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Following a joint statement from the farming industry calling for the government to secure a Brexit transition period when the UK would retain unfettered access to European markets inside the Customs Union, it is clear there is agreement on the need to avoid a cliff-edge withdrawal from the EU. Any transition period would need to last until there is a free trade agreement between the UK and EU, and this may go beyond the end of the Article 50 process.

Brexit uncertainty continues to influence the markets, including that for farmland. Subdued demand coupled with falling land prices and a lack of new supply also saw calls for more post-Brexit clarity from respondents to the January to June RICS–Royal Agricultural University Rural Market Survey. The transaction-based price index slipped for a third successive report and headline demand continued to decline. However, there is considerable variation in prices, for example, from £7,000 to in excess of £10,000 per acre for arable land. Where there is strong local interest, buyers are paying prices similar to the peak; elsewhere, land is struggling to sell. Meanwhile the 12-month price expectation remains negative, but only modestly.

The Bristol conference did not happen this year due to reorganisation of programmes by RICS Events; the plan remains to rotate the annual conference between Nottingham and Bristol, but if members express preference for alternatives, these might be considered. I would encourage members to drive the agenda locally: it is important that we maintain our links with regular attendees at our events as well as with speakers, so we can continue to secure their input into what I think have been excellent and informative conferences over the years. I want to thank members who have helped put these events together in the past and hope we can work together in the future.

This edition of Land Journal contains several articles that will greatly interest members who want to delve into practice issues in a range of land-related sectors. The article on land valuation initiatives and their use of technology in Rajasthan, India (pp.20–21) follows our piece on ecosystem valuation (see Land Journal August/September, pp.6–8) and highlights how important the realisation of intrinsic value is in people’s connection to land. Some would argue that such value is as important as a legal title and helps local people negotiate from a position of knowledge when dealing with land acquisition and compensation. This understanding of value is also central to the International Land Measurement Standards, which are reaching the draft stages for consultation, with launch due at the FIG meeting in Istanbul next May.

Before then, our evening lecture series is beginning again. This year’s Christmas lecture on 7 December will be given by Alan Mills of MapAction, who will focus on the charity’s essential work in providing geographic support during disaster response. Email pgsupport@rics.org for more information on the lectures.

This issue’s piece on the important subject of data standards (see p.14) makes some key points on the reasons for, and advantages of, adopting well-structured standards. We are all likely to benefit from these initiatives, so it is in our interest to consider how they could help us in our day-to-day work and data interactions. It is also an opportunity to comment on, and contribute to, RICS’ work in its promotion and support of the geomatics profession.

When I asked last year what the name of our professional group should be – geomatics, land and hydrographic surveying or geospatial surveying – it generated lots of comments, and I wonder whether the interesting article by Brian Coutts on our profession (p.9) and the impact technology is having will also prompt a strong response.

The use of satellites for remote sensing in London, the topic of another article (pp.10–11), illustrates how technology can help us in our work. These systems come into their own for many types of monitoring, especially with the recent extreme weather events around the world, because the spatial data and accurate measurements from satellites enable us to be better informed and prepared, giving us more time to plan. Our services are in need more than ever before, and our adoption of new tools and technologies will sustain our profession for many years.
The RICS Governing Council will meet in early November in Toronto, Canada, for the profession’s AGM. This will coincide with the inauguration of Toronto-based John Hughes FRICS as the organisation’s new president, and his consulting practice is quite focused on planning and development.

The council will also be making a number of key strategic decisions on the overall governance of the profession, including the structure of professional group representation, enhanced ways to communicate and develop our professional knowledge, skills and associated standards and practice guidance.

Whatever changes are decided, the work of planning and development surveys will continue, but with new challenges. One of the articles in this issue (see pp.12–13) explores the possible impacts of new technologies on the profession: research suggests that up to 88% of core surveying tasks, for example, are ripe for automation. Valuation work appears to be particularly vulnerable, but developing land use plans less so. This is arguably related to the inherently future-gazing, future-planning and future-making nature of our work.

Automated or not, every professional group is being asked to consider what areas of activity should be governed by clear standards and which by guidance: not an easy question, but one that must be addressed over the coming months. And a complementary question has to be whether automated areas of practice are more appropriate to standards than non-automated areas. Please send your thoughts to Tony Mulhall or myself (mulhall@rics.org or paul.collins@ntu.ac.uk).

