THE ARBORICULTURAL
Consultant

Volume 47
issue one 2014

Dunster, J.A. 2014. *Documenting Evidence - Process and Practice*. The Arboricultural Consultant. 47(1): 4-11.

ASCA
AMERICAN SOCIETY of CONSULTING ARBORISTS

9707 Key West Avenue, Suite 100
Rockville, MD 20850

Phone: 301.947.0483
Fax: 301.990.9771
Email: asca@mgmtsol.com
www.asca-consultants.org

Documenting Evidence – Process and Practice

By Julian Dunster, Dunster & Associates Environmental Consultants Ltd.

Every day, arborists encounter situations where they need to document site and tree conditions, work processes, or specific aspects that might be needed later on. Learning how to document and explain evidence is important for any assignment, whether it is a simple letter, or an expert report for court testimony. In all cases, the way in which evidence is documented determines how well future analysis can be undertaken. Well-documented evidence allows analysis to proceed smoothly. Poorly documented evidence hinders or misleads analysis and creates additional time-consuming, expensive steps that could have been avoided. At worst, issues of interpretation may become hard to resolve, simply because the available evidence was poorly documented, leading to adverse decisions that should have been avoidable. In practice, if you are out working on a site, and may one day need to refer to what you saw (or think you saw), documenting evidence is important.

What is evidence?

Evidence : Something that tends to prove or disprove the existence of an alleged fact. *(Black's Law Dictionary, 9th Edition.)*

Evidence is the information you analysed to form your conclusions. It is the foundation of your analysis, discussions, conclusions, and opinion. For your opinion to be accepted as true, the evidence, and your analysis and interpretation of its implications, must follow a well reasoned thought pattern. If your conclusions are not supported by the evidence, then what you are seeing and discussing may lead others to a very different opinion.

Describing evidence requires effective communication, which includes written or verbal descriptions, photographs, sketches, diagrams, and plans. These forms of communication are used to tell the story. They describe:

What you saw at various scales.

- How you recognised the evidence.
- How you analysed it.
- How you interpreted all of this to arrive at your opinions.

To collect and document evidence effectively, several important steps are required. You need to know:

1. What to look for and how to find it.
2. What you are looking at and understand its implications.
3. What to sample and why.
4. How best to collect and record the data.
5. How to describe what you saw.
6. How to best analyse the evidence collected, and be aware of the various strengths and weaknesses of any one approach.
7. How to discern the important from the irrelevant

Finally, you have to clearly understand the ethics and professional protocols that go with these steps. Pitfalls abound, and in a legal setting they can undermine, if not completely discredit, your efforts.

To accomplish these steps, documentation has to be thorough. You need to know and understand the subject matter and the various procedures and protocols used in collecting and analysing evidence. The procedures used, along with the thought processes and decisions that led to the final opinion, need to be effectively and ethically reported and communicated. Describing these steps allows others, who have never seen the site, to clearly see the same thing and derive their own opinions.

Evidence includes the body of factual items, such as oral and written testimony, statistics, examples of similar items, and comparisons and analogies, along with supporting information such as documents, photographs, maps, and physical evidence (e.g., soil samples, pieces of wood). Taken together, the evidence shows how you formed your opinion about whether or not a hypothesis is true or false.

Evidence is strongest when it provides incontrovertible proof that there is a direct link between the cause and the effect. Evidence is at its weakest when the link between the cause and effect is consistent with one assertion but may be open to other assertions that are equally plausible.

Using evidence

Evidence is used to support an opinion. To be credible, the evidence must be supported with data and "facts." It must be convincing, provable "beyond reason-

able doubt" as authentic, and within the realms of accepted science and professional practice. In its simplest form, science investigates why things happen. A hypothesis is formed that predicts "if event A occurs, then result B will follow." This is called a cause and effect linkage. Scientists test the hypothesis by comparing what was predicted to happen against what did happen. Over time, and after much testing, certain patterns become clear and can then be used to make reasonably accurate predictions about similar future events. When using evidence, we often have only a small part of the whole picture. To form a defenceable opinion you need to know the importance of the evidence, the reliability of it, the accepted ways it might be analysed, and the strength and weaknesses of both aspects. If the foundational data is not accurate, then all subsequent analysis and decisions will be inaccurate.

