

## **ADELAIDE'S STREET TREES: PAST, PRESENT AND FUTURE**

**Lorraine Oldrey** - Corporation of the City of Adelaide

The City of Adelaide was first surveyed in 1837 and the first City Council elected in 1840, however following a troubled start it was not until 1849 that the City Corporation was re-established

We do not know where or when the first street trees were planted in Adelaide, but early documentation would indicate that tree planting may have been experimented with from around 1870.

The City of Adelaide, which at its highest point is 54 metres above sea level, has 115 kilometres of roadway (excluding Park Land roads) of which approximately 50% are planted with street trees.

A recent street tree audit indicated that we have over:-

- 6,000 street trees
- 60 tree varieties
- 183 significant trees (circumference of 2.00m or greater 1 m above ground level)
- 560 trees with a circumference between 1.5m and 1.99m

Tree planting effected prior to 1940 included tree varieties such as:-

- *Platanus orientalis*
- *Ulmus procera*
- *Fraxinus oxycarpa*
- *Robinia pseudoacacia*
- *Ficus macrophylla*
- *Celtis occidentalis*
- *Melia azedarach*;
- *Jacaranda mimosaeifolia*; and
- *Olea europaea*

These trees now predominantly exist in our wider east-west residential streets such as Archer Street and Gover Street in North Adelaide and Gilles Street and Halifax Street in Adelaide. However Frome Road one of our best known avenues was planted in 1902 as an Arbour Day planting.

It is interesting to note that in the late 1800's the City Gardener questioned the appropriateness of planting *Platanus* in Adelaide's streets as it appeared to be intolerant of our weather conditions. Yet today this tree has undoubtedly proven itself extremely tolerant of drought and pollutants whilst withstanding the abuse of trenching and severe pruning.

It was not until the 1970's and 1980's that a further major tree planting programme was undertaken when it was sought to complete the planting of all east-west streets along with the minor north south streets where footpath width and underground services permitted.

During this period trees planted included:-

- *Betula pendula*
- *Callistemon* sps
- *Celtis australis*
- *Celtis laevigata*
- *Eucalyptus erythrocorys*
- *Eucalyptus torquata*
- *Eucalyptus spathulata*
- *Hibiscus syriacus arden*
- *Hymenosporum flavum*
- *Koelreuteria paniculata*
- *Lophostemon conferta*
- *Podocarpus elatus*
- *Pyrus calleryana*
- *Sophora japonica*

Whilst more recently we have planted:-

- *Angophora costata*
- *Celtis tournefortii*
- *Ginkgo biloba*
- *Lagerstroemia indica* x *L. fauriei* 'Biloxi', 'Sioux' and Tuscarora
- *Pyrus calleryana* 'Chanticleer', Red Spire' and 'Bradford'
- *Pyrus ussuriensis*
- *Robinia pseudoacacia* 'Frisia'
- *Ulmus angustifolia* 'Cornubiensis'
- *Washingtonia filifera*

Other trees to be found in our streets include but are not limited to:-

- *Brachychiton populneus*
- *Brachychiton rupestris*
- *Citrus* sps
- *Corymbia citriodora*
- *Ficus macrophylla*
- *Malus* sps

Earlier this year Council undertook a street tree audit. Data from this survey is currently being checked and evaluated and will be up loaded to our Asset Management System (Hansen) in the near future.

Data collected included tree location, specie, observed tree maturity, tree condition, tree protection, tree base treatment, overhead wires, if located within one metre of a cross over and if the tree had street lights, signage or banners within its canopy, pruned to standard. This information will be further supplemented by additional information relating to known planting dates, what trees were originally planted and any other known data.

