

## Urban Forest Technical Manual

### Appendix 1 – Disease and Insect Pest Management Protocols Newcastle LGA

This appendix contains information regarding general information on disease and pest management and specific information on disease and pests identified within the Newcastle local government area, or are potential threats (Table 1.2 and 1.3).

Disease and pest management requires action to prevent the introduction of the pest or disease, and measures to prevent the spread once it is introduced. The actions can vary depending on the disease or pest as shown in table 1.1 *Heads of consideration to quarantine or contain disease or pest*. These heads of consideration should form the basis of developing hygiene protocols for a work site.

**Table 1.1 Heads of consideration to quarantine or contain disease or pest**

Quarantine and	Containment
define boundaries	material flow
logistics	risk level
work flow	waste disposal
organise tools	recycling

Hygiene is a critical element in reducing, excluding, eliminating and eradicating pathogens. Poor hygiene can quickly result in the spread of pests or disease which can significantly affect the overall urban forest. In some cases there is no treatment, such as for *Fusarium oxysporum* which leads to death of the palms affected, leading to potential elimination of a species and significant avenue plantings. Hygiene can prevent this from occurring. It is important that material that is or suspected of being infected with pest or disease should not be used for mulch or firewood.

The cleaning of equipment used on work sites, securing disease and pest free plant stock, ensuring transport of the infected material and cleaning of trucks occurs. The following detail is to be included in any hygiene protocols and is in addition to the specific information in tables 1.2 and 1.3 below.

#### Equipment

Equipment is to be clean entering and before leaving a site. Equipment includes:

- Boots, clothing, ropes, saws
- Regularly wash and dry ropes
- Clean and disinfect chainsaws, loppers, handsaws, secateurs and any other cutting/pruning tools
- Machinery regularly cleaned and position to not spread material outside the established work zone.

#### Stock

- Source tree stock from nurseries that certify stock to comply with Australian Standard 2303:2015 'Tree stock for landscape use.'
- Monitor plants for signs of ill health.
- Landscaping materials - source materials from suppliers who will certify products to be free of pests or diseases, including packaging and transportation.

#### Transport

- Soil and debris is to be removed from vehicles including cabs and footwells before leaving the established work zone.
- Ensure transported material is covered.
- Use wash down and disinfection facilities when entering or leaving waste facility sites and clean vehicles prior to the next day.

### Specific Hygiene guidelines

Where an existing disease or pest is present or suspected follow the specialist guidance provided for the pest or disease in table 1.2 and 1.3 below. If removing infected material ensure removal, transport and disposal complies with the controls and hygiene columns in table 1.2 and 1.3 below. A list references is included after the tables.

**Table 1.2: Tree Diseases reported in Newcastle, or recorded as a potential threat**

TREE DISEASES REPORTED IN NEWCASTLE				
Common Name	Scientific Name	Comment	NCC Control potential controls	Hygiene requirements for all works
Armillaria root rot	<i>Armillaria luteobubalina</i>	<p>Soil born fungus. The fungus can survive in soil for extremely long periods of time and there are estimates of up to survival for 50 years, although 20 years would be more likely.</p> <p>Difficult to diagnose. Early symptoms are dieback and yellowing of foliage, poor vigour. Later symptoms include splits in trunk and exudation, with mycelium under loose bark in lower part of trunk.</p> <p>Small olive brown to yellow mushrooms in May June at base of tree.</p>	<ul style="list-style-type: none"> <li>▪ <b>Prevention of spread</b> through Hygiene is essential as spread through plant material including mulch.</li> <li>▪ <b>Reduce inoculum</b> <ul style="list-style-type: none"> <li>- Grind stumps</li> <li>- Removal of all infected plant material from the site.</li> <li>- Addition of organic matter to soil.</li> <li>- Clearing, aerating and drying the root collar. Exposure to air dries surface wood and bark which can retard fungal activity.</li> <li>- Introducing a decay organism (eg. <i>Phanerochaete filamentosa</i>) into infested dead material in the soil, eg. stumps. Slow acting but can displace <i>Armillaria</i> from stump.</li> </ul> </li> </ul>	<ul style="list-style-type: none"> <li>▪ Set up a zone to clean off vehicles, equipment, boots and clothing as a transition from the infected area prior to leaving the site.</li> <li>▪ Ensure all equipment is clean from vegetated matter and soil before leaving the site.</li> <li>▪ Where required: Excavate stumps roots and soil to a specified area.</li> <li>▪ Where required: Excavate and replace soil and all woody material prior to planting.</li> <li>▪ All debris is to be tipped at a waste facility as land fill.</li> <li>▪ Infected stems/trunks to be removed whole. Do not chip infected material.</li> <li>▪ Do not use mulch from infected trees. NOTE: the disease can spread various heights depending on species.</li> <li>▪ Clean and disinfect all equipment used to transport to landfill before working on next site.</li> </ul>

TREE DISEASES REPORTED IN NEWCASTLE				
Common Name	Scientific Name	Comment	NCC Control potential controls	Hygiene requirements for all works
Butt Rot and White Rot	<i>Ganoderma applanatum</i> and <i>Phellinus</i> spp.	<p>Fungi which produce platform like hard brown brackets on palms and grey surfaced brackets on many other woody species.</p> <p>Airborne spores can travel vast distances lodging in bark fissures or crevices and can then grow into the tree. Wounds on trees provide easy access for the fungus.</p> <p>Any part of the tree can be infected and multiple infection sites can occur.</p> <p>Once tree is infected it will eventually die. This may take several years. Infected trees may be susceptible to wind throw.</p>	<ul style="list-style-type: none"> <li>▪ <b>Prevention of spread</b> <ul style="list-style-type: none"> <li>- Avoid wounding of trees to reduce the chance of infection.</li> <li>- Remove infected material whole to land fill. Do not chip and use as mulch.</li> <li>- Initiate hygiene protocols on site to ensure spores not transported.</li> </ul> </li> <li>▪ <b>Controls</b> <ul style="list-style-type: none"> <li>- There is no chemical or manual control for <i>Ganoderma</i> butt rot.</li> </ul> </li> <li>▪ <b>Manage Risk</b> <ul style="list-style-type: none"> <li>- Any tree with brackets on it should</li> <li>- Be inspected through full VTA process stages 1 to 3.</li> <li>- Have risk assessed.</li> </ul> </li> </ul>	<ul style="list-style-type: none"> <li>▪ Set up a zone to clean off vehicles, equipment, boots and clothing as a transition from the infected area prior to leaving the site.</li> <li>▪ Ensure all cutting equipment is cleaned down and sprayed with 30% water and 70% methylated spirits and clothing is cleaned (or bagged) before leaving the site.</li> <li>▪ All debris is to be tipped at a waste facility as land fill.</li> <li>▪ Infected stems/trunks to be removed whole. Do not chip infected material. NOTE: the spores can travel vast distances.</li> <li>▪ Do not use mulch from infected trees.</li> <li>▪ Where location of tree prevents excavation (e.g. footway) then the stump and any surface roots to be ground, and the grindings removed to landfill.</li> <li>▪ Clean and disinfect all equipment used to transport to landfill before working on next site.</li> </ul>

