

Arboricultural Assessment & Report – Preliminary Design

15-31 Hay Street, Box Hill South

For: Canaan Holdings Pty Ltd

Wednesday 7 December 2011

Arboricultural Assessment and Report 15-31 Hay Street, Box Hill South

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Objectives

To assess those trees located within and adjacent the subject site that may be affected by a proposal to develop the land.

To provide an assessment of the subject trees detailing their health, structure, form, dimension, origin, planning scheme status and retention value.

To provide information that will assist the design process in terms of tree value and the required construction set back from retained trees.

To provide remedial and tree protection information for those trees that are nominated for retention.

Methodology

A site inspection was undertaken on Tuesday 6 December, 2011. The trees were inspected and observations made of the surrounding area. No intrusive investigation or sampling of the tree/s or soil was undertaken. Visual observations were undertaken from ground level to determine age, structure and condition with measurements taken to establish approximate trunk and canopy dimensions. Canopy height was estimated, canopy width was measured using a laser-measuring device and trunk diameters measured using a forester's tape. No internal sampling or aerial inspection was undertaken.

Numerical identifiers ascribed to individual trees correspond with those numbers placed on the plan provided in appendix 4 of this report. Appendix 4 also contains tree retention value coding to assist the design process.

Observations

The subject site consists of a Public Use/Special Use Zone 1 allotment in Box Hill South, a suburb located within the City of Whitehorse. The site has been previously developed for educational purposes and holds a number of brick dwellings, driveways, asphalt car parks and sporting fields, situated within a landscape of indigenous and introduced vegetation.

Gardiners Creek forms part of the eastern boundary adjacent a large sports field, a number of unsurveyed indigenous trees including *eucalyptus camaldulensis* (River Red Gum) and *Eucalyptus viminalis* (Manna Gum), exist adjacent the creek embankment. A large population of environmental weeds also exist in this area and would include woody weeds such as *Pittosporum undulatum* (Sweet Pittosporum), *Salix babylonica* (Weeping Willow), *Ligustrum lucidum* (Glossy Privet), *Pinus radiata* (Monterey Pine) and *Ulmus procera*.

As the land is greater than .04 of a hectare it is subject to Clause 52.17 State Vegetation Controls. Under this state planning provision a permit is required to lop,

remove or destroy native vegetation. Under this clause relevant exemptions apply to dead vegetation that is less than 40cm in trunk diameter at 1.3m from grade, exotic species and native vegetation that has been planted for garden purposes. It is important to note that the term 'Native Vegetation' applies to vegetation that originates within the state of Victoria. As all of the assessed vegetation is either exotic or planted native vegetation it appears that they are exempt from this planning control. Indigenous trees located along the Gardiners Creek would be affected by this planning provision.

Discussion

Tree Value

Trees can make a positive contribution to the appeal of a completed development by providing a visual softening of the built form, a maturity to the landscape, a connection with the pervading landscape and neighbourhood character, they also provide scale, shade, beauty and habitat. However not all trees are suitable for retention particularly within a proposed development; an arboricultural assessment will ultimately place a retention value on the existing vegetation, depending on that vegetation's potential to have a positive or negative influence on the site proposal.

Safety has to be valued above economics or amenity and hazard potential is the foundation for all decisions regarding whether a tree is to be retained or removed. If hazard potential can be effectively managed then other factors such as amenity, longevity, tolerance to impact, anti social traits, habitat etc. will be considered. These attributes are useful in estimating the retention value and useful life expectancy of a given tree.