RICS prides itself on producing quality standards, offering value and guidance to members and regulated firms by providing them with clear mandatory requirements and best practice advice. In order to do so effectively, we rely on the comments that you provide as part of the consultation process.

The process lasts for a minimum of four weeks and, during this time, RICS encourages all stakeholders to engage by reading and commenting on the document. The consultation is shared as widely as possible.

RICS wants to offer the best possible advice and guidance to members, and to achieve this we need to be transparent about our consultation process. By consulting widely and openly on our standards, we are being clear in how we advise members to behave and the criteria against which we regulate them, giving them the opportunity to contribute to and shape the documents themselves. We rely on the expertise and experience of our members to help influence future standards, and every comment provided can make a difference.

If a standard is likely to affect you and the way that your firm deals with clients, this is your chance to comment on it and make suggestions to the author team. You have the right to contribute, and your comment could directly influence the published document. Consultations depend on active engagement from members, and we set great value on your input and insights.

How to get involved
First, visit the iConsult website (www.consultations.rics.org), which will show you the list of open consultations. You will be able to view live consultations and download a PDF of the complete consultation document without logging in. However, if you are new to iConsult, you will need to register to submit comments on the consultations. Please note that iConsult is a different platform to rics.org, and a separate account is needed.

Registering is easy, and involves a few simple steps. Select “register” and add details of your specialist to be informed about consultations. Complete your details under “user details”, “public profile” and “private profile”. Please note that fields that are marked with a red asterisk are mandatory.

In order to be notified about consultations, fill in subject areas of interest and select “yes” when asked whether you want to be notified about consultations. Finally, click “register”, and you will be ready to start commenting.

Please note that all comments need to be submitted via iConsult for auditing purposes; comments that are sent by email may not be considered. Note, however, that RICS members can gain 0.5 hours of informal CPD for every consultation on which you comment.

Ellie Scott is a senior product manager at RICS escott@rics.org
An increase in cases of new houses being damaged by the collapse of old mine workings is a stark warning to developers and land purchasers to protect themselves from underground dangers, writes Tom Backhouse

A sinking feeling

Subsidence is an issue that plagues many houses across the UK. Often the result of natural shrinking and swelling of clays during dry or wet weather, subsidence or ground collapse can also occur due to historical mineral extraction.

Subsidence is the motion of the earth's surface as it shifts downward, while collapse is a more severe form of subsidence and occurs when an existing void reaches the surface and creates a visible depression, often referred to as a "sinkhole". These may be caused by natural processes or by a "crown hole" if caused by human activity, such as mining.

Several types of subsurface mining, and specifically methods that intentionally cause the extracted void to collapse – such as pillar extraction, longwall mining and any metalliferous mining method that uses caving, such as block caving or sub-level caving – will result in surface subsidence. Mining-induced subsidence is relatively predictable in its magnitude, manifestation and extent, except where a sudden pillar or near-surface underground tunnel collapses, which is usually the case in very old, poorly supported workings.

You would expect these subsidence issues only to affect old buildings and property constructed before stricter modern planning and building regulations. However, homeowners at Bayfield Estate at West Allotment on North Tyneside were evacuated in June 2016 and permanently relocated in December owing to severe subsidence damage that initially threatened five properties. It was later revealed that this subsidence was probably caused by the collapse of historical shallow coalmines beneath the estate.

These mine workings were undocumented by the Coal Authority (TCA), and without additional data and the interpretation of existing data, the risks were not evident during preliminary due diligence when the land was originally purchased or later when the houses were constructed.

In January 2017, five houses on the estate were demolished, costing £95,000. A further 10 were scheduled for demolition, leading to a total housing development loss of value of around £3m.

Bayfield Estate is one of many examples of new-build developments being affected by historic mineral extraction within a few years of completion, and this unprecedented increase in cases is a stark warning for housing developers and purchasers to protect themselves from what lies beneath developments.

With more land, technical and historic industrial data available, as well as the means to interpret and model old mine workings quickly, the onus is on developers, the government and local authorities to carry out more comprehensive research and risk assessment on land for both construction and redevelopment.

Bayfield Estate geology

The area of North Tyneside is underlain predominantly by the Pennine middle coal measures, a group of interbedded grey mudstones and pale grey sandstones with frequent coal seams, many of which have been exploited by surface, shallow and deep underground mining since at least the 13th century (see Figure 1C).

TCA data (see Figure 1) reveals that the Bayfield Estate development area rests on a north-dipping, east–west-trending coal seam, recorded as intersecting the surface at the southern end of the estate.