TREE DISEASES REPORTED IN NEWCASTLE				
Common Name	Scientific Name	Comment	NCC Control potential controls	Hygiene requirements for all works
Plane Anthracnose	<i>Apiognomonia veneta</i> (asexual: <i>Discula platani</i> )	<p>A fungal disease affecting the leaves, twigs and branches of some species of plane tree including the London Plane tree.</p> <p>Cankers and fallen leaves are a source of new infections that are spread by rain splash and wind during the early part of the growth season.</p> <p>Untreated leaves become blotched and necrotic and fall prematurely. Distorted tree growth results in a decline and diseased appearance.</p> <p>Affected trees usually recover to produce new growth by mid-summer. However, the overall vigour of the tree can be reduced, and branch growth distorted if regular dieback experienced.</p> <p>The disease places the trees under stress, and potentially more susceptible to other infectious and non-infectious problems including insect attack.</p>	<ul style="list-style-type: none"> <li>▪ <b>Prevention of spread</b> <ul style="list-style-type: none"> <li>- Initiate hygiene protocols on site to ensure disease is not transported.</li> <li>- The maintenance of tree vigour is important with adequate nutrient and water supply.</li> <li>- Maintain adequate air and circulation between trees.</li> </ul> </li> <li>▪ <b>Reduce inoculum</b> <ul style="list-style-type: none"> <li>- Removal of infected twigs and branches by pruning is beneficial. This will be usually confined to peripheral growth resulting in limited control of the disease problem.</li> </ul> </li> <li>▪ <b>Control</b> <ul style="list-style-type: none"> <li>- Chemical control is not recommended.</li> <li>- Collect and remove infected leaves twigs and which have when they have fallen and pruning of infected branchlets during the deciduous period can reduce the amount of spores available to re-infect new growth in spring.</li> </ul> </li> </ul>	<ul style="list-style-type: none"> <li>▪ Set up a zone to clean off vehicles, equipment, boots and clothing as a transition from the infected area prior to leaving the site.</li> <li>▪ Ensure all cutting equipment is cleaned down and sprayed with 30% water and 70% Methylated spirits and clothing is cleaned (or bagged) before leaving the site.</li> <li>▪ All debris is to be tipped at a waste facility as land fill.</li> <li>▪ Do not use mulch from infected trees. NOTE: the spores overwinter in the debris.</li> <li>▪ Clean and disinfect all equipment used to transport to landfill before working on next site.</li> </ul>

TREE DISEASES REPORTED IN NEWCASTLE				
Common Name	Scientific Name	Comment	NCC Control potential controls	Hygiene requirements for all works
Powdery Mildew of Crape Myrtle	<i>Erysiphe lagerstroemiae</i>	<p>White to greyish powdery growth on leaves, flowers and new shoots. Favoured by warm, humid conditions.</p> <p>Generally non-fatal but can cause dwarfing of new growth and foliage death. Heavily infected flowers may fail to open.</p> <p>Spores are spread by water-splash and air current.</p>	<ul style="list-style-type: none"> <li>▪ <b>Prevention of spread</b> <ul style="list-style-type: none"> <li>- Planting strategies to ensure crape myrtle trees have full sun, with adequate spacing to avoid crowding.</li> <li>- Variant selection: select cultivars of lagerstroemia that are resistant to powdery mildew.</li> </ul> </li> <li>▪ <b>Control</b> <ul style="list-style-type: none"> <li>- Inspection and treatment</li> <li>- Thinning to relieve congested crowns on heavily infected trees.</li> <li>- If limited number of shoots infected remove sprouts at the base of the plant as they are particularly susceptible. If sprouts infected fungus spreads easily.</li> <li>- Spray application of fungicides only where permitted by law on small trees.</li> <li>- Micro-injection on mature trees only if warranted for particularly important specimens.</li> </ul> </li> </ul>	<ul style="list-style-type: none"> <li>▪ Avoid working on infected trees during windy or rainy conditions.</li> <li>▪ Set up a zone to clean off vehicles, equipment, boots and clothing as a transition from the infected area prior to leaving the site.</li> <li>▪ Ensure all cutting equipment is cleaned down and sprayed with 30% water and 70% Methylated spirits and clothing is cleaned (or bagged) before leaving the site.</li> </ul>

TREE DISEASES REPORTED IN NEWCASTLE				
Common Name	Scientific Name	Comment	NCC Control potential controls	Hygiene requirements for all works
Dieback of Claret Ash	<i>Causal agent unconfirmed, thought to be Botryosphaeria dothidea</i>	<p>A variant of the <i>Botryosphaeria</i> family of fungus that affects Claret Ash <i>Fraxinus oxycarpa</i> 'Raywood'.</p> <p>The related species <i>Botryosphaeria dothidea</i> also commonly occurs and causes similar symptoms on Camphor Laurel <i>Cinnamomum camphora</i> and Hill's Weeping Fig <i>Ficus microcarpa</i> var. <i>hillii</i>.</p> <p>A common endophyte that, on stressed trees, can cause a canker rot that girdles twigs and stems, leading to dieback of the affected parts.</p> <p>Inoculum can be spread on pruning tools.</p> <p>Spores produced in fruiting structures on infected stem. Spread by rain splash, insects, tools, infected plant debris and plant-plant direct contact.</p>	<ul style="list-style-type: none"> <li>▪ <b>Prevention of spread</b> <ul style="list-style-type: none"> <li>- Not practical. Condition possibly exacerbated by water-stress.</li> </ul> </li> <li>▪ <b>Control</b> <ul style="list-style-type: none"> <li>- No chemical control currently available.</li> <li>- Maintain mulch levels, supplement rainfall with irrigation when necessary.</li> </ul> </li> </ul>	<ul style="list-style-type: none"> <li>▪ Set up a zone to clean off vehicles, equipment, boots and clothing as a transition from the infected area prior to leaving the site.</li> <li>▪ Ensure all cutting equipment is cleaned down and sprayed with 30% water and 70% Methylated spirits and clothing is cleaned (or bagged) before leaving the site.</li> <li>▪ All debris is to be tipped at a waste facility as land fill.</li> <li>▪ Do not use mulch from infected trees.</li> <li>▪ Clean and disinfect all equipment used to transport to landfill before working on next site.</li> </ul>

TREE DISEASES REPORTED IN NEWCASTLE				
Common Name	Scientific Name	Comment	NCC Control potential controls	Hygiene requirements for all works
Brittle Cinder	<i>Kretzschmaria deusta</i> Formerly <i>Ustulina deusta</i>	A facultative parasite initially causing a soft rot and in advanced stages will also remove lignin, typically in the stem base and woody roots. Can lead to brittle failure without warning signs. Will continue to decay the wood after the host tree has died. Fruiting bodies small 2-5cm 'tar spots' at base of stem/between buttresses/hidden by grass and can easily be overlooked.	<ul style="list-style-type: none"> <li>▪ <b>Prevention of spread</b></li> <li>- Not practical. Fruit bodies have typically formed well before infection is noticed.</li> <li>▪ <b>Control</b></li> <li>- Familiarity with fruiting bodies essential for early detection &amp; diagnosis.</li> <li>- Regular tree inspections.</li> <li>- Internal and external monitoring</li> <li>- Tree removal</li> <li>- Hygiene associated with internal inspection and tree removal.</li> </ul>	<ul style="list-style-type: none"> <li>▪ Set up a zone to clean off vehicles, equipment, boots and clothing as a transition from the infected area prior to leaving the site.</li> <li>▪ Ensure all cutting equipment is cleaned down and sprayed with 30% water and 70% Methylated spirits and clothing is cleaned (or bagged) before leaving the site.</li> <li>▪ All debris is to be tipped at a waste facility as land fill.</li> <li>▪ Do not use mulch from infected trees.</li> <li>▪ Excavation to remove stump and larger woody roots.</li> <li>▪ All stump, roots and soil around root-ball to be taken to land fill.</li> <li>▪ Where location of tree prevents excavation (e.g. footway) then the stump and any surface roots to be ground, and the grindings removed to landfill.</li> <li>▪ Clean and disinfect all equipment used to transport to landfill before working on next site.</li> </ul>

TREE DISEASES REPORTED IN NEWCASTLE				
Common Name	Scientific Name	Comment	NCC Control potential controls	Hygiene requirements for all works
Fusarium wilt of Phoenix canariensis (Canary Island Date Palm)	<i>Fusarium oxysporum f. sp.canariensis</i>	Soil born fungus that infects <i>Phoenix</i> and <i>Washingtonia</i> palm species. Stays active in all living and dead palm tissue and soil. Cannot be chipped or used as mulch. Favourable soil conditions promoted by high water table.	<ul style="list-style-type: none"> <li>▪ <b>Prevention of Spread</b></li> <li>- Remove infected palms. Do not transplant palms from infected areas, nor install susceptible species into known diseased areas.</li> <li>▪ <b>Control</b></li> <li>- None. Infected palms will die. Improving drainage may help on established sites.</li> </ul>	<ul style="list-style-type: none"> <li>▪ Inspect palm prior to work.</li> <li>▪ Set up a zone to clean off vehicles, equipment, boots and clothing as a transition from the infected area prior to leaving the site.</li> <li>▪ Disinfect pruning/cutting tools with 30% water and 70% Methylated spirits between palms ensuring all vegetation is removed from cutting equipment.</li> <li>▪ All vegetation including stump/root-ball from infected palms to be removed whole without chipping.</li> <li>▪ All debris is to be tipped at a waste facility as land fill.</li> <li>▪ If required - All stump, roots and soil around root-ball to be taken to land fill.</li> <li>▪ Where location of tree prevents excavation (e.g. footway) then the stump and any surface roots to be ground, and the grindings removed to landfill.</li> <li>▪ Clean and disinfect all equipment used to transport to landfill before working on next site.</li> <li>▪ Back-fill hole with clean sandy loam.</li> </ul>