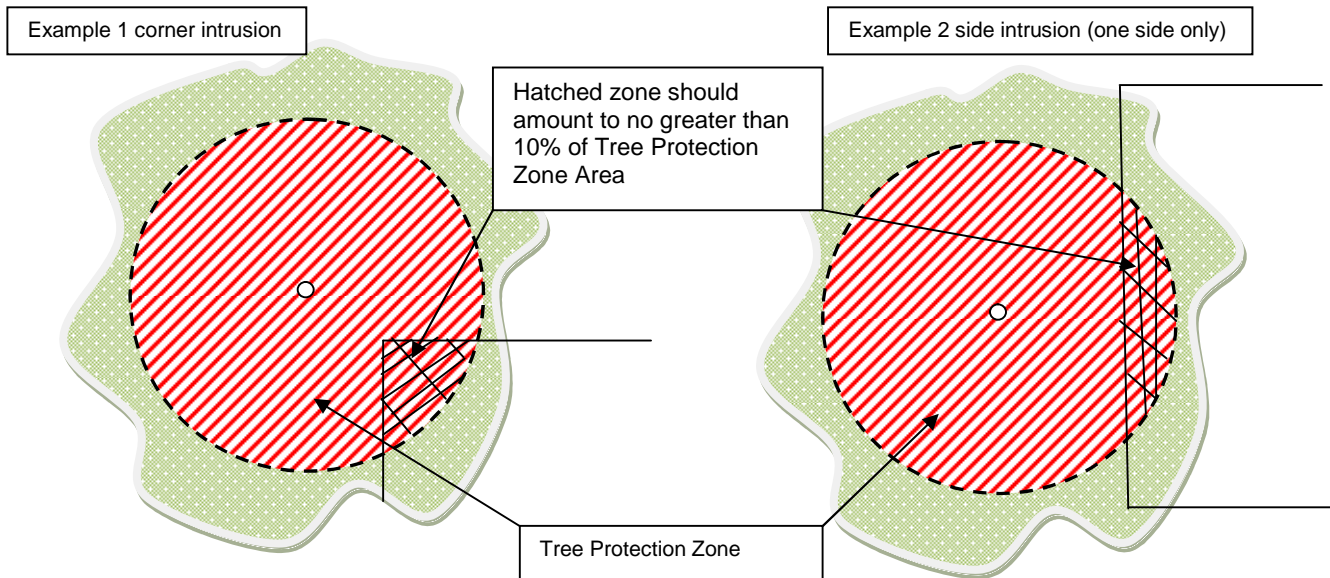
- Trees of low retention value are unsuitable for retention,
- Trees of medium retention value can be retained if site constraints can accommodate tree retention,
- Trees of high retention value are recommended for retention and should be accommodated within the design process.

Although trees within neighbouring properties must be retained the retention value that is provided can give some guidance as to the appropriate treatment of a given tree within the design and construction process.

Tree Retention and acceptable impacts

If trees are to be successfully retained within a development site then measures must be taken to ensure adequate protection of the canopy and root mass. To this end an arborist identifies Tree Protection Zones (TPZ) so that adequate amounts of canopy and root mass are left unaffected by construction, thereby providing for a healthy, stable, long-term tree resource.

AS 4970-2009 *Protection of Trees on Development Sites* provides guidelines for determining the radius of the TPZ based upon the size of the trunk diameter. This standard considers that an encroachment of less than 10% of the area of the TPZ is acceptable, provided that other contiguous areas can be used to increase the TPZ. If encroachments are greater than 10% the project arborist must demonstrate why the tree may remain viable with such an encroachment. The tree protection zones and 10% threshold in appendix 1 are based upon the information provided in AS4970 – 2009.



It should be noted that tree protection zones are a model for planning and design and are not sacrosanct from some sympathetic intrusion, root growth is often unpredictable and for this reason negotiation into a TPZ may be possible. Careful exploratory excavation can give a more accurate depiction of a tree's root mass and the setback required to minimise any negative impact. However, exploratory excavation is sometimes impractical, particularly when dealing with large populations of trees or in areas of heavy clay/shale soil environments such as the subject site and for this reason the TPZ model is provided.

Tree Protection

In order to protect trees on construction sites, tree protection fencing must be erected prior to the commencement of any demolition, excavation or construction works. Tree protection fencing excludes access and defines the extent of the TPZ given for all retained trees. If construction is set at the edge or close to the TPZ, then the fence may be temporarily moved to facilitate construction - with the approval of the responsible authority. N.B. The relocation of the fence does not indicate a change in the TPZ of the tree and suitable protection measures must be undertaken; this may include the use of heavy plywood sheeting laid over a bed of coarse mulch to reduce soil compaction from vehicles and pedestrian traffic. The relocation of the protection fence should be used for short-term purposes only and must be reinstalled as soon as possible. Tree protection fencing specifications are listed in Tree Protection Measures, Appendix 3 of this report.

Tree pruning may be required to facilitate construction, these works must conform to A.S.A 4373-2007 "Amenity Tree Pruning" and be undertaken by a suitably qualified arborist.

An Overview of the Subject Trees

The assessed vegetation of the site is an eclectic mixture of twenty-one (21) exotic species, eighteen (18) planted Victorian natives, twelve (12) NSW species, eleven (11) environmental weeds, seven (7) indigenous species, two (2) WA species and one (1) QLD species.

The subject trees display varying levels of health, structural condition and usefulness, which is reflected in the retention value assigned to each tree. Of the assessed population, twelve (12) have high retention value, twenty-five (25) have medium retention value and thirty-five (35) have low retention value.

The high retention value trees are nos. 8, 20, 21, 26, 27, 38, 40, 41, 46, 53, 54 & 64. These trees displayed such good overall condition; landscape contribution and long expected remaining usefulness that they should be accommodated within the design wherever possible.

The medium retention value trees on the site are nos. 1, 6, 9, 10, 11, 16, 17, 18, 22, 23, 28, 29, 32, 33, 34, 39, 55, 56, 59, 61, 62, 65, 67, 68 & 69. These trees are not significantly good examples or of significant size and condition, but they do still offer some value to the site. If they are not considered a constraint to any future design then they can be retained.

