

RML Newsletter round-up

MARCH 2015

URBAN TREE RESEARCH – PART 2

How much water does a tree need?

In the first of this series on urban tree planting, I explained that trees can struggle to develop a good root system in engineered urban sites. Without an extensive root system, trees cannot get the water they need. To design better environments for roots, we need to understand how much water a tree needs.

We can think of the water within the soil as lying in a reservoir, refilled by winter rain when the tree's demand is low and emptied progressively during the summer when demand exceeds supply. Unless the reservoir holds enough water to meet the demand, the tree becomes stressed and ultimately will die.



As part of the RML 'Urban Tree Planting Research' project for Transport for London, we used records of soil moisture content around

mature trees to calculate the total volume of water present at the beginning of the season (when moisture contents were highest) and the end of the season (when moisture contents were lowest). The difference is the volume of water taken from the reservoir during the season. Trees taller than 15m drew 60– 150 m³ of water from the soil reservoir during the growing season, and as much as 240 m³ was taken by the largest tree studied. Even a Birch of just 10m height drew 30 m³ of water from the soil*. This water came from an area reaching out more than twice the height of the tree, and to a depth of over 3m in places. This compares with around 55 m³ of water consumed on average each year by a UK resident.

These results mean that systems for street tree planting have to provide a large volume of soil that can both hold water and allow roots to grow within it, and the paved surfaces that cover the soil have to allow rainfall to pass quickly through to the soil. Even in perfect soil with excellent water-holding, roots would need to exploit well over 600m³ of material to get through a dry summer. Compare that with the tiny spaces left for tree roots in most urban planting situations! Specialists in tree growth and drainage engineers are starting to work together to find practical solutions that combine the needs of trees and stable surfaces – as we recommended back in 2002. Perhaps our work, which was intended as the foundation for subsequent research, will now be fully used.

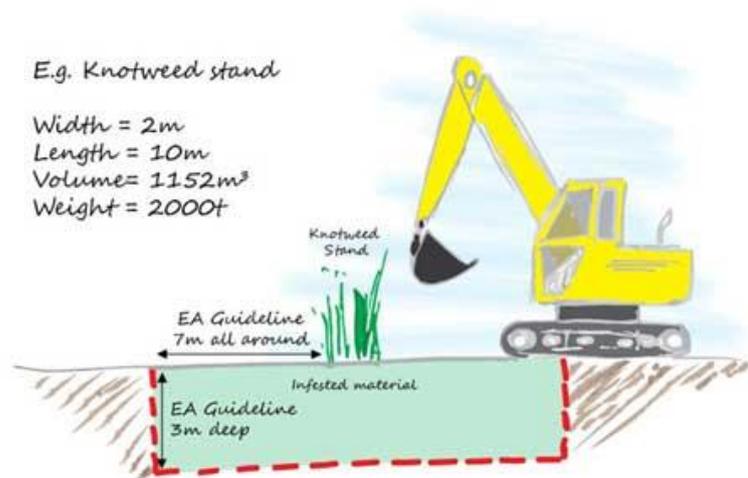
* published as Blunt, S.M. (2008) 'Trees and Pavements – Are they compatible?' paper to AA conference. *Arboricultural Journal* 2008, Vol31 pp73-80.

LEGITIMATE TAX AVOIDANCE SCHEME!

The escalating cost of sending excavated soil to landfill means that treating Japanese Knotweed on site is even more important than ever. The exemption from Landfill Tax has ended, and so £80 tax is added to every tonne tipped. Landowners and developers need on-site treatments which allow the soil to be re-used without delaying their projects or reducing the area available for building. Deep burial in a lined containment cell, following the Environment Agency Code of Practice, is one option but this requires the excavation, stockpiling and refilling of around 5 m³ of clean material for each m³ of knotweed-infested material. Concern over differential settlement after completion has ruled-out this option on a number of residential developments.

