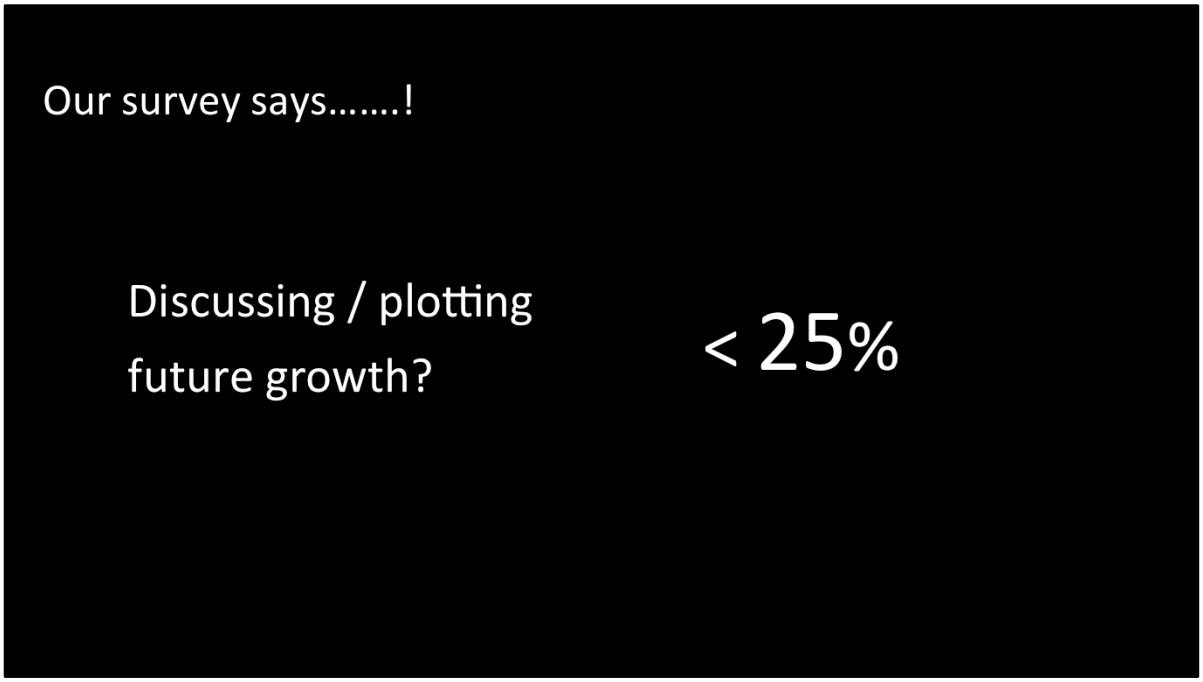
We're all familiar with the term Arboricultural Impact Assessment - which is used, although perhaps not adequately framed, in *BS5837*.

As a consultant and company director I have a responsibility to make sure I'm running a successful business that gets repeat customers, operates ethically and acts professionally. Part of that means looking at what I'm selling - and that's where this presentation comes from.

Over the last 18 months or so, colleagues & I have made a bit of a hobby of downloading arboricultural reports, plans, surveys, email threads, tree officer responses, decision notices etc - all submitted documents connected with planning & development.

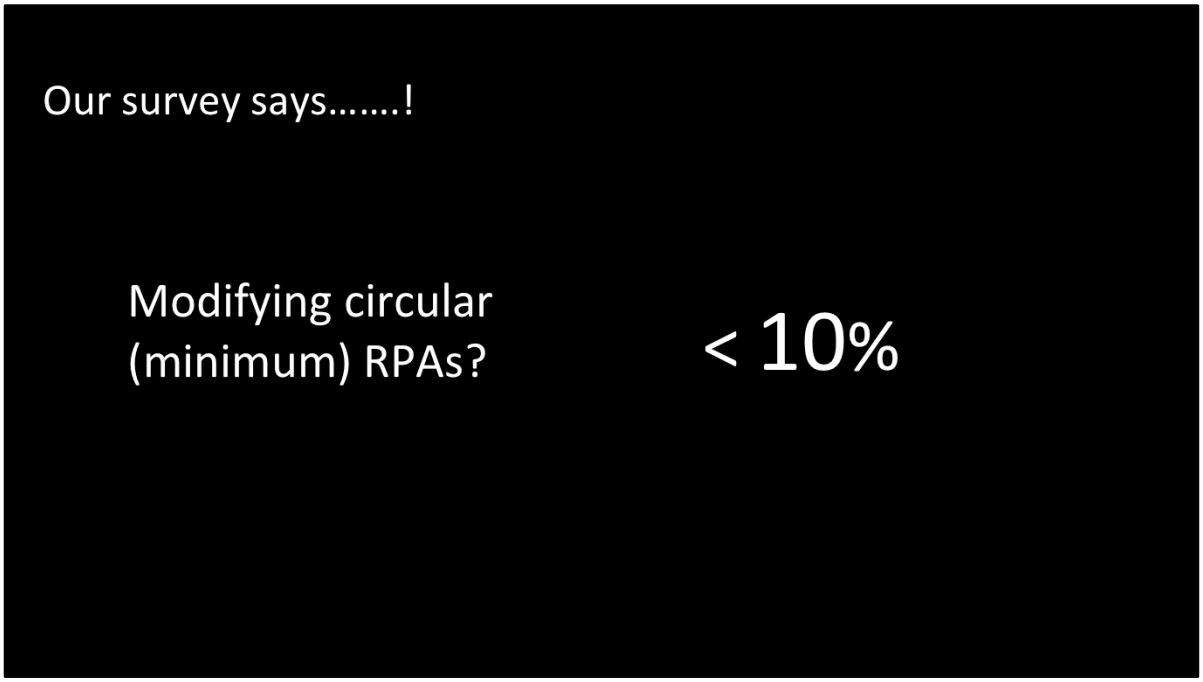
If you have hours of spare time you can have a look at the 1,000's of results generated when you type AIA into Google.

I've personally looked at over 100 reports and although this isn't a scientific study (it has its limitations) the preliminary results are pretty striking…for example…of all the work I have reviewed…

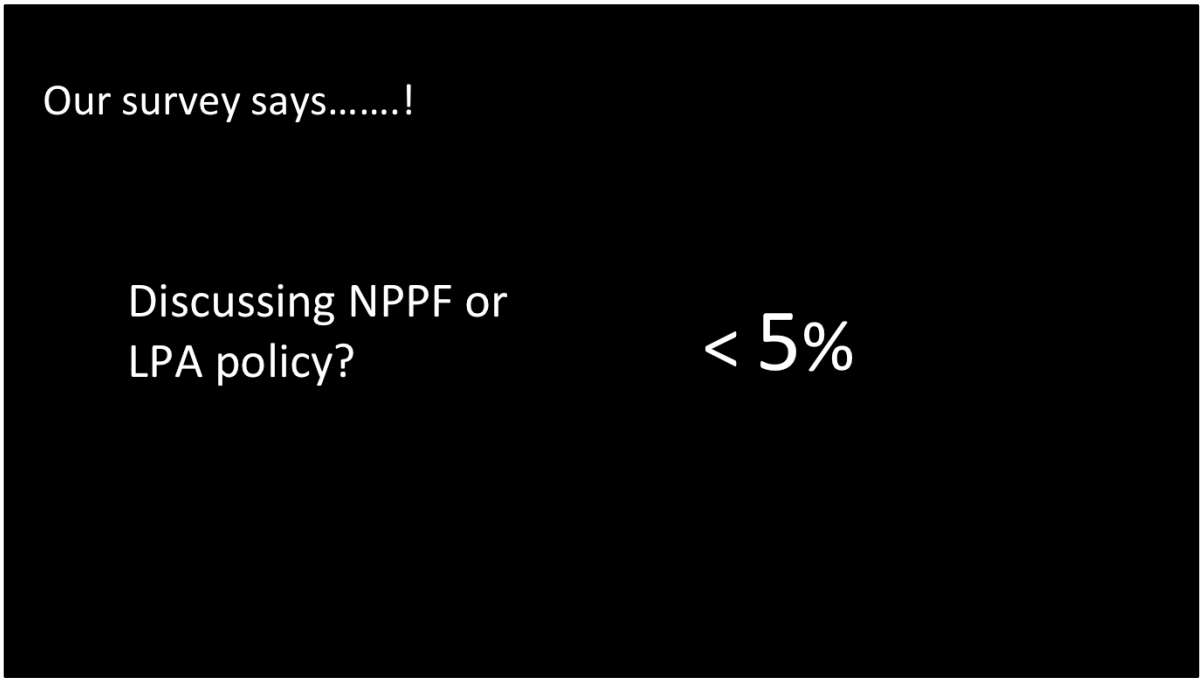


Less than 25% of reports/plans discussed or plotted *Future Growth*.

Which is amazing as most trees are growing i.e. getting bigger (hopefully)…at least before the development starts!



More than 90% of reports I reviewed used circular minimum RPAs as a starting point for assessing below ground impacts on trees – I'll come back to this later…



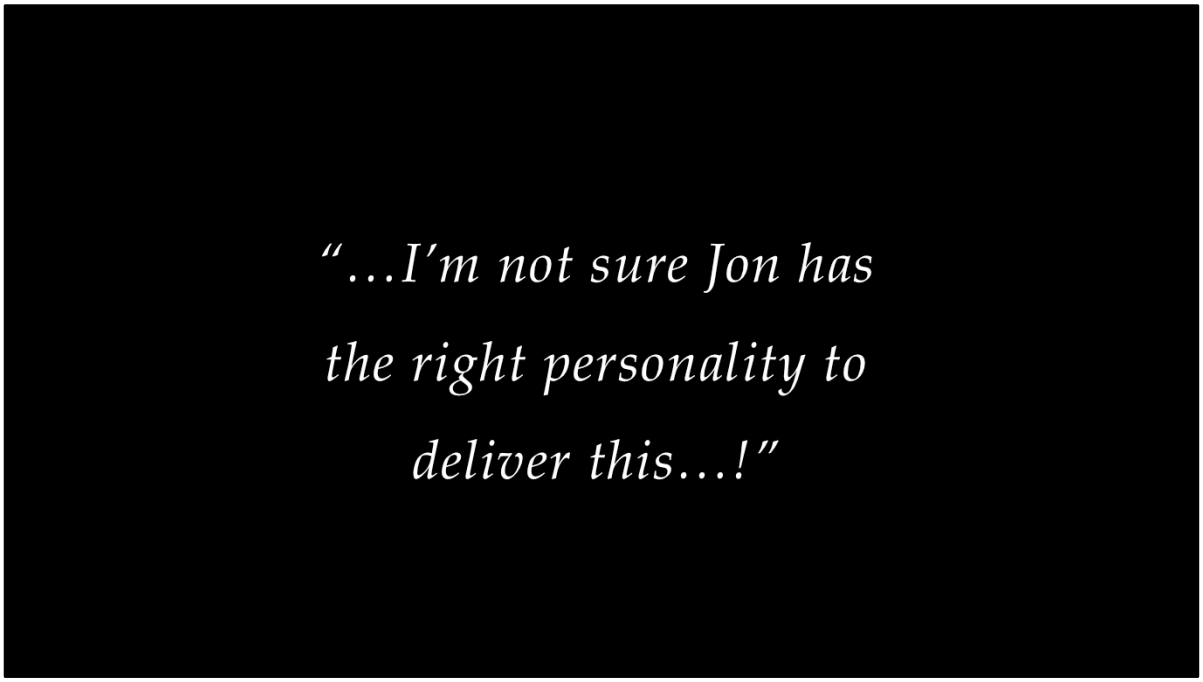
Less than 5% made any reference to planning policy…

The number of reports using terms & language fundamental to IMPACT ASSESSMENT…is so far ZERO.