TREE DISEASES REPORTED IN NEWCASTLE				
Common Name	Scientific Name	Comment	NCC Control potential controls	Hygiene requirements for all works
Root Rot	<i>Phytophthora cinnamomi</i>	<p>Phytophthora dieback is listed as a “key threatening process” to bushland/biodiversity under NSW State and under Federal legislation. State government agencies have developed documents detailing hygiene methodologies for work and recreation in and around P. cinnamomi management areas.</p> <p>Phytophthora infects the non-woody roots, rotting them off, affecting the ability of the roots to absorb water &amp; nutrients, leading to wilting and then death.</p> <p>Soil born mould (sometimes called pseudo-fungus) active in wet soil conditions. Can stay dormant in dryer soil for decades until conditions reactivate lifecycle.</p> <p>The mould can spread through the movement of soil and mud, especially in soil fragments stuck to vehicles and in particular to footwear. Zoospores can move in free warm (tropics) water and via root-to-root contact between plants.</p> <p>Humans can spread P. cinnamomi further and faster than any other infestation vector.</p> <p>Management practices to prevent the spread of Phytophthora dieback into uninfected areas include strict hygiene measures.</p>	<ul style="list-style-type: none"> <li>▪ <b>Control/Prevention of Spread</b></li> <li>- There is no effective control of the disease.</li> <li>- Prevention and containment methodologies include:</li> <li>- Hygiene protocols for all works activities</li> <li>- Monitoring to designate disease risk areas</li> <li>- Use of management zones to protect threatened flora</li> <li>- Host removal</li> <li>- When purchasing replacement stock ensure it is disease-free.</li> <li>- Replant with disease resistant plants.</li> </ul>	<ul style="list-style-type: none"> <li>▪ Do not enter disease risk areas during, or for three days after, rain.</li> <li>▪ Set up a zone to clean off vehicles, equipment, boots and clothing as a transition from the infected area prior to leaving the site.</li> <li>▪ Ensure all vehicles, equipment, boots and clothing is cleaned down and sprayed with 30% water and 70% Methylated spirits before leaving the site.</li> <li>▪ All debris is to be tipped at a waste facility as land fill.</li> <li>▪ Do not use mulch from infected trees. NOTE: the disease can spread various heights depending on species.</li> <li>▪ Clean all equipment used to transport to landfill before working on next site.</li> <li>▪ Where required -Excavation to remove stump and larger woody roots.</li> <li>▪ Where location of tree prevents excavation (e.g. footway) then the stump and any surface roots to be ground, and the grindings removed to landfill.</li> </ul>

TREE DISEASES REPORTED IN NEWCASTLE				
Common Name	Scientific Name	Comment	NCC Control potential controls	Hygiene requirements for all works
Myrtle Rust	<i>Puccinia psidii</i>	<p>Myrtle rust is a fungal disease that attacks new leaves, shoot tips, and young stems. On some hosts, it can attack flowers and fruit. Symptoms and severity can vary across hosts.</p> <p>The disease is caused by the exotic fungus <i>Puccinia psidii</i> (initially identified as <i>Uredo rangellii</i>). First identified in NSW in early 2010, it has now spread across eastern Australia and can be found from Tasmania to the Tiwi Islands in the NT. It is established in bushland reserves, home gardens, commercial operations such as production nurseries, and amenity settings such as parks and street plantings.</p> <p>It infects plants in the Myrtaceae family, for example the following genera: eucalyptus, corymbia, agonis, melaleuca, callistemon, syncarpia, acmena, syzygium, leptospermum, tristaniopsis, among 300 known host species. Heavy infection can kill new growth. Severe infections can kill susceptible hosts.</p> <p>The disease is spread by wind, water, insects people and animals. Spores can travel many kilometres from the initial site of infection. Myrtle rust spores can also spread over long distances if carried on plant material, equipment, vehicles and clothing.</p> <p>Various controls and strategies are outlined by the NSW Department of Primary Industries web site (see references for links).</p>	<ul style="list-style-type: none"> <li>▪ <b>Prevention of Spread</b> <ul style="list-style-type: none"> <li>- Familiarity with the signs of infection allows for early diagnosis.</li> <li>- Stock security - ensure new plants or cuttings are free from myrtle rust.</li> <li>- Keep new plants separate from existing plants until disease freedom can be assured or until treated with an appropriate fungicide.</li> <li>- Affected plants should be removed and disposed of appropriately to minimise the spread of myrtle rust.</li> </ul> </li> <li>▪ <b>Control</b></li> <li>▪ <b>Chemical treatment</b> <ul style="list-style-type: none"> <li>- There are a number of fungicides containing mancozeb, triforine, or copper oxychoride, among others, available for the control of myrtle rust. Special conditions may apply to their use, check with the NSW DPI for circumstances. Where suitable and appropriate spray infected and nearby plants with a fungicide to kill spores 3-4 days prior to removal.</li> </ul> </li> </ul>	<ul style="list-style-type: none"> <li>▪ Set up a zone to clean off vehicles, equipment, boots and clothing as a transition from the infected area prior to leaving the site.</li> <li>▪ Ensure all vehicles, equipment, boots and clothing is cleaned down and sprayed with 30% water and 70% Methylated spirits before leaving the site.</li> <li>▪ Before being removing, smaller plants and plant parts enclose in a plastic bag</li> <li>▪ Larger plants that do not fit in bags can be cut into smaller pieces and covered with black plastic</li> <li>▪ All debris is to be covered/wrapped in plastic and tipped at a waste facility as land fill.</li> <li>▪ Clean all equipment used to transport to landfill before working on next site.</li> </ul>

TREE DISEASES REPORTED IN NEWCASTLE				
Common Name	Scientific Name	Comment	NCC Control potential controls	Hygiene requirements for all works
Botryosphaeria dieback	<i>Botryosphaeria parva</i> ; <i>B. dothidea</i> .	<p>A variant of the <i>Botryosphaeria</i> family of fungus that affects Norfolk and Cook Island Pine. The related species <i>Botryosphaeria dothidea</i> also commonly occurs and causes similar symptoms on Camphor Laurel <i>Cinnamomum camphora</i> and Hill's Weeping Fig <i>Ficus microcarpa</i> var. <i>hillii</i>.</p> <p>A common endophyte that, on stressed trees, can cause a canker rot that girdles twigs and stems, leading to dieback of the affected parts.</p> <p>Inoculum can be spread on pruning tools.</p> <p>Spores produced in fruiting structures on infected stem. Spread by rain splash, insects, tools, infected plant debris and plant-plant direct contact.</p>	<ul style="list-style-type: none"> <li>▪ <b>Prevention of Spread</b> <ul style="list-style-type: none"> <li>- Maintain tree health through good cultural practice, i.e. prevent soil compaction, carry out mulching, reliable irrigation, fertilising when necessary, and</li> <li>- Appropriate pruning including hygiene protocols</li> <li>- Removal of badly infected trees</li> </ul> </li> <li>▪ <b>Control</b> <ul style="list-style-type: none"> <li>- There are no chemical controls for this disease.</li> <li>- Avoid pruning during wet weather (spores of Botryosphaeriaceae fungi are released up to 2 hours after rain).</li> <li>- Smaller dead or diseased parts could be pruned out.</li> </ul> </li> </ul>	<ul style="list-style-type: none"> <li>▪ Do not prune during wet weather or up to 2 hours after rain.</li> <li>▪ Set up a zone to clean off vehicles, equipment, boots and clothing as a transition from the infected area prior to leaving the site.</li> <li>▪ Ensure all cutting equipment is cleaned down and sprayed with 30% water and 70% Methylated spirits and clothing is cleaned (or bagged) before leaving the site.</li> <li>▪ All debris is to be tipped at a waste facility as land fill.</li> <li>▪ Do not use mulch from infected trees.</li> <li>▪ Where location of tree prevents excavation (e.g. footway) then the stump and any surface roots to be ground, and the grindings removed to landfill.</li> <li>▪ Clean all equipment used to transport to landfill before working on next site.</li> </ul>

