# URBAN FOREST: RISK STARTED THE BALL ROLLING – SO WHAT WILL SUSTAIN IT?

Philip Hewett
City Arborist, City of Newcastle NSW

## Introduction

My 2003 essay, 'As We Think - So We Manage', considered how influential language was in shaping response to tree-infrastructure interactions. For government, insurers, utilities and many 'asphalt-hardened' engineers, tree removal was the first rather than the last consideration. In the words of architect and author Robin Boyd this was 'clearing the decks for action'.

I suggested that decisions based on 'short-term economic expediency' had become the *modus-operandi* in considering options for managing trees in rapidly changing urban environs characterised by even more concrete, glass and asphalt.

Today's essay looks at the passage of tree management from 2003 to 2009 with the New South Wales city of Newcastle as a point of reference.

It is widely acknowledged that there are major financial shortfalls with implications for the sustainability of Councils across Australia struggling with the costs of maintaining and renewing their built infrastructure. This has implications for the future of 'green infrastructure' i.e. street and park trees, creeks and bushland in urban areas.

Infrastructure traditionally refers to built assets like roads, bridges, and stormwater constructions such as drains and culverts. It has not included natural resources such as trees, creeks and wetlands. Since the natural resources managed by local government are in the main not defined or managed as assets, then many councils will find it extremely difficult to secure the finance and resources needed to maintain, let alone 'renew', their green infrastructure.

Communities, corporate and business interests, officials and elected representatives must be brought 'up to speed' on the fundamental contributions of 'green infrastructure'. There can be no urban sustainability without adequate, healthy and managed natural assets. No amount of road building, footpath construction, pipe laying and cable stringing will sustain cities in the long term if the underpinning natural resources are not in the equation. For natural resource managers and advocates the task is not only to improve mainstream understanding of urban trees, creeks and bushland, but also to quantify the contributions of these priceless assets to our ecological and financial sustainability.

## As We Think - So We Manage: Risk management as the 2003 focus

The phrase 'as we think - so we manage' encapsulates the way language influences responses to risk and tree management. Determinations on trees were and still are framed around the urban tree as a cost and risk centre, with tree removal resolving that risk and providing a cost benefit. In the absence of quantified tree benefits the costs of trees remains the foundation for decisions.

That death or even serious injury by trees is rare fails to mitigate the widely held view that large trees are 'dangerous'. The myth that trees are sentient beings that have intentions such as 'seeking' and 'invading' pipes is deeply ingrained. Some utilities and commercial enterprises reinforce these myths in order to gain work or support for the policies that remove trees and prevent replanting as a cost cutting exercise.

My 2003 essay also discussed the State Wide Insurance Best Practice trees and tree roots manual that Judy Fakes and I revised. The State Wide framework and the revised trees and tree roots manual were important drivers for Newcastle's pilot tree information and management system.

## From 2003 to 2009: The emergence of asset management

Asset management was in its infancy in local government in 2003. But since then Newcastle has made a quantum leap by acknowledging and incorporating natural resources as an asset group in

their own right. By 2007 the Council had adopted an urban forest policy and had started to develop a systematic, proactive approach to managing the public tree resource.

The inclusion of street and park trees in the city assets portfolio and the adoption of the Urban Forest policy are the foundations on which tree asset management is now being built. Today's conversation is about canopy benefits and on how to define and sustain an optimal canopy through time. There is discussion not only about the cost of maintaining existing public tree assets, but also about the costs of canopy renewal. Since trees are now acknowledged assets, there is a need for a tree asset management plan. Once again we are set to move into uncharted territory!

The systematic renewal or 'rotation' of the urban tree canopy has been absent from municipal conversation until very recently, despite cities and municipalities nationwide facing the renewal costs of two or more generational cohorts of cultivated trees. Couple this scenario with aging and declining built infrastructure systems, and it becomes obvious that the need to secure resources and funding is at a critical point.

Newcastle Council crossed an important threshold in 2006-2007 when it formally acknowledged natural resources as an asset group in their own right. Few councils have taken this step to date but they will need to do so as they travel the path to financial sustainability.