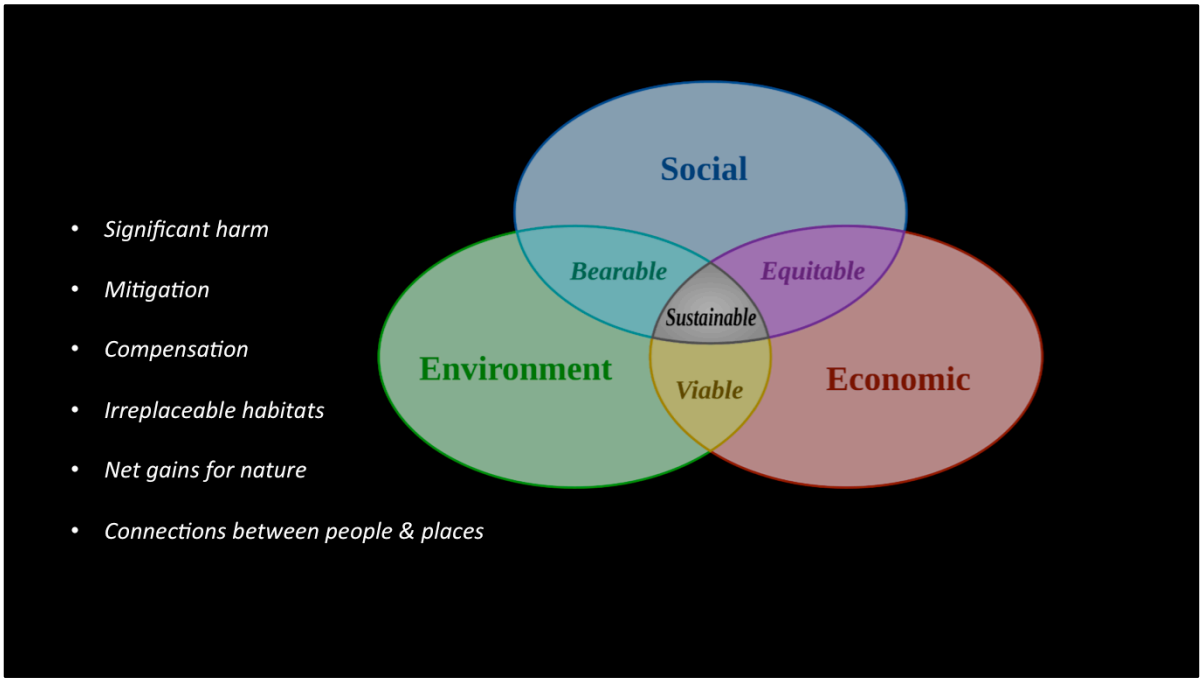
- not assessing impacts effectively
- advocates for developers
- poor decision makers
- default positions based on nonsense
- claims of compliance with BS5837
- loss of mature trees
- failing to plant large trees
- paying lip service to the concept of Sustainable Development

WE ARE NOT ASSESSING IMPACTS EFFECTIVELY.

I should perhaps say at this point that I've delivered earlier versions of this presentation to other professions, with some interesting feedback – some of which I'll mention later - although perhaps the most interesting comment came from a senior engineer…



Anyway, the reason I'm here is to talk about impact assessment in arboriculture…and how EFFECTIVE impact assessment can lead to more sustainable development.



Sustainable development is a balance, it's a discussion…its about protecting valuable, and irreplaceable features.

Features that my children…and my children's children can enjoy.

NPPF discusses various elements which we all need to factor into our thinking.

Its not all about trees - its a balance between the 3x so-called 'pillars of sustainability' It needs collaboration.

Fortunately we are starting to acknowledge the value of trees, and lots of excellent work has been done on this.

According to the government "trees reach across generations"…YES they do!

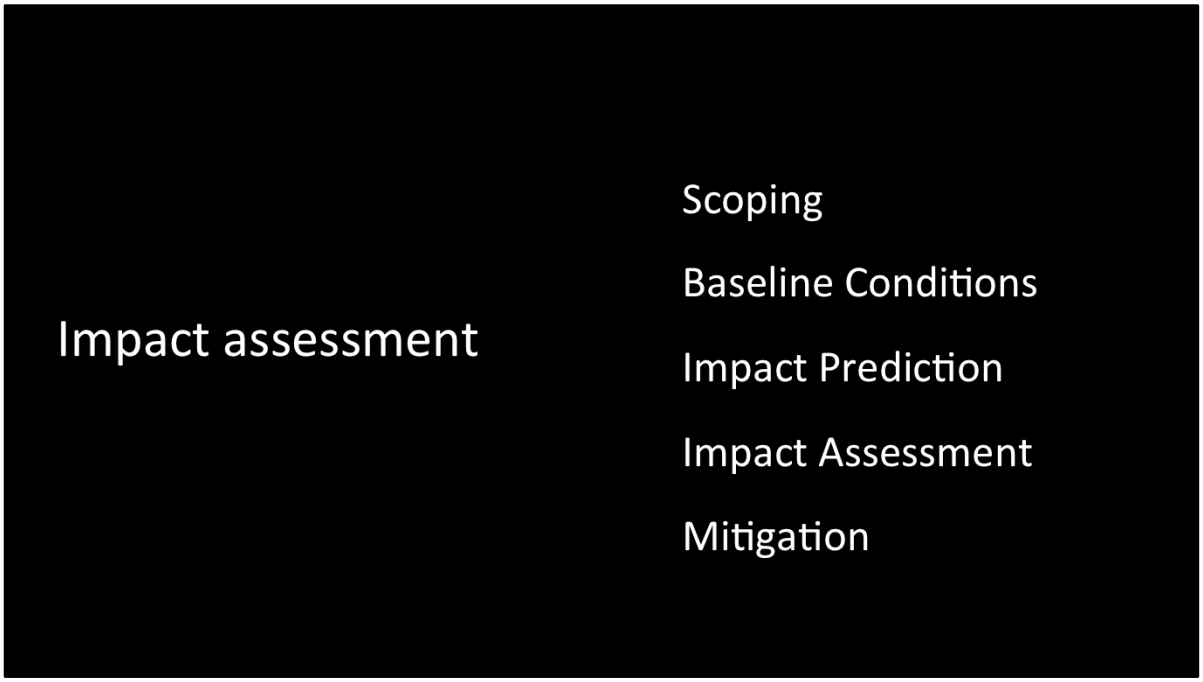
Although I'm not sure the authors meant this type of tree.

I think that perhaps part of our problem is that we've not been good enough at selling ourselves…or at least using the planning arena to get effective, positive outcomes for trees.

My report research confirms this.
I also think that we can change this by agreeing a method for impact assessment.

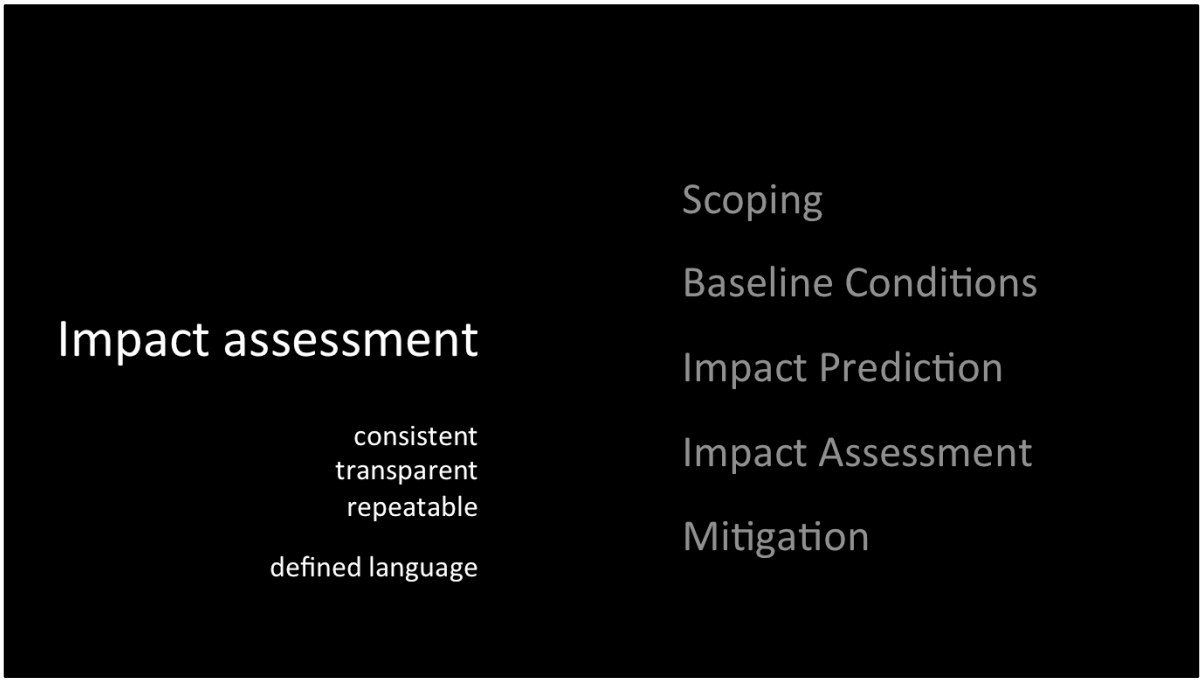
Fortunately you don't have to look very far to find useful examples of processes & procedures used in allied professions such as Ecological Impact Assessment and Landscape & Visual Impact Assessment.

For completeness I also touched base with other wider organisations including the ***International Association for Impact Assessment*** and ***Better Evaluation*** (an international collaboration to improve evaluation practice and theory by sharing and generating information about options, methods & processes and approaches).

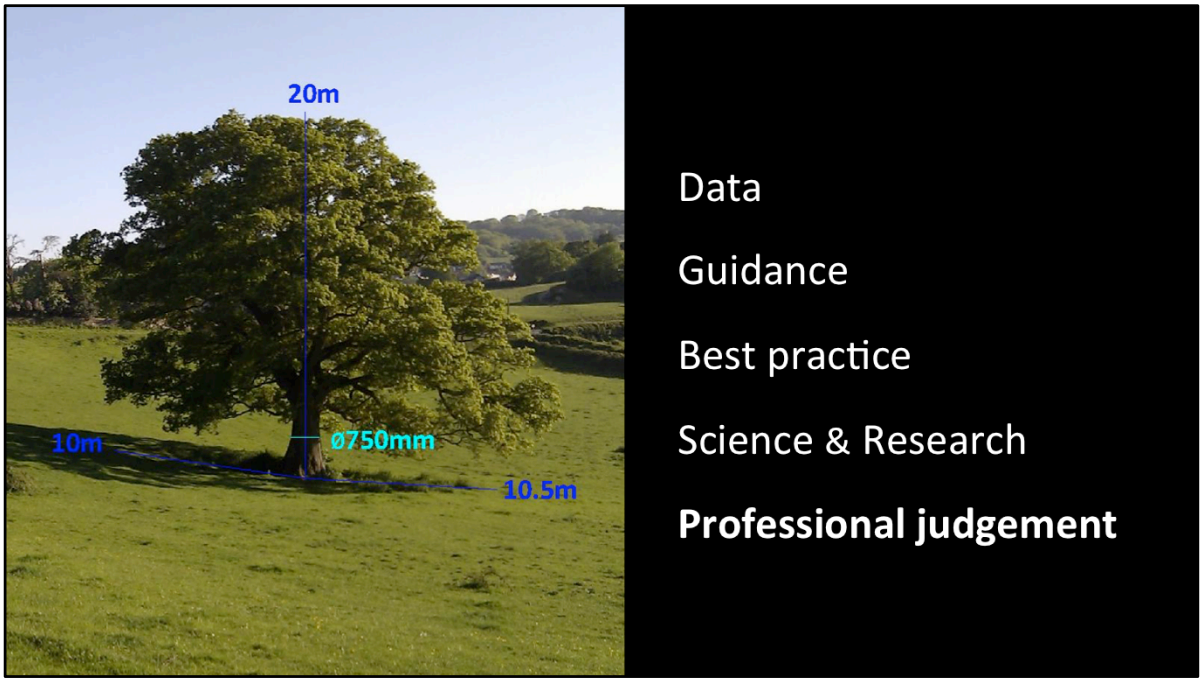


The underpinning framework for impact assessment across all disciplines is broadly the same, and includes:
Scoping,
Baseline conditions,
Impact prediction,
Impact assessment,
Impact mitigation.