**TREE DISEASES OF SIGNIFICANCE ELSEWHERE IN AUSTRALIA - NOT REPORTED IN NEWCASTLE**

Common Name	Scientific Name	Comment	NCC Control potential controls	Hygiene requirements for all works
Cypress Canker	<i>Seiridium cardinale</i> , <i>S. unicorn</i> and <i>S. cupressi</i>	<p>Numerous conifer species affected.</p> <p>Cypress canker is caused by several species of fungi whose spores enter the plants through natural fissures or through injuries. They result in cankers which exude resin from the margins or through bark fissures, and cause a vascular dysfunction similar to ringbarking. Multiple cankers can form on a single stem. This can lead to yellowing and rapid death of affected branches or stems.</p> <p>Spores carried by rain splashes, insects, birds and animals.</p> <p>Spores transferred from plant to plant on pruning tools, or through transport of infected cuttings or plants.</p>	<ul style="list-style-type: none"> <li>▪ <b>Prevention</b></li> <li>- Maintain tree health through good cultural practice, i.e. prevent soil compaction, carry out mulching, reliable irrigation, fertilising when necessary, and appropriate pruning including hygiene protocols.</li> <li>▪ <b>Control</b></li> <li>- There is no effective chemical control for this disease.</li> <li>- Smaller infected branches could be pruned out although pruning wounds could create opportunities for reinfection.</li> <li>- Severely diseased plants to be removed and diseased vegetation disposed in landfill.</li> </ul>	<ul style="list-style-type: none"> <li>▪ Do not prune infected trees during very humid or rainy conditions.</li> <li>▪ Set up a zone to clean off vehicles, equipment, boots and clothing as a transition from the infected area prior to leaving the site.</li> <li>▪ Ensure all cutting equipment is cleaned down and sprayed with 30% water and 70% Methylated spirits and clothing is cleaned (or bagged) before leaving the site.</li> <li>▪ All debris is to be tipped at a waste facility as land fill.</li> <li>▪ Do not use mulch from infected trees.</li> <li>▪ Clean all equipment used to transport to landfill before working on next site.</li> </ul>

TREE DISEASES OF SIGNIFICANCE ELSEWHERE IN AUSTRALIA - NOT REPORTED IN NEWCASTLE				
Common Name	Scientific Name	Comment	NCC Control potential controls	Hygiene requirements for all works
Ink Disease of Oak	<i>Phytophthora cambivora</i>	<p>Soil-borne fungus common in Australian soils. English Oak <i>Quercus robusta</i> is very susceptible, among others.</p> <p>A root-rot that gradually spreads along the woody roots and up the main stem, causing small lesions which can coalesce into larger lesions, eventually ring-barking the affected part and causing wilting followed by death.</p> <p>Lesions appear on the lower stem as dark patches in the bark 2-3cm across, 'bleeding' from the centre.</p> <p>The disease can be spread on pruning tools, but it mainly affects the stem and does not usually extend to branches.</p>	<ul style="list-style-type: none"> <li>▪ <b>Prevention</b></li> <li>- Maintain tree health through good cultural practice, i.e. prevent soil compaction, carry out mulching, reliable irrigation, fertilising when necessary, and appropriate pruning including hygiene protocols.</li> <li>▪ <b>Control</b></li> <li>- The disease can be treated with phosphonate by soil drenching, tree injection, or foliar application. Treatment is not always successful, however.</li> <li>- Remove dead branches as necessary.</li> <li>- Severely affected trees should be removed.</li> </ul>	<ul style="list-style-type: none"> <li>▪ Set up a zone to clean off vehicles, equipment, boots and clothing as a transition from the infected area prior to leaving the site.</li> <li>▪ Ensure all vehicles, equipment, boots and clothing is cleaned down and sprayed with 30% water and 70% Methylated spirits before leaving the site.</li> <li>▪ All debris is to be tipped at a waste facility as land fill.</li> <li>▪ Infected stems/trunks to be removed whole. Do not chip infected material. NOTE: the spores can travel vast distances.</li> <li>▪ Do not use mulch from infected trees</li> <li>▪ Where location of tree prevents excavation (e.g. footway) then the stump and any surface roots to be ground, and the grindings removed to landfill.</li> <li>▪ Clean all equipment used to transport to landfill before working on next site.</li> <li>▪ Stump grinding required, including larger woody roots.</li> <li>▪ If required - All stump, roots and soil around root-ball to be taken to land fill.</li> </ul>

EXOTIC DISEASES – POTENTIAL THREATS TO AUSTRALIA				
Common Name	Scientific Name	Comment	NCC Control potential controls	Hygiene requirements for all works
Sudden Oak Death (Not yet present in Australia)	<i>Phytophthora ramorum</i>	<p><i>Phytophthora ramorum</i> is currently listed as a category 1 emergency plant pest in Australia because of its potentially devastating effects not only to affected plant industries, such as nurseries and landscape centres, but also to native ecosystems.</p> <p>It is primarily an aerial pathogen, impacting on stems, trunks and leaves.</p> <p>Sporangia are produced on the surfaces of infected leaves and twigs, can be dispersed by water splash to neighbouring hosts, or spread longer distances by wind and rain. The pathogen can also be carried downstream of infested areas in rivers and streams, or spread via infested soil.</p> <p>As cool, moist conditions favour survival, infection and spread of <i>P. ramorum</i>, the pathogen would be particularly suited to establishment in coastal areas of south-eastern and south-western mainland Australia, as well as Tasmania, should it be introduced into this country.</p> <p>The disease can be spread on pruning tools.</p> <p>See Appendices for link to NGIA Biosecurity Plan.</p> <p>Three different diseases can be caused by <i>P. ramorum</i>: stem or bole canker (sudden oak death), leaf blight (ramorum leaf blight) and twig blight/dieback (ramorum shoot dieback).</p>	<ul style="list-style-type: none"> <li>▪ <b>Prevention</b> <ul style="list-style-type: none"> <li>- In the event that the disease is introduced to Australia, there is no prevention other than avoiding the purchase of infected stock, and otherwise maintaining trees with good cultural practice.</li> </ul> </li> <li>▪ <b>Control</b> <ul style="list-style-type: none"> <li>- Chemical treatments are available but are not always successful in eradicating the disease.</li> </ul> </li> </ul>	<ul style="list-style-type: none"> <li>▪ Set up a zone to clean off vehicles, equipment, boots and clothing as a transition from the infected area prior to leaving the site.</li> <li>▪ Ensure all vehicles, equipment, boots and clothing is cleaned down and sprayed with 30% water and 70% Methylated spirits before leaving the site.</li> <li>▪ Infected trees are to be removed whole or in large parts and not chipped.</li> <li>▪ All debris is to be tipped at a waste facility as land fill.</li> <li>▪ Infected stems/trunks to be removed whole. Do not chip infected material. NOTE: the spores can travel vast distances.</li> <li>▪ Do not use mulch from infected trees</li> <li>▪ Excavation to remove stumps and larger woody rots of infected trees is required.</li> <li>▪ Where location of tree prevents excavation (e.g. footway) then the stump and any surface roots to be ground, and the grindings removed to landfill.</li> <li>▪ Removal of soil, stump and roots to landfill and backfilling with clean loam soil.</li> </ul>