The low retention value trees on the site are nos. 2, 3, 4, 5, 7, 12, 13, 14, 15, 19, 24, 25, 30, 31, 35, 36, 37, 42, 43, 44, 45, 47, 48, 49, 50, 51, 52, 57, 58, 60, 63, 66, 70, 71 & 72, they included trees that are considered a liability to the site as they are either environmental weeds or in poor health and/or poor structural condition.

Conclusions & Recommendations

Remove and replace all trees of low retention value.

Where high and medium retention value trees are to be retained the Tree Protection Zone (TPZ) listed in appendix 1 should ideally be adopted as a no works zone.

To conform to AS4970 2009 *Protection of Trees on Development Sites*, any excavation into the TPZ should not amount to more than 10% of the TPZ area (provided in column 8, appendix 1).

Concrete pads for a proposed fence should not affect more than 10% of the TPZ area (unless they are massive!), however the fence should, as a minimum, be clear of the SRZ provided in Column 9 and the majority of the tree canopy. Some minor pruning can be arboriculturally supported at the planning level.

A proposed bike path can be seen as impacting greater than the 10% threshold, however if it is constructed at or above grade (no excavation for sub base) then it can gain arboricultural support.

As the retained trees may be damaged by direct and indirect impacts, tree protection and remedial measures listed in appendix 3 must be applied to all retained trees, prior to the commencement of any site works, including demolition, site delivery or excavation. Tree protection measures are provided in appendix 3 should they be a requirement of any permit issued.

A final design must clearly indicate the location of those trees nominated for removal, those trees nominated for retention and the location of tree protection fencing for those retained trees.

Storm water drains and other underground services must be diverted around the retained trees TPZ, the only exception would be if the services are installed by underground boring, at appropriate depths, with machinery access and entry pits located outside the TPZ.

Graeme Lewis
Consultant Arborist

References: ASA 4907 2009 *Protection of Trees on Development Sites* (Standards Australia)

Appendix 1

***DESCRIPTORS IN APPENDIX 2**

DBH = DIAMETER OF TRUNK AT 1.4M FROM GRADE. TPZ = TREE PROTECTION ZONE (MEASURED AS A RADIUS FROM THE TRUNK CENTRE). 10% OF TPZ AREA INDICATES MAXIMUM ENCROACHMENT ON ONE SIDE OF THE ROOT PLATE (MEASURED AS A RADIUS FROM THE TRUNK CENTRE). SRZ= STRUCTURAL ROOT ZONE.

*** INDICATES A TREE WITH MULTIPLE TRUNKS.**

Ref	Botanical Name	Common Name	Height (m)	Width (m)	DBH (cm)	TPZ (m)	10% of TPZ area (m)	SRZ (m)	Health	Structure	Form	Origin	Retention Value	Comments
1	<i>Hakea salicifolia</i>	Willow Leaved Hakea	5	5	22*	2.7	1.8	1.8	Fair	Fair	Fair	NSW	Medium	
2	<i>Pinus radiata</i>	Monterey Pine	7	3	19	2.3	1.6	1.6	Good	Good	Good	Environmental Weed	Low	
3	<i>Fraxinus angustifolia</i>	Desert Ash	8	7	28	3.4	2.3	1.9	Good	Poor	Good	Environmental Weed	Low	Bifurcated with decay
4	<i>Fraxinus angustifolia</i>	Desert Ash	8	8	40*	4.8	3.3	2.3	Fair	Poor	Good	Environmental Weed	Low	Stump regrowth
5	<i>Fraxinus 'raywoodi'</i>	Claret Ash	9	8	32*	3.9	2.6	2.1	Good	Poor	Fair	Exotic	Low	Bifurcated with included bark
6	<i>Eucalyptus mannifera</i>	Brittle Gum	8	8	28	3.4	2.3	1.9	Good	Fair	Fair	Planted Victorian Native	Medium	Beginning to break up curb

Appendix 1

Ref	Botanical Name	Common Name	Height (m)	Width (m)	DBH (cm)	TPZ (m)	10% of TPZ area (m)	SRZ (m)	Health	Structure	Form	Origin	Retention Value	Comments
7	<i>Eucalyptus saligna</i>	Sydney Blue Gum	12	12	39	4.7	3.2	2.2	Good	Poor	Good	NSW	Low	Decay canker at 2.3m. Bifurcated with included bark at 5m
8	<i>Eucalyptus mannifera</i>	Brittle Gum	12	12	64	7.7	5.3	2.7	Good	Good	Fair	Planted Victorian Native	High	
9	<i>Photinia serrulata</i>	Chinese Hawthorn	5	6	32*	3.8	2.6	2	Good	Good	Good	Exotic	Medium	
10	<i>Photinia serrulata</i>	Chinese Hawthorn	5	6	33*	3.9	2.7	2.1	Good	Good	Good	Exotic	Medium	
11	<i>Photinia serrulata</i>	Chinese Hawthorn	4	4	17*	2	1.4	1.6	Good	Good	Good	Exotic	Medium	
12	<i>Acer negundo</i>	Box Elder	8	8	26*	3.1	2.2	1.9	Fair	Poor	Good	Exotic	Low	Bifurcated with included bark. Weedy species
13	<i>Cotoneaster pannosus</i>	Cotoneaster	5	7	25*	3.1	2.1	1.9	Good	Fair	Poor	Environmental Weed	Low	

