



102 OLD PITTWATER ROAD, BROOKVALE ARBORICULTURAL IMPACT ASSESSMENT

PREPARED FOR:

OLANI PROPERTY GROUP

PREPARED BY:

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date	revision	prepared	checked
21/12/22	Issued Development Application	RC	AM



Executive Summary

This report was commissioned by Orlani Group to accompany a Development Application within the precinct of the Northern Beaches Council at the site address of 102 Old Pittwater Road, Brookvale. The aim of this report is to provide an assessment in accordance with AS4970 – 2009 'Protection of trees on development sites' of the potential impacts of the proposed development upon twenty eight (28) trees.

This report collates and presents information collected by Robyn Cunningham on the 23/09/22. The data collected is located at **7. Tree Survey Table** (page 14) also see **8. Tree Survey Table Notes** (page 17) for notes relating to tree survey table.

Generally the site's vegetation was observed to have a majority native tree canopy, with an exotic shrub mid storey and a turf groundcover layer. The existing surveyed trees are shown at **9. Tree Location Plan** (page 22).

The proposed development will involve the alterations and additions to an existing building with associated paving. This will involve the demolition of existing structures and regrading site levels through excavation, cutting and filling of soil on site. The extent of site works is also illustrated at **9**. **Tree Location Plan** (page 22).

The matrix below gives a brief overview summary of tree significance and level of encroachment from the proposed development of numbered trees.

	ENCROACHMENT WITHIN TPZ Numbering of trees as shown on Tree Location Plan									
ш		No Impact	Minor Encroachment (<10% of TPZ)	Major Encroachment (>10% of TPZ)	Within Development Footprint					
S C A P N C E	High	#3, #4, #20	#21, #24	#9, #25, #26, #27, #28						
LAND	Medium	#1, #2, #5, #14, #16, #17, #22, #23	#6, #7	#10, #11, #12, #13	#8					
T R E E S I G N	Low	#15, #18, #19								
	Total Number of trees	14	4	9	1					

In consideration of the data collected recommendations are provided for the removal or retention of trees including specific tree protection measures required to reduce the anticipated impacts from the proposed construction on those trees proposed to be retained. This report specifically recommends:

- I. The removal of Tree No. 8 if the development is approved as there is an unsustainable major encroachment into the tree protection zone.
- II. The retention and protection of Tree Nos. 1, 2, 3, 4, 5, 14, 15, 16, 17, 18, 19, 20, 22 and 23. The construction will not impact these trees.
- III. The retention and protection of Tree Nos. 6, 7, 21 and 24. The construction will provide a minor encroachment into the tree protection zone.



- IV. The retention and protection of Tree Nos. 9, 10, 11, 12 and 13. These trees are high (9) and medium (10, 11, 12, 13) significance and will require design modification to avoid and minimise impacts from the proposed major encroachment. Specifically, i) new retaining wall foundations to be located entirely within the existing retaining wall foundations, ii) no cut or additional compaction for installing the new paving.
- V. The retention and protection of Tree Nos. 25, 26, 27 and 28. These trees are of high significance and will require the decking to be permeable and supported by isolated piers to avoid and minimise impacts from the proposed major encroachment. Construction drawings should ensure excavation for piers is carefully undertaken by hand or air spade to remove soil without damaging bark of woody roots and the footing design is to provide for the adjustment of the pier location to avoid large woody roots (>40mm dia), if found.
- VI. A Tree Protection Plan should be prepared to guide: (A) construction final design and methodology; (B) Tree Protection barrier installation, and; (C) the Project Arborist supervision/direction as necessary to protect the trees during construction works. The plan should be prepared following provision of a CMP (Construction Management Plan) and/or TMP (Traffic Management Plan), in liaison with Construction plans and consistent with any conditions of consent and AS4970 (2009), sections 4 & 5.
- VII. Root Mapping under project arborist supervision (prior to issue of construction certificate) as the proposed works will constitute a major encroachment within the TPZ.
- VIII. Any earthworks within the TPZ of retained trees should be carried out under project arborist supervision by first excavating a narrow trench to the depth required by hand or equivalent. Severing roots by earthmoving equipment is unacceptable.
- IX. Demolition and Construction: Pedestrian and machinery access, material storage and other construction activities which compact the soil should be designated to be outside of TPZs of all retained trees.
- X. For additional tree protection information see 6. Tree Management Plan (page 12) and 10. General Tree Protection Notes (page 24).
- XI. Revision undertaken of any architectural, Civil, landscape, construction and service plans should be carried out in liaison with the Project Arborist. This arboricultural impact assessment (AIA) should be revised immediately following.
- XII. No landscape plans have been supplied. Constructed landscape elements such as retaining walls, paving and other features; and open trenches for services requiring excavation should be located outside the TPZ of all retained trees.
- XIII. This arboricultural assessment should be reviewed upon the preparation of stormwater, landscape, revised architectural plans or others.
- XIV. Layouts of all proposed mains water, gas, electricity and sewer have not been prepared. Plans of all such proposed services must be reviewed, assessed and approved by the project arborist prior to approval or implementation.



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1. Introduction

This report was commissioned by Orlani Group to accompany a Development Application within the precinct of the Northern Beaches Council at the site address of 102 Old Pittwater Road, Brookvale. The aim of this report is to provide an assessment in accordance with AS4970 – 2009 'Protection of trees on development sites' of the potential impacts of the proposed development upon twenty eight (28) trees.

This report collates and presents information collected by Robyn Cunningham on the 23/09/22. The data collected is located at **7. Tree Survey Table** (page 14) also see **8. Tree Survey Table Notes** (page 17) for notes relating to tree survey table.

2. Methodology

2.1. Limitations

Care has been taken to obtain all information from reliable sources. All data has been verified as far as possible. However Arboreport can neither guarantee nor be responsible for the accuracy of information provided by others. Unless stated otherwise:

- Information contained in this report covers only the tree/s examined and reflects the health and structure of the tree at the time of inspection. The documented, observations, results, recommendations and conclusions given may vary after the site visit due to environmental conditions. Liability will not be accepted for damage to person or property as a result of natural processes, unforeseeable actions or occurrences.
- Observations recorded for trees located within adjacent properties have been made without
 entering that property. Deciduous trees inspected during winter and all trees obscured by other
 vegetation are not able to be properly assessed. As a result measurements for these trees are
 estimated. Similarly these trees were not subject to a complete visual inspection and defects or
 abnormalities may be present but not recorded.
- Defects such as cambial damage, cracks, decay or hollows may be present which are not visible from the ground. This report does not include an aerial survey of the crown.
- Defects such as root damage, cracks or decay may be present under the ground. This report does not include any subterranean survey of the root plate.
- The inspection was limited to visual examination from the base of the subject tree without dissection, excavation, probing or coring (unless specifically noted otherwise).
- There is no warranty or guarantee, expressed or implied, that problems or deficiencies of the subject trees may not arise in the future.