This seam, the Charlaw/Moorland, is documented to have been mined 200m to the north, coinciding with numerous documented mine shafts. As well as coal, there is evidence that sandstone had also been quarried beneath the western part of the estate.

The risk

Mining-related subsidence or collapse can occur from the progressive degradation of subsurface voids, a legacy of historical underground mining activity. These voids can increase in size over time and migrate towards the surface, a process exacerbated by loading the ground above them – for example, by building new homes on previously undeveloped land. This subsidence can warp and damage buildings, manifesting as large-scale cracks in walls and floors, as was the case on the Bayfield Estate.

Much of the West Allotment area falls in a development high-risk area, defined by TCA as a zone in which developers...
are required to commission a coalmining risk assessment (CMRA) from a qualified mining geologist or engineer before beginning any construction. While TCA data records extensive historical coalmining activity in the vicinity of the site, it does not include documented shallow coalmine workings beneath the site.

Historically, the information required by both planning and conveyancing legislation did not include interpretation, only the reporting of data by answering a series of standard questions on a yes-or-no basis. Gaps in data around the West Allotment area are therefore mistaken as a sign that no workings are present, and areas where there was probably shallow coalmining have been neglected and misinterpreted.

The TCA data – commonly and historically used as the sole source of coalmining data in the UK when undertaking due diligence in land purchase and development – did not reveal any documented historical mining activity beneath the Bayfield Estate.

However, the addition of more varied historical, land, mining, geological and technical data and the interpretation of likely ground movement revealed a different picture.

**Professional interpretation**

It is now possible to access TCA data and supplement it with detailed historical maps dating back to the 16th century, comprehensive geological information, historical land records, academic research, council records and local site investigation records. This differs from the services of government-run organisations such as TCA, wherein an independent company can hold a composite database and, importantly, use internal expertise to establish links and interpret the gaps between the data.

Mineral extraction must be viewed as a single industry, one that includes the exploitation of more than 60 minerals across the country. But TCA provides data solely on the extraction of coal and brine, so many risks are therefore missed in land due diligence. The extraction of minerals other than coal is thought to have played a crucial role in the subsidence at Bayfield.

The interpretation of the mining risk beneath the estate is based on multiple varied data sets and the application of simple geological and technical rules. First, the Charlaw/Moorland seam that intersects the surface in the southern part of the estate is known to dip northwards beneath the rest of the Bayfield development. We also know that this seam was mined 200m north of this outcrop in the late 19th century at a depth of between 10m and 20m.

The extraction of minerals commonly begins at the surface and extends laterally or vertically underground, as...
the minerals closer to the surface are exhausted. Based on this knowledge, the Bayfield Estate area lies above what is inferred to be ancient – that is, pre-19th century – shallow coalmine workings, undocumented in TCA data. Additional records reveal previously undocumented coalmining. Historical maps show features indicative of ground movement or collapse directly beneath the five homes that were initially demolished. These features are common in this area and others where early coalmining took place, and represent the surface expression of collapsed “bell pits”, a primitive mining method of sinking a shaft to reach an ore body – coal – where excavation then occurs laterally. A sandstone quarry, recorded to be disused by the late 1800s with a road running through it, is also documented in historical records of the west part of the Bayfield Estate. To the untrained eye, this may not be directly associated with any risk of subsidence more than 50m to the east; however, by identifying historical land use and the context in which the mining of coal and sandstone has occurred here and in numerous other locations across Newcastle and the UK, the quarry is inferred to be an access point for tunnels driven laterally eastwards from the quarry face. These tunnels or levels would have been driven along the coal seam at a depth of just a few metres, before being abandoned in the early 19th century to leave voids beneath the surface (Figure 1C).

An interpretation of these new findings and TCA data would quickly conclude that this area of West Allotment is at a potentially high risk of ground instability from shallow coalmine workings. Based on the interpretation of all data, it would then be possible to highlight the unsuitability of the site for development, or advise that appropriate site investigations and surveys be commissioned to manage this risk.

Wider implications
The developer in this case was acting on information provided, which did not indicate any substantial risk associated with the site. As a result, the homes were built in accordance with standard UK regulations that do not account for substantial ground movement from shallow or previously undocumented mining activity.

