Update on the development of a tree inventory at Hume City Council

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Development of a tree inventory can be as simple as a list of trees at a location it may be a park or street to a fully GIS based inventory of a City's tree assets, including risk assessments, GPS locations and allocated work histories. The work involved in the latter is substantial, but the benefits are many and worth the effort.

In 2005 Hume City Council recognised the need to establish a comprehensive street tree inventory now known at the Hume Tree Management System (HTMS). This process began with the formation of a trial inventory encompassing the suburb of Greenvale in Melbourne's north. The trial enabled council to test the data collection method, evaluate the data collection parameters and establish that the data being collected met the risk management and operational objective of council, before gathering data on hundreds of thousands of trees.

Hume City Council is a growth council in Melbourne's north with 148,000 trees mapped, risk assessed and works identified. The tasks from the outset seemed large and having done 1 ½ laps of the city the Hume Tree Management Team (HTMT) have learnt a lot and the HTMS has moved on from primarily being used as a risk management tool and now is being used for strategic management and forecast of long term future management requirements of our urban forest. The HTMS and accompanied auditing program allows for the effective allocation of tree management priorities, resource allocation and has proven to be an effective monitoring tool for the success of our proactive tree management program i.e. formative/structural pruning programs, targeted removal and renewal of inappropriate or problematic tree avenues, regulated area assessment program.

The HTMS and accompanied auditing program allows for the effective allocation of tree management priorities and resources allocation. It is a useful tool as Hume City Council is able to measure the success of our proactive tree management program i.e. formative/structural pruning programs, targeted removal and renewal of inappropriate or problematic tree avenues, regulated area assessment program.

The Hume Tree Management Team manage a large number of young trees with more than 5000 planted each year over the past eight years and around 5000-10,000 planted through urban development activities each year. To ensure their successful establishment and reduce the likelihood of structural defects forming in Hume's future tree stocks, a very specific tree establishment program has been established. Every tree planted within this program receives establishment watering, mulch & weed management for the first 2-3 years; at years 2, 4, and 6 canopy lifting and formatively prune occurs to manage any issues out of our trees before they get too big and expensive to undertake. The HTMS plays an important role in monitoring and management of the council's program, logging all works as they occur.

HTMS is used to record vacant planting sites, which are used operationally in planning for the annual planting program, to establish planting opportunities, forecasting number and species for ordering and establishing defined characters of an area from a desk top analysis rather than field investigations. In addition an analysis of the HTMS and power line data is undertaken to highlight problem tree/avenues associated with power line assets to flag areas for investigation for the targeted tree renewal program. This process has enabled the removal of and orderly process of replacement of high risk and problematic avenues throughout the City leading to significant reductions in line clearance pruning and reactive works requests.

All tree activities are recorded in the HTMS from inspections, resident requests, pruning, removals, planting and vacant sites. The HTMS is building a valuable special data set and documentary history on trees managed by the Hume City Council which enables valuable strategic analyses of the tree population and/or species to be undertaken.

A full HTMS update which entails the auditing of every tree in the HTMS is undertaken every four years in a rotating cycle throughout four zones within the municipality and a regulated areas audit is undertaken every year to assess high risk trees i.e. tree under power assets, associated with high risk targets including

playgrounds, kindergartens, child care facilities, public buildings, high use paths etc. These audit updates provide new priority work to be completed, the challenge is to interpret these priorities and develop work flows that enable best value outcomes while managing the risks and public expectations within the available resources.

Some residents don't understand why council may only prune two trees in a street and often pose the question why did you not prune mine? In most instances it does not require work otherwise it would have been picked up in the annual audit or the four yearly update and works programme. Hume City Council with the aid of the HTMS has moved more to a risk based approach to tree management whereby resources are specifically targeted to the highest risks rather than a scatter gun approach. Strategically this information within our inventory is an untapped gold mine, add our resident requests, call out data, insurance claims and weather data information then the analysis and interpretation is almost endless.

Some very interesting information can be extracted like:

- When do we get the most resident requests, what month of the year?
- When is the windiest month for our city?
- When do most of our trees fail?
- How many requests for help do we get from storm events and at what speed of wind?
- When do people request tree planting?
- Which trees do residents report to prune the most?
- Which species have cost council the most by pruning or insurance claims? How well represented are they in the tree population?

When you spatially analyse all this data against an inventory you can find out some amazing facts.

Whilst having an inventory is great, it creates many challenges to a council or organisation and requires commitment and dedication on an ongoing basis to keep it current and relevant. It is not something to be taken lightly, a lot of time, effort, and blood, sweat and tears are required. The needs to better manage trees in a city are obvious but having adequate resources, both staff and budget, can be a challenge. You really need a champion to drive the program and commit recurrent funds to keep the data updated. The data to be collected is critical and needs to reflect the management challenge of the council or area the inventory is to be used in. Who will collect the data? Should we use in-house resources or contract it out? Hume City Council decided to buy in expertise and contract the work out and commit funds to keep the inventory updated. Working together with our consultant Council has developed, agreed data collection definitions that clearly articulates how council wanted to collect the information and standards to be adhered to.

In the first case we have simply collected all street trees and reserve trees using the data site (Table 1).