The EA regard excavated knotweed-infested soil as a waste material and subject to the Waste Management Regulations. The EA Code of Practice provides options including containment cells and designated herbicide treatment areas which avoid the need to obtain a Licence or register an Exemption from the Regulations. Alternatively, an on-site treatment which holds an EA Waste Treatment Licence or 'Environmental Permit' can be used

to eradicate the knotweed so that the treated soils are no longer a 'waste' and can be re-used within the works. This option avoids landfilling and can be eligible for Land Remediation Tax Credit, so that 150% of the treatment cost is deducted from the profit on which Corporation Tax would be paid. This shift in the tax regime is intended to make on-site treatment more attractive than landfilling wherever possible.



KLARO saves money and meets environmental objectives by on-site treatment

Our JV company GroundCoverDBM operates the **KLARO** Knotweed eradication plant which was used to process 6000m³ of infested material so that it could be re-used as engineered fill on site. In addition to a big financial saving, the environmental benefits included a substantial reduction in carbon emissions (typically a quarter of the 'dig and dump' option even without importing backfill), no road traffic and no use of scarce landfill space. These benefits can make a significant contribution to achieving other targets within Site Waste Management Plans and environmental quality schemes such as BREEAM or CEEQUAL.

'Your work really assists us in achieving our overall objective as well as reducing nuisance to the local community by removing unnecessary vehicles from the road' said the developer's Senior Sustainability Manager.

If you would like to know more about **KLARO**, contact us for details.

WILLOW AS AN ENGINEERING MATERIAL

*“But the Brook (you know her habit) rose one rainy autumn night
And tore down sodden fitches of the bank to left and right.*

*.....
They spiled along the water-course with trunks of willow-trees,
.....”*

The land

Rudyard Kipling

We all know of brooks that rise on rainy nights and tear down banks leaving a sodden mess of turf and soil and stone, together with overhanging wire fences making up a very sorry scene. In Kipling’s poem his timing was just right, the damage was done in the autumn just as the willows were dropping their leaves in preparation for winter. Repair work could be put in hand immediately to avoid further loss during the winter.

As soon as the leaf fall was complete trunks of willow trees of a size suitable for easy handling could be cut to length, pointed and driven into the banks and the gaps between them filled with withies, branches of willows several metres long, light enough to be handled in groups of 3 or 4 and placed by hand, weaving them between the trunks. The soil that had been lost would be replaced using local material.

Willow spiling is ‘nice’ work and much admired by passers-by if you happen to be close to a highway or footpath. “Do you mean that those things (the trunks) will take root?” one is asked in disbelief. “Yes indeed, come back in the spring”.

Spiling is environmentally friendly, the raw material is drawn from renewable sources, even local sources, and the work can be done without machines when access is difficult with all of the materials being carried in by hand.

The tearing down by the flood disturbs all manner of life, but the smaller mammals are back immediately the repair work is complete. In the spring nesting goes on and later a range of butterflies and moths may enter on the scene. It seems that invertebrates like willow.

In 10 years or so the spiling has disappeared and the willow stakes are trees in their own right. It is time to consider thinning to perhaps 3 -4 m centres and dependent on the local environment and the varieties of willow used, repeating the work again in another 10 years.

The willow trunks and withies that are recovered are ready for use on the next job.



COORDINATED, WE ARE BETTER

Clients and the public are getting an improved performance from civil engineers in the 21st century because in order to meet a wide range of requirements we have invented the role of Environmental Coordinator.

In the 1980s RML reported to the then Director of Highways at the Welsh Office that it was little wonder that engineers were being criticised for 'making a mess and then leaving sites in a mess'. In terms of surface finishing and landscape management the report produced by a multi-disciplined team lead by engineers said that things could not have been worse. Significant changes were needed in approach, design and ways of working if things were to improve. Design and construction teams needed to have a far broader understanding of the conditions in which they would be working. As a result of RML's advice multi-disciplined site assessments were introduced;



a wide range of physical and environmental conditions that characterised a site were taken into consideration in addition to the traditional geotechnical topics. These assessments were intended to have an impact on programming, design, choice of materials, working methods and long term management.

One would be quite entitled to think that the introduction of the report was the end of the matter, but this has turned out not to be the case. Lessons have been learned slowly. Persistence as well as patience has been important in getting the environmental message across. Many meetings were made fraught by opposing views, some still are. We have all met the totally committed single-minded specialist who refused to recognise the significance of the needs of the whole team or the engineer whose mind was closed.

