visual amenity.

5.5 **Tree #4** was identified as a large mature Marri (*Corymbia calophylla*). It was noted to be physically large and is considered to possibly be in the order of 50-60 years old. It was noted to be in good health and structural form, although there was some evidence to suggest the presence of Marri Canker (*Quambalaria coyrecup*) which may start to affect its health longer term; particularly if its root zone becomes disturbed/damaged.

5.6 **Tree #5** was identified as another large mature Marri (*Corymbia calophylla*). It was noted to be physically larger than Tree #4 and is considered to possibly be in the order of 60-80 years old. It was noted to be in good health and structural form, although there was some evidence to suggest the presence of Marri Canker (*Quambalaria coyrecup*) which may start to affect its health longer term; particularly if its root zone becomes disturbed/damaged.

5. Summary of Key Observations on the Trees

5.7 **Tree #6** was identified as a mature Almond (*Prunus dulcis*). It was considered to be old for a specimen of this species in this part of West Australia and looks to possibly have limited life span remaining. A section of its canopy was noted to be dead.

5.8 **Trees #7** was identified as a Marri (*Corymbia calophylla*). It showed good health and was considered to be an early-mature tree and possibly in the order of 20-30 years old. It's canopy was noted to be one-sided to the north due to the proximity and influence of the adjacent larger trees.

5.9 **Trees #8** was identified as a Flame Tree (*Erythrina x sykesii*). It looked to be in good health and is possibly only 10-20 years old. This Tree also looks to be regrowth from the stump of an original tree.

5.10 **Tree #9** was noted to be a mature Native Frangipani (*Hymenosporum flavum*). It was considered to be in the order of 20-30 years old and was considered to be large for a specimen of this species in Perth and looked to be in good health at this time.

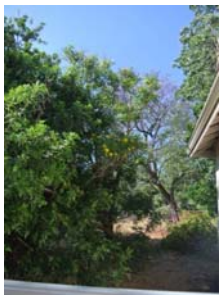
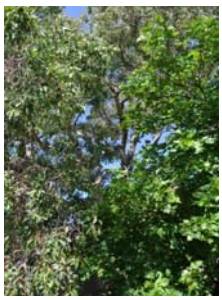
5.11 **Tree #10** was identified as a semi-mature Benjamin's Fig (*Ficus benjamina*). It looked to be in good health and structural form.

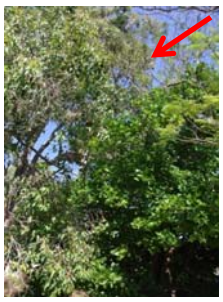
5.12 **Trees #1, #2, #3, #6 #8, #9 and #10** are all considered likely to have been planted by previous residents.

Trees #4 and #5 are considered likely to have been present when the properties were originally developed (albeit as juvenile trees).

Tree #7 is possibly self-sown and possibly even from seed from either Tree #4 or #5.

The pages overleaf provide further details on each of the Trees identified during this assessment.

Tree ID	Species	Approx. Height (metres)	Trunk Calliper (cm)	Canopy Spread (metres diameter)		Estimated Age	Image	Comments	TPZ (metres radius)	Retention Value
				N-S	E-W					
1	Brazilian Pepper (*Schinus terebinthifolius*)	9	80	3-4	9-10	30-40yrs		Ok specimen. Multi-stemmed from near ground level. Very low wide spreading canopy northern and western sides. Could be raised if required	9.6	Relatively Low
2	Yellow Elder (*Tecoma stans*)	9	30, 18, 18	7-8	3-4	30-40yrs		Canopy condition suggests it may have limited life span remaining. Multi-stemmed from near ground level. Very low wide spreading canopy northern side. Could be raised if required	3.6	Very Low
3	Jacaranda (Jacaranda mimosifolia)	15	46	11-12	11-12	40-50yrs		Good mature specimen. Good aesthetic form/value. Canopy is slightly one sided north-east but not of any concerns	5.5	High
4	Marri (*Corymbia calophylla*)	18	56	6-7	5-6	50-60yrs		Good mature specimen. Evidence of Marri Canker but looks to be having limited affect at this time. Area of decay noted but not of a major concern at this time. Canopy is slightly one sided south-east due to proximity of adjacent trees. Close to boundary fence	6.7	High
5	Marri (*Corymbia calophylla*)	19	90	12-13	10-11	60-80yrs		Large mature specimen. Evidence of Marri Canker but looks to be having limited affect at this time. Main stem bi-furcates but union looks to be Ok at this stage. Evidence of previous branch failures; looks to have been storm damage. Close to boundary fence	10.8	High
6	Almond (*Prunus dulcis*)	7	35	5-6	4-5	40-50yrs		Ok specimen. Section of its canopy is dead. May have relatively limited life span remaining	4.2	Very Low