2.2. Site Inspection

A visual inspection of the tree/s was performed from ground level, data collected includes:

- Genus, Species, Common Name;
- Height, Width, DBH (Diameter at Breast Height), DRB (Diameter above Root Buttress);
- Age, Health & Vigour;
- Significance, Amenity and Ecological Value;
- Form and Structural Condition;
- Visible Defects or Evidence of Wounding.



2.3. Measurement

- Tree locations are supplied by client on the survey plan or triangulated using a measuring tape.
- Diameter at breast height (DBH) and Diameter above Root Buttress (DRB) are measured using a diameter tape.
- Height is measured using a clinometer or Nikon Forestry Pro.
- Canopy width is measured with a Leica Disto (laser distometer) OR estimated using a measured stride paced out on site.
- Structural Root Zone (SRZ) and Tree Protection Zone (TPZ) radii are calculated (in accordance with AS 4970-2009).
- Development impact/setback is measured from the nearest face of the trunk to the face of the structure in Auto CAD using the perpendicular distance function.

2.4. Recording Data

Data collected is collated in the tree survey table located at **7. Tree Survey Table** (page 14). The tree survey table contains abbreviations for terms describing the tree's characteristics; explanatory notes pertaining to these are located at **8. Tree Survey Table Notes** (page 17).

The physical data for tree locations, crown width and DRB is schematically described in **9. Tree** Location Plan (page 22).

2.5. Reference Documents

The report was written with reference to:

- Survey Plan prepared by Total Surveying Solutions, dated 17/01/20.
- Architectural Site Plan prepared by Nordon Jago, dated 22/11/22.
- Australian Standard 4970-2009 'Protection of Trees on Development Sites'.

2.6. Council Tree Preservation Regulatory Controls

The property is in the recently formed Northern Beaches Council LGA. During the current transition phase, the Manly Council DCP applies.

Manly council DCP prevents and prohibits ringbarking, chopping, topping, lopping, soil build up around trunk, removal, injuring or wilful destruction of any tree or trees within Manly LGA.

It protects trees located on private property with a height 5m or greater.

Trees not requiring Council consent include:

- Dead trees where technical evidence can be provided to show they are dead.
- Species listed in DCP 3.3.2.1 as specifically exempt.

2.7. Determining a tree's significance

The significance of a tree is an essential criterion to establish the importance that a particular tree may have on a site. When determining a tree's significance within the landscape context, the following questions are asked of each tree. Significance may be expressed in increments of High, Medium or Low. For a High rating the majority (≥4) of the answers will be yes; For a Medium-High



rating 3.5 of the answers will be yes; for a Medium rating half (=3) of the answers will be yes; for a Low-Medium rating 2.5 of the answers will be yes; and for the Low rating the minority of answers will be yes (\leq 2).

- 1. Is the tree of botanical interest; Is it included in a significant tree register or listed as a heritage item under the Federal State or Local Regulations?
- 2. Is the tree visually prominent in the locality?
- 3. Is the tree well structured?
- 4. Is the tree in good health and/or does it display signs of good vigour?
- 5. Is the tree typically formed for the species?
- 6. Is the tree currently located in a position that will accommodate future growth?

3. Observations

3.1. Site Description

The site is a single industrial block located at 102 Pittwater Road, Brookvale. It currently contains a detached building with associated paths, turf areas and gardens. The site has a general southerly aspect.

3.2. Soil Landscape Map

The soils consist of landfill including soil, rock, building and waste materials capped with up to 40 cm of sandy loam or up to 60 cm of compacted clay.³

Generally the landscape is classified as Disturbed Terrain, characterised by level plain to hummocky terrain, extensively disturbed by human activity, including the complete disturbance, removal and/or burial of natural soil profiles. There is local relief of less than 10 m, and slope gradients of less than 30%, with original vegetation completely cleared, and replaced with turf or grassland ³.

The soils limitations are dependent on the nature of the fill material, but may include; mass movement hazard, unconsolidated low wet strength materials, impermeable soil, poor drainage, localised very low fertility and toxic materials².

The critical soil characteristics of this soil type for trees growing on this site include shallow soil depth.³

3.3. Native Vegetation Map

This area is mapped as cleared and modified lands. These areas are mostly suburban development. Small remnants of vegetation too small to map may occur here.

3.4. Summary of site inspection data

Generally the site's vegetation was observed to have a majority native tree canopy, with an exotic shrub mid storey and a turf groundcover layer. The existing surveyed trees are shown at **9. Tree Location Plan** (page 22).



3.5. Summary of Proposed Development

The proposed development will involve the alterations and additions to an existing building with associated paving. This will involve the demolition of existing structures and regrading site levels through excavation, cutting and filling of soil on site. The extent of site works is also illustrated at **9**. **Tree Location Plan** (page 22).



3.6. Tree significance and encroachment matrix

The matrix below gives a brief overview summary of tree significance and level of encroachment from the proposed development of numbered trees.

	ENCROACHMENT WITHIN TPZ Numbering of trees as shown on Tree Location Plan									
ш		No Impact	Minor Encroachment (<10% of TPZ)	Major Encroachment (>10% of TPZ)	Within Development Footprint					
S C A P N C E	High	#3, #4, #20	#21, #24	#9, #25, #26, #27, #28						
LAND	Medium	#1, #2, #5, #14, #16, #17, #22, #23	#6, #7	#10, #11, #12, #13	#8					
T R E E S I G N	Low	#15, #18, #19								
	Total Number of trees	14	4	9	1					

4. Discussion

4.1. Trees Not Impacted by the Proposal

- High Significance Trees: Tree Nos. 3, 4 and 20.
- Medium Significance Trees: Tree Nos. 1, 2, 5, 14, 16, 17, 22 and 23.
- Low Significance Trees: Tree Nos. 15, 18 and 19.