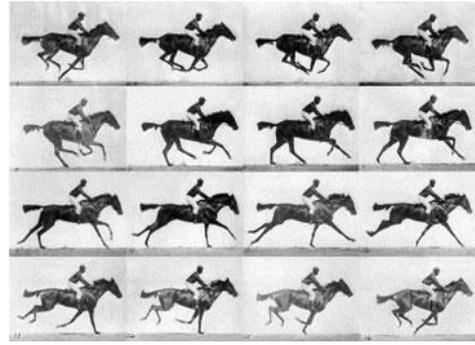
Persistence and patience has resulted in most teams now involving a wide range of specialists as contributors to the design, build and management processes. It has been found to be invaluable to have one person on the team who takes an overall and experienced sense of the varied topics, and is there to provide a coordinated view and action plan.

RML's experience as environmental coordinators is derived from a long attachment to engineers and specialists and understanding and then meeting their needs.

Coordinators provide a key role in delivering quality and an effective team.

I-SPY WITH NATURESPY

Recently I took my 6 yr old daughter to a free public event in a local country park. Run by NatureSpy, it spanned 2 weekends separated by 3 weeks and involved learning the history of camera trapping (which is older than you think, in 1878 it was used to prove that horses at some point in their gallop lose contact with the ground), learning how to operate the camera traps and then the installation and placement. If you are not aware of camera trapping, it is the practice of photographing wildlife when researchers are not present, and is very popular amongst Ecologists.



My daughter thoroughly enjoyed both days and she even managed to keep everyone entertained by getting them playing I-spy as we walked through the woodland. This was particularly so on day 1 as it involved a fair bit of walking off the beaten track in order to find suitable locations for the cameras. Collection of the cameras involved the same walking off the beaten track and some head scratching



due to the (in)accuracy of the GPS location we recorded for the camera locations. It was really good seeing everyone smiling at the results of what we found and particularly rewarding to me seeing my daughter's reaction and involving her in activities related to what I do at work.

NatureSpy are running the 'iWild North Wales' project funded by the Heritage Lottery Fund to work in conjunction with local country parks to help identify and connect the local people to the various species of animals, protected or not, in their local environment. The events have recently featured on BBC news and Radio as well as the NatureSpy website.

Follow the link below to see what we captured and keep an eye on our website for some footage from RML's camera traps soon!

<http://www.naturespy.org/projects/iwild-north-wales/iwild-events/iwild-loggerheads-country-park/>

WORKING ON A HIGHWAYS PROJECT IS EASY, RIGHT?

“The best thing one can do when it's raining is to let it rain.”

By Henry Wadsworth Longfellow

Ongoing delays to works on a trunk road not too far from our office have provoked quite a response in the local rag. Continued delays to commuters are the main story, but with a six week extension to the works recently requested, several commuters' comments have been quoted. These include such unhelpful comments as “we've had a mild winter, how can works be delayed by normal temperatures, rainfall and wind?” and “it's the contractor milking a lucrative arrangement”. Anyone who has an appreciation of proper handling of soils, tarmac and concrete should know that quite normal weather conditions can ruin your day, or even your week on a construction site! The newspaper printing this nonsense is giving credence to comments that misrepresent reality, further undermining the standing of civil engineers and their contractors.



When wet, soil creates an environmental disaster if handled. Contractors cannot allow silt to enter local watercourses from the works. The pouring of concrete requires a temperature of and rising, otherwise will fall short of the quality required, and cause even more costly delays when having to be ripped out and redone. We are all aware that good traffic management can save the lives of workmen otherwise in harm's way on live carriageways. When the wind is blowing the cones all over the place an employer cannot protect the workforce and the work must stop.

I have an idea. It is that when the “normal” weather we enjoy in the UK interrupts an otherwise well run construction project, members of the local press and politicians should be invited onsite to see first-hand what the realities of the situation are. Get your thermals, waterproofs and wellies on and enjoy all the outdoors can throw at you, then write your articles on delays to highways projects!

