ARBORICULTURAL ASSESSMENT REPORT

Site address:
GORDON ROAD, REDLAND BAY

Prepared for:
REDLAND BAY STATE SCHOOL

Date:
13 February 2018

Written by
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N.Dip. Arb
1. Introduction
1.1 Instruction: I am instructed by my client to provide a report on the four Mango trees located on this site. This report will:
   - Identify and assess the trees, providing their location, species, dimensions, age, health and structural condition, and their suitability for retention;
   - Comment on the landscape contribution of site trees;
   - Recommend management actions for trees to be retained;

1.2 Qualifications and experience: I have based this report on my site observations and the provided information, the conclusions that have been made are drawn from my experience as a practicing Arborist and tertiary qualifications in arboriculture (Appendix 1).

1.3 Scope of this report: This report is only concerned with the four Mango trees that are situated at this site. It takes no account of other trees, shrubs or groundcovers within the area unless stated otherwise.

2. Methodology
2.1 Tree Assessment: The tree assessment may include details on the trees crown condition, characteristics and the site conditions at the time of inspection. The trees are visually assessed from ground level only. There are no aerial inspections or root excavations performed on the trees to determine structural integrity.

The Useful Life Expectancy (ULE) categories (detailed in Appendix 4) are subject to normal weather conditions, which include strong winds and torrential rains, but exclude extreme localised events such as tornado-like squalls and storms which have the capacity to destroy many trees regardless of age or condition.

2.2 General: Development changes the use of an area, adding buildings, infrastructure and people to the landscape. This increases the potential for trees to cause damage to people and property. Therefore, trees that are structurally poor or that have a short life expectancy are generally unsuitable for retention on developed sites.

Redland Bay State School is increasing its pupil numbers over the next few years to cope with the ever increasing demands of the population expansion the area is currently experiencing. More infrastructure will take place throughout the school within the next few years as numbers increase.
3. Site Visit and Observations
3.1 Site Visit:
The trees are situated in the main thoroughfare of the school's design.

- TREE 1 - at the main entrance of the Performing Arts Centre or Main Hall.
- TREES 2, 3 & 4 - at the main entrance to the school on Gordon Road. The obvious smell of decaying fruit was quite overpowering in the trees vicinity.

3.2 Site Description:
Within the Northern Main Entrance of the school there are many large established trees such as Camphor Laurels, *Ficus Microcarpa* and Eucalypts in addition to the four Mango Trees are the focus of this report.

There are walkways under all of the aforementioned trees. Trees 2, 3 and 4 are situated over the Gordon Road main entrance walkway which at schools start and finish times are extremely busy with parents dropping off and picking up students.

3.3 Identification and Photographic Evidence:
The trees have been identified and named, both common and botanical, to the best of my ability. The photographic evidence was taken at the time of the inspection to the best of my ability.

4. Appraisal
4.1 General Tree Conditions:

4.1.1 Tree 1 – Mango (*Mangifera indica*)
This is a large, well-structured Mango tree situated outside the Performing Arts Centre. Its leaf is a healthy rich green with no sign of anthracnose or leaf spot. The branch formation has no inclusions or mis-formed forks and has a dense canopy.

There are a few large wounds on the trees base as a result of branches having been removed in the past, however the callus growth around the wounds indicates health and vigour within the trees transport system. There is no heartwood decay evident.

Apart from the lower limbs being removed, there is no evidence of excessive pruning or lopping in the past.

4.1.2 Tree 2 – Mango (*Mangifera indica*)
This Mango is situated at the Northern Main Entrance within a planter / seating area with pavers surrounding the retaining planter / seating area.

The obvious canopy defect is that there are previous lopping points around the entire tree as shown in photo Tree 2: Picture 3. Trees that are lopped are actually quite dangerous. When new growth emerges (referred to as 'Epicormic' growth) they are poorly attached to the outer layer of the tree. The long term effect of lopping is that as the growth gets bigger they are more susceptible to breakage which can cause injury or death to a person and damage to property.
The union where the new growth joins onto the tree (if managed regularly) can turn in to a knuckle of Callus or Pollard Point. The weight of the Mango Fruit on the extremities of the branches is also adding stress onto these unions causing them to fail.