These ingredients should all have a degree of…



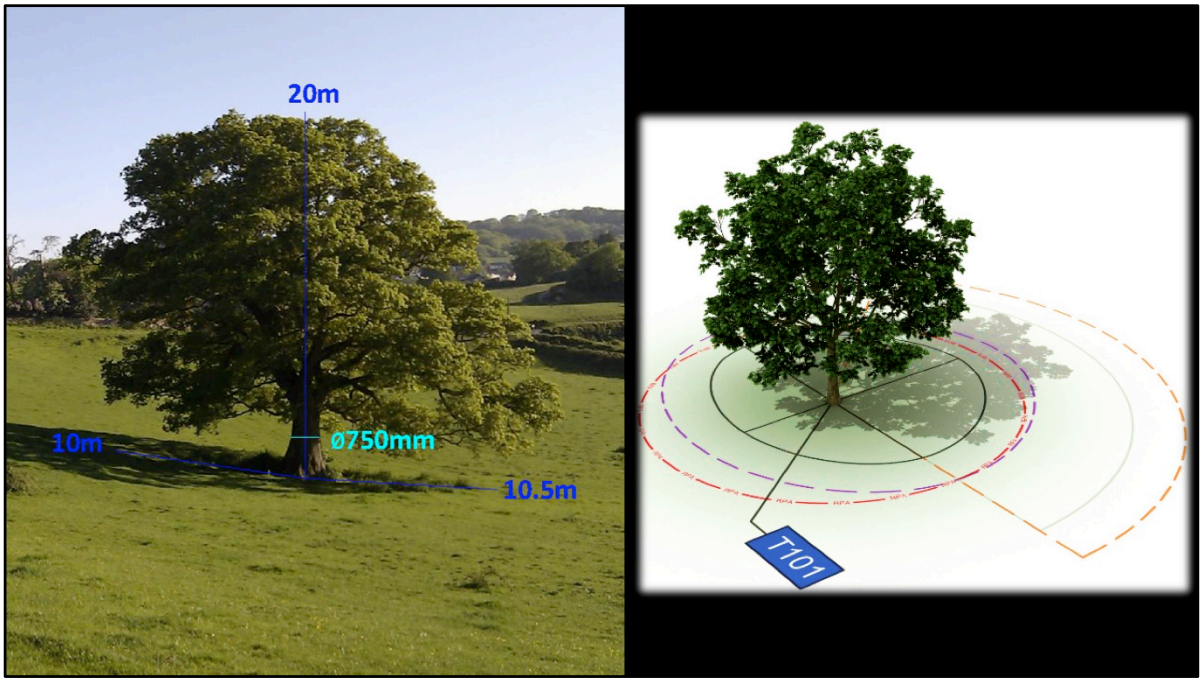
Consistency,
Transparency,
Repeatability,
…and use a common (defined) language.



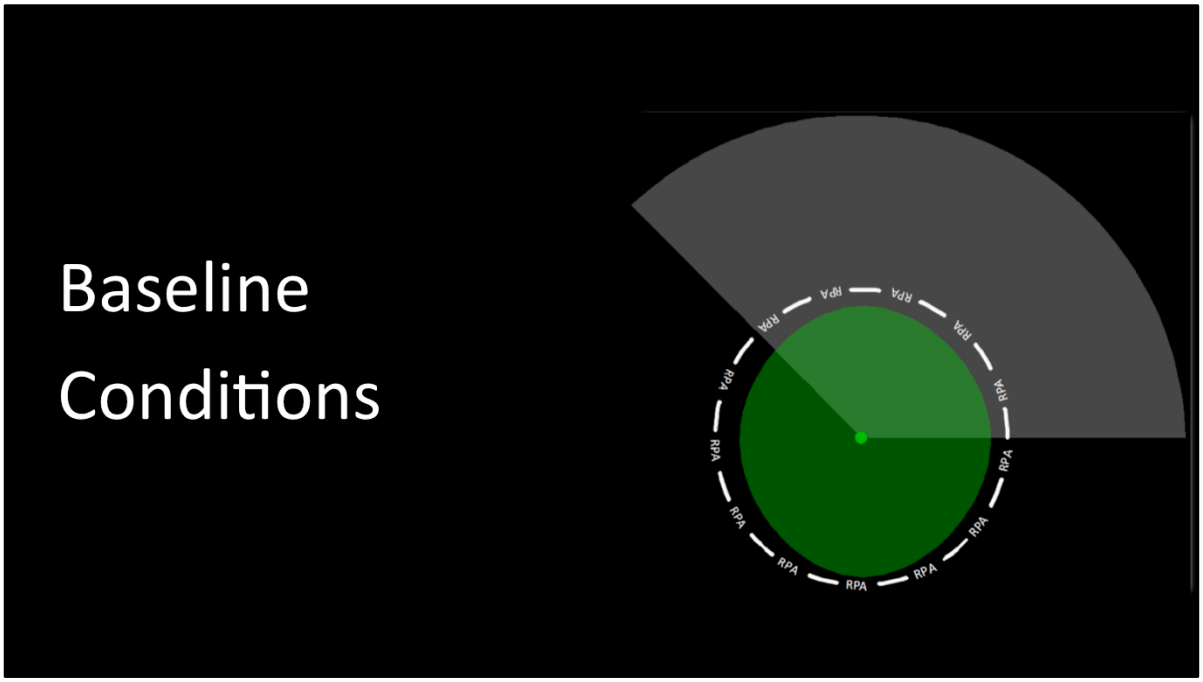
What is fundamental to effective impact assessment is an accurate baseline which should always be informed & underpinned with
good, relevant Data,
Guidance & Best Practice,
Scientific Research,
and massaged by a large dollop of **Professional Judgement.**

This is the starting point…get this bit right and the rest is easy.

However…typically, under client instruction, we go to site and with varying degrees of precision, take some tree measurements and gather our baseline data…



The BS then encourages us to graphically represent the existing and future tree constraints to inform the design team….this is the time to start a conversation…to engage.

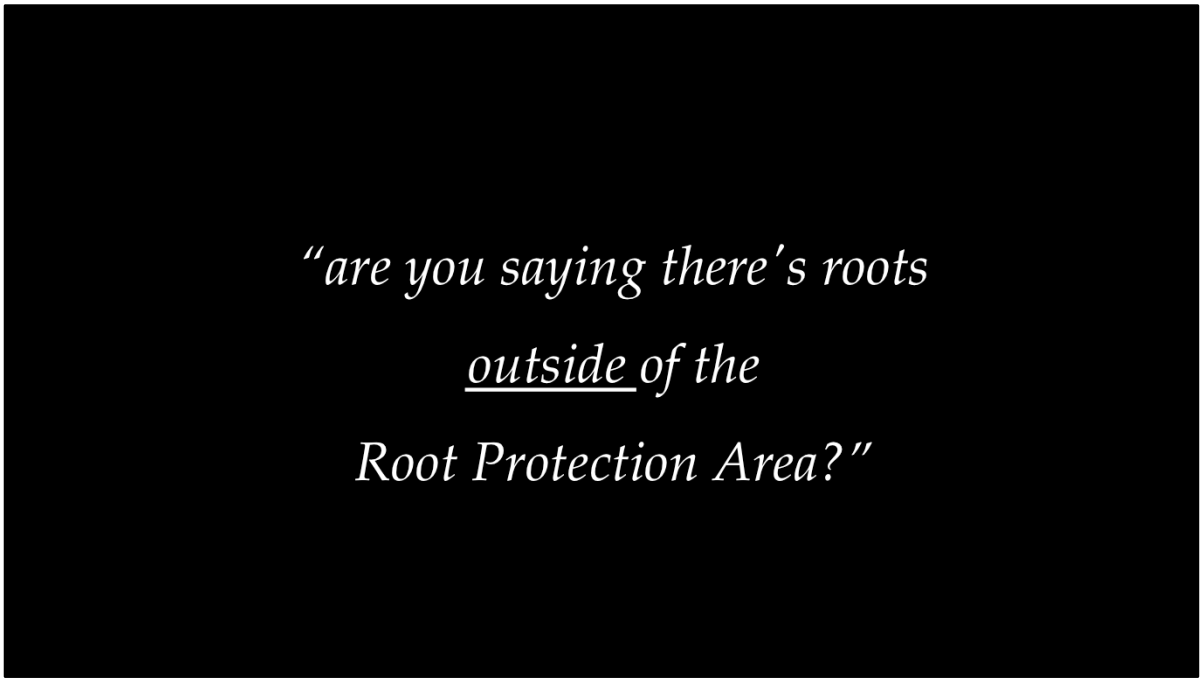


More typically - and certainly based on my research - very simplistic information is portrayed and we really need to ask ourselves **is this a good starting point?**

I don't know if its because of problems with automated drawing systems, or an attempt to over-simplify our work?

Maybe this works most of the time, for some trees on some sites.

The problem is it fails with regards to the most important trees we are all so keen to promote and retain - the large irreplaceable trees.

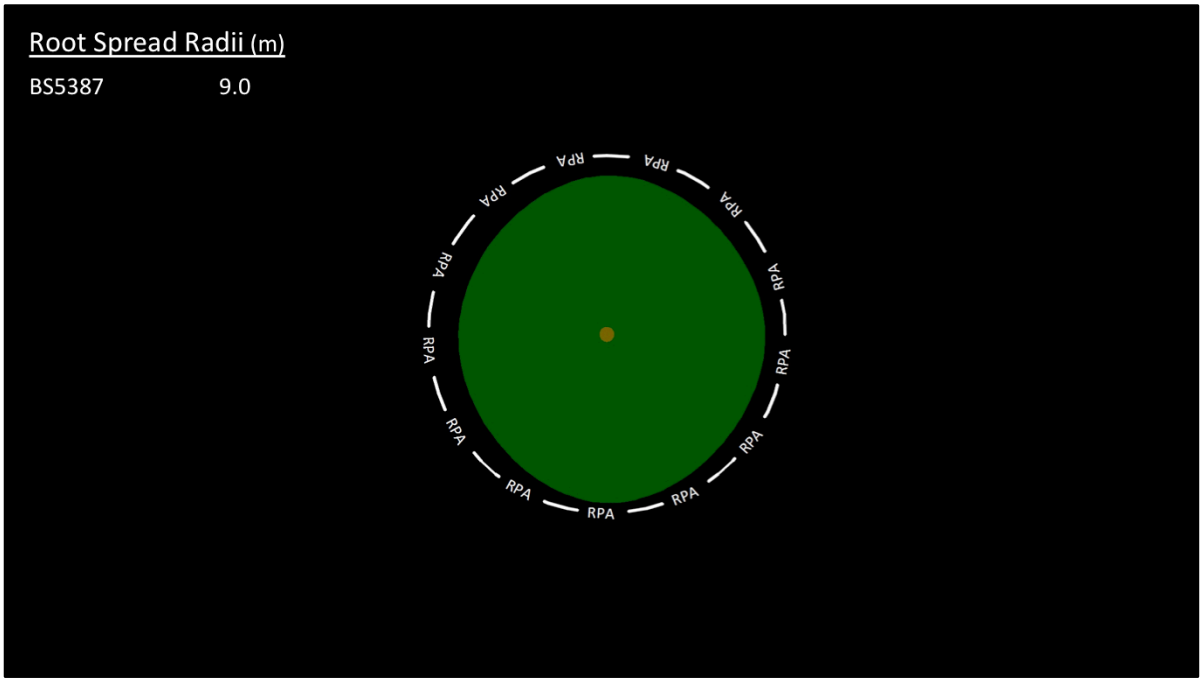


More than one of the engineering companies we previously presented to said they'd only ever seen very simplistic constraints plans.

They liked the simplicity BUT they didn't really understand what exactly was being communicated.