EXOTIC DISEASES – POTENTIAL THREATS TO AUSTRALIA				
Common Name	Scientific Name	Comment	NCC Control potential controls	Hygiene requirements for all works
		<p>Individual plant species can display more than one disease type (e.g. leaf blight, shoot dieback and stem cankers on tanoak). Leaf blight and twig blight/dieback symptoms are typically visible within five to fourteen days following infection, while bleeding cankers and whole plant dieback may not be visible for some time (ie. months or years) following an infection event. Infections typically develop rapidly under moist, temperate conditions, similar to those prevalent in the nursery environment.</p> <p>Sudden oak death is characterised by bleeding bark cankers, usually on the lower trunk, which cause red-brown to black discolouration of tissue below the bark. These cankers can lead to death of entire tree crowns due to necrotic girdling (ringbarking) of trunk tissue.</p>		<ul style="list-style-type: none"> <li>Wash down all pruning equipment, truck and plant at completion of works and disinfect (30% water and 70% Methylated spirits).</li> </ul>

EXOTIC DISEASES – POTENTIAL THREATS TO AUSTRALIA				
Common Name	Scientific Name	Comment	NCC Control potential controls	Hygiene requirements for all works
Pitch Canker of Pine	<i>Fusarium circinatum</i> / <i>Gibberella circinata</i>	<p>Threat to all pine species and Douglas Fir, especially in plantations.</p> <p>A fungal disease that causes bleeding cankers on branches, stems, and surface roots. Causes a vascular dysfunction leading to wilting and death of affected parts. While the major damage from this fungus is to branches, needles, trunk or stem and roots, pine pitch canker can also infect trees' reproductive structures, killing female flowers and mature cones.</p> <p>The fungus requires a moist substrate for infection and can be spread by insects or water splash, and where host trees have been wounded by such things as insect attack, strong winds or pruning, can be spread by the wind.</p> <p>The fungus can survive in soil for 6 months and in wood pieces for over 12 months. Currently there is no effective treatment for the disease in mature trees. While Douglas fir and many pine species are relatively resistant to the Pitch canker disease, Radiata or Monterey pine (<i>Pinus radiata</i>) is considered highly susceptible to the disease with mortality rates in mature trees reaching 80% in some areas of California.</p> <p>The disease can be spread on pruning tools.</p>	<ul style="list-style-type: none"> <li>▪ <b>Prevention</b> <ul style="list-style-type: none"> <li>- In the event that the disease is introduced to Australia, there is no prevention other than avoiding the purchase/transportation of infected stock, and otherwise maintaining trees with good cultural practice</li> </ul> </li> <li>▪ <b>Control</b> <ul style="list-style-type: none"> <li>- There is no chemical control for mature trees.</li> <li>- Smaller dead or diseased branches could be pruned out, observing hygiene protocols.</li> <li>- Severely affected trees will require removal, including stumps and woody roots.</li> </ul> </li> </ul>	<ul style="list-style-type: none"> <li>▪ Set up a zone to clean off vehicles, equipment, boots and clothing as a transition from the infected area prior to leaving the site.</li> <li>▪ Ensure all vehicles, equipment, boots and clothing is cleaned down and sprayed with 30% water and 70% Methylated spirits before leaving the site.</li> <li>▪ Excavation to remove stumps and larger woody roots of infected trees is required</li> <li>▪ Removal of soil, stump and roots to landfill and backfilling with clean loam soil.</li> <li>▪ Where location of tree prevents excavation (e.g. footway) then the stump and any surface roots to be ground, and the grindings removed to landfill.</li> <li>▪ Wash down all pruning equipment, truck and plant at completion of works and disinfect (30% water and 70% Methylated spirits).</li> </ul>

EXOTIC DISEASES – POTENTIAL THREATS TO AUSTRALIA				
Common Name	Scientific Name	Comment	NCC Control potential controls	Hygiene requirements for all works
Fire Blight	<i>Erwinia amylovora</i>	<p>Threat to Rosaceae family which includes pears, plums cherries, apples, cotoneaster, crabapples, flowering quince, hawthorn etc.</p> <p>A bacterial disease spread by insects (bees included), contaminated pruning or grafting tools, infected grafts, and any manner that carries the bacterial pathogen from an infected plant to one that is not, including wind and rain-splash.</p> <p>Fire blight can appear as different symptoms, depending on which plant parts are affected and seasonal timing. Blossoms, shoots, fruit, rootstock, branches and stems all have differing symptoms.</p> <p>Infected trees appear to be scorched by fire, hence the name 'fire blight'.</p>	<ul style="list-style-type: none"> <li>▪ <b>Prevention</b> <ul style="list-style-type: none"> <li>- In the event that the disease is introduced to Australia, there is no prevention other than avoiding the purchase of infected stock, and otherwise maintaining trees with good cultural practice</li> </ul> </li> <li>▪ <b>Control</b> <ul style="list-style-type: none"> <li>- There is no chemical control for mature trees.</li> <li>- Smaller dead or diseased branches could be pruned out, observing hygiene protocols.</li> <li>- Severely affected trees will require removal, including stumps and woody roots.</li> </ul> </li> </ul>	<b>AS PER MYRTLE RUST ABOVE</b>

EXOTIC DISEASES – POTENTIAL THREATS TO AUSTRALIA				
Common Name	Scientific Name	Comment	NCC Control potential controls	Hygiene requirements for all works
Eucalyptus rust (Guava rust)	<i>Puccinia psidii</i>	<p>Eucalyptus rust (also known as guava rust) is part of the <i>Puccinia psidii</i> species complex and is <u>closely related</u> to Myrtle Rust. It is considered to be one of the most serious threats to Australia's eucalypt plantations, commercial native forests and natural ecosystems. It is a disease caused by a fungus which infects plants belonging to the plant family <i>Myrtaceae</i>, which includes Eucalyptus, Corymbia, Melaleuca, Lilly Pilly, Callistemon, and Turpentine, among others.</p> <p>Eucalyptus rust primarily attacks young (juvenile) leaves and also the flowers, shoots and fruits. First signs of rust infection are tiny raised spots or pustules on infected tissue. After a few days pustules turn a distinctive yellow colour.</p> <p>Infected leaves become deformed and eventually shrivel. Severe infection can cause heavy defoliation and stunt growth. Recurrent infections can lead to death of trees or shrubs.</p>	<ul style="list-style-type: none"> <li>▪ <b>Prevention</b> <ul style="list-style-type: none"> <li>- As per Myrtle Rust:</li> <li>- Familiarity with the signs of infection allows for early diagnosis.</li> <li>- Stock security - ensure new plants or cuttings are free from myrtle rust.</li> <li>- Keep new plants separate from existing plants until disease freedom can be assured or until treated with an appropriate fungicide.</li> <li>- Affected plants should be removed and disposed of appropriately to minimise the spread of myrtle rust.</li> </ul> </li> <li>▪ <b>Control</b> <ul style="list-style-type: none"> <li>- As per Myrtle Rust:</li> <li>- There are a number of fungicides containing mancozeb, triforine, or copper oxychloride, among others, available for the control of myrtle rust. Special conditions may apply to their use, check with the NSW DPI for circumstances.</li> <li>- Various controls and strategies are outlined by the NSW Department of Primary Industries, see Appendices for link.</li> </ul> </li> </ul>	<b>AS PER MYRTLE RUST ABOVE</b>