4.2. Trees with a Minor TPZ Encroachment

(Where the proposed construction encroaches within the TPZ by 10% or less).

• **Tree Nos. 6 and 7** are located 9.8m and 4.4m respectively from proposed new paving, providing encroachments of 1.6% and 0.8% respectively within TPZ. This level of impact is considered low and sustainable by the trees.

These trees are considered to be of medium significance and should be retained and protected.

• **Tree No. 21** is located 6.3m from proposed refurbished paving, providing an encroachment of 5.1% within TPZ. This level of impact is considered low and sustainable by the tree.



This tree is considered to be of high significance and should be retained and protected.

• Tree No. 24 is located 3.6m from proposed deck, providing an encroachment of 10.0% within TPZ. This level of impact is considered low and sustainable by the tree.

This tree is considered to be of high significance and should be retained and protected.

4.3. Trees with a Major TPZ Encroachment

(Where the proposed construction encroaches within the TPZ by more than 10% or is within the SRZ).

• **Tree Nos. 9, 10, 11, 12 and 13** are located 5.5m, 0.5m, 0.6m, 0.6m, and 0.5m respectively from proposed refurbished paving, providing encroachments of 17.2%, 36.6%, 35.1%, 38.5% and 22.3% respectively within TPZ. This level of impact is considered moderate (9, 13) and significant (10, 11, 12) and unsustainable by the trees without final construction drawings including these specifications i) new retaining wall foundations to be located entirely within the existing retaining wall foundations, ii) no cut or additional compaction for installing the new paving.

Tree sensitive construction measures should be used to minimize impact as prescribed by the Australian Standard AS4970-2009 Protection of trees on development sites. Root loss from excavation for new paving is to be avoided, and reduced water infiltration and gaseous exchange from compaction of sub-base is also to be avoided.

Paving design and installation within the TPZ of retained trees should be designed and constructed:

- To be above grade using appropriate FFLs and paving profile depth that requires no excavation.
- Designed to eliminate excavation for sub-base.
- Construction to require no sub-base compaction, and
- Provide a permeable surface.
- All modifications and revisions should be carried out in liaison with the project arborist (minimum AQF Level 5). All future revised plans should be assessed by a minimum AQF Level 5 arborist.

These trees are considered to be of high (9) and medium (10, 11, 12, 13) significance and should be retained and protected.

• **Tree Nos. 25, 26, 27 and 28** will have encroachment from a deck at approximately one meter above existing levels within the TPZ of these trees. These species have a moderate to good tolerance for construction impacts. No details of the deck construction have been issued. Typically, decks have timber boards which are spaced on joists and beams, which are supported by piers or posts.

These trees are located 2.7m, 3.3m, 2.6m, and 1.2m respectively from proposed deck, providing encroachments of 19.6%, 17.2%, 20.8% and 19.2% respectively within TPZ and encroachment within SRZ (27, 28). Tree impacts will be i) isolated excavation for pier footings resulting in direct root loss ii) timber decking with gap between existing soil surface and deck. The decking is effectively permeable and allows gaseous exchange and water infiltration. If excavation for piers is carefully undertaken by hand to remove soil without damaging bark of woody roots and the design allows for the adjustment of the pier location to avoid large woody roots (>40mm dia), then the impact on these trees should be low-moderate.



These trees are considered to be of high significance and should be retained and protected.

4.4. Trees within the development footprint

• **Tree No. 8** is located within the development footprint – proposed entry and retaining walls. This tree is considered to be of medium significance and should be retained and protected. Extensive redesign of the proposed entry and retaining walls would be required to retain this tree.

4.5. Other Tree Comments

• Tree Nos. 1, 2, 3, 4, 5, 14, 15, 16, 17, 18, 19, 20, 22 and 23 are located in positions that will allow their retention without impact from the proposed development.

5. Recommendations

In consideration of the data collected recommendations are provided for the removal or retention of trees including specific tree protection measures required to reduce the anticipated impacts from the proposed construction on those trees proposed to be retained. This report specifically recommends:

- I. The removal of Tree No. 8 if the development is approved as there is an unsustainable major encroachment into the tree protection zone.
- II. The retention and protection of Tree Nos. 1, 2, 3, 4, 5, 14, 15, 16, 17, 18, 19, 20, 22 and 23. The construction will not impact these trees.
- III. The retention and protection of Tree Nos. 6, 7, 21 and 24. The construction will provide a minor encroachment into the tree protection zone.
- IV. The retention and protection of Tree Nos. 9, 10, 11, 12 and 13. These trees are high (9) and medium (10, 11, 12, 13) significance and will require design modification to avoid and minimise impacts from the proposed major encroachment. Specifically, i) new retaining wall foundations to be located entirely within the existing retaining wall foundations, ii) no cut or additional compaction for installing the new paving.
- V. The retention and protection of Tree Nos. 25, 26, 27 and 28. These trees are of high significance and will require the decking to be permeable and supported by isolated piers to avoid and minimise impacts from the proposed major encroachment. Construction drawings should ensure excavation for piers is carefully undertaken by hand or air spade to remove soil without damaging bark of woody roots and the footing design is to provide for the adjustment of the pier location to avoid large woody roots (>40mm dia), if found.
- VI. A Tree Protection Plan should be prepared to guide: (A) construction final design and methodology; (B) Tree Protection barrier installation, and; (C) the Project Arborist supervision/direction as necessary to protect the trees during construction works. The plan should be prepared following provision of a CMP (Construction Management Plan) and/or TMP (Traffic Management Plan), in liaison with Construction plans and consistent with any conditions of consent and AS4970 (2009), sections 4 & 5.
- VII. Root Mapping under project arborist supervision (prior to issue of construction certificate) as the proposed works will constitute a major encroachment within the TPZ.
- VIII. Any earthworks within the TPZ of retained trees should be carried out under project arborist supervision by first excavating a narrow trench to the depth required by hand or equivalent. Severing roots by earthmoving equipment is unacceptable.
- IX. Demolition and Construction: Pedestrian and machinery access, material storage and other construction activities which compact the soil should be designated to be outside of TPZs of all retained trees.