LIVING ALMOST FOREVER - ASPIRING TO IMMORTALITY

Exploring countryside and finding a veteran tree is a huge pleasure. It marks a point that is unchanged and is set in a landscape which has changed beyond recognition over its lifetime.

I know an old sweet chestnut with a girth of 12.7 metres (42ft) that stands in a small private garden near Ruthin it was once part of a huge medieval hunting estate. Sweet Chestnuts were widely planted and grow quite fast. They also provide useful timber of huge dimensions and were often managed as pollards in wood-pasture and deer parks. Pollarding involves the careful and selective removal of limbs above the browsing height of animals. This practice was repeated whenever a limb of a particular form was required. Throughout England and Wales Oak, Lime, Ash, Beech and Sweet Chestnut have been treated in this way so that all their branches were removed. Large limbs of oaks, for example, were harvested to order for a high price to provide curved dimensioned timbers for timber framed buildings or ships.

Pollarding, much like coppicing, is an ancient skill that prolongs the life of a tree by rejuvenating growth. Where a limb is removed a rash of new shoots appears, each one growing fast and competitively. The woodman responsible for the tree would remove all but the best shoots, knowing that he might be long dead before the nurtured shoots had sufficiently girth and length to be felled for timber.

But what did pollarding do for the tree?

Pollarded when young, a tree is rejuvenated and can be managed in this way indefinitely, while an old tree that has never been pollarded dies. The secret of indefinite life that trees keep hidden beneath their bark is its dormant buds. In the Sweet Chestnut, a tree introduced by the Romans, dormant buds can last for 60 years. Dormant buds only sprout if stimulated to do so by some change in the tree or its environment. Successive removal of limbs by pollarding encourages fresh branches to grow and new dormant buds to develop under the bark of the new shoots. The crown of the tree remains young, but the trunk grows old, adding rings of growth each year, to gradually expand its girth. We often see huge hollow trees; these are formed because the trunk of a tree is so old that the heart wood has rotted away.



So, how old is the Sweet Chestnut tree I mentioned? It is hard to be precise, but using a statistic-based method for dating trees developed by the famous Alan Mitchell, I obtained an age of many hundreds of years; so this tree was alive in the 12th or 13th Century. The photograph shows another sweet chestnut planted in the 16th Century.

RML have completed a number of landscape heritage projects where the need to date trees has enabled a client to identify trees that should be kept and managed, and those that can be removed to be replaced by new planting nearby.

GUARANTEES, WARRANTIES AND BONDS

Read the other guy's small print

The world of guarantees, warranties and bonds can be baffling and, for Japanese Knotweed as much as anything else, the small print is crucial. Generally a guarantee is an advance commitment to achieve specified objectives such as complete eradication, whereas a warranty is issued later to confirm that specified performance has been achieved. Developers relying on knotweed eradication in order to begin building will need a guarantee that eradication will be achieved by a set date – something excluded in many firms' terms. In many examples the 'guarantee' simply states that any regrowth of knotweed will be treated with further applications of herbicide at no cost. This is little comfort to the developer who finds knotweed re-appearing in the middle of his works and has to suspend construction!

'Not worth the paper it's written on' The contract for the work and any guarantee must be compatible: 'Guaranteed to eradicate Japanese Knotweed in a single growing season' and 'Time for completion of the Services shall not be of the essence of the Contract' are directly contradictory - but came from the same proposal document!

A warranty confirms that the work has been completed in accordance with specified contract conditions, and is usually 'collateral' i.e. it benefits a third party such as the site purchaser or tenant who is not a party to the contract. Industry-standard forms (e.g. JCT or Registered Social Landlord model) are available but some larger projects have bespoke wording prepared by lawyers. The purchaser or tenant would then be able to recover losses incurred through failure to complete the eradication fully. Warranties usually require the contractor to maintain suitable insurance such as Professional Indemnity (for design work) and Product Insurance.



Proving that knotweed is completely dead after herbicide treatment is tricky, particularly when a residual chemical such as Picloram has been used. Knotweed growth can be suppressed but buds on the rhizome will sprout when the herbicide wears off or if the rhizome is disturbed by excavations. Herbicide treatment is not a reliable strategy where time-sensitive development is planned, unless there is a 'fall-back' option when the ground works start.