The grading criteria used for the tree condition was:-

<i>Grade</i>	<i>Condition</i>	<i>General Meaning</i>
<b>0</b>	Non-existent	Asset absent or no longer exists
<b>1</b>	Excellent	Healthy tree in correct shape for species and location. Well maintained with no significant defects and no evidence of deterioration. <b><i>No work required</i></b>
<b>2</b>	Good	As grade 1 but showing slight defects and deterioration eg <5%-10% bark damage, <10% deadwood, but no dead branches. Needs to be reinspected in 2-3 years. Deterioration has no significant impact on health, safety and appearance of the tree. <b><i>Only minor work required</i></b>
<b>3</b>	Average	Tree generally sound but appearance affected by minor defects eg vandalism, 5-10% bark damage, 10-15% deadwood, inappropriate shape, some rubbing and dead branches but no safety risk. Some deterioration beginning to affect the health, safety and appearance of the tree. <b><i>Some work required</i></b>
<b>4</b>	Poor	Tree has significant defects eg 10-15% bark damage, 15-25% deadwood, broken branches, some rot and disease, poor shape and up to 5% dead or rubbing branches, likely to cause a marked deterioration in appearance, health and safety of the tree within 1 year. <b><i>Some replacement / rejuvenation needed within 1 year</i></b>
<b>5</b>	Very Poor	Unhealthy tree with serious defects and has died or is about to die in the near future eg >15% bark damage, >25% deadwood, >5% dead branches, significant disease and rot resulting in unacceptable appearance, health and safety. <b><i>Urgent replacement/ rejuvenation required</i></b>

A quick evaluation of the data to date indicates:-

Observed tree age

- 24% juvenile
- 25% semi-mature
- 44% mature
- 7% senescent

Tree condition

- 70% of the trees were considered in above average condition
- 27% average; and
- 3% below average

However

- 20% of our trees either have evidence of injuries or health problems
- mature trees considered to be in above average condition are dominated by *Platanus orientalis*, *Celtis occidentalis* and *Fraxinus oxycarpa*
- *Fraxinus oxycarpa*, *Celtis occidentalis* and *Koelreuteria paniculate* dominant the senescent trees in below average condition and the majority of these trees are located in North Adelaide

Street trees within Adelaide face an extremely tough time in addition to the usual issues:-

- the footpaths are often very narrow often without a nature strip or adjoining private garden
- the root zone is often composed of foreign material
- a recent trench excavation in Frome Road exposed old fill consisting of broken bottles and pottery etc.
  - proximity of kerb to tree and continually widening carriageways, resulting in the trees upper trunk protruding over the carriageway below the required clearance
  - high density residential development with its associated narrow street frontages, crossovers, service infrastructure and street signage
  - old infrastructure (gas, water, sewer)
- the trees in Frome Road was severely affected by numerous gas leaks associated with old infrastructure. Luckily the SA Gas Company (Origin Energy), recognising the importance of this planting, was able to abandon the pipe in question and use another one
  - major event infrastructure
- many large events are hosted within our streets which require the erection of spectator stands, footpath barricades, overhead wiring and speakers etc.

Other issues facing Council are:-

- authorities trenching too close to the tree trunks
- this is of particular concern for the long term stability and health of the trees
  - bus zones – especially articulated and wheelchair accessible buses where proximity to kerb is critical and vehicle intrusion over kerb is greater
  - construction methods and site access issues for larger developments – cranes, hoardings, site offices etc.
  - construction methods of older buildings
- many of Adelaide's older buildings were constructed on bluestone strip footings which are highly prone to movement
  - complaints regarding roots intruding into private gardens and shading there off
  - alleged structural damage to adjoining buildings, bluestone strip footings etc.

- it is interesting to note that in many of root barrier excavations where root damage has been alleged we have only exposed fine root growth
  - street lighting – canopy growth restricts throw of light for both pedestrians and vehicles
  - bud lights and trees grates
- maintenance issues, wiring and fixings embedded in growth
  - Ash whitefly and termites
- Adelaide’s Mediterranean summers provide an ideal climate for Ash Whitefly to thrive. However the degree of infestation can be a major inconvenience to residents and businesses alike. Two summers ago an Australian Post delivery man raised this pest as an OH&SW issue.
  - reduced soil moisture levels
- movement of underground moisture has been modified by building construction and in recent times reduced summer rainfall
  - success of infill plantings particularly in well established tree boulevards
- Growth of replacement plantings is slow and difficult for example in Frome Road
  - inappropriate trees originally planted either by Council or resident
- trees should be removed and not replanted due to high risk of structural damage or extremely narrow footpaths but residents object to loss of trees
  - developers perspectives
- Many developers advertise residential developments showing associated street tree planting which Council cannot effect. This creates a false impression and potential conflict with new residents seeking to have tree planting effected as they were advised that the trees would be planted.