- X. For additional tree protection information see 6. Tree Management Plan (page 12) and 10. General Tree Protection Notes (page 24).
- XI. Revision undertaken of any architectural, Civil, landscape, construction and service plans should be carried out in liaison with the Project Arborist. This arboricultural impact assessment (AIA) should be revised immediately following.
- XII. No landscape plans have been supplied. Constructed landscape elements such as retaining walls, paving and other features; and open trenches for services requiring excavation should be located outside the TPZ of all retained trees.
- XIII. This arboricultural assessment should be reviewed upon the preparation of stormwater, landscape, revised architectural plans or others.
- XIV. Layouts of all proposed mains water, gas, electricity and sewer have not been prepared. Plans of all such proposed services must be reviewed, assessed and approved by the project arborist prior to approval or implementation.

6. Tree Management Plan

6.1. Management Objectives:

The prioritisation of the following objectives is integral for the successful management of site trees:

- 1. Protection of the TPZ of retained trees;
- 2. Protection of the trunk and branches of retained trees;
- 3. Reduction of stress on retained trees from construction;
- 4. To ensure the viability of retained trees after practical completion.

6.2. Tree Management Actions:

The above general tree management objectives are achieved by:

- Appointment of a Level 5 AQF Project Arborist experienced in managing trees on construction sites to prepare and certify a Tree Management Plan.
- The installation of a Tree Protection Fence to enclose and protect the TPZ.
- Installation of additional root, trunk and branch protection as required to protect retained trees where minor encroachments within the TPZ are anticipated.

• Supervision, monitoring, inspections and certification of tree protection as outlined in the Tree Management Plan.

6.3. Schedule of Hold Points, Inspections and Certification

To ensure this plan is implemented, hold points (**HP**) have been specified in the schedule of works (below). Once each stage is reached the work will be inspected and certified by the Project Arborist and the next stage may commence.

Alterations to this schedule may be required due to necessity however this shall be through consultation with the Project Arborist only.

Hold Point	Task	Responsibility	Certification	Timing of Inspection	
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1	Undertake Root Mapping for trees with major encroachment.	Principal Contractor	Project Arborist	Prior to completion of foundation design
2	Complete foundation design so to avoid woody roots greater than 40mm	Principal Contractor	Project Arborist	Prior to construction certificate application
3	Indicate clearly (with spray paint on trunks) trees approved for removal only	Principal Contractor	Project Arborist	Prior to demolition and site establishment.
4	Install TPF and additional root, trunk and/or branch protection	Principal Contractor	Project Arborist	Prior to demolition and site establishment.
5	Supervise all excavation works proposed within the TPZ	Principal Contractor	Project Arborist	As required prior to the works proceeding adjacent to tree
6	Inspection of trees by Project Arborist	Principal Contractor	Project Arborist	Quarterly during construction period
7	Inspection of trees by Project Arborist at Practical Completion.	Principal Contractor	Project Arborist	Following the removal of tree protection measures from HP 4
8	Final Inspection of trees by Project Arborist at Final Completion.	Principal Contractor	Project Arborist	Prior to issue of occupation certificate.



7. Tree Survey Table

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	U IDC	repo														High										
	Vegetation	Management Consu	ltants													Medium			No ir	Major Minor Within		Within deve	elopment			
																Low					encroachment	encroachment	footp	print		
NO#	Botanic Name	Common Name	Height (m)	Spread (m)	Trunk Dia (mm)	Trunk Dia 2 (mm)	Trunk Dia 3 (mm)	Trunk Dia 4 (mm)	DBH (mm)	DRB (mm)	SRZ (mm)	TPZ (mm)	Age	Health	rown Con	Signifi- cance	Am	Eco	Crown Form		Developm Encre	ent Setback and oachment			Comments	
1	Lophostemon confertus	Brush Box	9	6	280	0	0	0	280	360	2155	3360	Mature.	Av	Av	M	Μ	Μ	(F) Dominant.	No impo	act			Located on line clearan 500mm sout	road reserve. Previously lo ce. Surface roots extendi h and 2m west.	opped for power ng 3m east and
2	Lophostemon confertus	Brush Box	10	6	310	0	0	0	310	380	2204	3720	Mature.	Av	Av	M	М	М	(F) Codominant.	. No impo	act			Located on clearance c	road reserve. Lopped for It 5m. Surface roots exter	power line Iding west 1m.
3	Cupressus macrocarpa	Monterey Cypress	15	9	810	0	0	0	810	800	3013	9720	Mature.	G	G	н	м	L	(F) Dominant.	No impo	act			Appears to tree immedi	be recent parking area 1. ately adjacent to tree no	5m to north. Base o 4.
4	Jacaranda mimosifolia	Jacaranda	14	8	420	410	0	0	587	720	2883	7044	Mature.	G	G	Н	Μ	L	(F) Codominant.	. No impo	act			Appears to tree immedi trunks from 5 300mm diar north at 3m diam. Subst	be recent parking area 1. ately adjacent to tree no 600mm. Branch recently p heter. New pathway to e and 5m, 200mm diamete ation located 4m north.	5m to north. Base o 3. Co-dominant runed at 2m east, ast 6m. Pruned er and 100 mm
5	Phoenix canariensis	Canary Island Date Palm	9	6	530	0	0	0	530	610	-	4000	Mature.	Av	Av	м	L	L	No Value	No impo	act			Exempt spe	cies under Northern Beacl	nes Council DCP.
6	Cinnamomum camphora	Camphor Laurel	15	12	390	430	380	520	868	1800	4236	10416	Mature.	Av	Av	M	L	L	(F) Codominant.	Locateo . encroa	d 9.8m from propos achment within TPZ	sed new paving - 7	1.6%	Four stems fi diameter. C 150mm, 300 Beaches Co Surface roo	om base. Pruned at 2m, avity, south, at 300mm fro omm deep. Exempt specie ouncil DCP. s extending 6m east.	south, 250mm m grade, 100mm x es under Northern
7	Melaleuca quinquenervia	Broad-leaved Paperbark	15	6	450	0	0	0	450	600	2670	5400	Mature.	Av	Av	M	Μ	Н	(F) Codominant.	Locateo . encroa	d 4.4m from propos achment within TPZ	sed paving - 0.8%		Located on	boundary.	
8	Casuarina glauca	Swamp Oak	15	8	480	0	0	0	480	620	2707	5760	Mature.	Av	Av	м	Н	Н	(F) Dominant.	Within d retaining	development footp ng walls	rint - proposed en	try and	Recently pro	uned west at 6m, diamete	r 300mm.
9	Populus deltoides	Cottonwood	21	16	1050	0	0	0	1050	1200	3573	12600	Mature.	Av	Av	н	Н	L	(F) Dominant.	Located encroad	d 5.5m from propos chment within TPZ	sed refurbished pc	iving - 17.2%	Pruned to no 150mm diar inaccessible	orth and west at 6m, 8m, neter to 300mm, occludin	10m, 11m, 12m, g. DRB
10	Syzigium smithii	Lilly Pilly	10	6	210	210	150	0	333	430	2322	3996	Mature.	Av	Av	M	Μ	H	(F) Codominant.	Located . encroad	d 0.5m from propos chment within TPZ o	sed refurbished po and encroachmer	iving - 36.6% nt within SRZ	Canopy ske Canopy lifte	wed to south. Caterpillar i d to 6m.	nests in leaves.
11	Macadamia integrifolia	Macadamia Tree	11	5	160	190	200	0	319	430	2322	3828	Mature.	G	G	M	Μ	Н	(F) Codominant.	Locateo . encroa	d 0.6m from propos Ichment within TPZ o	sed refurbished pc and encroachmer	iving - 35.1% nt within SRZ	Canopy lifte	d to 6m.	
12	Leptospermum petersonii	Lemon-scented Tea Tree	11	5	300	0	0	0	300	340	2104	3600	Mature.	Av	Av	M	Μ	M	(F) Codominant.	Locateo . encroa	d 0.6m from propos Ichment within TPZ o	sed refurbished pc and encroachmer	iving - 38.5% nt within SRZ	Branch prun lifted to 6m.	ed north recently at 3m,	200 mm. Canopy
13	Syzigium smithii	Lilly Pilly	11	10	260	110	230	0	365	500	2474	4380	Mature.	Av	Av	M	Μ	M	(F) Codominant.	Locateo . encroad	d 0.5m from propos chment within TPZ o	sed refurbished pc and encroachmer	iving - 22.3% nt within SRZ	Canopy lifte side of stem Crack on lor side of same 100mm and	d to 6m. DRB est. Transver , north, extending 1m from wer side of same stem also e stem, located 1m from g 50mm deep.	rse crack on upper n grade to 2m. o. Cavity on upper grade, 100mm x
14	Phoenix canariensis	Canary Island Date Palm	7	6	570	0	0	0	570	720	-	4000	Mature.	Av	Av	м	L	L	No Value	No impo	act			Exempt spe	cies under Northern Beacl	nes Council DCP.