TREE DATA COLLECTION ATTRIBUTES		
TITLE	**DATA TO BE COLLECTED**	
UNIQUE ID		
GPS CO-ORDS	N & E AMG COORDINATES	
GENUS/SPECIES		
HEIGHT	METRES ESTIMATED	
DBH RANGE	0-30, 30-60, 60+ CM	MENU LIST
TREE AGE	YOUNG, SEMI MATURE, MATURE	MENU LIST
TREE HEALTH	GOOD, FAIR, POOR, VERY POOR, DEAD	MENU LIST
TREE STRUCTURE	GOOD, FAIR, POOR, VERY POOR, FAILED	MENU LIST
USEFUL LIFE EXPECTANCY	Unsafe or zero years, less than 5, 5 to 10, 10 to 20, 20+	MENU LIST

TREE DATA COLLECTION ATTRIBUTES		
TITLE	**DATA TO BE COLLECTED**	
RESERVE NAME		CAN BE PUT IN POST DATA COLLECTION
RESERVE / STREET ADDRESS		CAN BE PUT IN POST DATA COLLECTION
WORKS REQUIRED	REMOVAL, FORMATIVE PRUNING, STRUCTURAL PRUNING, WEIGHT REDUCTION, DEADWOOD REMOVAL, LV WIRE CLEARANCE, HV WIRE CLEARANCE, CANOPY LIFT, VISIBILITY CLEARANCE PRUNING, REMOVE CODOMINANTS, AERIAL INSPECTION,	MENU LIST
RISK SCORE	TO BE CALCULATED FROM THE 5 FIELDS BELOW	CALCULATED
FAILURE POTENTIAL	NONE = 0, LOW = 1, MODERATE = 2, HIGH = 3, VERY HIGH = 4	MENU LIST
FAILURE SIZE	NONE = 0, 0-15 = 1, 15- 45 = 2, 45-75 = 3, 75+ = 4	MENU LIST
TARGET PRESENCE	NONE = 0, OCCASIONAL = 1, INTERMITTENT = 2, FREQUENT = 3, CONSTANT = 4	MENU LIST
TARGET VALUE	NONE = 0, LOW = 1, MODERATE = 2, HIGH = 3, VERY HIGH = 4	MENU LIST
DAMAGE PROBABILITY	NONE = 0, LOW = 0.4, MODERATE =0.6, HIGH = 0.8, VERY HIGH = 1	MENU LIST
WORKS PRIORITY	N/A, VERY LOW, LOW, MODERATE, HIGH, URGENT	CALCULATED POST PROCESS OR ASSIGNED IN THE FIELD
PHOTOS FOR TREES IN HIGH SCORE RANGE	TWO PHOTOS OF TREES WITH HIGH RISK SCORES ONE OVERALL SHOT & OTHER SHOWING RISK CONCERN	JPEG'S
PROXIMITY TO STRUCTRES (INCLUDES FENCES, BUILDINGS, PLAYGROUNDS, SEATS OR PICNIC TABLES ROTUNDAS ETC)	< 4 METRES, OR WITHIN 360^{O} FALL ZONE OF TREE OR NO STRUCTURES PRESENT	MENU LIST
INSPECTION DATE	DATE	
INSPECTORS NAME	NAME	MENU LIST

In the six years of operating the HTMS, we are half way through the second lap around the city. Recently a review of system was undertaken brought on by the new Victorian Code of Practice 'Electric Line Clearance 2010'. The results of this review determined that a slightly difference approach was needed.

This resulted in the development of a regulated areas program, where high risk zones were defined and trees in these areas are audited annually. These included playgrounds, high use areas, trees under powerlines & shopping centres, schools and major roads. This audit would only collect identified works such as trees in powerlines, canopy lifts, dead trees, stumps etc for specific trees. All other trees including these would get a full update and reassessment every four years. So one quarter of the city would be reassessed picking up new plantings, tress removed and the works and risk assessment of all trees. This helps keep the inventory current and works flowing into our contractors and staff.

Primarily the HTMS data is collected and collated by external consultants; however resident requests are management by Hume's Tree Management Team though the corporate customer request system and work activities are entered by Park Administration staff.

Development of the Hume Tree Management System HTMS is ongoing and there are still areas that require more work to see the full benefits. Council is committed to a continuous improvement program to keep the software and processes up to date. In the near future the Hume City Council will finalise a mobile computing solution for tree inspections to deal with requests, allowing in the field allocation of works to crews or a contractor. The system will be followed by the development of a crew/contractor module that can update the works completed in the inventory to our customer service system. This would assist in stream lining the current hybrid desktop/paper system that needs to be manually entered in after inspections and works are completed.

The system currently provides very basic reporting and only uses 10% of the potential that the data set could provide. The need for improved reporting tools was a significant finding of the recent review.

Creating dashboards to monitor outstanding works and the timelines associated with them and what workloads crew or contractors may have ahead of them. This information is very powerful in submitting budget requests when you know exactly the work load and what resources you have available.

More detailed analysis would reveal many interesting facts about our urban forest, Hume City Council has over six years of detailed data on tree management within the city and this information would help us understand the real story.

It has been an amazing journey that will continue on now that I have become the Parks and Open Space Manager for the entire department. I will have to forward the responsibility to Graham Dear our new Open Space Coordinator who I know will take it to another level.