WHEN PROCESS IS MORE IMPORTANT THAN OUTCOME!

“As you think, so shall you become.”

Bruce Lee

We recently sent out invitations to potential clients to join a newsletter system we are creating for a very specific specialist service we offer, and offered a free guide once signed up. One of the responses we got back was from a gentleman in the public sector. He was in the process of procuring a service related to the one we were offering. Our reply was that in this case would not be competitive and so would not be tendering but again invited him to join our newsletter, so that he could stay informed and we would be on hand when a project that required our service was on his desk.

His response made my blood pressure spike. He stated that public sector bodies aren't in a position to sign up to promotions from individual suppliers. The first route he would procure services through would be his framework of contractors, before going for an open tender on a tender portal.

It is no wonder that the public purse is under such great pressure when the procurement professionals tie themselves up in knots of bureaucratic nonsense. The procurement officers do not allow themselves to be educated in current best practice as our offer of a free guide on signing up would certainly have done. They limit their first best option to a framework contractor that is most likely out to offer solutions well within his comfort zone and ones giving the best margin to get a return on the huge investment his company has had to make in getting on the framework in the first place.

The benefit of our three decades of experience and wealth of knowledge, which includes the research that underpins the government agency guidelines on the subject, will remain with the private sector for now.



SPRING CLEANING...GET YOUR DUSTERS OUT!

"If you spend too much time thinking about a thing, you'll never get it done."

Bruce Lee

In the office, one of the small things we constantly like to get our teeth into is building, managing and maintaining smooth operation of our workstations. If you caught last November's newsletter you will know all about this, and we also talked about water cooling for optimised operation of PC components.

When was the last time you or your IT staff maintained your workstation?

An issue every office suffers from is dust, perhaps from all the paper (even in a near paperless office there is still reams of it on shelves and in cabinets), but where ever it comes from dust in your PC is not a good thing. Dust can insulate the components and hamper efficient cooling which can potentially shorten the computer's lifespan.



As cooling becomes less efficient it is also likely to cause the fans to spin faster, making more noise, so a good clean out from time to time is not only going to be good for it but also for the user. So, every six months or so we get the vacuum out and a small paint brush and clean all the filters and try to get all the dust out of the inside of the workstation. When designing a workstation a positive internal air pressure should be aimed for. This means that there is more filtered air being drawn into the case than pulled out of it, and the open gaps in the case allow the excess to escape. If a negative pressure is present these gaps and vents will allow unfiltered air and dust into the case.

The well-known IT support Guru and part time Wing Chun master, Bruce Lee after all said

"The less effort, the faster and more powerful you will be."

I am sure he had workstation cooling performance in mind when he said this!

DOING THE RIGHT THING

The responsible developer or contractor can be faced with a dilemma – whether to ‘do the right thing’ for the environment or simply take the cheapest option? With Japanese Knotweed infestations, the answer is simple – do both!

When knotweed is found on a site, the developer/contractor needs a quick solution. It takes a minimum of 2 years to demonstrate eradication using herbicides, but the quicker landfill option is very expensive. Which to choose? RML’s sister company GroundCoverDBM offers the answer - a unique on-site eradication solution to knotweed infestation that is both cheaper than the landfill alternative AND environmentally responsible. The process is instant, allowing a positive use for the inert



processed material and avoiding the use of scarce landfill capacity. This approach recently brought clear benefits on a development site where 3400m³ of material infested with Japanese Knotweed was processed rather than taken to a distant landfill. Some 340 lorry trips totalling 65000 miles were avoided, saving over 28000 litres of fuel and 75 tonnes of CO₂ emission. The cost was only half that of the landfill option, and the job took only 5 weeks.

Environmental responsibility need not cost the earth!

To get your hands on GroundCoverDBM’s **FREE 7 point guide to Japanese Knotweed**, click [here](#) to confirm your current details and interest in GroundCoverDBM services. It only takes a few short steps and could save you a major headache if knotweed strikes.

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