102 OLD PITTWATER ROAD, BROOKVALE - TREE SURVEY DATA SHEET

DATE OF SURVEY: 23/09/22

	Orbo	prepc	ort	• 1 <u>1</u>												High											
	Vegetation	Management Consu	Itants													Medium			No ir		Major	Minor	Within de	evelopment			
																Low				e	ncroachment	encroachmer	nt foo	otprint			
NO#	Botanic Name	Common Name	Height (m)	Spread (m)	Trunk Dia (mm)	Trunk Dia 2 (mm)	Trunk Dia 3 (mm)	Trunk Dia 4 (mm)	DBH (mm)	DRB (mm)	SRZ (mm)	TPZ (mm)	Age	Health	rown Cor	Signifi- n: cance	Am	Eco	Crown Form		Developm Enc	nent Setback and roachment			Co	omments	
15	Syagrus romanzoffianum group	Cocos Palm	8	3	240	0	0	0	240	360	_	2500	Mature.	Av	Av	L	L	L	(F) Codominant.	. No impact				Group of th Council D(nree. Exempt sp CP.	pecies under North	ern Beaches
16	Jacaranda mimosifolia	Jacaranda	12	6	280	0	0	0	280	350	2129	3360	Mature.	Av	Av	M	L	L	(F) Dominant.	No impact				Pruned at 3	3m, north, and	3.5m	
17	Glochidion ferdinandi	Cheese tree	9	6	260	170	180	170	398	600	2670	4776	Mature.	F	F	Μ	м	M	(F) Dominant.	No impact				One tree. I canopy sp located at	Root girdle to n arse. Surface r top of emban	orth, canopy lifted oots extending 3m kment.	to 6m, south. Tree
18	Melia azedarach	White Cedar	8	5	250	0	0	0	250	400	2252	3000	Mature.	Av	Av	L	L	L	(F) Dominant.	No impact				Located o	n neighbouring	property. Not on s	survey
19	Melia azedarach	White Cedar	8	6	300	0	0	0	300	330	2077	3600	Mature.	Av	Av	ι	L	L	(F) Dominant.	No impact				Not on surv	vey. Located o	n site.	
20	Melaleuca quinquenervia	Broad-leaved Paperbark	14	5	570	0	0	0	570	600	2670	6840	Mature.	Av	Av	н	Н	Н	(F) Codominant.	. No impact				Canopy sk Branch at	ewed to east. 1m east remove	Co-dominant trun ed. 200mm	ks from 2m.
21	Araucaria heterophylla	Norfolk Island Pine	24	10	690	0	0	0	690	820	3045	8280	Mature.	G	G	н	м	L	(F) Dominant.	Located 6. encroachn	3m from propo nent within TPZ	osed refurbished p	paving - 5.1%	Canopy lif	ted to 6m		
22	Macadamia integrifolia	Macadamia Tree	14	10	240	230	310	250	519	740	2916	6228	Mature.	Av	Av	м	М	Н	(F) Codominant.	. No impact				Multi stemr lifted to 9m	med from base n Branch recen	. Entire canopy to tly pruned east at	west recently 1m, 250mm
23	Melaleuca auinauenervia	Broad-leaved Paperbark	22	5	590	0	0	0	590	560	2594	7080	Mature.	Av	Av	м	м	Н	(F) Codominant.	. No impact				Codomino	nt stems from 1	m	
24	Melaleuca quinquenervia	Broad-leaved Paperbark	22	7	660	0	0	0	660	560	2594	7920	Mature.	Av	Av	Н	Н	Н	(F) Codominant.	Located 3. encroachn	6m from propo nent within TPZ	osed deck - 10.0%	,)	Canopy to Recently p	east and west runed at 2m, w	only. Canopy fror vest, 300mm diame	n 11m only. eter.
25	Melaleuca quinquenervia	Broad-leaved Paperbark	22	20	890	0	0	0	890	990	3295	10680	Mature.	Av	Av	н	Н	Н	(F) Codominant.	Located 2. encroachn	7m from propo nent within TPZ	osed deck - 19.6%	,)	Forest form	1		
26	Melaleuca quinquenervia	Broad-leaved Paperbark	22	12	570	0	0	0	570	500	2474	6840	Mature.	Av	Av	н	Н	Н	(F) Codominant.	Located 3. encroachn	3m from propo nent within TPZ	osed deck - 17.2%	,)	Canopy to	east and west	only	
27	Melaleuca quinquenervia	Broad-leaved Paperbark	22	14	1280	0	0	0	1280	1310	3707	15000	Mature.	Av	Av	Н	Н	Н	(F) Codominant.	Located 2. encroachn	6m from propo nent within TPZ	osed deck - 20.8% and encroachm	s ent within SRZ	Exposed ro extending	oots to west, ext 3m.	tending 2m and to	south
28	Melaleuca quinquenervia	Broad-leaved Paperbark	22	14	1280	0	0	0	1280	1311	3708	15000	Mature.	Av	Av	н	Н	Н	(F) Codominant.	Located 1.: encroachn	2m from propo nent within TPZ	osed deck - 19.2% and encroachm	% ent within SRZ	Canopy sk	ewed to south		