The level of accuracy required to provide defensible evidence is also important. In some instances, a simple test may be sufficient to derive a reasonable conclusion. A simple increment core may be just as useful as a Resistograph® test if all you need to do is prove a cavity exists. But, if you need a detailed and accurate measurement of relative wood density along a set line, the increment core will not give you enough data.

In all cases, the evidence must be clear and explainable, free from bias (or the bias must be acknowledged), and to the extent possible, unchanged from the original condition.

While these aspects form the common definition of evidence, there are also Rules of Evidence prescribed by the courts at federal and state/provincial levels.[1, 2]

These may also be embedded within individual Acts and Statutes, and may contain details about types and admissability of evidence. For example, the U.S. Federal Rules of Evidence (2013) include a test for whether or not evidence will be allowed in court cases.

Rule 401. Test for relevant evidence
Evidence is relevant if:

a. *It has any tendency to make a fact more or less probable than it would be without the evidence; and*
b. *The fact is of consequence in determining the action.*

Pitfalls

When forming an opinion, don't try to form it in advance of the evidence. Rather, let the evidence, and your systematic analysis of it, guide you toward the opinion. Evidence establishes facts, not the other way around. It is not always easy to gather or have access to a comprehensive set of evidence and supporting data. For example, you might be working on a case long after the incident occurred. It may be that you will not have access to the site, or if you do, it has changed in the intervening years, and key elements are no longer available. The original physical evidence may have deteriorated, been "misplaced," or destroyed. Often, you will have to work with someone else's photographs. These may be poor quality, offer incomplete coverage, and perhaps have completely missed aspects that you feel are important. If the available evidence is deficient, clearly state what is missing, why it would have been helpful, and how it affects your opinion.

Evidence establishes facts, not the other way around.

Understand what to look for and avoid bias. Bias is defined as "a predisposition to decide a cause or an issue in a certain way."[3] Your understanding of the "facts" may be biased if the implications about the supporting evidence, or your analysis of it, are not impartial. Do not be pressured into stretching limited evidence and your interpretation of it to fit the "facts" that your client wants to establish. If the evidence is unclear don't try to fabricate your explanation of what it is or what it means. Similarly, if there are multiple explanations about the evidence, be sure you understand them all. Do not overlook or ignore other explanations simply to keep the client happy.

Most importantly, avoid the temptation to see one aspect and assume that it alone is the key factor. That approach conditions how you gather evidence, because subconsciously (as opposed to intentionally), you will tend to gather the evidence that supports your conclusion and ignore or fail to see other evidence that would lead to a different conclusion.

This is called confirmation bias, and it can be powerful and very misleading. Take the time to examine the entire site of interest, look at and document all aspects, and be sure to collect everything of potential relevance.

When you collect evidence, be aware of the many ways in which bias can creep in. Understand the technical protocols for properly collecting and storing samples. Know the options available for conducting tests and the strengths and weaknesses of each one. Document every step of your analysis so that opportunities to prove you wrong are largely eliminated. For example, collecting foliage, soil, or water samples for analysis of possible herbicide damage all have quite specific and commonly accepted protocols to avoid cross-contamination from other sources. You need to know these and abide by them if the physical evidence, and your analysis of it, are to have credibility later on.

The intellectual process of gathering evidence

Not all evidence is immediately obvious, and even when it is, not all evidence presents itself as important. There are two key principles to follow.

1. Know what to look for.
2. Know what you are looking at.

For example, tree risk assessors know that some tree forms and shapes may indicate specific issues of concern. Simply seeing these shapes or forms—knowing what to look for—is not enough. We need to know what we are looking at. To do that, we need to understand what any one tree should look like, and compare that to what it does look like. If there is a variation between the two, what does that mean? Are you seeing an issue of concern?