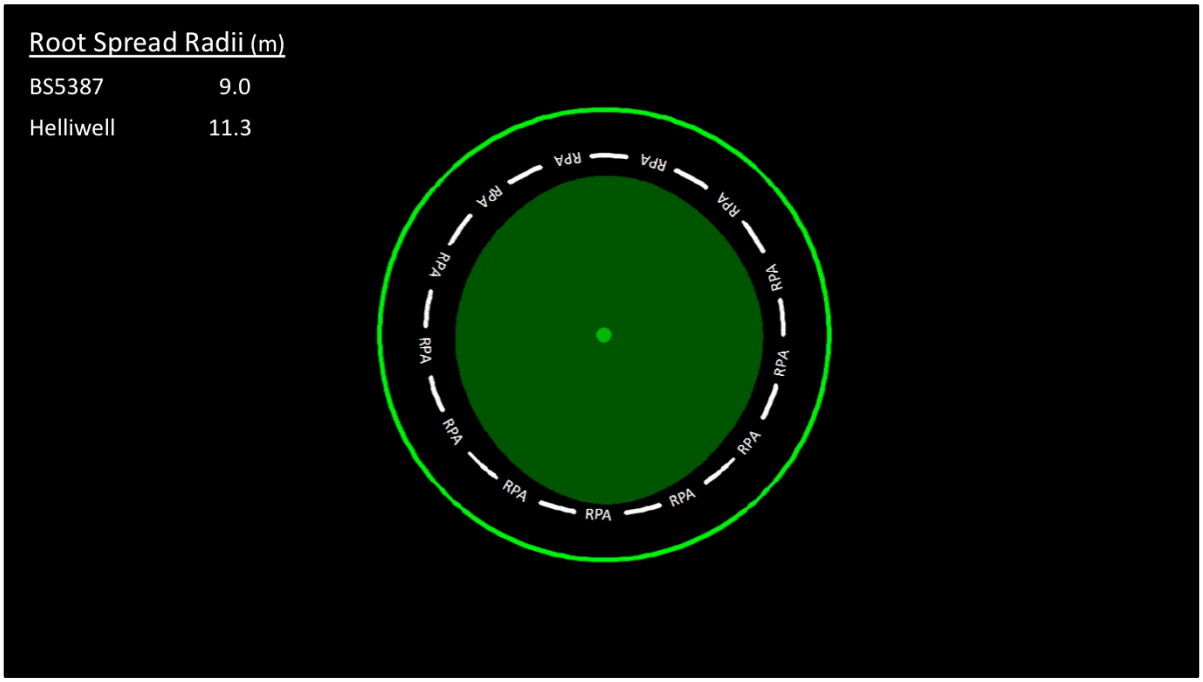
On one occasion another senior engineer asked me a very pertinent question.

This made me stop and think about our failure to effectively communicate important information.



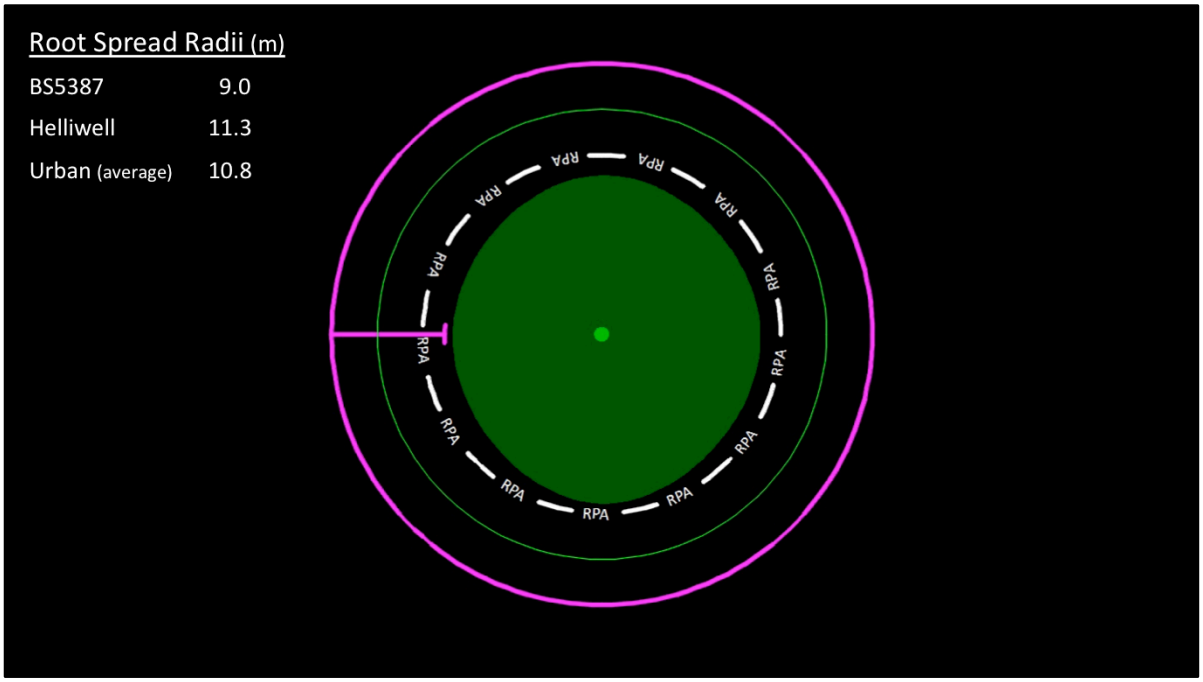
We all know that root growth is opportunistic……but in over 90% of the work I reviewed the default circular RPA was used as a starting point.

The RPA has had a pervasive influence over our data gathering, site assessments, reporting and assessment of impact.

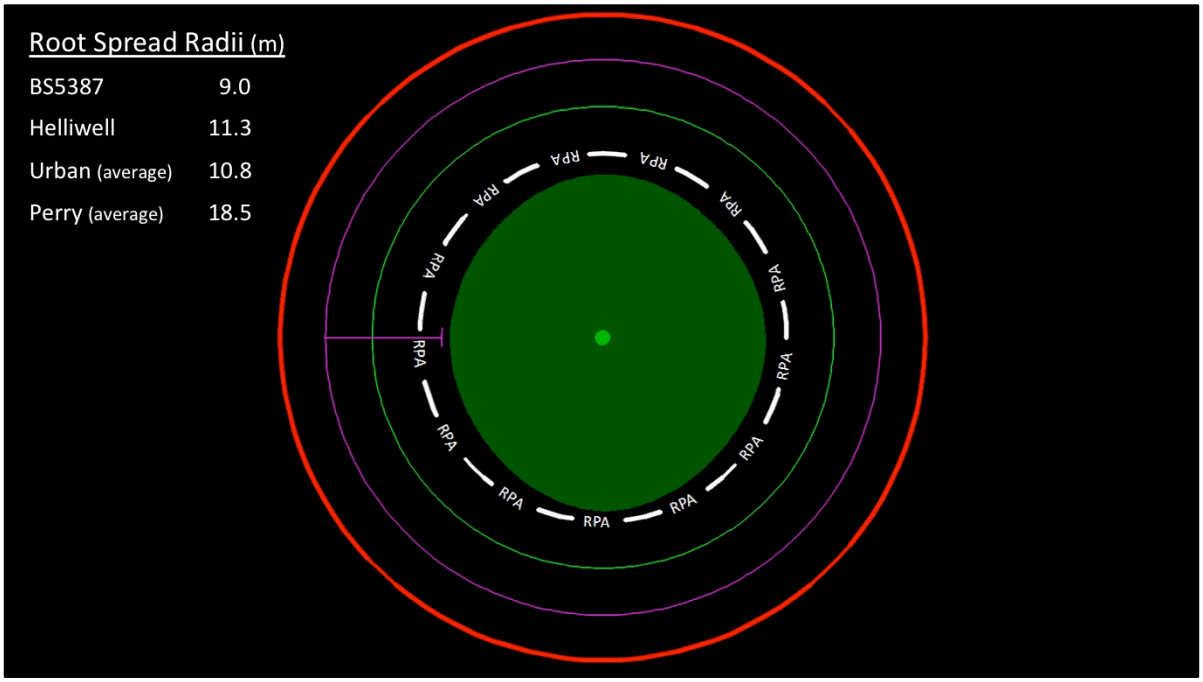


Various references have cited *Helliwell* - suggesting that a healthy tree can tolerate some root damage/loss equal to about 1/3 to 1/2 of its total root mass…..so I reverse engineered that and added the area to the BS RPA, as shown by the green line.

Helliwell states that a small tree (grown in a nursery) can normally withstand the loss of quite a large proportion of its root, although this varies considerably from species to specie. He goes on to state that a fully mature tree may dieback with the loss of 5-10% of the root system.

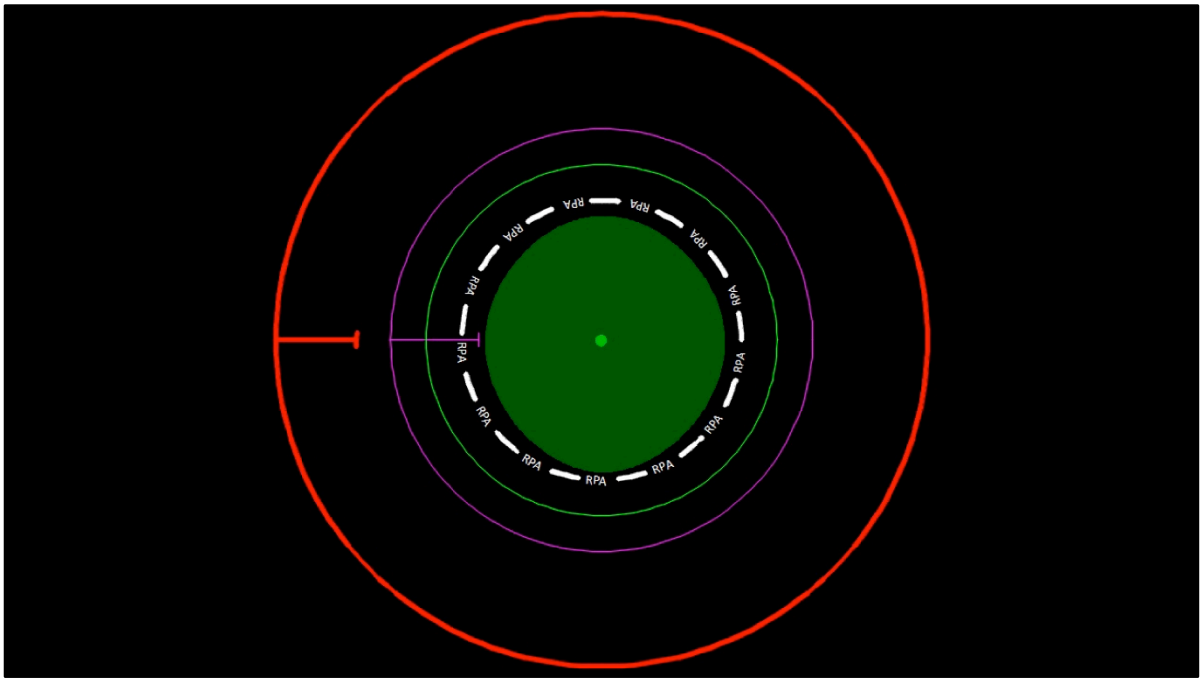


James Urban states that roots are likely to be in an area approximately equal to 1x – 3x canopy cover.



Like *Urban*, *Thomas O. Perry* also states an area range approximately equal to 4x – 7x canopy cover.

I've only plotted Perry at 4 times canopy cover here (in red)…the range actually looks like this…



We need to make a distinction between:

Young & Old trees
Healthy & Predisposed
Trees in groups
Trees on slopes
Open grown trees

Surely not all trees grow roots evenly in a circle - or will tolerate losing 50% or more of their roots?

There's plenty of reference material out there confirming our lack of acknowledgement about below ground constraints in particular.

NPPF talks about *aged & veteran trees* and their special significance**.**

The UK government even pays landowners under the *Countryside Stewardship Scheme* to stay further away from trees than we often recommend**…**to help preserve old trees.