The taper of the stem into the ground indicates the raised soil around its base has been done recently and could pose a threat of root rot or aeration problems.

**4.1.3 Tree 3 – Mango (Mangifera indica)**
I would estimate that this larger Mango Tree was planted at the same time as Tree 1 due to the girth of the stem. Unfortunately, the same lopping procedure has been implemented on this tree as has been on Tree 2.

It does have a more substantial canopy width and shows no signs of disease or necrosis. Its proximity to the walkways and entrances give its root system a less compacted and more aerated area that would likely be the reason for its health and vigour.

The Pollard Points/Lopping Unions do have a considerably greater sized branches on them creating a higher potential to fail with the addition of the weight during fruiting season.

**4.1.4 Tree 4 – Mango (Mangifera indica)**
This smaller/younger Mango is situated above a bike stand as photo Tree 4: Picture 1 verifies. As photo Tree 4: Picture 2 confirms the tree has lost a main limb from the union point which could have had deadly implications.

Its canopy is less developed than the other trees, possibly due to suppression by the other trees and has the same height lopping points as the others.

**5. Conclusions / Recommendations**

5.1
The lopping of any tree is against Australian Standards and has been frowned upon as an acceptable work practice for 30 years.

I would estimate the lopping of these 3 Mango Trees on the Northern Boundary to have been done approximately 10 years ago by the size of the regrowth.

With the existing trees and Mango trees on the Northern Side boundary, the density of the canopies will not allow enough light through for regeneration of a more suitable and sustainable species that are not so dangerous or fruit baring.
5.2 TREE 1:
My recommendation is Tree 1 be reduced, not lopped but reduced back to a suitable growth point that are already existing within the trees canopy to Australian Standard 4374. This would alleviate the amount of Mango Fruit drop in season that attract the bats and rats that feed upon the fruit at night time. The fruit shows evidence of Rodent teeth marks and bat guano is evident along the foot paths and on the buildings. A bi-annual thin of the canopy with a slight reduction would keep the tree managed.

✓ Recommendation - 50% reduction to growth points

Tree 1: Picture 1: Location of tree

Tree 1: Picture 2: Suitable growth point for reduction

Tree 1: Picture 3: Composting Fruit, teeth marks evident.
5.3 TREE 2:
Due to its location I would recommend removal and replanting with a more suitable species due to the amount of pedestrian traffic and its potential for limb failure, and also the dropping of mango fruit whilst in season.

 ✓ Recommendation - Remove

Tree 2: Picture 1: Location

Tree 2: Picture 2: raised soil level

Tree 2: Picture 3: Lopping knuckles
5.4 TREE 3:
This tree’s location being set back from the pathways provides a lesser potential for injury to pedestrians due to branch failure. Its size needs to be brought back to the lopping points and managed as if pollarded, i.e. reduce back to its knuckle points every couple of years. This would also alleviate the mango fruit being so excessive when in season attracting the bats and rats.

✓ Recommendation - 50% reduction to growth points

Tree 3: Picture 1 – location evident

Tree 3: Picture 2: Composting Fruit, teeth marks evident

Tree 3: Picture 3: knuckled pollard point
5.5 TREE 4:
Being situated over the bike stand I would advise removal of this tree also and plant a more suitable species. This would remove the threat of branch failure altogether. Replanting with a Lily Pilly or Waterhausia would be a less invasive and dangerous tree species that is fast growing and non-fruit bearing unlike the Mango species currently in place.

✓ Recommendation - Remove or reduce

Tree 4: Picture 1: location

Tree 4: Picture 2: failure lopped point
Explanatory notes

6.1 **Measurements/estimates:** All dimensions are estimates unless otherwise indicated.

6.2 **Species:** Species identification is based on visual observations and the botanical name. In some instances, it may be difficult to quickly and accurately identify a particular tree without further detailed investigations. Where there is some doubt of the precise species of tree, it is indicated with a “?” after the name to avoid delay in the production of the report. The botanical name is followed by the abbreviation “sp” if only the genus is known.