I will try now to outline why this occurred at Newcastle. Council committed funds in its 2005 Management Plan to develop an urban forest policy and city greening project. Ian McKenzie, a Newcastle City Councillor (Greens) was the main political support for the project. I was seconded as Project Co-coordinator under direction of a control group of Group Managers from three Council departments. A working group, comprising three Service Managers and I, thus launched into an uncharted policy domain.

Towards the end of 2005, we ran a series of facilitated workshops to sensitise Councillors, senior management, staff and community to the concept of urban forest and the practices of urban forestry as they might apply to Newcastle. The workshops expressly canvassed the opinions and aspirations of participants to inform and refine policy development.

By early 2006 we had a first draft for the urban forest background paper, policy and action plan. The framework for action established four key response areas containing key actions as follows:

1.Leadership and direction
- a.Newcastle Greening Plan
- b.Research
- c.State of Environment reporting

2.Managing vegetation assets
- a.Major Assets Preservation Program (MAPP)
- b.Tree maintenance service levels
- c.User pays option
- d.Community land management

3.Guiding activities
- a.LEP framework – vegetation
- b.Tree management policy and technical manuals
- c.Development contributions

4.Partnering with the community
- a.GreenAssist scheme
- b.NeighbourWoods program
- c.Institutional partnerships
- d.Community information and advice

This holistic framework was necessary because of the ubiquitous distribution of the urban tree canopy. Of particular interest to my discussion here, is the recommendation to bring public trees into the Major Assets Preservation Program (action 2a above). Our key response for managing vegetation assets was unequivocal:

> *A programmed asset management approach for all tree and vegetation assets will be implemented through the Major Assets Preservation Program. Supporting information and planning systems will be developed or upgraded, including those relating to asset inventory, inspection, complaints, maintenance scheduling and natural asset accounting.*

At the time that we were developing the urban forest action plan a review had commenced into the financial sustainability of the City Council. The review by Review Today Pty Ltd [(1)] under the direction of Research Director Professor Percy Allan AM, became known within Council as the 'Percy Report'. Terms of reference for the review included an assessment of the state of existing Council infrastructure and an estimate of the cost of fixing existing infrastructure and services.

In a recent interview with Council's Asset Manager, I found that in 2006 Professor Allan did not regard natural resources (e.g. trees) as part of the asset mix under review. However during the early stages of his review, Council management argued strongly and successfully for the inclusion of natural resources.

The argument was essentially pragmatic: street trees and to a lesser degree park trees imposed a cost since they were often the cause of footpath, kerbs and drainage repairs and so they had to be accounted for. They also argued that the community wanted trees to remain part of the city form and therefore trees should be managed in the same way as built assets.

The genesis of the 'trees are assets' argument came in part from the urban forest draft key action for a programmed asset maintenance approach for public trees and vegetation. It was coincidental that the financial sustainability review was being developed after the organisation-wide urban forest workshops had been held. The workshops influenced the framing of the argument for trees as assets.

Unfortunately, senior management at the time removed many of the urban forest working group's draft key actions before putting the final policy to Council. This was not simply a disappointment for the policy team: it was an error of judgment in that it retained the existing non-integrated and diffuse structure that green infrastructure planning and administration had foundered on in the first place.

On a positive note, Council did implement the 'trees as assets' key action, even before the urban forest policy was adopted. At that time, I joined the Asset Management Team developing the tree component of the natural assets program.

Completed in March 2007, the financial sustainability review reported the city's infrastructure backlog at $134 million with a further $630 million of infrastructure renewal in the next 20 years.

The report profiled Newcastle's major asset groups as follows:

- Regional and local roads (including pavements, street lighting, bridges, etc) $552 million
- **Natural assets (eg street and park trees, urban creeks) $127 million**
- Storm water (e.g. pits, pipes, culverts) $460 million
- Buildings and structures (e.g. retaining and river walls, bridges and culverts) $471 million
- Recreational assets (e.g. parks and sports grounds) $6 million
- Cultural assets (e.g. art works and museum exhibits) $69 million

The total replacement value of the city's infrastructure was $1,685 million. From 2007 to 2009 the Asset Management team researched, designed and implemented the Tree Asset Management System (TAMS) as a wholly in-house project. Data collection for the entire street and park tree population was completed in 2008, and the work orders system was finalised in 2009.