Another issue regularly brought to our attention is asthma, particularly with respect to tree pollen. Whilst we acknowledge the health issues associated with this condition, there are many triggers within Adelaide that are known to be problematic with respect to pollen including Kikuyu (which is planted throughout our Park Lands and streets) and Acacia sps, Olea sps, Fraxinus sps, Betula sps, Cupressus sps, Platanus sps, Pinus sps and downy mildew (regularly found on our Plane trees)

Given this wide range of possible triggers for both asthma and seasonal allergic reactions and the distance that pollens and spores can easily travel it is extremely difficult to justify the removal of any street tree particularly where it is planted as part of an avenue at a resident’s request.

Over the years we have excluded trees from our planting list and these include:-

- Callistemon sps – extremely difficult to get required clearances for pedestrians and vehicles, numerous complaints related to flower drop.
- Calodendrum capense – too slow, extremely difficult to get stock of a larger size
- Cercis siliquastrum – irregular growth habit makes it extremely difficult to get required clearances for pedestrians and vehicles
- Eucalyptus sps –, irregular growth habit, desiccation of adjoining road surfaces, upheaval of water tables and footpath
- Fraxinus oxycarpa – intrusive roots, surface rooting

- *Koelreuteria paniculata* – generally does not perform well unless regular water can be provided, short lived
- *Lophostemon conferta*– surface rooting, fruit size
- *Melia azedarach* – fruit drop
- *Pyrus calleryana* – excessive fruit set which stains car duco and carpets, leaf spurs like thorns
- *Podocarpus elatus* - tree generally does not respond well to pruning, heavy fruit drop
- *Robinia pseudoacacia* ‘Frisia’ – we have planted these trees in a street where the residents maintain nature strip verges and they have grown well however as they age they tend to sucker and the wood is fragile.
- *Tilia cordata* – trial plantings in streets did not perform well, also exudes a secretion that is sticky onto adjoining surfaces
- *Ulmus procera* -

Trees that we are watching closely, specifically with respect to fruit drop, include:-

- *Pyrus* sps, with exception of *Pyrus ussuriensis*, we are concerned that these trees have the potential to become prolific fruit setters
- *Ginkgo biloba* – these trees have performed extremely well provided they receive sufficient water in the first two summers, and residents resist the temptation to plant at their bases. However, are they all male – only time will tell.
- *Gleditsia* sps –. performs well if planted at a larger size, if planted too small the weepy young growth is prone to vandalism, however these trees can set a prolific amount of seed which when dropped onto the footpath can be extremely slippery
- *Sophora* - performs well if planted at a larger size but also can set a prolific amount of seed which when dropped onto the footpath can be extremely slippery. We have also recently received complaints that the seeds/pods are staining carpets when carried in on shoes; and
- Ash Whitefly hosts - this insect has been found on many street trees including *Fraxinus* sps, *Hymenosporum flavum*, *Lagerstroemia indica*, *Pyrus* sps and *Citrus* spp.

We are watching with interest:-

- *Lagerstroemia* sps – new varieties – formative pruning is critical to ensure a well shaped trees, we will be looking at their susceptibility to Ash Whitefly
- *Celtis tournefortii*
- *Malus* standards

Recent star performers have been:-

- *Pyrus ussuriensis* – we have trees over 10 years in age and to date apart from an isolated small pear they have not set fruit.
- *Celtis laevigata* – fast growing, drought tolerant, forgiving of abuse including pruning and trenching

When considering a new street tree specie which we haven't used before or do not know we endeavour to speak with people who have experience with the tree. We are particularly concerned with the potential fruiting habit. That is the quantity of fruit set and the nature of the fruit when dropped to the footpath. However we also need to know about its response to both formative and clearance pruning and its propensity to lift adjoining paved surfaces.

The recent street tree audit will provide a clear insight into the many management issues currently facing Council. From this data it is envisaged that a street tree management plan will be developed addressing both the nominated replacement tree, maintenance regimes for specific streets and also long term replacement proposals.

We will also be developing operational guidelines

- for the installation and maintenance of bud lights; and
- the installation of root barriers

We shall also continue to seek innovative solutions to enable tree planting to occur where presently we cannot, including the use of root paths, structural soils, root barriers and underground service protection