6.3 **Glossary of terms:**

The following relates to terms or abbreviations that have been used in this report and provides the reader with a detailed explanation of those terms.

**Aerial inspection:** Where the subject tree is climbed by a professional tree worker or arborist specifically to inspect and assess the upper stem and crown of the tree for signs or symptoms of defects, disease, etc.

**Australian Standards – ‘Pruning of Amenity Trees’**: a guide to explain the Australian Standards of how trees are to be pruned correctly.

**Branch collar:** The ring of wood tissue which forms around the base of a branch (near the branch attachment), frequently more pronounced below the branch.

**Branch failure:** The structural collapse of a branch that is physically weakened by wounding or from the actions of pests diseases, or overcome by loading forces in excess of its load-bearing capacity.

**Cambium:** refers to the layer of cells between the exterior bark and the inner wood which primarily controls cell division, and hence radial expansion of the stem, branches and shoots.

**Cavity:** A void, often localised, initiated by a wound and subsequent decay within the trunk, branches or roots, or beneath bark, and may be enclosed or have one or more openings. These voids are also referred to as hollows.

**Cluster:** describes a group of branches or stems arising from the same point on a larger branch or stem.

**Co-dominant:** refers to stems or branches equal in size and relative importance.

**Condition:** refers to the tree’s form and growth habit, as modified by its environment (the aspect, suppression by other trees, soils etc) and the state of the scaffold (i.e. trunk and major branches), including structural defects such as cavities, crooked trunks or weak trunk/branch junctions. These are not directly connected with health and it is possible for a tree to be healthy but in poor condition.

**Crook:** An abrupt bend in the branch or trunk (stem).

**Crown:** All the parts of a tree arising above the trunk where it terminates by its division forming branches, e.g. the branches, leaves, flowers and fruit: or the total amount of foliage supported by branches.

**Crown raise pruning:** Pruning technique where lower limbs are removed, thereby lifting the overall crown above the ground.

**Dead wood:** refers to any whole limb that no longer contains living tissues (e.g. live leaves and/or bark). Some dead wood is common in a number of tree species.

**Decay:** Process of degradation of woody tissues by fungi or bacteria through decomposition of cellulose and lignin. There are numerous types of decay that affect different types of tissues, spread at different rates and have different effect on both the tree’s health and structural integrity.

**Defect:** Any structural weakness or deformity.

**Diameter at Breast Height (DBH):** refers to the tree trunk diameter at breast height (1.4 metres above ground level)

**Dieback:** Death of growth tips/shoots and partial limbs, generally from tip to base. Dieback is often an indicator of stress and tree health.

**Epicormic:** Shoots which arise from adventitious or latent buds. These shoots often have a weak point of attachment. They are often a response to stress in the tree. Epicormic growth/shoots are generally a survival mechanism, often indicating the presence of a current, or past stress event such as fire, pruning, drought, etc.
**Ganoderma**: *Ganoderma lucidum*, the varnish fungus, is a pathogen that enters openings in root systems of many tree and shrub species, it causes significant damage by destroying a tree’s structural root system.

**Hazard**: refers to anything with the potential to harm health, life or property.

**Heartwood**: inner non-functioning tissues that provide structural support to the trunk.

**Inclusion**: the pattern of development at branch or stem junctions where bark is turned inward rather than pushed out. This fault is located at the point where the stems/branches meet. This is normally a genetic fault and potentially a weak point of attachment as the bark obstructs healthy tissue from joining together to strengthen the joint.

**Leader**: primary terminal shoot or trunk of a tree.

**Lopping**: Cutting between branch unions (not to branch collars), or at internodes on a tree, with the final cut leaving a stub. Lopping may result in dieback of the stub and can create infection courts for disease or pest attack.

**Necrosis**: death of plant or animal cells or tissues. In plants can discolor stems or leaves or kill a plant entirely.