Figure 1B shows that the houses already demolished lie around the bell pit, while those to be demolished are above what is inferred to be the shallow coalmine workings that have extended laterally eastwards from the recorded location of the quarry. Had an interpretive risk assessment analysing multiple data sets been commissioned before development began, this feature and mining risk model would have been identified. Historical mining activity occurs across North Tyneside, and it is therefore essential that all new homes here and in other former mining areas throughout the UK are properly assessed by an expert who has access to varied and comprehensive data sources and the ability to interpret the risk that the ground poses. Other examples of former mining areas or areas at risk in the UK include: • in Plumstead, London, May 2016, a 5m-wide hole opened up in the 18-month-old Brickfield Cottages development due to the collapse of a misinterpreted chalkmine, forcing the immediate evacuation of 48 residents • in 2015, plans were unveiled to demolish 140 homes in Swinton, Manchester, which have been affected by coalmining-related subsidence since their construction in the 1930s • in 2015, a 10m-deep hole opened in a residential road in St Albans from the inundation and collapse of a previously unknown chalkmine, and more than 50 households were temporarily left without power, water or sanitation • at Field Road, Reading in 2000, an underground chalkmine collapsed resulting in the destruction of two homes and the temporary relocation of 30 households.

Prevention
These cases prove that the current methods for assessing mining-related risk are inadequate. Building and planning regulations require a ground risk assessment for mining only in development high-risk areas, even though this term applies to historic coalmining alone. With more than 60 other minerals and commodities extracted throughout the UK, it is essential that the correct procedures and legislation are implemented to ensure cases such as Bayfield and Brickfield Cottages do not occur again. Furthermore when risk assessment is undertaken in areas of historic mining activity, outcomes must be based on the expert interpretation of multiple data sources so that the developer is equipped to design and manage any residual risk.

It is surprising that given the development of comprehensive modern mining and geohazard data sets, houses are still being built on sites that are inherently unstable. The unprecedented scale of this issue highlights the need for developers and prospective homeowners to consult experts in interpreting the risk of mine-related subsidence.

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Related competencies include Environmental assessment, Legal/regulatory compliance, Property records/information systems
Redefining the land surveyor

Advances in technology mean that the term “land surveyor” no longer properly describes the capabilities of today’s professional, argues Brian Coutts

Measurers of land have been around for millennia. Records exist from the Sumerians around 2130 BC that indicate people were already measuring and recording land, while the Old Testament declares “Cursed be he that removeth his neighbour’s landmark. And all the people shall say Amen” (Deuteronomy 27:17) – the implication being that there must have been people who placed boundary marks in the first place.

The word “surveyor” is derived from the French words sur (over) and veior (to see), and “survey” was first used as a verb in 1550 to mean “to determine the form, extent, and situation of the parts of a tract of ground, or any portion of the earth’s surface, by linear and angular measurements”. This signifies the beginning of the practice, and later the profession, of land surveying.

The 100 years from around 1550 saw the arrival of new technology that ensured the development of the modern profession. New forms of mathematics were adopted from Arabian scholars through the Moorish invasion of Spain, including algebra, geometry, trigonometry and logarithms. Science brought the telescope, later to have crosshairs added, and accurately engineered, graduated circles leading to the theodolite. Edmund Gunter also developed the “chain” linear measuring device that still bears his name.

With the exception of making measurements from aerial photographs, not a lot changed in the following 300 years. Optical theodolites, hand-cranked calculators and steel and cloth tapes were the basic tools of the land surveyor of 1970. Then, in rapid succession, came electronic measurement devices, hand-held electronic calculators and desktop computers, and the theodolite was transformed into the total station.

Positioning from satellites followed, and the computer manipulation of measurement data onto maps prompted the development of geographic information systems (GIS). More recently, the laser scanner appeared and is now miniaturised into the total station. Remote sensing has enabled new techniques of gathering and interpreting data, and photogrammetry has seen a resurgence due to the arrival of unmanned aerial vehicles, or drones as they are more commonly known.

The tools available in 2017 could barely have been imagined in 1970. What does this mean for land surveying?

The equipment available to today’s professional land surveyor is capable of infinitely more applications than the theodolite and chain, and the ability to process the data gathered has been revolutionised, in terms of both quantity and speed. As a result, the applications to which the land surveyor’s skill set can be applied has expanded well beyond the traditional fields of mapmaking, measuring engineering works and defining land boundaries.