Appendix 1

Ref	Botanical Name	Common Name	Height (m)	Width (m)	DBH (cm)	TPZ (m)	10% of TPZ area (m)	SRZ (m)	Health	Structure	Form	Origin	Retention Value	Comments
14	<i>Pittosporum undulatum</i>	Sweet Pittosporum	8	9	19	2.3	1.6	1.6	Good	Fair	Fair	Environmental Weed	Low	
15	<i>Prunus cerasifera</i> 'Nigra'	Purple Leaved Cherry Plum	6	5	24*	2.9	2	1.8	Poor	Poor	Fair	Exotic	Low	
16	<i>Agonis flexuosa</i>	Willow Myrtle	6	7	41*	4.9	3.4	2.3	Good	Fair	Poor	WA	Medium	
17	<i>Photinia serrulata</i>	Chinese Hawthorn	6	7	38*	4.5	3.1	2.2	Good	Good	Fair	Exotic	Medium	
18	<i>Photinia serrulata</i>	Chinese Hawthorn	4	4	25*	3.1	2.1	1.9	Good	Good	Poor	Exotic	Medium	
19	<i>Eucalyptus botryoides</i>	Southern Mahogany	7	6	30*	3.6	2.5	2	Fair	Poor	Poor	Planted Victorian Native	Low	Stump regrowth
20	<i>Melaleuca styphelioides</i>	Prickly-Leaved Paperbark	9	10	69*	8.3	5.7	2.8	Good	Fair	Good	NSW	High	
21	<i>Quercus palustris</i>	Pin Oak	14	12	51	6.1	4.2	2.5	Good	Fair	Fair	Exotic	High	Bifurcated. Needs a cable system installed
22	<i>Allocasuarina torulosa</i>	Forest Oak	8	7	62	7.4	5.1	2.7	Fair	Fair	Good	NSW	Medium	Measured at base

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23	<i>Eucalyptus leucoxyloides</i> 'rosea'	Dwarf Yellow Gum	12	9	43	5.2	3.5	2.3	Fair	Fair	Poor	Planted Victorian Native	Medium	
24	<i>Pittosporum undulatum</i>	Sweet Pittosporum	8	6	24	2.9	2	1.8	Good	Good	Poor	Environmental Weed	Low	
25	<i>Angophora costata</i>	Smooth Barked-Apple	10	9	29	3.5	2.4	2	Fair	Poor	Fair	NSW	Low	Terminal dieback. Epicormic regrowth
26	<i>Eucalyptus sideroxyloides</i>	Red Ironbark	14	14	66	7.9	5.4	2.8	Good	Fair	Fair	Planted Victorian Native	High	
27	<i>Eucalyptus mannifera</i>	Brittle Gum	14	13	61	7.3	5	2.7	Good	Fair	Fair	Planted Victorian Native	High	Minor trunk decay. Deadwood
28	<i>Grevillea robusta</i>	Silky Oak	10	9	45*	5.4	3.7	2.4	Good	Fair	Fair	QLD	Medium	Storm damage. Cracked limb to east
29	<i>Melaleuca armillaris</i>	Giant Honey Myrtle	7	8	38*	4.5	3.1	2.2	Fair	Fair	Fair	Planted Victorian Native	Medium	
30	<i>Fraxinus angustifolia</i>	Desert Ash	8	8	32	3.8	2.6	2.1	Good	Good	Good	Environmental Weed	Low	

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Ref	Botanical Name	Common Name	Height (m)	Width (m)	DBH (cm)	TPZ (m)	10% of TPZ area (m)	SRZ (m)	Health	Structure	Form	Origin	Retention Value	Comments
31	<i>Fraxinus angustifolia</i>	Desert Ash	8	7	26*	3.2	2.2	1.9	Good	Fair	Poor	Environmental Weed	Low	
32	<i>Photinia serrulata</i>	Chinese Hawthorn	5	4	23*	2.8	1.9	1.8	Good	Fair	Poor	Exotic	Medium	
33	<i>Photinia serrulata</i>	Chinese Hawthorn	5	8	35*	4.2	2.9	2.1	Good	Good	Fair	Exotic	Medium	
34	<i>Photinia serrulata</i>	Chinese Hawthorn	5	8	44*	5.3	3.6	2.4	Good	Good	Fair	Exotic	Medium	
35	<i>Pittosporum undulatum</i>	Sweet Pittosporum	8	6	27*	3.3	2.3	1.9	Good	Fair	Good	Environmental Weed	Low	
36	<i>Eucalyptus sideroxylon</i>	Red Ironbark	14	14	88	10.6	7.3	3.1	Fair	Poor	Fair	Planted Victorian Native	Low	Terminal dieback. Borer damage on trunk and scaffold branches
37	<i>Cupressus macrocarpa</i>	Monterey Cypress	14	10	88*	10.6	7.3	3.1	Fair	Poor	Fair	Exotic	Low	Bifurcated with included bark throughout