Not all variations from the expected baseline condition are significant. Some may be well within a normal range of variation and would not usually be considered as important. If the variation appears to be beyond the normal range of variation, it may be very significant. The observer needs to know the range of variations and implications before any further analysis can be undertaken.

Often, a preliminary evaluation of the evidence may be inconclusive. Additional testing may be required, possibly over a period of time, to see if some conditions change. Perhaps the results show that there are serious structural issues visible in the tree, which, if analysed correctly, will better inform a risk assessment process. Or, the results may suggest there are no problems at all. Sometimes, the test results will be inconclusive and more tests may be required. And, there may be instances when there are no suitable answers to fit the situation. In all cases, do not make the evidence fit the facts desired by the client.

When gathering evidence, the basic starting point is to train your eyes and brain. What you see determines how your brain interprets the information and vice versa. The same applies to other people reviewing what you see. A picture that only shows a closeup view may eliminate critical information. Had there been a wider view, perhaps more evidence would have been visible. That might have allowed another set of eyes to draw a different conclusion.[4]

Know what to look for. Know what you are looking at.

To really test your opinion, you must accept that what the eye sees, and the brain interprets, might be wrong. A key concept at this stage is to answer the question "is the absence of evidence evidence of absence?" For example, just because no fungal fruiting bodies were observed does not automatically mean the tree has no decay (although that may well be true). Suppose the absence of fruiting bodies is due to the type of fungus (annual versus perennial conks), the time of year you saw the evidence, the stage of growth (not yet advanced enough to produce a fruiting body), or the presence of a decay that seldom shows up easily (such as only on the underside of roots). These are limitations that need to be known and understood, because if you have them wrong, your analysis and conclusions may also be wrong.

Knowing what to look for is the first step. To do it well requires thoroughness and a really good technical understanding of each situation. The evidence supports your conclusions, but your conclusions need to be validated. For that to become a rational and defensible process you need to be able to explain:

- What you think you saw.
- Why you felt it was or was not important.
- Why you accepted some things as important and others as irrelevant.

Is absence of evidence evidence of absence?

In many instances, you need to suspend your final opinion until such time as you have conducted a thorough assessment of all the available evidence and considered all of the possible explanations about the issue under investigation. All results and decisions are important. They represent further evidence supporting the process of data collection, analysis, and decision-making. You need to acknowledge constraints and limits on the processes used and how they might affect your conclusions.

And, you need to explain and defend the following:

- How you tested your thought process.
- How you considered possible alternative implications.
- Why you accepted or rejected each one in turn.

In effect, you have to demonstrate not only a logical data collection process, but also a logical data analysis process. Forensic investigations, where cause and effect linkages are examined in detail, require considerable levels of detail and documentation to address these issues.

The practical process of gathering information

Before the site visit

Before you get to the site, think about what types of evidence you might find and what you should be looking for. The scope of your assignment will define the level of detail required. If you have a limited budget or timeframe, you may not be able to gather much evidence at all. The result may be a preliminary opinion subject to more detailed work to confirm or confound certain aspects. That constraint must be clearly identified in your report. By contrast, a forensic investigation of a fatality requires you to consider every conceivable aspect, document the whole site and perhaps the larger locality, and examine very site-specific issues on a microscale level. In that case, it is often not practical or wise to even consider a preliminary opinion until such

time as all the evidence has been considered. Additional materials or data may be needed to pursue one line of inquiry, and that may prove the working hypothesis wrong, necessitating another explanation. A good approach is to expect the unexpected and be prepared to adapt your approach as needed.

Consider the following questions and use them on site to be sure you have documented all the information that might be needed later on.

1. What did you see?
2. What did you do to document what you saw?
3. Why did you use this process/ approach and not another?
4. When did you do it?
5. How did you do it?
6. Did you do it correctly?
7. Could you have done it a different way?
8. If so, why didn't you?