The prefix “land” has thus outlived its relevance to this branch of surveying. The term “geomatics” was coined in an attempt to create a new image for surveying, but wherever it has been used it has not been popular with surveyors, has not resonated with the public and does not appear to have fostered the expected impression. It has failed to produce the desired results in Canada, where it originated, in Australia or the UK.

One major criticism of “geomatics” has been dropping the reference to “surveying”. However, there are now so many occupations that legitimately claim the use of the word “surveyor” that some prefix is necessary to distinguish these land surveyors from the rest.

What is at the core of land surveying is the ability to represent the spatial relationships of one feature to any other with a known level of accuracy. The understanding of what measurements mean, what they represent, their relative value if they come from different sources – that is, their accuracy – and the ability to present them to a client in a useful way is the essence of land surveying today. But it does not just apply to land – it can have many and varied uses, from positioning actors on green screen in the movies to providing a developer with a building information model to assist in building management.

However, all of this is still surveying. Not land surveying, maybe, but spatially oriented surveying. It is the profession of the geospatial surveyor.

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Related competencies include Analysis of client requirements, Legal/regulatory compliance, Mapping
The London skyline continues to be dramatically transformed: there are already 627 buildings of more than 12 storeys, with 455 more in the pipeline and new ones being approved every week.

There are a lot of major underground works also planned or under consideration in the next 10 years, including Crossrail 2, High Speed 2 and the Thames Tideway Tunnel. The latter, a £4.2bn super sewer being developed by Thames Water, is the biggest infrastructure project ever undertaken by the UK water industry at 25km long, up to 65m deep and more than 7m in diameter.

Possible consequences of climate change, such as higher temperatures, drier or wetter seasons, rising sea level, increasing river volume and rainfall could exacerbate changes in the large, fast-growing city environment. This could increase rates of subsidence in some areas and ground uplift in others, together with higher rates of erosion – which, when combined with seasonal variations such as clay shrinkage or swelling, will have unpredictable effects.

Engineers and infrastructure owners and managers are looking for new, data-based technologies to help them protect and maintain a wide range of assets, and there are many world-class technology companies presently looking at innovative structural health monitoring.

**Space technologies**

Satellite-based remote sensing offers a method of surveying the London region near-instantaneously and comprehensively. Both Google and optical imagery are revolutionising our use of maps and navigation in the city.

Less well-known but in some ways more impressive technology is synthetic aperture radar (SAR). This is currently the most sensitive remote sensing technique available to survey surface movement comprehensively over large, regional scales.

Satellite interferometric SAR (InSAR) is a remote sensing technology that involves processing multi-temporal, or time-lapse, SAR images acquired by Earth observation satellites to detect, map and monitor surface deformation. It is capable of remotely detecting deformation ranging from millimetres to metres in size, spanning days, months, years or decades, across specific sites or areas of thousands of square kilometres, all over the world.

Since 1991, satellites carrying SAR instruments have been consistently acquiring data across much of the world, establishing an archive of more than 1.5m images; unlike conventional ground-based surveying techniques, this makes it possible to produce retrospective measurements.

**InSAR technology**

SAR images contain information about the position of ground and structures at the time of acquisition. As subsequent images are acquired over the same location, they can be compared and used to map relative terrain motion.

InSAR technology is used widely in the oil, gas and mining industries on a routine basis, to allow the monitoring of a few millimetres’ movement per year over large areas.

Urban areas were also monitored from time to time in an ad hoc manner over the past 20 years; the image (right) gives an example of processed information about ground movement based on historic images of London, with blue dots equating to uplift and red to subsidence.

Geohazards that can be observed from this data include:
- natural processes, such as the compaction of River Thames sediments
- anthropogenic instability as a result of water abstraction and engineering works during that time period, such as the Jubilee Line extension.

A new satellite mission called Sentinel is now being developed by the European Space Agency (ESA) to provide robust, continuous SAR data sets and ensure global surface coverage. Each Sentinel mission is based on a pair of satellites: Sentinel-1 is a polar orbiting, all-weather, day-and-night radar imaging mission for land and ocean services. Sentinel-1A was launched on 3 April 2014 and Sentinel-1B on 25 April 2016 (see image, top). Their regular data acquisitions will underpin the new services described below.
Data service concept

In 2015, a consortium led by UK remote monitoring business Moniteye developed a new data service concept as part of an ESA project (http://bit.ly/2prxLuI). Moniteye has created a city-scale ground monitoring archive by combining all existing ad hoc data from 1992 onwards and filled the gaps with commercially available data. At present, the archive covers the area of Greater London almost bounded by the M25 orbital motorway, including the roads, adjacent land, earthworks and structures. The service will continuously monitor ground and structural surface movement over the long term, and the database will be updated regularly with Sentinel-1A and 1B making repeat acquisitions every six days. Bespoke satellite InSAR will be used where it is applicable and commercially justifiable.