**Table 1.3: Insect Pests reported in Newcastle or are a potential Threat**

INSECT PESTS REPORTED IN NEWCASTLE				
Common Name	Scientific Name	Comment	NCC Control potential controls	Hygiene requirements for all works
Spotted Gum Borer	<i>Nascio vetusta</i>	Kills <i>Metrosideros</i> spp (NZ Xmas Bush). No effective treatment.	<ul style="list-style-type: none"> <li>▪ <b>Prevention</b></li> <li>- Do not plant susceptible species.</li> <li>▪ <b>Control</b></li> <li>- Removal of affected trees.</li> </ul>	<ul style="list-style-type: none"> <li>▪ No special hygiene requirements apply.</li> </ul>
Fig Psyllid	<i>Mycopsylla fici</i>	Periodically defoliates Morton Bay Fig ( <i>Ficus macrophylla</i> ) and sometimes Port Jackson Fig ( <i>Ficus rubiginosa</i> ). Induced defoliation amplified under drought conditions and where soil compaction and/or excavation damages roots. Root damage leads to secondary pressures from pathogenic fungi which may kill trees or weaken structural integrity. A native wasp ( <i>Psyllaephagus</i> sp.) parasitises the psyllid. The wasp emerges from leaves most of which will be in the litter layer beneath the tree. It is important to retain fallen leaves in the mulch beneath trees so that the wasp can continue its life cycle.	<ul style="list-style-type: none"> <li>▪ <b>Prevention</b></li> <li>- Fallen leaves should be spread as mulch beneath the tree. It is important that leaves are not chipped, for example, by lawn mowers, as that will destroy the biological control agent.</li> <li>- Maintain tree health through good cultural practice, i.e. prevent soil compaction, carry out mulching, reliable irrigation, fertilising when necessary, and appropriate pruning.</li> <li>▪ <b>Control</b></li> <li>- Good cultural practice usually is sufficient. Chemical control to be used only as a last resort. Micro-injection into stem, or soil injection, with imidacloprid. Crown-spraying of mature trees subject to granting of special licence from NSW DPI. Note that soil injection and crown spraying will also kill beneficial organisms.</li> </ul>	<ul style="list-style-type: none"> <li>▪ No special hygiene requirements apply.</li> </ul>

INSECT PESTS REPORTED IN NEWCASTLE				
Common Name	Scientific Name	Comment	NCC Control potential controls	Hygiene requirements for all works
Bag Moth, Kurrajong leaf tier	<i>Psychidae</i> spp.	Occasionally on Brushbox, Illawarra Flame and Kurrajong but also some other tree species.  Moth larvae which construct shelters or 'bags' from plant material.	<ul style="list-style-type: none"> <li>▪ <b>Prevention</b></li> <li>- Not applicable.</li> <li>▪ <b>Control</b></li> <li>- Not usually necessary. Bags can be removed by hand but beware stinging spines on caterpillars.</li> <li>- Small trees could be sprayed with systemic insecticide, larger trees treated by micro-injection.</li> </ul>	<ul style="list-style-type: none"> <li>▪ No special hygiene requirements apply.</li> </ul>
Winter Bronzing	<i>Thaumastocoris australis</i> , syn <i>T. peregrinus</i>	<p>Mainly Narrow-leaved Black Peppermint Eucalyptus <i>nicholii</i> and Wallangarra White Gum <i>Eucalyptus scoparia</i>, less severe on other eucalypts and allied genera.</p> <p>A sap-sucker or bug. The main egg-hatching period is during the cooler months. Insect populations rapidly reach plague proportions. Sap-sucking from leaves causes foliage to turn characteristic bronze (<i>E. nicholii</i>) or red (<i>E. scoparia</i>) during winter, leading to defoliation. Repeated defoliation events can deplete tree energy reserves resulting in dieback and death.</p> <p>Adult bugs are highly mobile and can swarm from tree to tree if crowns contact, or be blown by wind to new trees, or even "hitch-hike" on birds.</p> <p>Previous widespread planting of susceptible host trees means chemical treatment is probably cost prohibitive.</p>	<ul style="list-style-type: none"> <li>▪ <b>Prevention</b></li> <li>- Maintain tree health through good cultural practice, i.e. prevent soil compaction, carry out mulching, reliable irrigation, fertilising when necessary, and appropriate pruning</li> <li>▪ <b>Control</b></li> <li>- Chemical control to be used only as a last resort. Micro-injection into stem, or soil injection, with imidacloprid. Crown-spraying of mature trees subject to granting of special licence from NSW DPI. Note that soil injection and crown spraying will also kill beneficial organisms.</li> </ul>	<ul style="list-style-type: none"> <li>▪ Ensure all material is chipped promptly.</li> <li>▪ Where practical hose vehicles off before leaving site</li> <li>▪ Transport material in covered vehicle.</li> <li>▪ Ensure all equipment, clothing, tools and vehicles are washed or cleaned before moving to other areas.</li> <li>▪ Report to Council immediately.</li> </ul>

INSECT PESTS REPORTED IN NEWCASTLE				
Common Name	Scientific Name	Comment	NCC Control potential controls	Hygiene requirements for all works
Scale Insects	Numerous species	<p>Sap sucking insects commonly found on Lilly Pilly leaves and stems, and other species. Chinese Tallow Tree <i>Sapium sebiferum</i> is also highly susceptible to Chinese Wax Scale, especially when growing as street trees.</p> <p>Bugs excrete honeydew which provides a substrate for sooty mould that forms on leaves and surrounds. Sooty mould coats leaves, reduces photosynthesis and weakens trees. Honey-dew also drips onto whatever is beneath tree, causing nuisance.</p>	<ul style="list-style-type: none"> <li>▪ <b>Prevention</b> <ul style="list-style-type: none"> <li>- Avoid purchase of infested stock. Maintain tree health through good cultural practice, i.e. prevent soil compaction, carry out mulching, reliable irrigation, fertilising when necessary, and appropriate pruning.</li> </ul> </li> <li>▪ <b>Control</b> <ul style="list-style-type: none"> <li>- On smaller trees, spray white-oil directly over scales to cause suffocation, oil can be mixed with insecticide. Do not spray on when temp &gt;300.</li> <li>- Micro-injection into stem, or soil injection, with imadocloprid on larger trees. Crown-spraying of mature trees subject to granting of special licence from NSW DPI. Note that soil injection and crown spraying will also kill beneficial organisms.</li> </ul> </li> </ul>	<ul style="list-style-type: none"> <li>▪ Pruning's should be promptly chipped to destroy scales.</li> </ul>
Borers/Longicorn Beetle/ Jewel Beetle	<i>Phoracantha spp.</i> and many other species.	<p>Numerous woody species including Eucalyptus, Corymbia, Acacia <i>et al.</i></p> <p>Note that trees are part of the food chain and some borer damage is normal.</p> <p>Larvae generally feed in phloem and/or sapwood and will typically create exit hole at surface just before pupation. Some species like bulls-eye borer and giant wood moth induce long split in bark over hole.</p> <p>Borers are only a problem if they repeatedly and in great numbers attack a tree year after year. Short-lived species such as acacia are typically 'recycled' by borers at the end of the tree's life.</p>	<ul style="list-style-type: none"> <li>▪ <b>Prevention</b> <ul style="list-style-type: none"> <li>- Maintain tree health through good cultural practice, i.e. prevent soil compaction, carry out mulching, reliable irrigation, fertilising when necessary, and appropriate pruning.</li> </ul> </li> <li>▪ <b>Control</b> <ul style="list-style-type: none"> <li>- Removal of badly damaged trees.</li> </ul> </li> </ul>	<ul style="list-style-type: none"> <li>▪ No special hygiene requirements apply.</li> </ul>

INSECT PESTS REPORTED IN NEWCASTLE				
Common Name	Scientific Name	Comment	NCC Control potential controls	Hygiene requirements for all works
Spitfires/Painted Cup Moth	<i>Doratifera spp.</i>	<p>Stinging moth larvae common on Eucalyptus, Corymbia, melaleuca, guava, apricot.</p> <p>Insect family Limacodidae. The stout, slug-like caterpillars are usually a pale green, and may be marked with purple or brown, depending on the species. Each end of the caterpillar is often armed with clusters of sharp spines. When the caterpillar is disturbed, these spines are erected, but at rest they are retracted inside tubes. The spines cause intense stinging if they touch the skin, and may even cause large lumps to appear.</p> <p>Adult cup moths lay clusters of eggs on the leaves of food plants such as Eucalyptus and other trees, and often cover them with hairs from their own bodies.</p> <p>When the caterpillars hatch, they begin to feed in groups on the surface of a leaf. As they mature, they move off to feed on a whole leaf each.</p> <p>When the cup moth caterpillar is ready to pupate, it spins a hard, smooth oval or pear-shaped cocoon (the 'cup') attached by the base to a twig. The moth emerges by pushing off a circular cap or lid.</p>	<ul style="list-style-type: none"> <li>▪ <b>Prevention</b> <ul style="list-style-type: none"> <li>- Maintain tree health through good cultural practice, i.e. prevent soil compaction, carry out mulching, reliable irrigation, fertilising when necessary, and appropriate pruning.</li> </ul> </li> <li>▪ <b>Control</b> <ul style="list-style-type: none"> <li>- Not usually necessary. Branches with heavy infestations could be pruned off. Beware of stinging spines.</li> </ul> </li> </ul>	<ul style="list-style-type: none"> <li>▪ No special hygiene requirements apply.</li> </ul>