On site

On site, it is always important to be focused and not get sidetracked by the obvious and then forget to check other aspects. Conversely, don't get hung up on the esoteric and then miss the obvious. If you are working with a colleague, it can be useful to bounce ideas around, but keep an open mind as you proceed. Do not be rushed. Take time to correctly gather all the information you need. Take lots of photographs, but be sure the photographs you take are all relevant. In a court case, it is possible that all photographs taken will be requested by the opposing side, so be sure to avoid inappropriate images and video.

Start with the basics. Ideally, you should have a site plan, survey, or aerial image of the site before you arrive. That way, you can readily orient yourself to the site. If these are not available, be logical and systematic. Take an obvious landmark, such as a fire hydrant, lamp post, power pole (write down and photograph any identifying numbers present), or street corner, or a GPS point accurately locating latitude and longitude, and use that as your reference point. Avoid items that might be removed, demolished, or cut down within the next 10 years.

Know how to properly collect evidence. There are well established protocols for aspects such as soil, water, and foliage sampling. Be thorough in identifying and documenting what you see, and be sure that what you see belongs where you see it. For example, if you find a perennial conk on the ground, and you recognise it as a fruiting body associated with root rot, are you sure it is in its original location, or has it been moved around? Document its location before moving it, and note that it might have been moved, or document why you think it is in its original location.

Analysing the evidence on site

Some of the evidence can be analysed on site, and these results may dictate how to proceed with the rest of a tree, or with other trees nearby. Correctly analysing data on site also helps you collect the right evidence for later use. Know what to look for and what you are looking at.

If you are investigating a tree failure for an inquest or an insurance claim, be very aware of the evidence. Right after the incident, it is likely that emergency services will be focused on public and / or individual safety. Your access to the evidence may be constrained, or even prohibited, and there may be no way to stop some or all of it being moved around, damaged, or destroyed before you get there. Often that will mean working with partial evidence and trying to reconstruct the scene as it was before and after the incident. Be very systematic and comprehensive. You can set aside evidence later on if it is unimportant. But, if you didn't collect all of the critical evidence initially, your subsequent analysis and conclusions may be flawed. If there is pressure to clean up the site, try to document every possible aspect as soon as possible. Once the evidence is lost, it may be impossible to recreate it.

As an aside, the pressure to "clean up" the site may be a manager's or owner's way of getting rid of any potentially incriminating evidence, thus making a potential claimant's job considerably more difficult. It can be important to recognize this issue and try to work ahead of it as best as possible.

Gathering other evidence

When assembling evidence for analysis, don't forget to look for historical data, including past inspection reports and images, photographs taken by a homeowner, and anecdotal evidence from long-term residents or realtors, as well as historical aerial imagery and Google Earth and Google Street View images.

Photographing the evidence

A picture is worth a thousand words, especially when it comes to conveying detailed information. Most evidence can be presented in images, although physical evidence may also be critical in some instances.

The starting point is to have photographic images that clearly show:

- What the evidence looked like on the day the image was created.
- How any one image relates to the overall site and overall tree.
- Where detailed images fit in the larger scale.
- Specific details that informed your analysis.