Each coloured point on its map of London has an associated history, showing the evolution of the respective locations and applying a set of proprietary algorithms to identify the areas showing changes. This service is in the process of combining and integrating other data sources and algorithms designed to:

- monitor ground and terrain movement that threatens existing infrastructure
- reduce the risk associated with structures that are built on potentially unstable ground
- minimise the risk of damage occurring during construction.

This new archive will provide a data record to help diagnose various geotechnical problems such as subsidence and heave. The work is still in progress and subscription to the service will be available in 2018, but Moniteye can already help.

A school in Harrow is currently suffering geological instability, caused by ground collapse on the site. The movement is associated with underlying unstable historical chalkmine workings, likely to date from about 1800 (see image, above). InSAR data can be used to monitor subtle changes in ground level during the ongoing investigation, and prior to or during any remedial works, as a risk assessment tool.

Advisors to the local authority from Peter Brett Associates LLP think that this monitoring capability provides increased confidence for checking altered rates of movement in response to changes in the stress field in the ground over the mine, and that the service can assist with the overall health and safety management of the site.

Acknowledgement

The author would like to acknowledge H. McCormack for helpful discussions in the preparation of the article.

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Related competencies include Sustainability
Change is coming

Bob Thompson, Miquela Bezuidenhoudt and Andrew Waller identify the five areas of technology that will have the biggest impact on surveying – and predict that change will bring benefits for those who adapt quickly.

Property professionals, we are told, are under threat from automation. Research by the University of Oxford in 2013 suggested that 95% of a valuer’s role will be automated in two decades but only 25% of the property manager’s job is at risk from robots (see Table 1).

There is already some evidence that automation is making a difference to the industry. Remit Consulting’s REMark research in 2015 found that the number of property management accountants had halved in the preceding two years. However, the research also showed that surveying roles had stayed at the same level in property management while facilities roles had doubled.

The RICS commissioned Remit to produce an Insight paper, The Impact of Emerging Technologies on the Surveying Profession (www.rics.org/techinsight) to look at what is likely to happen in terms of job automation, and what surveyors should do about it.

RICS Insight

Predictions that automation will make humans redundant have a long history, going back to the First Industrial Revolution, when textile workers, most famously the Luddites, protested that machines and steam engines would destroy their livelihoods.

The Fourth Industrial Revolution has started with billions of people connected by mobile devices, with unprecedented processing power, storage capacity and access to information. The opportunities that these present will be magnified by emerging devices such as artificial intelligence, robotics, new materials, energy storage and quantum computing.

The idea that manual work can be carried out by machines is already familiar; now the Fourth Industrial Revolution sees machines performing tasks carried out by information workers too. This is likely to usher in a period of disruptive change for all professions, including surveying.

Five key areas of technology have been identified that will have a significant impact on surveying:

- the Internet of Things (IoT)
- fifth-generation (5G) communications
- machine learning and robotics
- building data
- distributed ledger technology, that is blockchain.

In assessing the impact of these, this insight paper takes as its starting point the structure of the surveying profession as defined by RICS, overlaid with the functional structure of the industry. This allows us to draw up a skills matrix for surveying functions.

Surveyors are multiskilled professionals. Each job title will share a set of basic tasks and add a specialism to this. For example, brokers will share a set of common task descriptions with other disciplines – covering reporting, monitoring of market information and so on – but will focus on specialist expertise in sales or lettings.

To model the impacts of a digital future, this research uses the Remit Process Model to break down these functions into a set of 41 tasks, as shown in Figure 1.

Table 1

<table>
<thead>
<tr>
<th>Property role</th>
<th>Percentage of jobs that will be automated</th>
</tr>
</thead>
<tbody>
<tr>
<td>Valuers</td>
<td>95%</td>
</tr>
<tr>
<td>Accountants</td>
<td>95%</td>
</tr>
<tr>
<td>Agents</td>
<td>68%</td>
</tr>
<tr>
<td>Chartered surveyors</td>
<td>63%</td>
</tr>
<tr>
<td>Planners</td>
<td>57%</td>
</tr>
<tr>
<td>Property managers</td>
<td>25%</td>
</tr>
</tbody>
</table>

Source: The Future of Employment: How susceptible are jobs to computerisation? Data from Carl Frey and Michael Osborne, Martin School, University of Oxford

Each task has then been scored in five areas:

- data
- algorithmic content
- learning content
- interpersonal skills
- physical presence

Of these tasks, 18 – nearly half – exhibit a high degree of vulnerability to automation – 70%-100% – now and over the next decade. A further 19 show a significant degree of vulnerability – 20% or more – over the same period.