**INSECT PESTS REPORTED IN NEWCASTLE**

Common Name	Scientific Name	Comment	NCC Control potential controls	Hygiene requirements for all works
<p>Sycamore (Plane Tree) Lace Bug</p>	<p><i>Corythucha ciliata</i></p>	<p>Sap sucking insect native to North America, feeds on the undersides of leaves of Sycamores (Plane Trees), especially <i>Platanus occidentalis</i>. It was identified on London Plane Trees growing in Sydney CBD in 2007 by an Irish entomologist holidaying in Australia.</p> <p>Adults and nymphs feed on the underside of leaves. This initially causes white stippling, progressing to bronzing, chlorosis and, eventually, premature leaf drop. Severe infestation in late summer can even cause defoliation.</p> <p>Several consecutive years of heavy infestation may kill trees.</p> <p>Damage to plane trees has been worsened by the stress brought on by drought conditions. Outbreaks often occur in January to February and are associated with low rainfall.</p> <p>Current infestation appears to not affect trees west of Newcastle and Cooks Hill.</p> <p>Is easily spread on clothing, equipment and vehicles. Pest overwinters in crevices of buildings or trees.</p>	<ul style="list-style-type: none"> <li>▪ <b>Prevention</b></li> <li>- Avoid purchase/transport of infested stock.</li> <li>- Maintain tree health through good cultural practice, i.e. prevent soil compaction, carry out mulching, reliable irrigation, fertilising when necessary, and appropriate pruning.</li> <li>▪ <b>Control</b></li> <li>- Hygiene protocols to avoid spread.</li> <li>- Pruning works to be undertaken when infestation present.</li> <li>- Removal of severely damaged trees.</li> <li>- Use of water blasting up in amongst canopy can</li> </ul>	<ul style="list-style-type: none"> <li>▪ Ensure all material is chipped promptly.</li> <li>▪ Where practical hose vehicles off before leaving site</li> <li>▪ Transport material in covered vehicle.</li> <li>▪ Ensure all equipment, clothing, tools and vehicles are washed or cleaned before moving to other areas with Plane trees.</li> </ul>

INSECT PESTS REPORTED IN NEWCASTLE				
Common Name	Scientific Name	Comment	NCC Control potential controls	Hygiene requirements for all works
Fig-leaf Beetle	<i>Poneridia semipullata</i>	<p>Mainly on Port Jackson Fig, but can occur on other species.</p> <p>Both the adult and the larvae are defoliators of fig trees, but each cause different damage.</p> <p>Larvae usually feed in groups (they resemble sawfly larvae) grazing the lamina (leaf surface) and leaving white, papery leaf-tissue behind.</p> <p>Very young grubs are yellow but later become black. They are a fleshy, hairy, roughened grub, widest at the head end and growing to about 1 centimetre.</p> <p>Clusters of young grubs look like sawdust on the leaf. There may be several generations per season.</p> <p>Adults feed on the leaves also, chewing from the margin inwards until the leaf is totally consumed. Adult beetles are about 1 centimetre long and are dull-brown with prominent antennae.</p> <p>Generally, leaf beetles are most destructive from October through to about March, but when large populations are present, damage may occur over a longer period. Adults persist over winter.</p> <p>Populations of Fig-leaf Beetle can periodically increase rapidly and can defoliate entire trees. Repeated defoliation events can cause branch dieback and in extreme case, tree death.</p> <p>Fig-leaf Beetle is usually controlled by its own predatory beetle. Occasionally, populations of Fig-leaf Beetle will reach plague proportions and may require chemical control.</p>	<ul style="list-style-type: none"> <li>▪ <b>Prevention</b> <ul style="list-style-type: none"> <li>- Maintain tree health through good cultural practice, i.e. prevent soil compaction, carry out mulching, reliable irrigation, fertilising when necessary, and appropriate pruning.</li> </ul> </li> <li>▪ <b>Control</b> <ul style="list-style-type: none"> <li>- Spraying with carbamate-based insecticides is possible for smaller trees but may require a special licence from the NSW DPI for use on large urban trees.</li> <li>- Large trees - micro-injection into stem, or soil injection, with imidacloprid. Note that soil injection and crown spraying will also kill beneficial organisms.</li> </ul> </li> </ul>	<ul style="list-style-type: none"> <li>▪ No special hygiene requirements apply.</li> </ul>

INSECT PESTS IN AUSTRALIA – NOT REPORTED IN NEWCASTLE				
Common Name	Scientific Name	Comment	NCC Control potential controls	Hygiene requirements for all works
Lantana Tree Hopper	<i>Aconophora compressa</i>	<p>This Central American species of bug was released by the Queensland Department of Natural Resources &amp; Mines in 1995 as a biological control for weedy species of Lantana. The bug has since also been found damaging Fiddlewood and Jacaranda. The bug has been anecdotally reported as far south as Terrigal but as yet not reported in Newcastle.</p> <p>The treehopper is brown and up to 8 millimetres long with a horn-shaped head. The bugs assemble in large numbers and suck sap from the stems of host plants. Most of its known host species are in the verbena family (verbenaceae). In its native habitat in Mexico it is only associated with plants in genus Lantana.</p> <p>The treehopper lays eggs on plant stems and then guards the eggs against predators. Nymphs progress through five instars before reaching adulthood in about 45 days.</p> <p>Populations can rapidly reach plague proportions. Mass removal of photosynthates through sap sucking can quickly deplete tree reserves, leading to dieback and death of affected parts. It excretes copious amounts of honeydew, which cause other problems of sooty mould.</p>	<ul style="list-style-type: none"> <li>▪ <b>Prevention</b> <ul style="list-style-type: none"> <li>- Avoid purchase/transport of infested stock.</li> <li>- Maintain tree health through good cultural practice, i.e. prevent soil compaction, carry out mulching, reliable irrigation, fertilising when necessary, and appropriate pruning.</li> </ul> </li> <li>▪ <b>Control</b> <ul style="list-style-type: none"> <li>- No practical non chemical controls.</li> </ul> </li> </ul>	<ul style="list-style-type: none"> <li>▪ Ensure all material is chipped promptly.</li> <li>▪ Where practical hose vehicles off before leaving site.</li> <li>▪ Transport material in covered vehicle.</li> <li>▪ Ensure all equipment, clothing, tools and vehicles are washed or cleaned before moving to other areas.</li> <li>▪ Report to Council immediately.</li> </ul>

INSECT PESTS IN AUSTRALIA – NOT REPORTED IN NEWCASTLE				
Common Name	Scientific Name	Comment	NCC Control potential controls	Hygiene requirements for all works
Cuban Laurel Thrips	<i>Gynaikothrips ficorum</i>	<p>Mainly on Hill's Weeping Fig <i>Ficus microphylla</i> var. <i>hilli</i>.</p> <p>Adult and nymphal thrips feed on the upper surface of young and expanding leaves, causing reddish feeding scars along leaf midribs. Leaves in the process of unfolding become deformed, tightly curled and folded, appearing crescent-shaped. Damaged leaves may first turn reddish, then dark brown and hard, before dropping from the plants. Besides causing unsightly plant damage, infestations slow plant growth. Occasionally, Cuban laurel thrips also bite people who come into contact with infested plants.</p>	<ul style="list-style-type: none"> <li>▪ <b>Prevention</b> <ul style="list-style-type: none"> <li>- Maintain tree health through good cultural practice, i.e. prevent soil compaction, carry out mulching, reliable irrigation, fertilising when necessary, and appropriate pruning.</li> </ul> </li> <li>▪ <b>Control</b> <ul style="list-style-type: none"> <li>- Small trees – prune off new growth to eliminate oviposition sites and the population should die out before additional new plant growth emerges.</li> <li>- Spraying with systemic insecticides is possible for smaller trees but may require a special licence from the NSW DPI for use on large urban trees.</li> <li>- Large trees - micro-injection into stem, or soil injection, with imidacloprid. Note that soil injection or crown spraying will also kill beneficial organisms.</li> </ul> </li> </ul>	<ul style="list-style-type: none"> <li>▪ Prompt chipping of prunings.</li> </ul>