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DATE OF SURVEY: 23/09/22



8. Tree Survey Table Notes

8.1. Genus, Species and Common Name

The botanical and common name of each tree is identified and recorded. Occasionally the exact species name is unknown; sp. is recorded to indicate this.

8.2. Height (m), Spread (m), Trunk Dia, DBH and DRB (mm)

- The tree's height and spread (diameter) is recorded in metres.
- The tree **DBH** is recorded in millimetres. DBH is an abbreviation of Diameter (of the trunk) measured at Breast Height (or 1.2m from the base of the trunk). If more than one trunk is present the DBH is calculated in accordance with AS4970-2009 Protection of Trees on Development Sites.
- If the tree has multiple trunks multiple trunks each trunk DBH (**Trunk Dia**) will be recorded individually.
- The tree **DRB** is recorded in millimetres. DRB is an abbreviation of Diameter (of the trunk) measured above the Root Buttress. It is required to calculate the SRZ in accordance with AS4970-2009 Protection of Trees on Development Sites when there is major encroachment within the TPZ, ie. greater than 10% is encroached upon or if there is an encroachment within the SRZ.

8.3. Age (Maturity)

The age class of each tree is estimated as either:

- Y = Young; a well-established but juvenile tree.
- SM = Semi-mature; a tree at growth stages between immaturity and full size.
- **EM = Early-mature**; a tree that is more-or-less of mature dimensions yet still vigorously growing.
- **M** = **Mature**; a full-sized tree with some capacity for further, expansive crown growth.
- LM = Late Mature; a tree of full, mature dimensions with little capacity for expansive growth, many years away from decline.
- **OM = Over-mature**; a tree of old age in a phase of slow decline.

8.4. Health and Vigour

The trees health and vigour is recorded as a measurement of:

- **G** Good the tree does not appear stressed with no excessive dieback, insect infestation, decay, dead wood or epicormic shoots.
- **Avg** Average Health the tree appears stressed and have some crown dieback, and/or a few epicormic shoots, and/or some dead wood in the crown and some new growth at branch tips. These trees may benefit from remediation of the growing environment to reduce stress and return it to good health.
- F Fair the tree may have areas of crown dieback, and/or epicormic shoots, and/or areas of decay, and/or reduced new growth at branch tips. These trees have been stressed for a short period of time, remediation of the growing environment may improve the trees health.
- P Poor the tree may have large areas of crown dieback, and/or many epicormic shoots, and/or reduced new growth at branch tips. These trees have been stressed for a long time, remediation of the growing environment would not return the tree to good health.
- D Dead the tree is dead



8.5. Structural Condition (Crown)

The structural condition of each tree is assessed and recorded as either:

- **G** Good Condition: the tree appears to have no visible indication of inherent structural defects.
- **Avg** Average Condition: the tree has minor structural defects which may be corrected with remedial works or pruning, allowing the tree to return to Good Condition.
- F Fair Condition: the tree has visible structural defects such as (but not limited to) dead branches, and/or an unbalanced crown, and/or leaning trunk and/or areas of decay. These trees do not demonstrate the typical form of their species, or have been damaged or have begun to deteriorate. Remedial works or pruning may return the tree to Average Condition.
- P Poor Condition: the tree has significant structural defects such as (but not limited to) very large dead branches, and/or extremely unbalanced crown, and/or subsiding trunk and/or large areas of decay. These trees do not demonstrate the typical form of their species, or have been severely damaged or have deteriorated significantly. Remedial pruning would not return the tree to Fair Condition.

8.6. Significance

Measured as High, Medium or Low, see **2.7 Determining a tree's significance** (page 6). Significance may be expressed in increments of High, Medium or Low. For a High rating the majority (\geq 4) of the answers will be yes; For a Medium-High rating 3.5 of the answers will be yes; for a Medium rating half (=3) of the answers will be yes; for a Low-Medium rating 2.5 of the answers will be yes; and for the Low rating the minority of answers will be yes (\leq 2).

8.7. Amenity Value

Amenity value is a subjective measurement based on the tree's contribution to the landscape, it may be based on the tree's visual form, however it also includes non-visual attributes such as provision of shade for a seat, screening of poor views or for privacy, or if it has historical significance. The amenity value is recorded as:

- H High, the trees form is an excellent example of its species and it makes a great specimen and/or it has other attributes such screening, or is historical significance. These trees are visually prominent and valuable to the community or public domain.
- **M** Medium, the tree may have an altered form and/or it has attributes that provides amenity to local residents only.
- L Low, the tree is not a good specimen and it does not provide substantial benefit to local residents or the community.

8.8. Ecological Value

Ecological value is a measurement of the tree's contribution to the environment. <u>It is determined</u> by the tree's area of origin, its potential to provide habitat to native fauna and its potential to become an environmental pest. The ecological value is recorded as:

- **H** High, the tree is locally native or remnant and/or it has habitat value for native fauna.
- **M** Medium the tree is native but not locally native.
- L Low, the tree is not native and/or it may be a listed nuisance
- Ha Habitat, is the tree valued by fauna for food (ie. foliage fruit or sap) or shelter (ie. nesting, roosting, dray or hollow).
- Wd tree is a weed or invasive species.