We have to have an accurate STARTING point in order to effectively assess impacts.

Is this really it?

Is this the best we can do?

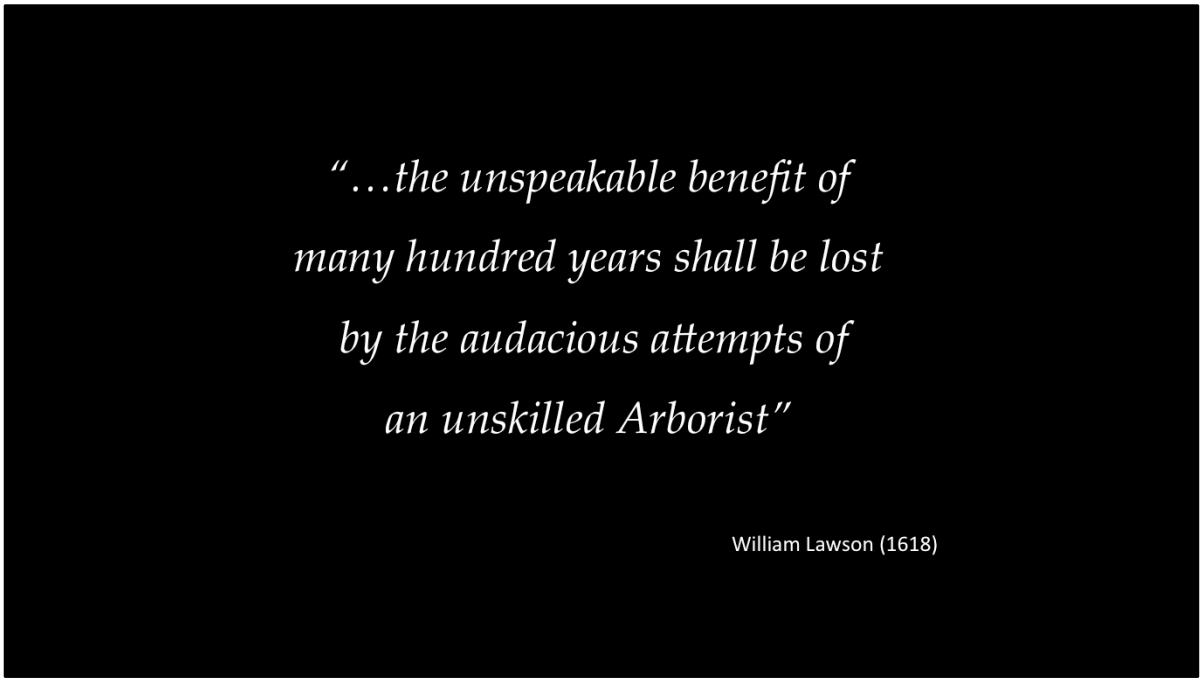
It won't be long before clients just ask the topographical survey companies to plot 12x stem diameter.

At that point we risk being marginalised in the process.

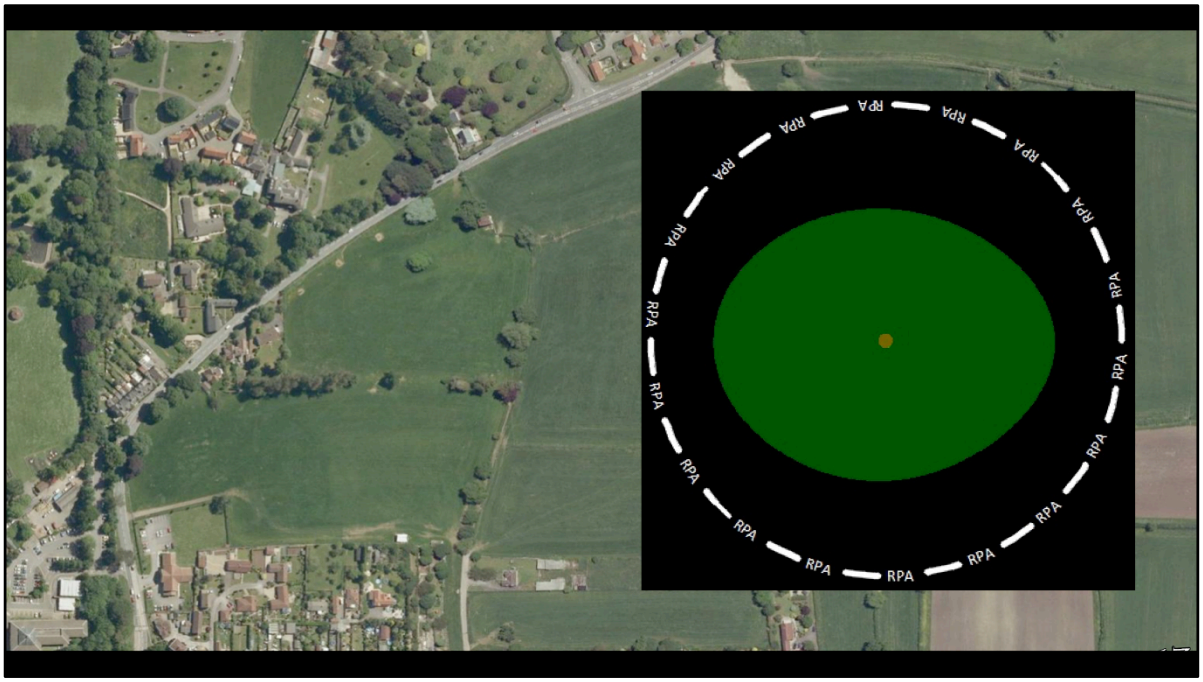
Look at the state of this chap after hand-digging a hole on the edge of the RPA of a mature L. Plane tree….he's saying "what do ya want from me?"

Default positions should be a starting point for an intelligent conversation, if not they shouldn't exist…they are dangerous.

Before I move on from establishing an accurate BASELINE lets just have a pause and a read of this 400 year old quote.



I'd like to just show an example from a real site we're working on at the moment.



This is a strategic site allocated for in the region of 500 homes, green space and a primary school.

The beech tree I've plotted is an open grown mature specimen near the centre of the site in a highly visible position.

It may be considered a KEY feature, certainly very prominent
Arguably irreplaceable in a reasonable timeframe.

What do I need to know about it?

What do I need to tell the designers about it?

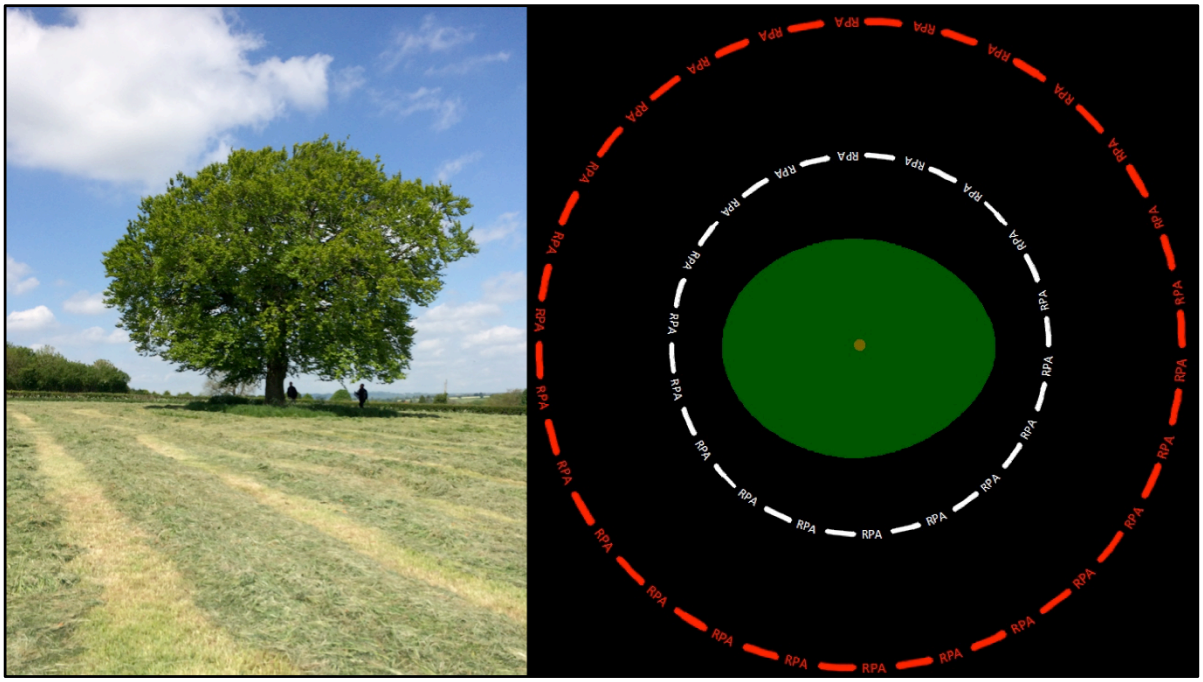
I dug several holes just outside the (default) minimum RPA.

Remember we're actually talking about soil VOLUME not AREA.

I found 20-25cms (depth) of soil suitable for root growth.

The tree is mature, and in my opinion sensitive to site change and significantly less tolerant of root severance than a young, healthy tree.

Therefore the below ground constraints need to be modified to reflect the site conditions.

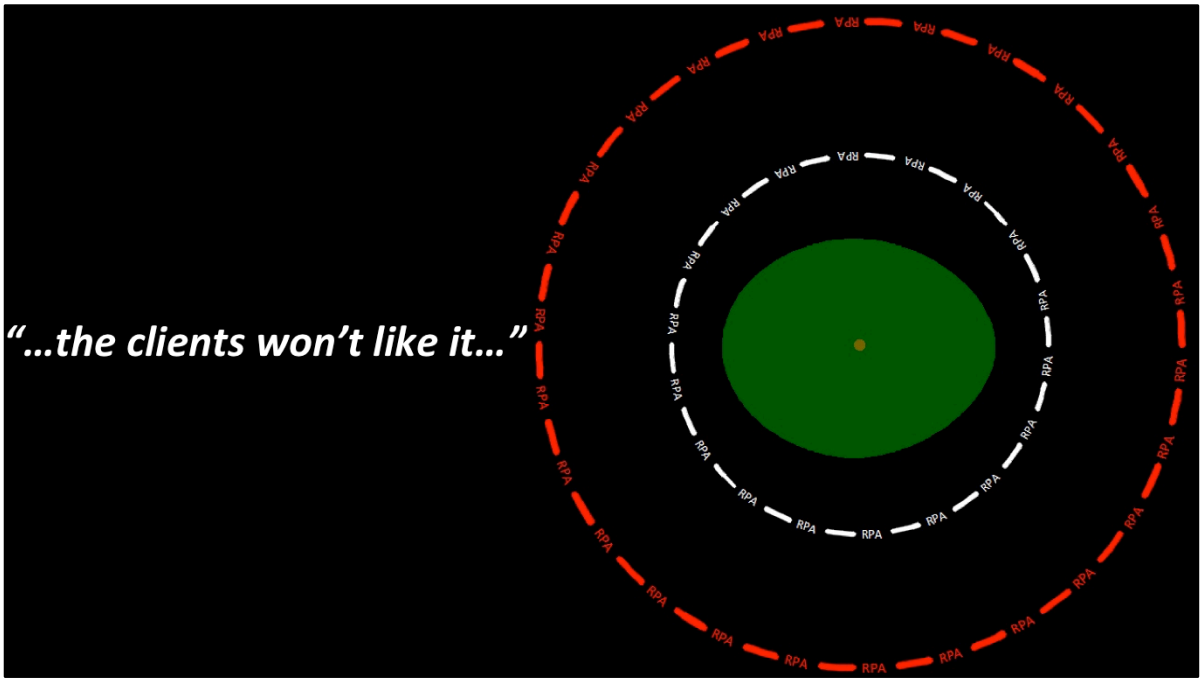


Obviously if there's 25cms (depth) of soil suitable for root growth then in order to find the requisite volume I have to increase the radial RPA x2 - as shown by the red line.

I did not review any AIA reports which discussed digging holes on site.