Tree ID	Species	Approx. Height (metres)	Trunk Calliper (cm)	Canopy Spread (metres diameter)		Estimated Age	Image	Comments	TPZ (metres radius)	Retention Value
				N-S	E-W					
7	Marri (*Corymbia calophylla*)	12	46	11-12	9-10	20-30yrs		Reasonably good specimen. Canopy is one sided (north) due to proximity of adjacent tree. Some larger deadwood in canopy	5.5	Relatively Low
8	Flame Tree (*Erythrina x sykesii*)	10	35, 30, 30, 30	11-12	9-10	10-20yrs		Ok specimen. Looks to be regrowth off/around an old stump/original tree. Evidence of a broken (hanging) branch in the canopy. Low canopy spread particularly western and northern side	4.2	Very Low
9	Native Frangipani (*Hymenosporum flavum*)	15	28	6-7	4-5	20-30yrs		Good mature specimen. Good aesthetic form/value. Not shown to be retained on the plan provided	3.4	Medium
10	Benjamin's Fig (*Ficus benjamina*)	9	22	4-5	4-5	10-20yrs		Good semi-mature specimen. Good aesthetic form/value. Not shown to be retained on the plan provided. Nice tree	2.6	Medium

6. Opinion and Recommendations

6.1 **Tree #1** is considered to have a relatively low retention value. It is of an exotic/introduced species. Its physical size and canopy spread/form may also impede development of that area of the Lot to some degree, although the low canopy should be able to be raised to some extent to allow access.

That said it does provide good screening from the adjacent Lot.

If retained, the then alignment of any services into the proposed Lot and the design and construction of the access driveway to the Lot all need to be considered during the design process.

If desired to be retained then its location, canopy spread, and TPZ area is recommended to be overlaid onto all development plans to ascertain where any encroachments into its TPZ may occur as a result of development works.

In the event that any encroachments are noted to be required, then further arboricultural advice is recommended to be sought during the design stage to ascertain potential impact to the Tree, and if any remedial management measures or modifications to the design are required to ensure that its retention if undertaken will remain successful in the long term.

6.2 **Tree #2** is considered to have a very low retention value in the context of a development. It's canopy condition suggests it has limited life span remaining and is of an exotic/introduced species of tree that would be readily replaceable (if required) with advanced nursery stock.

6.3 **Trees #3, #4 and #5** are all considered to have a **high** retention value in the context of a development.

These are all good mature specimens of their species and provide high visual amenity to the area in which they are situated.

If these Trees are desired to be retained then their location, canopy spread, and TPZ area is recommended to be overlaid onto all development plans to ascertain where any encroachments into their TPZ may occur as a result of development works.

In the event that any encroachments are noted to be required, then further arboricultural advice is recommended to be sought during the design stage to ascertain potential impact to the Tree, and if any remedial management measures or modifications to the design are required to ensure that its retention if undertaken will remain successful in the long term.

6.4 **Trees #6** is considered to have a very low retention value in the context of a development. It's canopy condition suggests it has limited life span remaining and is of an exotic/introduced species of tree that would be readily replaceable (if required) with advanced nursery stock.

6.5 **Tree #7** is also considered to have a relatively low retention value. Although it is a native species in good health its development looks to be being impeded to some extent by the adjacent larger Trees and efforts and any expenditure are considered better spent on the retention and protection of Trees #3, #4 and #5; even if it came at the sacrifice of this Tree.

6.6 **Tree #8** is considered to have a very low retention value. Although it shows good health at this time, it's structural form (regrowth from an old stump) is considered likely to be a cause of future issues and concerns longer term (10-20 year time frame). This Tree is also considered to be relatively young and could be replaced if necessary with advanced nursery stock (albeit with a smaller sized tree).

6. Opinion and Recommendations

6.7 **Tree #9** is considered to have a medium retention value at this time. It is considered to be a good specimen of its given species and is also considered to be large for a specimen of its given species. Its location within the Lot may impede development of the area around it to some extent.

Note: This Tree is not shown on the plan provided as being retained. However it is considered to be a good specimen of its given species.

6.8 **Tree #10** is considered to have a medium retention value at this time. It is considered to be a good specimen of its given species. Its location within the Lot may however impede development of the area around it to some extent.

Note: This Tree is also not shown on the plan provided as being retained. However it is considered to be a good specimen of its given species.

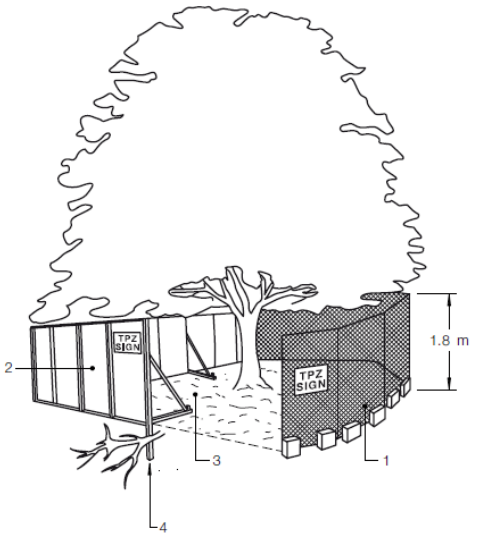
6.9 If any of the Trees on this property are desired to be retained then their location, canopy spread, and TPZ area is recommended to be overlaid onto all development plans to ascertain where any encroachments into their TPZ may occur as a result of development works.