**Non-woody roots**: Roots where the primary function is the absorption of water and nutrients in solution. Smallest non-woody roots also referred to as ‘fibrous’ or ‘fine’ roots.

**Rhizosphere**: the narrow region of soil that is directly influenced by root secretions and associated soil microorganisms.

**Removal**: cutting down of a tree.

**Root Crown**: Area at the base of the tree where the roots and stem merge (synonym – root collar).

**Root Mapping**: The exploratory process of recording the location of roots usually in reference to a datum point where depth, root diameter, root orientation and distance from trunk is structures are measured. It may be invasive (disturbs or displaces soil to locate but not damage roots, e.g. hand excavation, or use of air or water knife), or non-invasive (does not disturb soil, e.g. ground penetrating radar).

**Rooting environment**: Generally, the area and the conditions in which tree root growth may occur, or is occurring. Normally the minimum rooting environment is defined by the Tree Protection Zone (TPZ), however, as root growth can be restricted by structures, pavements, rock, soil type, soil moisture, etc, the area available for root growth may not be evenly distributed or develop in a symmetrical manner out from the tree.

**Scaffold branch/root**: A primary structural branch of the crown or primary structural root of the tree.

**Structural Root Zone (SRZ)**: refers to the critical area required to maintain stability of the tree. Only thorough investigation into the location of structural roots within this area can identify whether any minor incursions into this protection zone are feasible.

**Suppressed**: In crown class, trees which have been overtopped and whose crown development is restricted from above.

**Taper**: Relative change in diameter with length; reflects the ability of the stem or branch to evenly distribute stress along its length.

**Topping**: or heading is a pruning practice that results in removal of terminal growth leaving a cut stub end. Topping causes serious damage to the tree.

**Tree Protection Zone (TPZ)**: generally the minimum distance from the centre of the tree trunk where protective fencing or barriers are to be installed to create an exclusion zone. The TPZ surrounding a tree aids the tree’s ability to cope with disturbances associated with construction works. Tree protection involves minimising root damage that is caused by activities such as construction. Tree protection also reduces the chance of a tree’s decline in health or death and the possibly damage to structural stability of the tree from root damage. To limit damage to the tree, protection within a specified distance of the tree’s trunk must be maintained throughout the proposed development works. No excavation, stockpiling of building materials or the use of machinery is permitted within the TPZ.
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**References**


**APPENDIX 1** - Qualifications
**APPENDIX 2** - Site Map
**APPENDIX 3** - Tree Survey Table
**APPENDIX 4** - Useful Life Expectancy Table (ULE)
APPENDIX 1

Qualifications and experience of Nicholas Sharkey

I have based this report on my site observations and the provided information, and I have come to the recommendations in light of my experience and tertiary qualifications in arboriculture:

Qualifications:

- National Diploma in Arboriculture  
  Merrist Wood College 1992-1995

- Forestry Level I & II  
  Dartington Forestry Training Group  
  1991-1992

- Diploma of Horticulture  
  Sunshine Coast TAFE 2009 Arboriculture Cert.V

- TRAQ (Tree Risk Assessment Qualification)  
  International Society of Arboriculture

Practical Experience:

I have over 20 years of experience within the arboriculture industry, covering work practises in Britain, Europe, New Zealand and Australia. I am skilled in tree health care, landscaping and horticultural aesthetics. I have a broad spectrum of knowledge in all aspects of urban forestry from small domestic work to large contracts in highly populated areas, including urban development and Council tree contracts.