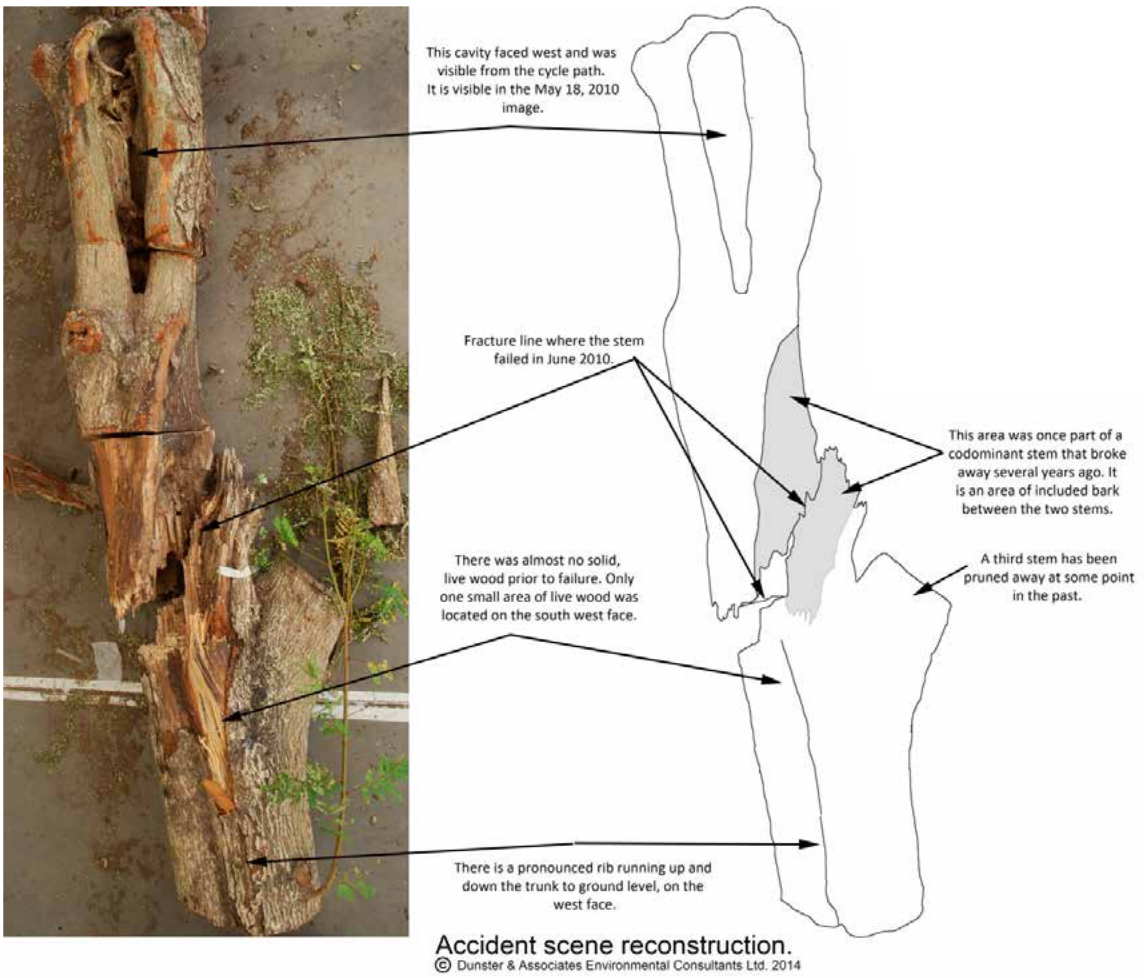
Learn how to take good photographs. At a minimum, each photograph must be in focus, be correctly exposed, and correctly show the story without bias. Each image tells part of the overall story, so make the sequence logical and informative. Later on, the photographs themselves become evidence.

At the site, document the scene as you first found it, before moving anything. Photograph every possible viewpoint: closeup, medium view, and further away. Get a comprehensive view of the entire site and any aspects that may have influenced the failure. Unless you need to show that a person was on site at the time, or a sense of scale, try to keep people out of the images, as they can be a distraction. Try to systematically document each part of the tree and its relationship to the site. Sometimes the site will have been "cleaned up" and the tree parts stored off site. Photograph tree parts in several ways—ideally *in situ,* as you find them first of all, and then in sequence, as you think they most likely were before failure. If necessary, try to reconstruct the failed part and document relative position of tree pieces so that you and others can clearly see critical aspects. If allowed, place markers (e.g., pieces of ribbon or paper pinned to specific points) on tree pieces to draw attention to key features. However, it is usually unwise or not permitted to physically alter the evidence or permanently mark it unless all parties involved agree to it. If you do take a sample for analysis off site, be sure to photograph the evidence *in situ* before you sample it, and take another image of the area after the sample is removed. Clearly show what is being removed so that you can show others later on.