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38	<i>Eucalyptus sideroxylon</i>	Red Ironbark	14	10	70	8.4	5.8	2.8	Good	Good	Fair	Planted Victorian Native	High	3 Tawny Frog Mouth owls roosting in crown
39	<i>Eucalyptus camaldulensis</i>	River Red Gum	11	10	48	5.8	4	2.4	Good	Fair	Poor	Indigenous	Medium	Planted tree
40	<i>Corymbia maculata</i>	Spotted Gum	15	13	51	6.1	4.2	2.5	Good	Good	Good	Planted Victorian Native	High	
41	<i>Corymbia maculata</i>	Spotted Gum	17	14	68	8.2	5.6	2.8	Good	Fair	Fair	Planted Victorian Native	High	Install cable in upper crown
42	<i>Cupressus macrocarpa</i>	Monterey Cypress	5	6	36	4.3	3	2.2	Poor	Poor	Poor	Exotic	Low	In decline
43	<i>Cupressus macrocarpa</i>	Monterey Cypress	9	6	44	5.3	3.6	2.3	Poor	Poor	Fair	Exotic	Low	In decline
44	<i>Cupressus macrocarpa</i>	Monterey Cypress	7	4	35*	4.2	2.9	2.1	Poor	Fair	Poor	Exotic	Low	In decline
45	<i>Eucalyptus saligna</i>	Sydney Blue Gum	12	12	41	4.9	3.4	2.3	Fair	Poor	Fair	NSW	Low	Decaying structure. Fungal bracket on trunk

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46	<i>Corymbia maculata</i>	Spotted Gum	16	13	70	8.4	5.8	2.8	Good	Good	Good	Planted Victorian Native	High	
47	<i>Eucalyptus spathulata</i>	Swamp Mallet	4	3	19	2.3	1.6	1.6	Poor	Poor	Poor	WA	Low	
48	<i>Cupressus macrocarpa</i>	Monterey Cypress	9	6	45	5.4	3.7	2.4	Poor	Fair	Fair	Exotic	Low	In decline
49	<i>Cupressus macrocarpa</i>	Monterey Cypress	5	4	49*	5.9	4.1	2.5	Poor	Poor	Fair	Exotic	Low	Measured at base. In decline
50	<i>Cupressus macrocarpa</i>	Monterey Cypress	6	4	47*	5.7	3.9	2.4	Poor	Fair	Fair	Exotic	Low	Measured at base. In decline
51	<i>Callistemon salignus</i>	White Bottlebrush	4	3	16*	2	1.4	1.5	Poor	Fair	Poor	NSW	Low	
52	<i>Eucalyptus botryoides</i>	Southern Mahogany	10	6	41*	4.9	3.4	2.3	Good	Poor	Fair	Planted Victorian Native	Low	Past stem failures
53	<i>Melaleuca linariifolia</i>	Snow In Summer	6	8	80*	9.6	6.6	3	Good	Fair	Good	NSW	High	
54	<i>Eucalyptus viminalis</i>	Manna Gum	16	16	126	15.1	10.4	3.6	Good	Poor	Fair	Indigenous	High	Hollows throughout. Needs pruning

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55	<i>Araucaria cunninghamiana</i>	Hoop Pine	9	5	29	3.5	2.4	2	Good	Good	Good	NSW	Medium	
56	<i>Eucalyptus rubida</i>	Candlebark	10	8	45	5.4	3.7	2.4	Good	Fair	Poor	Indigenous	Medium	Deadwood. Suppressed canopy
57	<i>Eucalyptus rubida</i>	Candlebark	11	8	53	N/A	N/A	2.5	Dead	Poor	Poor	Indigenous	Low	Could be lopped for habitat
58	<i>Eucalyptus globulus</i>	Southern Blue Gum	16	10	87	10.4	7.2	3.1	Poor	Poor	Fair	Planted Victorian Native	Low	Dead stem
59	<i>Melaleuca styphelioides</i>	Prickly-Leaved Paperbark	8	8	43*	5.2	3.6	2.3	Good	Fair	Fair	NSW	Medium	Storm damage. Needs pruning
60	<i>Eucalyptus camaldulensis</i>	River Red Gum	18	16	116	13.9	9.6	3.5	Fair	Poor	Poor	Indigenous	Low	Decay canker and fungal bracket on trunk. Bifurcation in upper crown
61	<i>Eucalyptus camaldulensis</i>	River Red Gum	11	7	41	4.9	3.4	2.3	Good	Fair	Poor	Indigenous	Medium	