In 2005 a space probe equipped with a penetrometer landed on Saturn's moon Titan, yet tree consultants still won't carry a spade!

At this point its time for another useful comment from the engineers…



I don’t really care if they like it or not!

I’m just offering the truth about where my assessment of below ground impact needs to start.

Where are the roots?

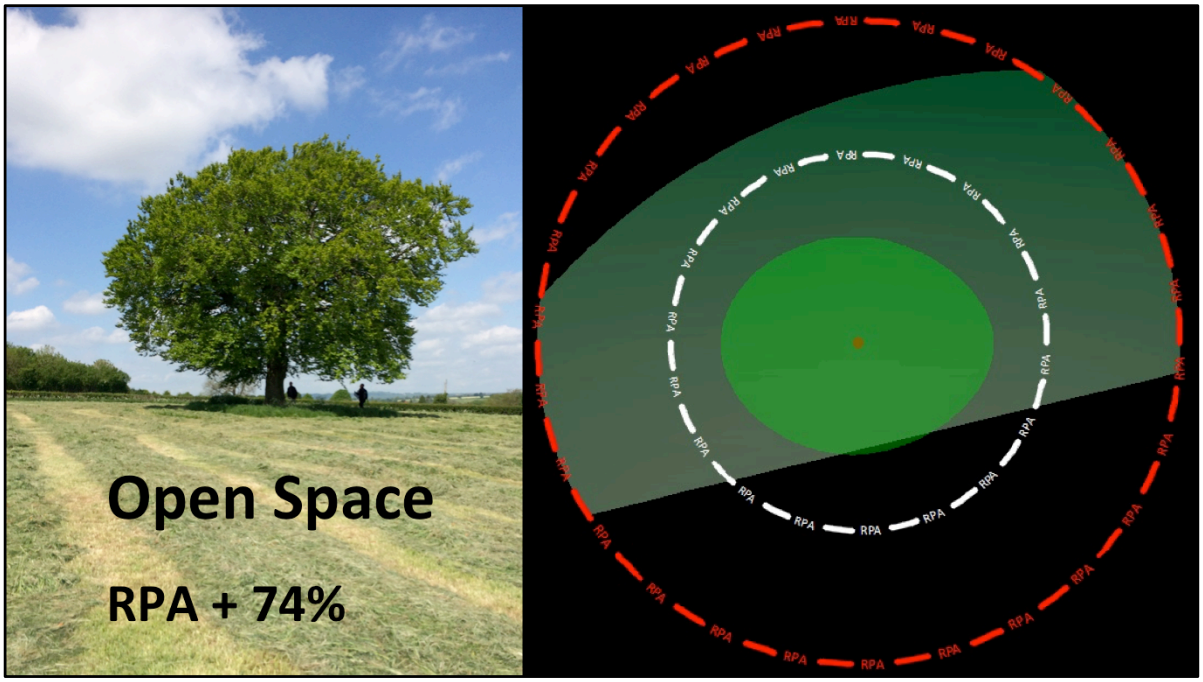
Irrespective of its BS quality category we need to establish whether the tree in question is a **KEY** tree or feature.

This cannot be determined solely by the arboriculturist – rather, it is much more valid if the value of the tree is agreed with others.

It requires input from other professionals wherever & whenever available.

It needs a DISCUSSION. I know from personal experience that arborists like to talk about trees…

What are the risks?
The unknowns?
Do you need more assessment?
How confident are you in the baseline assessment?



Does the tree have Landscape or Ecological Significance?

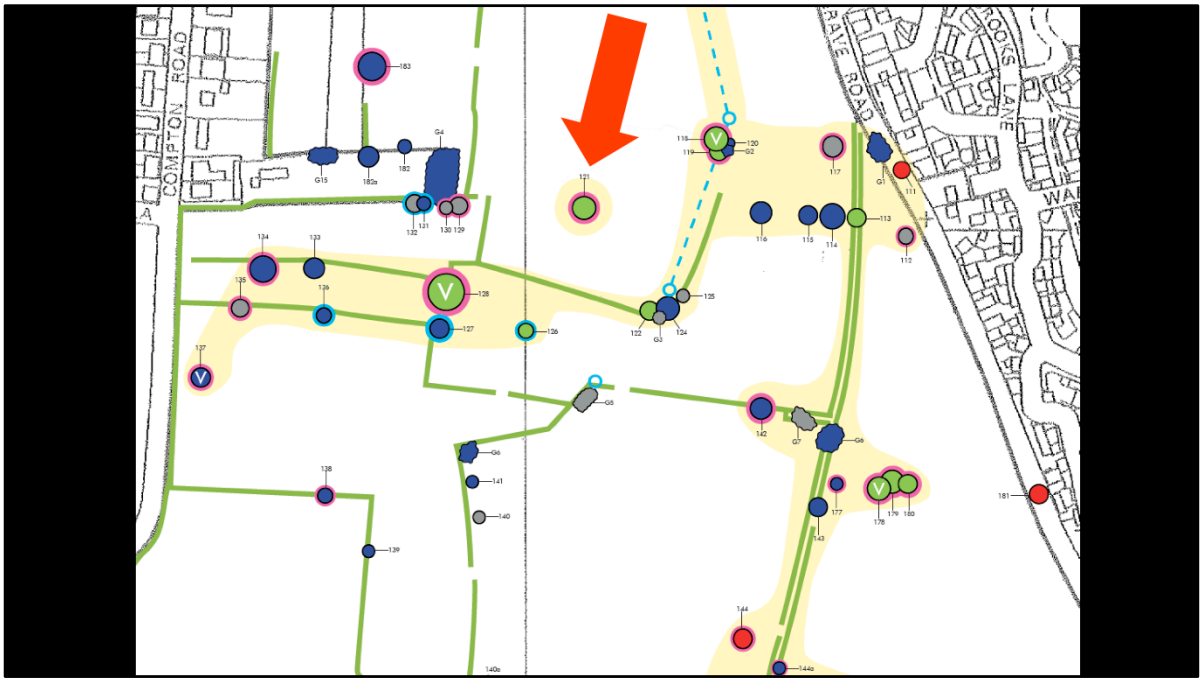
If you just state minimum information…and the design evolves tightly around this tree then you cannot avoid significant negative impact.

The design recommendation needs to come EARLY…..very early. In this instance it was suggested that retention of this tree will work best if it is retained in POS; either a pocket park or a communal space of some kind.

Put this tree into a roundabout at minimum RPA and it will suffer a significant negative impact. Nibble some of the default minimum RPA and extend the retained space elsewhere and the risk of long-term damage is surely reduced. We have minimised the impact.

A priori assumptions about the magnitude of impact, based on the default minimum RPA are clearly illogical.

There was a collaboration between LSP, TREES, and ECOLOGY – both stakeholders & the developers team - which resulted in the early production of an Environmental



Given the actual constraints posed by trees…particularly large trees…it's always going to be difficult to AVOID negative impact – and that's not what its all about…its about predicting and assessing SIGNIFICANT impacts effectively.

If you are alone in your contribution to the design team – be careful with your starting point.

The architect then has something more robust to work on.

Its then that we start to design places for KEY trees - and with regard to the beech tree, here's the architects early vision for a crescent around the tree which is retained in significant public open space.

Its only when you shout about them EARLY…

You cannot assess impacts effectively (particularly for KEY trees) if you start here….with minimal constraints information, based on assumptions.

The BS default minimum is a terrible place to start.

We need to pay more attention when gathering data and surveying sites, especially when there are large trees entirely within the identified boundaries – these are immediately at higher risk from development pressure.

Scoping

Baseline Conditions

Impact Prediction

Impact Assessment

Mitigation

The **impact assessment** should start here.

This is the Baseline!!!

Scoping

Baseline Conditions

Impact Prediction

Impact Assessment

Mitigation

"Impact" is synonymous with **effect.**

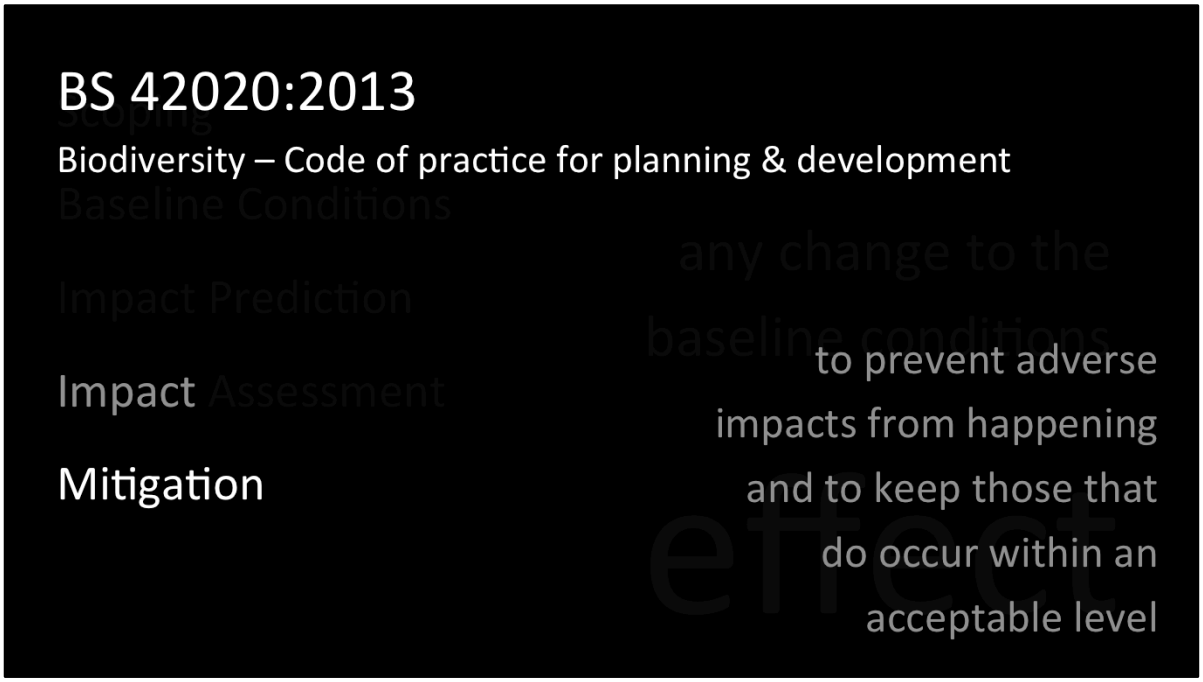
What effect will the proposed development have on the trees?

An Impact Assessment is essentially an evaluation of **any change to the baseline conditions.** This change can be positive or negative.

A distinction needs to be made between minor impacts (which can be dismissed with justification) and **significant** impacts which are the ones we should be assessing accurately, consistently, transparently and effectively.

The impact should be determined using predefined significance criteria (ref DCLG).

[significance being determined by the Impact **Magnitude** and the **Value** of the tree(s) being effected]



I'm just going to have a quick dip into **Mitigation**, which is a critical component of impact assessment.

Something that was brought to my attention during our research was the usefully titled British Standard BS42020 that some of you will be aware of.

In any event it defines a process for reducing significant negative impacts.