Current professional memberships:

QAA  – Queensland Arboricultural Association
ArbAus  – Arboriculture Australian
ISA  – International Society of Arboriculture
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<th>Species</th>
<th>Height (metres)</th>
<th>Crown Spread (metres)</th>
<th>D.B.H. (cms)</th>
<th>Age Class (years) Approx.</th>
<th>U.L.E</th>
<th>Condition</th>
<th>Notes</th>
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<td>15</td>
<td>18</td>
<td>128</td>
<td>40</td>
<td>Long B</td>
<td>Good</td>
<td>Recommend 50% reduction to growth points</td>
</tr>
<tr>
<td>T2 - Mangifera Indica</td>
<td>14</td>
<td>17</td>
<td>79</td>
<td>25</td>
<td>Remove D</td>
<td>Poor/Safety</td>
<td>Recommend Remove</td>
</tr>
<tr>
<td>T3 - Mangifera Indica</td>
<td>14</td>
<td>19</td>
<td>140</td>
<td>45</td>
<td>Long B</td>
<td>Good if pruned</td>
<td>Recommend 50% reduction to growth points</td>
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<tr>
<td>T4 - Mangifera Indica</td>
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<td>15</td>
<td>70</td>
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<td>Remove D</td>
<td>Poor/Safety</td>
<td>Recommend Remove or reduce</td>
</tr>
</tbody>
</table>
APPENDIX 4

USEFUL LIFE EXPECTANCY (ULE)

In a planning context, the time a tree can expect to be usefully retained is the most important long-term consideration. ULE i.e. a system designed to classify trees into a number of categories so that information regarding tree retention can be concisely communicated in a non-technical manner. ULE categories are easily verifiable by experienced personnel without great disparity.

A tree’s ULE category is the life expectancy of the tree modified first by its age, health, condition, safety and location (to give safe life expectancy); then by economics (i.e. cost of maintenance - retaining trees at an excessive management cost is not normally acceptable); and finally, effects on better trees, and sustained amenity (i.e. establishing a range of age classes in a local population).

ULE assessments are not static but may be modified as dictated by changes in tree health and environment. Trees with a short ULE may at present be making a contribution to the landscape, but their value to the local amenity will decrease rapidly towards the end of this period, prior to them being removed for safety or aesthetic reasons.

Useful Life Expectancy (ULE) CATEGORIES (after Barrell 1996, updated 01/04/01) The five categories and their sub-groups are as follows:

1. Long ULE - tree appeared retainable at the time of assessment for over 40 years with an acceptable degree of risk, assuming reasonable maintenance:
   A. structurally sound trees located in positions that can accommodate future growth
   B. trees which could be made suitable for long term retention by remedial care
   C. trees of special significance which would warrant extraordinary efforts to secure their long term retention

2. Medium ULE - tree appeared to be retainable at the time of assessment for 15 to 40 years with an acceptable degree of risk, assuming reasonable maintenance:
   A. trees which may only live from 15 to 40 years
   B. trees which may live for more than 40 years but would be removed for safety or nuisance reasons
   C. trees which may live for more than 40 years but would be removed to prevent interference with more suitable individuals or to provide space for new planting
   D. trees which could be made suitable for retention in the medium term by remedial care

3. Short ULE - tree appeared to be retainable at the time of assessment for 5 to 15 years with an acceptable degree of risk, assuming reasonable maintenance:
   A. trees which may only live from 5 to 15 years
   B. trees which may live for more than 15 years but would be removed for safety or nuisance reasons
   C. trees which may live for more than 15 years but would be removed to prevent interference with more suitable individuals or to provide space for new planting
   D. trees which require substantial remediation and are only suitable for retention in the short term

4. Removal - trees which should be removed within the next 5 years
   A. dead, dying, suppressed or declining trees
   B. dangerous trees through instability or recent loss of adjacent trees
   C. dangerous trees because of structural defects including cavities, decay, included bark, wounds or poor form.
   D. damaged trees that are clearly not safe to retain.
   E. trees which may live for more than 5 years but would be removed to prevent interference with more suitable individuals or to provide space for new planting.
   F. trees which are damaging or may cause damage to existing structures within the next 5 years.
   G. trees that will become dangerous after removal of other trees for the reasons given in (a) to (f)
   H. trees in categories (a) to (g) that have a high wildlife habitat value and, with appropriate treatment, could be retained subject to regular review.

5. Small, young or regularly pruned - Trees that can be reliably moved or replaced:
   A. small trees less than 5m in height
   B. young trees less than 15 years old but over 5m in height
   C. formal hedges and trees intended for regular pruning to artificially control growth.