INSECT PESTS IN AUSTRALIA – NOT REPORTED IN NEWCASTLE				
Common Name	Scientific Name	Comment	NCC Control potential controls	Hygiene requirements for all works
Ash Whitefly	<i>Siphoninus phillyreae</i>	<p>Ash whitefly (<i>Siphoninus phillyreae</i>) is a pest of several horticultural crops and ornamental plants in Europe and north Africa. It has spread to the United States and New Zealand, and been detected in South Australia and New South Wales.</p> <p>When not under the control of its natural enemies, it can cause significant damage to host plants. Affected plants have unsightly sooty mould which grows on honeydew produced by the pest.</p> <p>The first sign of an ash whitefly infestation is the small (1-2mm), white, winged adults resting on host plant leaves or fluttering around like tiny moths when disturbed. On an infested plant, the undersides of the leaves carry large numbers of adults and nymphs. The fourth stage nymphs are distinctive with noticeable spines that are tipped with globules of white waxy material.</p> <p>The whitefly is particularly noticeable on deciduous hosts when they are shedding leaves. The adults swarm around the plant as they prepare to search for an evergreen host.</p> <p>Ash whitefly breeds on a range of ornamental hosts including ash species, crepe myrtle, privet, magnolia, buckthorn and hawthorn and on fruiting plants including pomegranate, olive, apricot, peach, pear, Japanese plum, apple, citrus and quince. The pest can also infest other small tree and shrub species when populations are high.</p>	<ul style="list-style-type: none"> <li>▪ <b>Prevention</b> <ul style="list-style-type: none"> <li>- Avoid purchase/transport of infested stock. Note that Ash whitefly can be moved on plants from infested areas and can also be moved accidentally in vehicles and on clothes.</li> </ul> </li> <li>▪ <b>Control</b> <ul style="list-style-type: none"> <li>- Pending registration of chemicals for control, should be similar to control for other sap-suckers.</li> <li>- Probable: Small trees – spray with systemic insecticide such as Confidor™, Rogor™, and similar. Micro-injection into stem, or soil injection, with imidacloprid on larger trees. Crown-spraying of mature trees subject to granting of special licence from NSW DPI. Note that soil injection and crown spraying will also kill beneficial organisms.</li> <li>- The pest can be suppressed through the introduction of its natural enemies such as Encarsia inaron. Ash whitefly has been brought completely under control in the USA through the use of this parasite.</li> <li>- (Main source: Queensland Department of Agriculture &amp; Fisheries)</li> </ul> </li> </ul>	<ul style="list-style-type: none"> <li>▪ Ensure all material is chipped promptly.</li> <li>▪ Where practical hose vehicles off before leaving site</li> <li>▪ Transport material in covered vehicle.</li> <li>▪ Ensure all equipment, clothing, tools and vehicles are washed or cleaned before moving to other areas.</li> <li>▪ Report to Council immediately.</li> </ul>

INSECT PESTS IN AUSTRALIA – NOT REPORTED IN NEWCASTLE				
Common Name	Scientific Name	Comment	NCC Control potential controls	Hygiene requirements for all works
		<p>Ash whitefly has shown a preference for a temperate climate and temperate species of plants.</p> <p>Heavy infestations lead to premature leaf drop, wilting and smaller fruit. Whitefly infestations produce large quantities of honeydew on which black sooty mould grows. Damage includes loss of fruit and, at times, tree death.</p> <p>When the pest was first introduced to California in the United States without its natural enemies, it caused a significant amount of unsightly damage to ornamental trees in the urban landscape. Street inventories in 14 cities in California recorded 17% of trees affected.</p>		

## References

Armillaria root rot - <https://www.rbgsyd.nsw.gov.au/Plants/Pests-Diseases/Armillaria-Root-Rot>

Sudden Oak Death - **The impact of diseases of trees in the urban landscape, Brett Summerell, Royal Botanic Gardens and Domain Trust Mrs Macquaries Rd, Sydney, New South Wales, 2000. (PDF on server)**

Sudden Oak Death - <http://www.forestry.gov.uk/pramorom>

Pitch Canker of Pine - **The impact of diseases of trees in the urban landscape. Brett Summerell, Royal Botanic Gardens and Domain Trust Mrs Macquaries Rd, Sydney, New South Wales, 2000. (PDF on server)**

Pitch Canker of Pine - <http://www.agriculture.gov.au/pests-diseases-weeds/plant/quarantine/pine-pitch-canker>

Myrtle Rust - <http://www.dpi.nsw.gov.au/content/biosecurity/plant/myrtle-rust>

Myrtle Rust/Eucalyptus Rust control strategies, NSW Department of Primary Industries - <http://www.dpi.nsw.gov.au/biosecurity/plant/established-plant-pests-and-diseases/myrtle-rust>

Threat abatement plan for disease in natural ecosystems caused by Phytophthora cinnamomi - <https://www.environment.gov.au/system/files/resources/bad95d05-3741-4db3-8946-975155559efb/files/threat-abatement-plan-disease-natural-ecosystems-caused-phytophthora-cinnamomi.pdf>

Fire Blight - <http://utahpests.usu.edu/IPM/htm/fruits/fruit-insect-disease/fire-blight>

General biosecurity - Biosecurity for Arborists - <http://www.forestry.gov.uk/forestry/BEEH-A6TGQ7>

Ganoderma applanatum - <https://www.rbgsyd.nsw.gov.au/Plants/Pests-Diseases/Ganoderma>

Cypress Canker - <https://www.rbgsyd.nsw.gov.au/Plants/Pests-Diseases/Cypress-Canker>

Puccinia psidii - a threat to the Australian environment and economy – a review  
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Guava Rust - <http://www.agriculture.gov.au/pests-diseases-weeds/plant/guava-eucalyptus-rust>

Powdery mildew - <http://ccmg.ucanr.edu/files/123752.pdf> (not a great website) and [http://www.clemson.edu/extension/hgic/pests/plant\\_pests/trees/hgic2002.html](http://www.clemson.edu/extension/hgic/pests/plant_pests/trees/hgic2002.html)

Plane Anthracnose - <http://www.elmsavers.com.au/factsheet/pests-and-diseases/plane-tree-anthrachnose> and <https://www.rhs.org.uk/Advice/Profile?PID=694>;  
<http://www.metrotrees.com.au/disease-problems-in-the-genus-platanus/>

NSW Department of Primary Industry plant biosecurity - <http://www.dpi.nsw.gov.au/biosecurity/plant>

Botryosphaeria parva - [https://www.csu.edu.au/\\_data/assets/pdf\\_file/0004/455197/NWGIC-fs4-botdieback.pdf](https://www.csu.edu.au/_data/assets/pdf_file/0004/455197/NWGIC-fs4-botdieback.pdf)

Ash White Fly: Queensland Department of Agriculture & Fisheries - <https://www.daf.qld.gov.au/plants/health-pests-diseases/a-z-significant/ash-whitefly> )

**Other useful websites:**

Chemicals & Pesticides: NSW Environment Protection Agency - <http://www.epa.nsw.gov.au/pesticides/index.htm>

Biosecurity: NSW Department of Primary Industries - <http://www.dpi.nsw.gov.au/biosecurity>

Queensland Government Department of Agriculture & Fisheries - <https://www.daf.qld.gov.au>

Australian Government Department of Agriculture - <http://www.agriculture.gov.au>

Australian Government Department of Environment & Energy - <https://www.environment.gov.au>

Plant Health Australia - <http://www.planthealthaustralia.com.au/>

The NGIA biosecurity plan for Sudden Oak Death - [https://www.ngia.com.au/Category?Action=View&Category\\_id=497](https://www.ngia.com.au/Category?Action=View&Category_id=497)