The City Wide Maintenance Policy Tree Amendment adopted in 2008, gave Councillors, staff and the community clear direction in dealing with public trees and work requests. The amendment assigned priority to risk management and also to works that extend tree asset life e.g. formative pruning of new trees.

### What happens next?

Recent New South Wales legislation is seeking to change local government financial reporting and asset management. The Integrated Planning and reporting framework and fair value system are driving the state agenda.

The draft *Local Government Amendment Planning and Reporting Bill (2009)* and *Local Government (General) Amendment (Planning and Reporting) Regulation* require all New South Wales local councils to develop a strategic and Sustainable Approach to Asset Management (SAMP).

Future infrastructure funding support will depend on Council plans being implemented. Unfortunately, the legislation is focused on built assets. However, since Newcastle has already incorporated its natural resource base within its asset portfolio it is now well positioned on a path to financial sustainability. (Table1)

Newcastle's inaugural Strategic Asset Management Plan (SAMP) will initially deal with natural assets under a built asset data management framework. This presents some interesting challenges since natural and built assets are fundamentally different. For instance one depreciates, while the other appreciates! The language of asset management is itself a challenge for anyone whose life work has been dealing with natural systems and living things. But that is the challenge ahead - like it or not!

**Table 1: Summary of the Newcastle assets portfolio**

| Built Assets | Natural Assets and Open Space |
|---|---|
| Bridges | Estuaries / creek lines / catchments |
| Roads | Urban trees |
| Drainage | Parks |
| Buildings | Open space |
| Footpaths | Marine coastline / beaches / seawalls |
| Kerbs | Wetlands and bushland |
| Sport and recreation facilities | Riparian zones |

**Table 2: Summary of activities and issues relevant to urban forest management 2003 – 2009**

| | |
|---|---|
| 2003 | **NSW LGA Urban Forest Policy** adopted. |
| 2005 | **Newcastle City Greening and Urban Forest** project. A two-year project under direction of cross-organisation management team. |
| | **Urban forest workshop series**. Facilitated workshops for councillors, senior management, community and business groups, and Council staff. Prompted debate and discussion on urban forest and tree management. |
| 2006 | **Trees (Disputes Between Neighbours) Act (NSW)** Councils exempt from definition of a neighbour. |
| 2007 | **The Newcastle Report: issues for sustainability.** Natural resources included in the review of infrastructure. |
| | **Asset Manager** assumes responsibility for public trees under the Major Asset Preservation Program (MAPP). City Arborist transferred to Asset Management |
| | **Natural Assets coordinator** appointed to Asset Management with responsibility for bushland, stormwater, creeks and street trees. |
| | **Urban Forest Background** paper posted on Council website: details the underpinning for the Urban Forest policy |
| | **Newcastle Urban Forest Policy** adopted |
| | **DCP 4.10 Tree Management** adopted |
| | **Urban Forest Policy** implementation becomes the responsibility of Principal Strategist, New Communities and Green Corridors |
| | **(SEPP) State Environmental Planning Policy (Infrastructure) 2007** (NSW) greater autonomy for works and maintenance for energy, rail, communications, water, education and other entities. Utilities have discretion on tree removal without Council approval. |
| 2008 | **Newcastle City Wide Maintenance Policy - Public Tree Amendment** adopted. Policy assigns work priority to risk and to work that extends tree useful life. Whole-of-life tree maintenance adopted |
| | **Tree Asset Management System (TAMS)** design in-house. Data capture on 103,000 trees and 29,000 potential sites |
| | **TAMS** loaded to corporate mapping system & accessible to all users including Councillors |