Appendix 1

Ref	Botanical Name	Common Name	Height (m)	Width (m)	DBH (cm)	TPZ (m)	10% of TPZ area (m)	SRZ (m)	Health	Structure	Form	Origin	Retention Value	Comments
62	<i>Populus nigra</i> 'Italica'	Lombardy Poplar	20	7	69*	8.3	5.7	2.8	Good	Fair	Good	Exotic	Medium	Capable of root suckering
63	<i>Eucalyptus botryoides</i>	Southern Mahogany	16	7	48	5.8	4	2.4	Good	Poor	Poor	Planted Victorian Native	Low	Decay in trunk
64	<i>Melaleuca styphelioides</i>	Prickly-Leaved Paperbark	9	6	61*	7.3	5	2.7	Good	Fair	Fair	NSW	High	
65	<i>Eucalyptus camaldulensis</i>	River Red Gum	15	10	78*	9.4	6.4	3	Good	Poor	Fair	Indigenous	Medium	Could be retained with cable system
66	<i>Eucalyptus botryoides</i>	Southern Mahogany	8	6	25*	3	2.1	1.9	Good	Fair	Poor	Planted Victorian Native	Low	Weedy specie
67	<i>Corymbia maculata</i>	Spotted Gum	16	8	52	6.2	4.3	2.5	Good	Good	Fair	Planted Victorian Native	Medium	
68	<i>Melaleuca styphelioides</i>	Prickly-Leaved Paperbark	9	7	50	6	4.1	2.5	Good	Fair	Poor	NSW	Medium	
69	<i>Populus nigra</i> 'Italica'	Lombardy Poplar	17	7	66	7.9	5.4	2.8	Good	Fair	Good	Exotic	Medium	Root suckering

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Ref	Botanical Name	Common Name	Height (m)	Width (m)	DBH (cm)	TPZ (m)	10% of TPZ area (m)	SRZ (m)	Health	Structure	Form	Origin	Retention Value	Comments
70	<i>Pinus radiata</i>	Monterey Pine	16	14	90	10.8	7.4	3.2	Good	Good	Fair	Environmental Weed	Low	
71	<i>Eucalyptus botryoides</i>	Southern Mahogany	5	3	50	6	4.1	2.5	Good	Poor	Poor	Planted Victorian Native	Low	Suckering stump
72	<i>Salix babylonica</i>	Weeping Willow	12	10	62*	7.4	5.1	2.7	Poor	Poor	Fair	Environmental Weed	Low	

Appendix 2

Tree Descriptors Age:

Category	Description
Young	Sapling tree and/or recently planted. As a guide a tree up to \approx 5 years of age.
Semi-mature	Tree rapidly increasing in size and yet to achieve expected size in situation.
Maturing	Specimen has reached expected size in situation, with reduced incremental growth.
Over-mature	Tree is senescent and in decline.
Dead	Tree is dead

Health:

Category	Description
Good	Good growth indicators, eg. extension growth. Crown full, with good density, foliage entire with good colour. No or minimal canopy dieback. Minimal or no pathogen damage. Good wound wood development.
Fair	Typical growth indicators, eg. extension growth, leaf size, canopy density for species in location. Tree may have <30% dead wood, or can have minor canopy dieback. Foliage generally with good colour, some discolouration may be present. Minor pathogen damage may be present.
Poor	Poor growth indicators. Tree may have >30% dead wood. Canopy dieback present. Discoloured or distorted leaves, and/or excessive epicormic growth. Pathogen is present and/or stress symptoms that could lead or are leading to decline of tree.

Structure:

Category	Description
Good	Good branch attachment and/or no or minor structural defects. Trunk and scaffold branches sound or minor damage. Good trunk and scaffold branch taper. No branch over extension. No damage to structural roots and/or good buttressing present. No obvious root pests or diseases.
Fair	Typical structure for species. Some minor structural defects and/or minor damage to trunk. Bark missing. Cavities could be present. Minimal or no damage to structural roots.
Poor	Major structural defects and/or trunk damaged and/or missing bark, large cavities, and/or girdling or damaged roots that are problematic.
Hazardous	Tree poses immediate hazard potential that should be rectified as soon as possible.