8.9. Form

Francisco)

The form, structure or shape of each tree is assessed and recorded as either one or a combination of several of the below terms:



Program, Recreation and Park Dept., City and County of San

Forest forms (F) ²⁰: Dominant; Codominant; Intermediate; Suppressed. For sites that contain remnant native vegetation.



Urban Tree forms (U) ²⁹: Columnar; Fastigiate; Broad-domed; Narrowdomed; Conical; Standard; Branches Vase-shaped; Branches Horizontal; Branches Ascending; Pendulous' Excurrent; Shrub-like; Deliquescent. For sites that mainly contain Urban trees.

Modifiers: Bias Crown/Asymmetry (**BC**); Crown Shy (**CS**) (also referenced is the adjacent dominant tree canopy i.e. **T4**); Palm (**P**), Leaning (**L**); Basal Multi Trunked/stump sprout (**BM**); Emergent (**E**), the crown emerges from a lower canopy formed by other dominant or codominant crowns.



8.10. Defects

The presence of one or a combination of several defects is recorded (W) Wound, (D) Decay, (F) Fungus, (B) Bulge, (FB) Fibre Buckling, (C) Cracks, (S) Split, (H) Hollow, (DB) Die Back, (E) Epicormic shoots, (DW) Dead Wood, (I) Inclusion, (CA) Cavities, (PF) Previous Failure, (R) Root Damage, (P) Pruning wound, (PD) Pests and diseases, (ST) Storm Damage.

8.11. SRZ (Structural Root Zone) – Radius (mm)

The SRZ is a radial area extending outwards from the centre of the trunk. This area contains the majority of the structural woody roots. This area is responsible primarily for stability. Root damage or root loss within this zone greatly increases the opportunity for decay fungi to ingress into the heartwood, causing internal decay in addition to destabilising the tree's structural integrity. The SRZ is calculated as follows (This calculation is derived from the Australian Standard 4970 – 2009 Protection of Trees on Development Sites, where D = stem diameter in metres):

SRZ (Radius) = $(D \times 50)^{0.42} \times 0.64$

8.12. TPZ (Tree Protection Zone) – Radius (mm)

The TPZ is a circular area with a radius measured by multiplying the DBH by twelve (12), or a circular area the size of the tree's drip line whichever is greater. This area contains the majority of the essential structural and feeder roots responsible for stability, gaseous exchange and water and nutrient uptake. Excavation, back filling, compaction or other disturbance should not occur in this area.

The TPZ is used to identify the minimum area required for the safe retention of a given tree. This calculation is derived from the Australian Standard 4970 – 2009 Protection of Trees on Development Sites. An incursion to 10% within the TPZ is potentially acceptable if no other option is available. A major encroachment (in excess of 10%) is required to be clearly justified by the project Arborist and compensated for elsewhere. Justification methodology may vary depending on site or the individual tree's health, vigour and ability to withstand disturbance and may require root investigation.

8.13. Development Setback / Impact

The successful retention of trees on construction sites is dependent on the adequate allocation and management of the space above, below and around trees to be retained.

The trunk and canopy of trees to be retained must be protected to ensure the trunk and branches are not damaged during construction. The removal of bark and / or branches allows the potential ingress of micro-organisms which may cause decay. Similarly the removal of bark restricts the tree's ability to distribute water, mineral ions and glucose.

It is essential to prevent the disturbance of the soil beneath the drip line of each tree, because this is the area where oxygen, water and mineral ions are absorbed by tree roots. Oxygen, water and mineral ions are essential for healthy plant growth. If soil becomes compacted, the ability of roots to function correctly is greatly reduced. Similarly the removal or damage of roots will reduce the ability of roots to function correctly. Woody roots provide stability for the tree and they also transport nutrients to the leaves.

The potential implications of removing or damaging roots are threefold:



1. The risk of whole tree failure is increased, as tree roots anchor and stabilise the tree. Woody roots are developed to assist in the support of the tree in prevailing wind, with these roots removed wind throw may occur, which would result in the mass failure of the tree.

2. The ability of the tree to absorb and transfer the essential nutrients, oxygen and water from the soil to the leaves is greatly affected. This will place the tree under stress and reduce the tree's ability to photosynthesise, and in turn cause the tree to use up stored energy reserves. These energy reserves are used to fight infection and insect attack, for new growth, maintenance of existing tissues and also for healing wounds. Once energy reserves become depleted a tree is much more susceptible to drought, disease and pest attack.

3. Open wounds are sites by which decay-causing pathogens can enter the tree. The severance or damage of woody roots creates sites where pathogens may gain ingress. Whilst the effect of decay may not be immediately apparent, the long term health and structure of the tree will be compromised.

8.14. Comments

Comments generally relate to the suitability for retention. The comments allow for a brief notation of other factors relevant to the assessment of the tree.



9. Tree Location Plan



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	I. Do not scale from drawings 2. Verify all measurements on site 4. Carly volted of an other states of the states o	ORLANI PROPERTY GROUP	BECAME N.T.S. @ A3 DA Select T - 01 NEXAWY RC AM DAI 21-12-22 B



10. General Tree Protection Notes

10.1. Structural Root Zone (SRZ)

The SRZ is a radial area extending outwards from the centre of the trunk calculated as follows, where D is the stem Diameter in metres:

SRZ (Radius) = $(D \times 50)^{0.42} \times 0.64$

10.2. Tree Protection Zone (TPZ)

The TPZ is a radial area extending outwards from the centre of the trunk equal to the DBH x 12. This area shall be protected by a TPF (see *below*). For all trees to be retained a TPZ is to be created and maintained.

The TPZ function is primarily to protect the root zone by restricting access however the canopy of the tree shall also be protected from damage or injury. The Project Arborist shall approve the extent of the TPZ.

The TPZ shall be mulched to a depth of 75mm with an approved organic mulch. Supplementary watering shall be provided in dry periods to reduce water or construction stress, particularly to those trees which may have incurred root disturbance.