BS 42020:2013

Biodiversity – Code of practice for planning & development

Scoping

Baseline Conditions

Impact Prediction

Impact Assessment

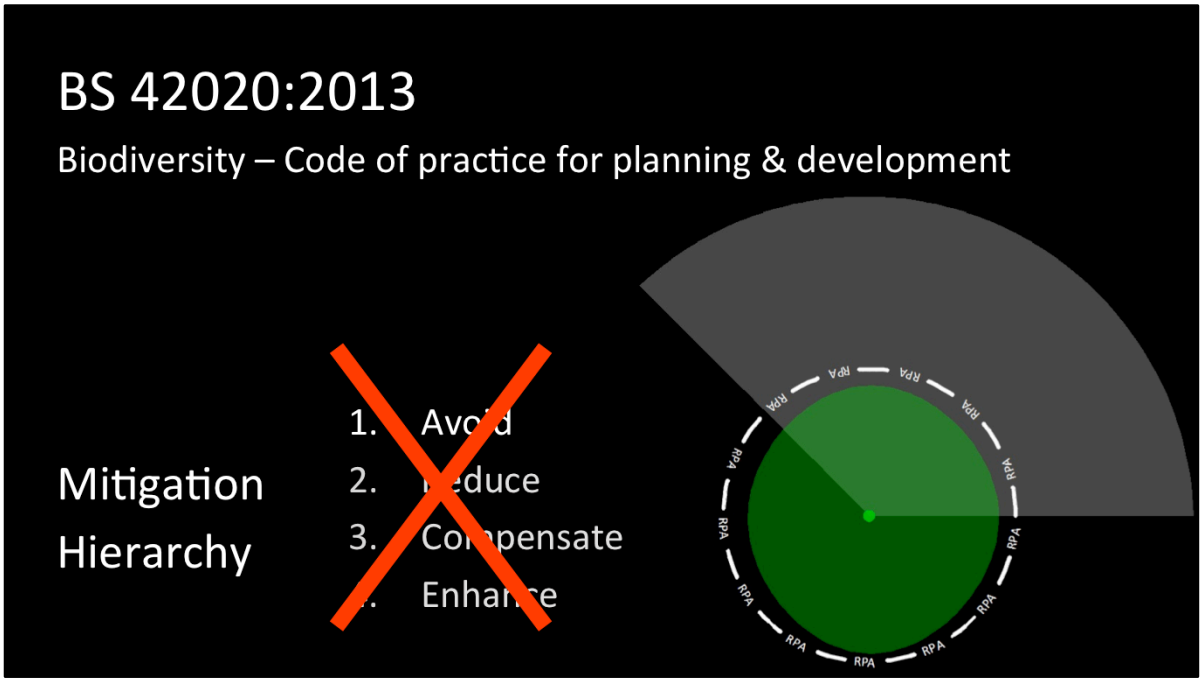
Mitigation Hierarchy

1. Avoid
2. Reduce
3. Compensate
4. Enhance

to prevent adverse impacts from happening and to keep those that do occur within an acceptable level

The process, defined as the Mitigation Hierarchy, states that in the first instance we should seek to **Avoid** 'significant' negative impacts…then **Reduce the effects of** and so on.

BUT the thing is if we base our work on BS5837 and express minimum RPAs as a starting point then, as we've already seen…



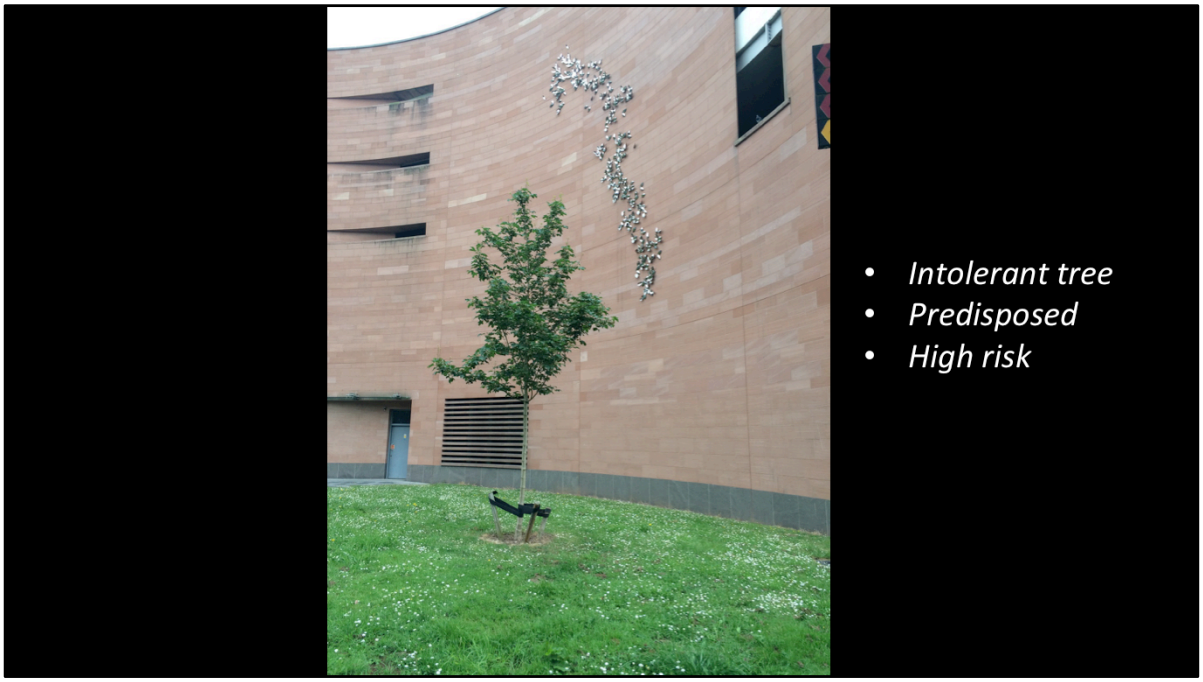
Impact avoidance is probably ***NOT POSSIBLE.***

Time for another couple of real examples.

I'm not saying it goes wrong all the time - it doesn't. Mature trees have been successfully retained in accordance with current recommendations…but perhaps we get lucky sometimes?

In another example…

This multi-story car park made a beautiful statement about the adjacent mature tree…which defined the buildings architecture…and in 2011 it looked wonderful.



Yet four years later the tree had died and been removed...unlucky?
No.

This was always an obvious candidate for a sooner rather than later departure from this world. It was a high risk tree.

The impact was not effectively assessed.

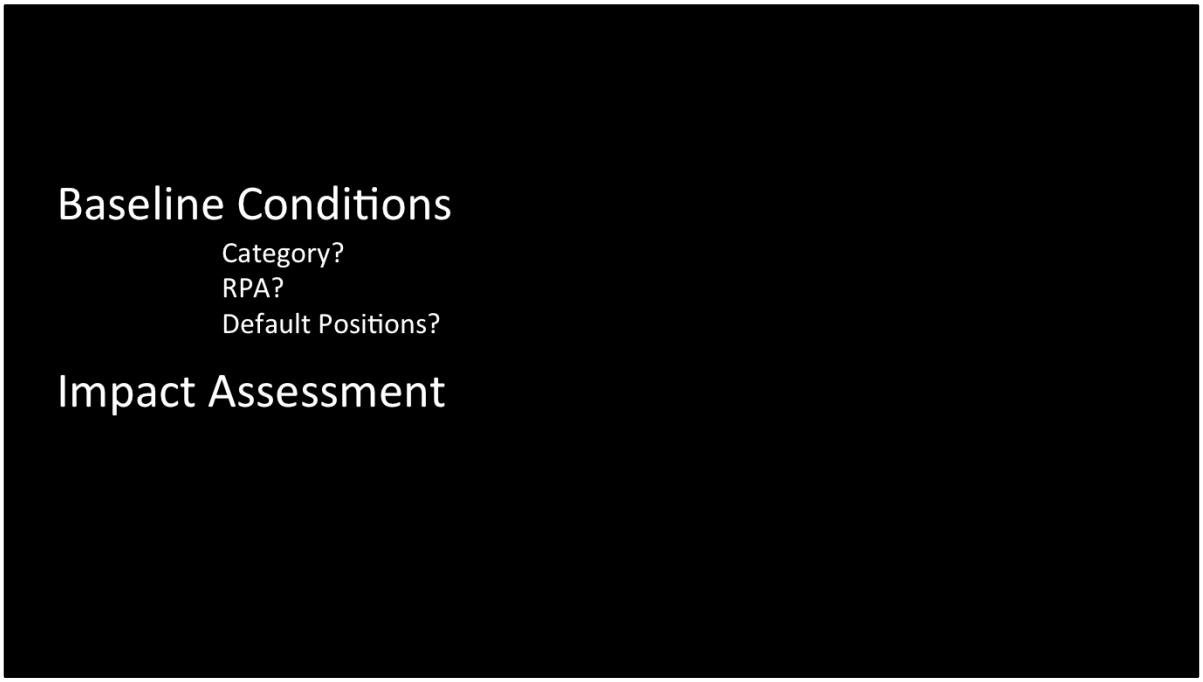
And just to add insult to injury look at the replacement planting!

On a positive note it did create an opportunity for some nice artwork…presumably of leaves going through the chipper!

Once again, the unfortunate reality is – for certain trees - that if we base our work on BS5837 we're not starting in the right place.

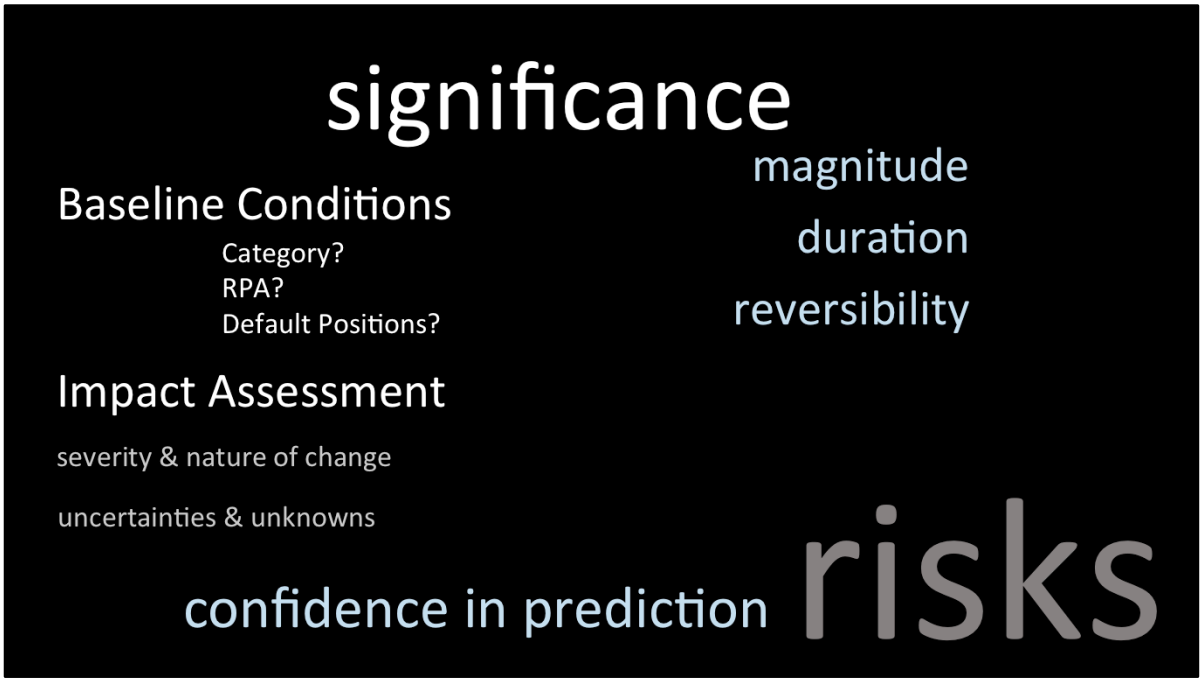
How many of you have 'haggled up' at a car boot sale and paid more than the asking price?

By plotting minimum constraints information from day one…we put large important (irreplaceable) trees at risk. Lines on plans get designed to.



We need Effective Impact Assessment based on good data without distracting ourselves with
CATEGORY,
RPA,
Default positions.

There's a common Language in Impact Assessment. We need to talk about…



Severity & nature of change,
Uncertainties & unknowns,
Risks,
Confidence,
Magnitude,
Duration,
Reversibility
etc…

There shouldn't be any fixed default positions as it commonly results in irrational or dysfunctional decision-making.

REMEMBER a line on a plan gets designed to, so unless you have the luxury of intimate & regular contact with all other project members don't be surprised when layouts don't work as well as you'd hoped they might.