Form (General shape of the tree):

Category	Description
Good	Canopy full and symmetrical.
Fair	Minor asymmetry or suppression. Considered typical for species in situation.
Poor	Canopy suppressed, major asymmetry. Stump re-growth

Retention Value:

Category	Description
High	In good condition and able to respond to changes in its environment. May be of particular significance to site e.g. environmental or heritage. Tree has potential to be a long-term component of the landscape if managed appropriately. Make every effort to retain
Medium	Tree in fair condition and structure. Tree may have condition or structural problems that would require treatment. Tree could sustain changes to its environment. Tree has potential to be a medium to long-term component of the landscape if managed appropriately. Tree has yet to achieve a significant landscape impact. May be retained or removed depending on design preference
Low	Tree is in poor condition and/or poor structure that can not be rectified. Tree could not sustain dramatic or severe changes, or tree has detrimental effects on environment, eg. woody weed. Recommended for removal.

Appendix 3

Tree Protection Guidelines

The protection and preservation of the existing trees on a development site is to be ensured by the installation of tree protection fencing set at the edge of the tree protection zones. Tree Protection fencing is to be installed prior to the commencement of any site works including demolition, excavation, delivery of materials etc.

The Tree Protection Zones will be determined by the consulting arborist in conjunction with the Site Manager and the Tree Protection Fences will be constructed along these lines.

The actual fence specifications should be a minimum of 1.2 - 1.5 metres of chain mesh or like fence with 1.8 meter star pickets every 3-4 metres and a top line of high visibility plastic hazard tape. This fence will deter the entry of heavy equipment and vehicles and also the entry of workers and/or the public into the Tree Protection Zone. The tree protection zone shall be clearly signed on all visible sides "Tree Protection Zone – No entry without permission from site manager"

These fences should only be removed or shifted by the consent of the consultant arborist or site manager.

The area inside this Tree Protection Zone should be mulched with a covering of approximately 100mm of woodchip mulch or like material.

If temporary access is required through a Tree Protection Zone this may be carried out using sheets of heavy plywood or like protection but should not be considered for long term requirements.

The following are guidelines that must be implemented to minimise the impact of the proposed construction works on the existing trees.

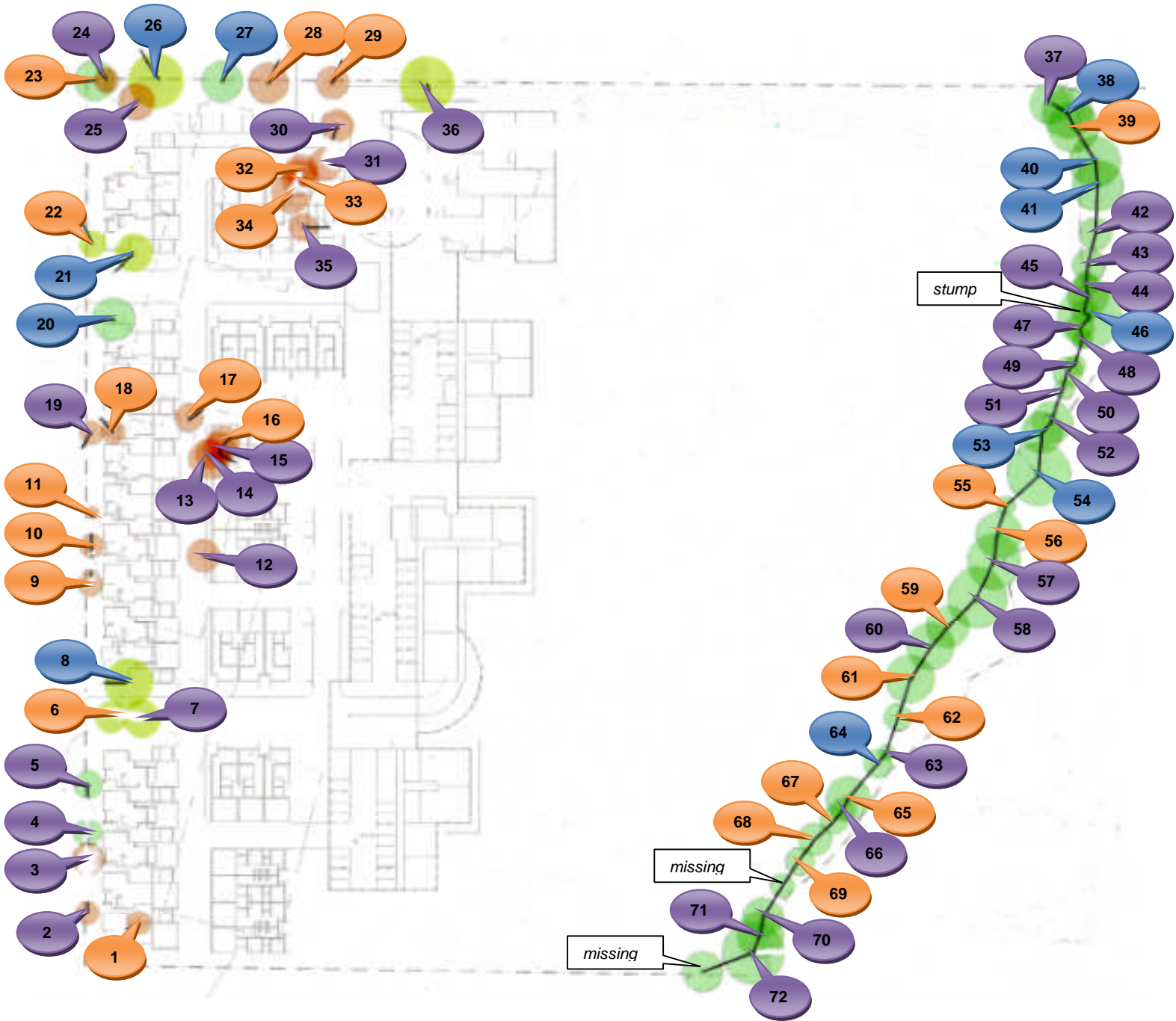
- The Tree Protection Zone is fenced and clearly marked at all times (according to the specification above).
- The consultant arborist is on-site to supervise all excavation works within the TPZ. This is more paramount if substantial roots (i.e. > 50 mm Ø) are encountered and may require pruning. Inspection will need to take place by a qualified arborist to ascertain impact on the trees and recommend follow up works if required.
- A layer of organic mulch (woodchips) to a depth of 100mm (no deeper) should be placed over all root systems (not just in the Tree Protection Zones) of trees which are to be retained to assist with moisture retention and to reduce the impact of compaction. This is particularly important where there will be constant construction vehicle traffic.
- No persons, vehicles or machinery are to enter the Tree Protection Zone without the consent of the consulting arborist or site manager.
- Any underground service installations should be bored and utility authorities should common trench where possible.
- No fuel, oil dumps or chemicals shall be allowed in or stored on the Tree Protection Zone and the servicing and re-fuelling of equipment and vehicles should be carried out away from the root zones.
- No storage of material, equipment or temporary building should take place over the Tree Protection Zone of any tree.
- Nothing whatsoever should be attached to any tree including temporary services wires, nails, screws or any other fixing device.
- Supplementary watering should be provided to all trees through any dry periods during and after the construction process.