An area equivalent to the encroachment is required to be provided (additional to and contiguous with the remaining TPZ) to offset against the encroachment. This additional area is to be protected during construction.

In the TPZ the following activities shall be excluded:

- Excavation, compaction or disturbance of the existing soil.
- The movement or storage of materials, waste or fill.
- Movement or storage of plant, machinery, equipment or vehicles.
- Any activity likely to damage the trunk, crown or root system.
- Scaffolding.

10.3. Tree Protection Fencing (TPF)

Prior to site establishment, tree protection fencing shall be installed to establish the TPZ for trees to be retained. Tree protection fencing shall be maintained entire for the duration of the construction program.

Tree protection fencing shall be:

- To enclose as much of the TPZ as can reasonably be enclosed, allowing for pedestrian access and 1m offset around construction footprint and scaffolding.
- Cyclone chain link wire fence or similar, with lockable access gates.
- Certified and Inspected by the Project Arborist
- Installed prior to the commencement of the works.

• Prominently signposted with 300mm x 450mm boards stating "NO ACCESS TO THIS AREA - TREE PROTECTION ZONE CONTACT PROJECT ARBORIST 0407 006 852".



10.4. Trunk, Lower Branches and Root Zone Protection

Other measures may be required in addition to tree protection fencing. These specific protection measures will be installed as directed by the Project Arborist to protect the canopy, trunk or branches from the risk of damage.

Trunk and lower branch protection may be required to alleviate mechanical damage to a height of 3m. The minimum trunk protection shall consist of an initial padding layer beneath and battens consistent with The Australian Standard for the Protection of Trees on Development Sites (AS 4970 – 2009), Section 4 and paragraph 4.5.2 and Figure 4. The battens shall consist of lengths of 100 x 50mm (or varied to accommodate risk and tree structure) timber boards secured side by side, spaced 50mm apart with galvanised steel banding for the full circumference of the trunk without driving nails or screws into the trunk or branches. Trunk protection should be installed prior to any site works, maintained throughout the construction program and removed post construction.

Root protection may be required if it site access and construction activities will not be able to be excluded from the entire TPZ as the installation of the tree protection fence is not reasonably practicable. Installation of root protection prior to the commencement of works to prevent the damage to roots such as i)Rumble boards as per section 4.5.3 - Ground protection and Figure 4 of AS4970 Protection of trees on development sites; or ii) construction of the above ground driveway.

The Project Arborist shall be consulted if there is risk of damage to a retained tree. The Project Arborist may require:

- A 75mm layer of approved mulch to be installed to the TPZ.
- A temporary drip irrigation system to be installed to the TPZ.

10.5. Tree Damage

In the event of damage to a tree or the TPZ of a tree to be retained the Project Arborist shall be engaged to inspect and provide advice on remedial action. This should be implemented as soon as practicable and certified by the Project Arborist.

10.6. Excavation within the TPZ

Excavation within the TPZ shall be avoided. All care shall be undertaken to preserve tree root systems. Excavation within the TPZ shall subject to the approval and supervision of the Project Arborist.

Excavation shall be executed by hand to avoid damage to roots by first excavating a narrow trench to the depth required. This will allow the location of woody structural roots greater than 40mm which can then be retained intact as necessary or pruned cleanly by and AQF level 3 Arborist or Horticulturalist. Final cut of roots should result in a clean cut, using appropriate tools as prescribed by the Australian Standard AS4970-2009 Protection of trees on development sites.

If excavation within the TPZ is required other than that anticipated in this report the Project Arborist shall be notified. A root mapping exercise may be required and should be certified by the Project Arborist. Root mapping shall be undertaken by either ground penetrating radar (GPR), air spade, water laser or by hand excavation. The purpose shall be to locate woody structural roots greater than 40mm in diameter.

Where roots 40mm dia. or greater are encountered, alternative construction method shall be considered to ensure roots are not severed. Adequate allowance must also be made for future



radial root growth. In paved areas, consideration should be given to raising the proposed pavement level and using a porous fill material in preference to excavation.

If there is no avoiding placing services through the TPZ excavate outside the TPZ and underbore below the root ball of the tree as directed by the Arborist.

10.7. Fill

All fill material to be placed within the TPZ should be approved by Arborist and equal to 5-7mm Round River Pea Gravel to provide aeration and percolation to the root zone. Otherwise no fill should be placed within the TPZ of trees to be retained.

10.8. Pavements

Proposed paved areas within the TPZ should be placed on or above grade to minimise excavation, and avoid root severance and/or damage. Pavements should be permeable or avoided otherwise.

10.9. Pruning

All pruning work required (including root pruning) should be in accordance with Australian Standard No 4373 -2007 - Pruning of Amenity Trees. A Pruning Specification Report may be required if pruning works are proposed.

Roots should be severed with clean sharp implement flush with the face of the excavation and maintained in a moist condition. Severing roots by earthmoving equipment is unacceptable as this results in tearing damage to roots, putting the tree at greater risk of root decay and/or structural instability. Root pruning shall be performed under the supervision of the Project Arborist.

If required, branch reduction should be made to internal lateral branches or stems which are at least 1/3rd of the diameter of the branch being cut – or – removed at the branch collar, consistent with AS 4373 -2007; Sections 6.4 a) & b) and 7.3. Deadwooding should be carried out as required.

Whilst work is being carried out by climbing arborists (AQF Level 3) an aerial inspection of stems, branches and their attachments should be made. If minor additional works are needed to remove or correct defects it should be done at that time. If significant defects are found requiring heavy pruning or whole tree removal, photos should be taken and an AQF Level 5 Arborist be consulted prior to work being done.

10.10. Tree Removal

Tree removal work shall be carried out by an experienced Level 3 Arborist in accordance with the NSW Work Cover Code of Practice for the Amenity Tree Industry (1998).

Care shall be taken to avoid damage to trees during the felling operation. Stumps shall be grubbedout using a mechanical stump grinder to a minimum depth of 300mm without damage to other retained root systems.

10.11. Post Construction Maintenance

In the event of any tree deteriorating in health after the construction period, the Project Arborist shall be engaged to provide advice on any remedial action. Remedial action shall be implemented as soon as practicable and certified by the Project Arborist.



Tree protection fencing with additional trunk and root protection shall be removed following completion of construction. The mulch layer in the TPZ shall be retained and replenished where required to maintain a 75mm thickness.



11. References

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