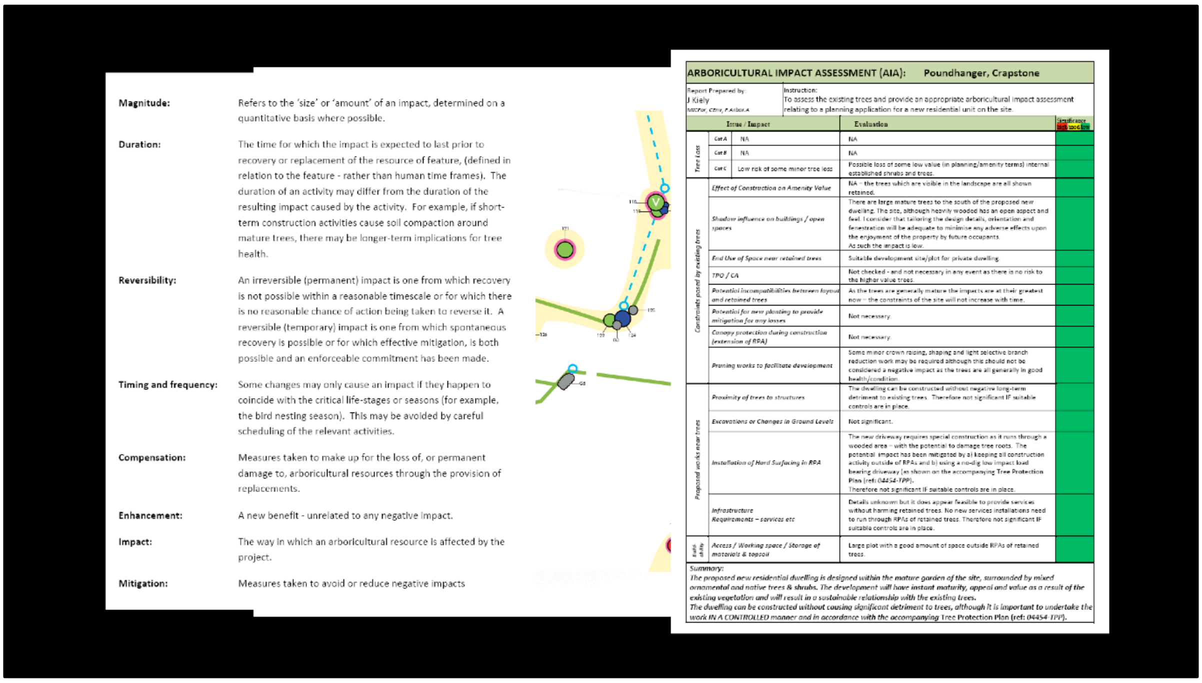
We need to be careful with our baseline data, in order to assess IMPACTS effectively.

Perhaps this is a more realistic starting point?

We need to discuss sites at every opportunity…the earlier the better.

In the instances we've sent out baseline plans with large circles on, it very quickly starts a conversation!

We don't have an unreasonable default position. I'm happy to discuss works in close proximity to retained trees once I have formed a well-balanced view on the impacts.



Magnitude: Refers to the 'size' or 'amount' of an impact, determined on a quantitative basis where possible.

Duration: The time for which the impact is expected to last prior to recovery or replacement of the resource of feature, (defined in relation to the feature - rather than human time frames). The duration of an activity may differ from the duration of the resulting impact caused by the activity. For example, if short-term construction activities cause soil compaction around mature trees, there may be longer-term implications for tree health.

Reversibility: An irreversible (permanent) impact is one from which recovery is not possible within a reasonable timescale or for which there is no reasonable chance of action being taken to reverse it. A reversible (temporary) impact is one from which spontaneous recovery is possible or for which effective mitigation, is both possible and an enforceable commitment has been made.

Timing and frequency: Some changes may only cause an impact if they happen to coincide with the critical life-stages or seasons (for example, the bird nesting season). This may be avoided by careful scheduling of the relevant activities.

Compensation: Measures taken to make up for the loss of, or permanent damage to, arboricultural resources through the provision of replacements.

Enhancement: A new benefit - unrelated to any negative impact.

Impact: The way in which an arboricultural resource is affected by the project.

Mitigation: Measures taken to avoid or reduce negative impacts

ARBORICULTURAL IMPACT ASSESSMENT (AIA): Poundhanger, Crapstone

Report Prepared by: J Kiely MICFor, CEnv, F.Arbor.A

Instruction: To assess the existing trees and provide an appropriate arboricultural impact assessment relating to a planning application for a new residential unit on the site.

	Issue / Impact		Evaluation	Significance high / mod / low
Tree Loss	Cat A	NA	NA	
	Cat B	NA	NA	
	Cat C	Low risk of some minor tree loss	Possible loss of some low value (in planning/amenity terms) internal established shrubs and trees.	
Constraints posed by existing trees	*Effect of Construction on Amenity Value*		NA – the trees which are visible in the landscape are all shown retained.	
	Shadow influence on buildings / open spaces		There are large mature trees to the south of the proposed new dwelling. The site, although heavily wooded has an open aspect and feel. I consider that tailoring the design details, orientation and fenestration will be adequate to minimise any adverse effects upon the enjoyment of the property by future occupants. As such the impact is low.	
	End Use of Space near retained trees		Suitable development site/plot for private dwelling.	
	TPO / CA		Not checked - and not necessary in any event as there is no risk to the higher value trees.	
	Potential incompatibilities between layout and retained trees		As the trees are generally mature the impacts are at their greatest now – the constraints of the site will not increase with time.	
	Potential for new planting to provide mitigation for any losses		Not necessary.	
	Canopy protection during construction (extension of RPA)		Not necessary.	
	Pruning works to facilitate development		Some minor crown raising, shaping and light selective branch reduction work may be required although this should not be considered a negative impact as the trees are all generally in good health/condition.	
Proposed works near trees	*Proximity of trees to structures*		The dwelling can be constructed without negative long-term detriment to existing trees. Therefore not significant IF suitable controls are in place.	
	Excavations or Changes in Ground Levels		Not significant.	
	Installation of Hard Surfacing in RPA		The new driveway requires special construction as it runs through a wooded area – with the potential to damage tree roots. The potential impact has been mitigated by a) keeping all construction activity outside of RPAs and b) using a no-dig low impact load bearing driveway (as shown on the accompanying Tree Protection Plan (ref: 04454-TPP). Therefore not significant IF suitable controls are in place.	
	Infrastructure Requirements – services etc		Details unknown but it does appear feasible to provide services without harming retained trees. No new services installations need to run through RPAs of retained trees. Therefore not significant IF suitable controls are in place.	
Buildability	*Access / Working space / Storage of materials & topsoil*		Large plot with a good amount of space outside RPAs of retained trees.	

Summary:
The proposed new residential dwelling is designed within the mature garden of the site, surrounded by mixed ornamental and native trees & shrubs. The development will have instant maturity, appeal and value as a result of the existing vegetation and will result in a sustainable relationship with the existing trees.
The dwelling can be constructed without causing significant detriment to trees, although it is important to undertake the work IN A CONTROLLED manner and in accordance with the accompanying Tree Protection Plan (ref: 04454-TPP).

We need a BS which is robust and which strongly encourages us to:

- Report appropriate/accurate baseline data,
- Predict significant negative impacts early,
- Discuss survey data with other project members & agree an environmental baseline,
- Identify the KEY features,
- Use a defined language.

Above all, report significant impacts clearly & effectively – you don't need a 50 page report. Try a table on a plan.

We need to move beyond static reports and place AIA through the entire process.

I'm reminded of the often quoted Blaise Pascal:
"I have made this [letter] longer only because I have not had the leisure of making it shorter".

Scoping

Baseline Conditions

Impact Prediction

Impact Assessment

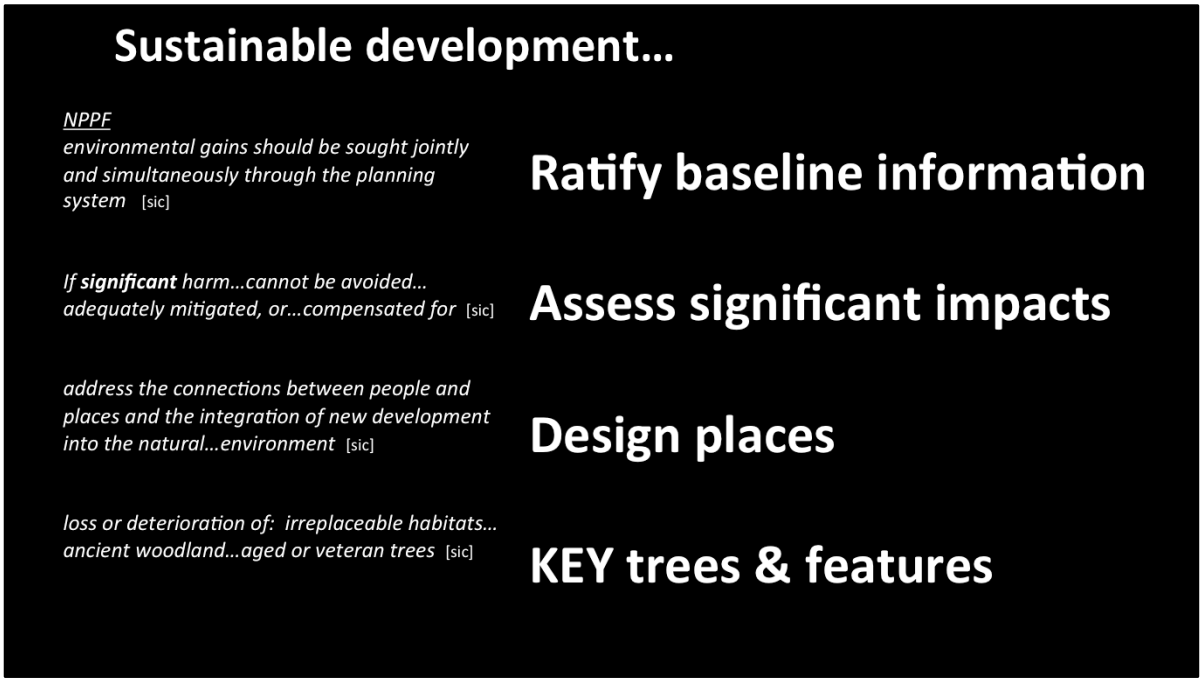
Mitigation

ARBORICULTURAL IMPACT ASSESSMENT: SUMMARY	Significance	Additional Information Request
Effect of Construction on Amenity Value	?	Details of tree planting: Species / Stock Size / Planting Method / Aftercare Program
Pruning works to facilitate development	?	Minor (however – proximity of several trees will lead to future management issues (section dwgs will help assessment)
Proximity of trees to structures	?	Confirmation of schools requirements – scale of building / description of development
Location & Dimensions of all Excavations or Changes in Ground Levels	?	Section dwgs will help assessment
Installation of Hard Surfacing in RPA	?	Confirmation of levels required – section details
Infrastructure Requirements – services etc.	?	Service run details – existing & proposed
Shading of buildings / open spaces		N/A
Direct & Indirect Damage	?	Foundation details / soil assessment – type, PI, description (heave calcs?)
End Use of Space near retained trees	?	Predicted use – numbers / occupancy rates
Future Pressure for Tree Removal	?	Proximity of several trees will lead to future management issues (section dwgs will help assessment)
Mitigation Strategy Details: Improvements in con'd for retained trees; Tree Protection; Compensatory Planting; Technical & Detailed Design issues; Working & Access Space for Construction; AMS		D & A statement / Timeframe for project / Duration of construction – plus any other info.... Type of Application Relevant Planning Policy – Mendip DC

Communicate throughout the process.
Ask questions.
Talk about trees.
Make sure you get all available information.

Clarity & Impact.

The art is making it simple.



Going back the opening point about 'sustainable development'.

The NPPF effectively asks us to:

- work collaboratively
- focus on significant impacts
- design places for trees
- focus on KEY trees

We need to take what's good from the current BS and move on.

We can't progress in this field whilst 'professionals' are applying rules of thumb rather than fact based evidence for the particular site/tree.

In summary we have to up our game and above all focus on keeping KEY trees & irreplaceable features well.

Thanks for listening.