Time of day can be very important. A low sun angle will cast long shadows that can obscure critical details. A high midday sun will have shorter shadows, but the contrast between shadow and well lit areas can be very harsh and much more difficult to photograph. Plan what you need to photograph beforehand. Think about where the sun will be, and which areas will be in sunlight or shadow. Think about good vantage points for image collection, and get all points of view: the overall landscape and site context as well as medium-range and closeup shots. Learning how and when to use flash photography is important.

A sense of scale is always important. At the larger level, note and photograph obvious site features and accurately measure distances between them. Later on, these distances can be added to photographs or sketches. At a site specific level, add in scales of some form. Use documentary rulers or scales so that the relative size of each piece of evidence is defined for later analysis. If you don't carry documentary scales, use an object whose size can be verified. A pencil, lens cap, hand, or coin are commonly used objects.

Documenting illegal tree cutting. The scale provides an accurate dimension. It is located at the pith mark to illustrate growth rings along a radius and to show how the rings were counted to estimate the age of the tree at the time of removal.—*Photo by © Dunster & Associates Environmental Consultants Ltd. 2014*



Tree fatality investigation: Hong Kong. On the left, the pieces of tree lined up as they would have been *in situ*, prior to failure.

On the right, a sketch of the tree with annotations to highlight specific aspects discussed in the report. The sketch was created by tracing the details of the image into a layered file using Photoshop. This ensures a reasonably accurate reproduction of the wood parts without distortion.

Analysing steep slopes and rockfall history by comparing the age and location of mature trees to position of the fallen rocks. The calibrated staff provides the scale.—*Photo by © Dunster & Associates Environmental Consultants Ltd. 2014*

For detailed images, the use of rulers is preferable, as there can be little dispute about size if a clearly calibrated ruler is visible. Be sure that the scale and the evidence are correctly exposed and in focus. The intent is to clearly show the size of the specific aspect. These scale measurements are critical; they allow other viewers to get a good sense of the site and specific aspects, even though they are not there.

Photographs in court

There is a lot of debate on what can or cannot be used in court when it comes to photographs. Two aspects need to be considered. Firstly, will the images be allowed as evidence in court? Admissibility means that the court believes the image is relevant. That is, it will assist the judge or jury to prove or disprove one or more aspects. To be admissible, the image must be authenticated as an image of that site on that day, and it must be relevant to one or more factors that affect the matter in dispute.

Secondly, once the images are admitted as evidence, the key test of acceptability is whether or not they "fairly and accurately" depict the site or event. Consider this test for aspects such as:

- Wide angle and detailed views of the site.
- The tree.
- The conditions affecting the site and the tree.
- The relationship between critical aspects that support or disprove each aspect of the incident.
- Sampling points.
- Any other aspects that will support or disprove the evidence.

The advent of digital photography has introduced additional complexity when it comes to photographs in court. In the past, producing the original negative and a print directly from it was enough to show authenticity. But digital images are easily moved from flash cards to computer hard drives. While the intention to submit the printed image as an original that has not been altered in any way may be honest, be aware that there are many pitfalls.

For photographs or videos, the key issue is the basic test "Does the photograph fairly and accurately depict the scene?" The intent is to show that scene in as much detail as possible without materially altering the evidence. For example, software can be used to lighten up shadows and reveal previously hidden or obscured aspects. The end result may be a very grainy image with appalling colour balance. As long as the key site factors are still visible, and as long as you can show what you did and how, the resulting image should be acceptable. The key here is to be able to have the original image, and be able to show how the processed image reveals additional information without any loss of context, distortion of facts, or addition or elimination of key aspects. Placing before and after images in a report, along with notes about the process used to achieve the changes, may be prudent.

Video evidence

Collecting video evidence on site often makes sense, as it can later be reviewed to refresh your memory of various aspects. Be sure to document wide angle and closeup scenes. Make any movement in the scenes slow and deliberate, not fast and choppy. If the video is to be used in court, be aware that there may be risks. Simply altering brightness, contrast, colour balance, grain, and background noise may be acceptable. If too much editing has been done, and especially if sections of the video have been removed, the material may be challenged as "significantly altered" and therefore, in some way prejudicial to the other side. As with photographs, having an untouched original and being able to show what changes have been made is important. And, just as with photographs, video often needs explanation to show what is being seen, how it relates to the matter at trial, and what can or cannot be interpreted from all or part of the imagery. This might entail having screen captures of one or more frames and being able to explain how they relate to crucial details that would otherwise be overlooked.