| | |
|---|---|
| | **Strategic Asset Management Plan (SAMP)** commenced. Plan aims to guide holistic and sustainable management of natural and built assets in the LGA |
| | **LiDAR capture of Newcastle LGA**. Tree canopy stratified to five height strata. Analysis in progress for canopy cover by precinct, suburb and LGA. Future monitoring to determine changes to canopy cover. |
| 2009 | **Urban Forest Technical Manual** supports DCP and guides public and private works affecting trees |
| | **Draft Street Tree Master Plan** for public exhibition September 2009 |
| | **TAMS data analysis** in progress as basis for Tree Asset Management Plan |
| | **Council sustainability review and organisational restructure** commenced. Major changes to structure and all levels of management |
| | **Street tree marketing & publicity campaign** designed. To commence February 2010 |
| | **Trees (Disputes Between Neighbours) Act 2006 (NSW)** Government review commenced. Councils may be defined as a 'neighbour' |
| | **Draft Local Government Amendment Planning and Reporting Bill (2009)** (**NSW)** and **Local Government (General) Amendment (Planning and Reporting) Regulation.** All Councils to develop a strategic and sustainable approach to Asset Management (AM). Future infrastructure funding from government depends on plans being implemented. |
| | **National Broadband Network**. Roll out of fibre-optic cables by in-ground or attached to power poles, creating significant implications for street trees |
| | **Widespread uptake of Wi-Fi** technology. Implications emerging for signal interference from trees |
| | **Solar panel installations**. Federal subsidy program. Conflicts emerging with shade from public and private trees |
| | **Solar powered school speed warning signs**. Conflicts emerging from tree shade. |

### Research rings alarm bells for backyards and private trees

Queensland's Griffith University investigated the disappearance of backyards (and trees) from new subdivision housing in Australia. It found that the traditional 30-40% plot coverage had increased to 50-60% resulting in the elimination of private backyards. The research suggested that the pursuit of large floor space as a financial investment took precedence over lifestyle choices. The new housing is characteristically single story, deep plan on slab.

The study pointed to planning controls as a driver and raised questions about the social and environmental costs from the loss of backyard space and trees. With the exception of Adelaide, all other Australian cities were found to have allowed large footprint housing on small allotments and as a result the once traditional backyard has almost completely disappeared.

The loss of private garden space (and canopy trees) has implications not only for community health, and especially for children's health and development, but also increases the cost of storm-water management, air quality management, biodiversity, and energy conservation.

The public domain component of new housing subdivisions is characterised by narrowed roads; roll over kerbs, and gaping 'stencil-crete' driveways consuming space once given to street trees.

The development style described above is increasingly popular. An extract from an article published in the Sydney Morning Herald in July 2009 is revealing:

> *V.L, 30, this week became the third resident of the first release of land, Banksia Rise, after paying $483,000 for a four-bedroom house with her partner B.F. The 1½-hour commute to the city to work as a legal secretary was a concern, she said, but "we were willing to travel to get our foot in the door". "We bought new because under the first-home owners grant you got more [if you bought new]." Department of Planning figures show new building on the city's fringe this financial year making up just under 20 per cent of all construction, compared with 10 per cent in 2005-06. Cornish Group, a developer, says turnover is 10 times that seen last year. A hillside of new homes has sprung up accordingly.*

## The Urban Heat Island: Western Sydney in the spotlight

Greening Australia [4] examined temperature records and reports a strong Urban Heat Island Effect in western Sydney, which, unlike coastal suburbs, does not receive the moderating influence of a cooling sea breeze. The examination found:

- Over the past 40 years all western Sydney weather stations had experienced a rise in annual temperatures over and above what would be expected through global warming
- The gap between coastal Sydney temperatures and western Sydney temperatures had widened.
- The number of extreme temperature events had risen dramatically

Greening Australia proposed a number of actions to mitigate the observed UHI effect:

- Increasing tree cover as street trees, in backyards and as broad scale revegetation
- Using light colored roofs instead of dark colored
- Minimise energy use: especially at peak periods (e.g. through solar hot water systems)

The GA recommended actions highlight some interesting dilemmas. Firstly, existing and new subdivision roads are not designed to accommodate the sort of shade trees required to cool anthropogenic surfaces without conflicting with pavement and a plethora of utilities at maturity. Secondly, shade trees will conflict with solar panels. This is already driving pressure for tree removals in established urban areas and will suppress new planting in the suburbs. Thirdly, new homes have no gardens and thus no backyards in which to plant trees.

We cannot rely on planting street trees or backyard trees to retrofit shade because decades of non-integrated urban planning and poor design means there is no space available. There are solutions, but they will not be palatable at least not until a crisis point is reached in the future.