In the event that any encroachments are noted to be required, then further arboricultural advice is recommended to be sought during the design stage to ascertain potential impact to the Tree, and if any remedial management measures or modifications to the design are required to ensure that its retention if undertaken will remain successful in the long term.

6.10 In the event that demolition and site clearing works are to commence before development designs have been finalised, then protection of the existing Trees is recommended to occur in accordance with AS 4970 guidelines.

The designated Tree Protection Zone of each Tree is recommended to be clearly marked out on site and fenced off from the site in accordance with AS 4970 guidelines **prior to any site clearing works commencing.**

Fig. 1 Tree Protection Zone Fencing Requirements



LEGEND:
1 Chain wire mesh panels with shade cloth (if required) attached, held in place with concrete feet.
2 Alternative plywood or wooden paling fence panels. This fencing material also prevents building materials or soil entering the TPZ.
3 Mulch installation across surface of TPZ (at the discretion of the project arborist). No excavation, construction activity, grade changes, surface treatment or storage of materials of any kind is permitted within the TPZ.
4 Bracing is permissible within the TPZ. Installation of supports should avoid damaging roots.

From AS 4970 Guidelines

6. Opinion and Recommendations

6.11 During site clearing works, removal of any trees or structures adjacent to a Tree to be retained is to be undertaken in a manner that does **not** cause any damage to the Tree's above or below ground parts.

If necessary removal of any trees around a Tree to be retained are to be cleared using tree surgery and sectional dismantling methods of removal.

No remediation of the existing soil profile is to occur within any designated Tree Protection Zone.

6.2 The Tree Protection Zone of any Tree is to remain undisturbed during the site clearing process and treated in accordance with AS 4970 and as detailed below.

The Tree Protection Zone must not at any time be utilised for the purposes of:

- Traversing and/or parking of plant machinery or vehicles
- Storage for construction or deleterious materials
- Vehicle refuelling
- Storage of surplus fill
- Preparation of chemicals and/or cement products (or within 15 metres of the TPZ)
- Areas to dump construction and general waste
- Wash down or cleaning
- Locations for site offices or toilets
- Or any activity that may harm or injure the tree above or below ground parts

No works are to occur within a Tree Protection Zone without prior discussion and approval of the arboricultural consultant.

In the event that works are required to occur within a Tree Protection Zone, further discussion with the arboricultural consultant will be required.

6.13 No canopy works are considered necessary on any of the Trees at this time.

Some minor canopy works (i.e. removal of deadwood, canopy raising) may be required depending on their retention and details of any development for the Lot, particularly for Trees #1, #3, #4 and #5.

Attachment; Company Information

Company Name:	ARBOR logic
A.C.N.:	107 194 061
A.B.N.:	66 566 369 687

Insurance Details:

General Liability;	QBE	$20 million
Professional Indemnity;	Vero	$10 million
Personal Protection;	Macquarie	

Office/Contact Details

Postal Address:	PO Box 1025, Balcatta WA 6914
Physical Office Address:	4c/5 Mumford Place, Balcatta
Ph:	(08) 9240 7555
Fax:	(08) 9240 7522

Consultant Details

Consultant Contact: Jason Royal
Dip. Arboriculture (UK)
Tech. Arbor A

MEMBER ISA J. Royal; 172723
Arboriculture Australia™ Member No. 1254
QTRA Registered User Lic. No. 1743

Ph: (08) 9240 7555
Mobile: 0409 105 745
Email: jason@arborlogic.com.au

Disclaimer

This Report has been provided in good faith and based upon the material information provided by the Client to Arbor logic, and/or based on the visual inspection of the tree(s) at the time this advice was prepared.

The contents of this Report should be read in full, and at no time shall any part of the Report be referred to unless taken in full context with the remainder of the document.

The contents of this Report may not be reissued to another party or published in part or full without Arbor logic's written permission.

Arbor logic does not accept liability arising out of loss or damage that results from: -

- Material information not being provided by the Client to Arbor logic at the time this advice was prepared.
- The provision of misleading or incorrect information by the Client or any other party to Arbor logic upon which this advice was prepared.
- This advice being used by the Client or any other party in circumstances or situations other than the specific subject of this advice.
- Failure by the Client to follow this advice.
- The action(s) or inaction(s) of the Client or any other party that gives rise to the loss of, or damage to, the tree(s) that are the subject of this advice.

It is also important to take into consideration that all trees are living organisms and as such there are many variables that can affect their health and structural properties that remain beyond the scope of reasonable management practices or the advice provided in this Report based on the visual inspection of the tree(s).

As such a degree of risk will still remain with any given tree(s) despite the adoption of any best management practices or recommendations made in this Report.