All of which means that if you want to use video or photographic documentation, be sure you know how to capture high-quality material so that it is less likely to be challenged as inaccurate, biased, prejudicial, or irrelevant.

Presenting evidence

How you present evidence is very important. As with earlier stages, there are pitfalls, and bias can easily creep in accidentally (or worse, deliberately). Your goal is to show someone who has never been on site what you saw, why you thought it critical, how you analysed it, and how it supports your conclusions. There should be a balance between presenting too little or too much detail. The presentation needs to include enough detail to make the concept or point easy to understand without being so incredibly detailed that even the most attentive listener cannot follow the explanation. It also needs to reveal what the evidence is purported to represent (your hypothesis); how it was

collected, analysed, and interpreted; and why the conclusions and opinions derived make sense and other explanations seem less possible. If there are gaps in the available evidence, or uncertainty in some aspects, know them and show how they do or do not affect your final opinion.

With the advent of sophisticated computer technology, it is now possible to easily assemble detailed reports that include charts, images, sketches, and plans. If you want to assemble a complex report, consider desktop-publishing software, as it is more robust and stable than most simple word processing software, especially if the report uses many graphics. As with the previous stages, assemble the materials sequentially and logically so that they clearly tell the story from start to finish. Be sure to annotate and describe images thoroughly so that the reader knows what they represent, where they fit in, and where they came from. If you are using images from several sources, note the source on each one. For example, "image taken by author" or "image supplied by city of Tsu Tao." If you have site plans, aerial images, and sketches, make them easy to read and understand. The reader has to be able to look at all of this material and follow the thought process used to collect, analyse, and interpret your evidence.

Sketch plans should always have a north arrow and a scale. The scale should always include a bar scale so that approximate measurements can easily be made from the sketch. Providing a numerical scale works as well but is a lot harder to use for simple measurements. Photocopiers are notorious for changing the scale of plans; having the bar scale present solves that issue. If the output size is small—for example, a standard page size—it is not uncommon to add a label stating "Do not scale from this plan." Label the sketch plan clearly. Make sure the labels are clear, will reproduce well at several scales, have contrasting colours and legible font size, and do not obscure critical information. If the plans will only be reproduced in black and white, use line weight and line style to differentiate items. Provide a clear title, a date, and the source of any work such as survey plans. If there are important limitations that should be noted, be sure they are clearly displayed.

Summary

Effective collection, documentation, and analysis of evidence is vital. Evidence forms the foundation of your opinion. You need to know what to look for and what you are looking at. You need to be able to document and describe what you saw, why it was or was not important, how you analysed it, and how you interpreted all of these aspects. At the end, the evidence examined, the process used, and the conclusions reached all have to make sense. Be sure that your opinion is clearly supported by the evidence available. Acknowledge areas of uncertainty, gaps in the evidence or data, and areas that may affect your opinion. Above all, remember that evidence establishes facts, not the other way around. Never stretch the evidence to make it fit the facts desired by the client.

This article is an extract from Julian's new book, *Documenting Evidence. Practical Guidance for Arborists.* Copies are available in hard copy or as a pdf at http://www.dunster.ca in the publications for sale section.

I thank my colleague Russ Carlson for his input and suggestions as the article and book evolved.

References

1 Canada Evidence Act Canada Evidence Act (R.S.C., 1985, c. C-5) http://laws-lois.justice.gc.ca/eng/acts/c-5/

2 U.S. Federal Rules of Evidence. http://federalevidence.com/rules-of-evidence

3 Black's Law Dictionary. Free Online Legal Dictionary 2nd Ed. http://thelawdictionary.org/bias/

4 Deliberately cropping the image to remove critical evidence that does not support a predefined opinion is a form of bias.