Appendix 3

- Any pruning that is required must be carried out by trained and competent arborist who has a thorough knowledge of tree physiology and pruning methods and carry out pruning to the Australian Standard – AS 4373 – 1996 Pruning of Amenity Trees.
- All root excavation should be carried out by hand digging or with the use of 'Air-Excavation' techniques, and roots should be severed by saw cutting or with a sharp axe and not with a Backhoe or any machinery or blunt instrument.

Appendix 4 Tree Nos. Plan

Blue = High Retention Value, Orange = Medium Retention Value, Purple = Low Retention Value



<p style="text-align: center;">Stem Arboricultural Consultancy Assumptions and Limiting Conditions</p>

1. Any legal description provided to the author is assumed to be correct. Any titles and ownerships to any property are assumed to be correct. No responsibility is assumed for matters outside the consultant's control.
2. The author assumes that any property or project is not in violation of any applicable codes, ordinances, statutes or other local, state or federal government regulations.
3. The author has taken care to obtain all information from reliable sources. All data has been verified insofar as possible; however the author can neither guarantee nor be responsible for the accuracy of the information provided by others not directly under the authors control.
4. The author shall not be required to give testimony or to attend court by reason of this report unless subsequent contractual arrangements are made, including payment of an additional fee for such services.
5. Loss of this report or alteration of any part of this report not undertaken by the author invalidates the entire report.
6. Possession of this report or a copy thereof does not imply right of publication or use for any purpose by anyone but the client or their directed representatives, without the prior consent of the author.
7. This report and any values expressed herein represent the opinion of the consultant and the fee is in no way conditional upon the reporting of a specified value, a stipulated result, the occurrence of a subsequent event, nor upon any finding to be reported.
8. Sketches, diagrams, graphs and photographs in this report, being intended as visual aids, are not necessarily to scale and should not be construed as engineering or architectural drawings, reports or surveys.
9. Unless expressed otherwise: 1) Information contained in this report covers only those items that were covered in the project brief or that were examined during the assessment and reflect the condition of those items at the time of inspection; and 2) The inspection is limited to visual examination of accessible components without dissection, excavation or probing unless otherwise stipulated.
10. There is no warranty or guarantee, expressed or implied by the author, that the problems or deficiencies of the plants or site in question may not arise in the future.
11. All instructions (verbal or written) that define the scope of the report have been included in the report and all documents and other materials that the consultant has been instructed to consider or to take into account in preparing this report have been included or listed within the report.
12. To the authors' knowledge all facts, matter and all assumptions upon which the report proceeds have been stated within the body of the report and all opinion contained within the report have been fully researched and referenced and any such opinion not duly researched is based upon the writers experience and observations.