Authorities could, for instance, enact planning controls to cap building footprints at 35% of allotment area and allow a second storey for those desirous of greater floor space. We could re-design suburban streets to be pedestrian-centric thoroughfares that permit vehicles on pedestrian terms. We could narrow road pavement (and save on asphalt and energy costs), plant potentially large crowned shade trees in sub-surface vaults, and redirect storm-water to benefit the trees – we could even insist that utilities design their ubiquitous and fragile infrastructure so that it accommodates rather than excludes green infrastructure in future. We could even give part of our redesigned streets over to resident initiated horticulture and agriculture production.

Unfortunately, by any standards these ideas appear radical since they challenge the nation's egocentric obsession with private transport. To be successfully implemented, there would also need to be a change of approach from the utilities sector away from dictating, and more towards serving the community.

On a positive note, it is good to hear that Australian health authorities are about to engage in the 'green infrastructure' debate, bringing research supporting substantive health improvements from green infrastructure into being, in particular creating healthy parks.

## Is Asset Management the best way for street trees?

The answer is unequivocally 'yes'. The following is illustrative: *"Whose *%$#&^* idea was it to make trees assets?"* This came from a road maintenance coordinator confronted with the responsibility to consult with the trees coordinator before resurfacing a Council car park where trees had dislodged 'his' kerbs. Herein is evidence of the importance of public trees being part of the assets portfolio.

When public trees are managed as assets they gain stature, identification and a recorded work history. Assets get consideration notwithstanding the personal views of those who disagree with their existence. It does not matter whether the asset is a road, culvert, creek or tree. Arbitrary and expedient tree removal or injury is no longer acceptable since it degrades the asset base and imposes avoidable costs.

## Today's asset design decisions warrant careful forethought

Today's decisions will shape the cities of the future: the cities and suburbs in which today's children will make their homes and raise families. A seemingly uneventful exchange of views and a resolution about street dimensions in Newcastle in 1913 has had a profound influence on the city's trees 96 years later.

Colonial architect and town planner (Sir) John Sulman [(2)] (1849-1934) designed the Hamilton Garden Suburb[(3)] in 1913 for the Australian Agricultural Company, proposing a 20ft nature strips on either side of a 60ft carriageway.

The nature strip was to be 20ft with the footpath 16ft with trees planted 4ft from road edge. The trees were to be spaced 33ft apart. Colonel Charles Ranclaud from the AA Company replied to Sulman on 3rd of March 1913 questioning the footpath width:

> *Thanks for your of 26th Ultimo.....We note proposals as to the 100ft avenues, but also that you show a 16ft footpath an a 66ft street. We trust this is not a material point to the new design as the local custom is 12ft footpaths and local Councils might demur at an alteration.*

Sulman replied on 4 March 1913,

> *Your favour of the 3rd just to hand. As regards the 16ft footpath and 66ft street, I am quite aware that it is not the usual custom, which is 12ft, but the sooner the latter is abandoned, the better I think it would be for both the Councils and the public: for the Councils because it would save in metalling if the street is to be metalled all over, and for the public because it reduces dust, and for both because it permits of the planting of trees at any time in a suitable position, whereas 12ft does not. . . . . .A 34ft roadway is ample for any traffic that the ordinary 66ft subdivision road is likely to carry. If, however, it is likely to have considerable traffic (like Hunter Street) then no doubt a 12ft footpath is preferable, but in that case the planting of trees should be definitely abandoned for all time.*

## Planting of trees 'Abandoned for all time'!

If the AA Co had accepted the Sulman's advice Newcastle might not be so burdened with extensive and costly pavement and structural damage and the impending removal of much of its iconic arboreal heritage

Despite the AA Co view, Newcastle residents still wanted the shade and amenity of street trees and they and their Councils (there were 9 small Councils at the time) planted thousands of trees in the new, narrow footways. Two main planting eras in the 1930's and 1980's followed. Most of the trees now need to be replaced because Council can no longer sustain the level of claims for infrastructure and drainage problems resulting from the lack of root space.

### Are there any lessons here?

YES. It is important for public trees to be acknowledged and managed as infrastructure assets.
YES. Space will only be considered worthy of assigning to urban trees if the true benefits of tree canopies are fully quantified, for which research is critically needed.
YES. Urban forestry integrated in the city assets, planning and operational systems is the most promising approach to sustaining the benefits of tree canopies in the increasingly dense cities of the future.

### Sources

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