Surveying appears to be a profession in which 88% of the core tasks are ripe for automation. This finding is a harbinger for discontinuous and disruptive change. How aware are professionals of this?

Online survey

An online survey was used to solicit opinion from the whole property sector, and 154 responses were received. The questions covered nine scenarios based on the likely impact of technology in different areas:

- data
- valuation
- risk evaluation
- lease preparation
- monitoring of market conditions
- lease management
- rent collection
- service charge collection
- acquisition and disposal of investment property

We asked how likely was automation on a scale of zero – unlikely – to 100 – very likely. The overall mean across the survey was 46 out of 100. The most likely area for automation was felt to be collection of rent which scored 70; the least likely, at just more than 28, was acquisition and disposal of property. The majority of other responses were all clustered around the mean.

At a functional level, automation is likely to be especially disruptive in the areas of valuation and property, lease, asset and facilities management, and will be seen in different ways, such as:
an increase in the consistency, transparency and timeliness of transactions
a step-change in the accuracy and timeliness of reporting
an explosion in the number of sensors deployed as part of the IoT, which will increase the visibility and responsiveness of all buildings as well as enabling remote facilities management
reduced cost for managing a portfolio of buildings, it being likely that the head count in particular areas – valuation for example – will be reduced significantly
a change in the skill set required; surveyors are likely to become either data scientists or client managers, which has implications for real-estate education.

In the longer term, this revolution paves the way for property to compete on a level playing field with other asset classes, becoming a wholly securitised, flexible and dynamic asset underpinned by its residual value.

At its most basic, the evolving technology will make core tasks less onerous – sensors will replace walking surveys, algorithms will augment the valuer’s role and reduce the time taken to value property. Computer-aided facilities management systems removed the need for the drawing office, but building surveyors are still needed for their opinion on a building’s condition.

Positive
We therefore expect the initial transition to be extremely positive – growth will be absorbed by the greater reliance on systems, profitability should improve and firms can become more flexible in their work.

Of course, it is difficult to predict which changes will be widely adopted first. Questions of insurance liability, client acceptance and the ability of our profession to manage work differently will ultimately guide this.

However, there is wide experience of changing practices in other sectors: this is the next change in a sequence which has included sending work offshore to Europe and Asia. Some of that work has returned, and most has now become business as usual.

That experience implies that change will happen, the changes will be positive and those who adapt quickly will bring value to clients by reducing costs and improving services.

The prognosis for our industry is good. Surveyors will benefit from providing better services and deeper insights to our clients. However, as change progresses, those who have not started to use this new technology are likely to be left behind.

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Related competencies include Analysis of clients requirements, Property records/information systems

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**Figure 1**

Task model

Source: Remit Consulting

- Cleaning...
- Monitor market conditions and trends...
- Sell real estate to clients...
- Survey condition of properties...
- Troubleshoot equipment or systems operation problems...
- Testify at legal or legislative proceedings...
- Strategy development...
- Space management...
- Risk management...
- Review plans or proposals...
- Purchasing equipment, supplies and services...
- Prepare service charge budgets...
- Prepare reports...
- Prepare contracts...
- Plan maintenance...
- Operate lifting equipment...
- Operate helpdesk...
- Obtain property information...
- Negotiate project specifications...
- Negotiate prices...
- Assess property...
- Manage leases...
- Manage helpdesk...
- Manage construction activities...
- Maintain work equipment or machinery...
- Maintain work areas...
- Knowledge management...
- Examine financial reports...
- Evaluate condition of properties...
- Estimate costs for labour or materials...
- Direct property management...
- Direct organisational operations, projects, or services...
- Direct facilities management...
- Direct construction operations...
- Coordinate operational activities...
- Collect rents and charges...
- Asset management planning...
- Assemble equipment...
- Appraise property values...
- Acquisitions and disposals...

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Related competencies include Analysis of clients requirements, Property records/information systems
RICS concentrates much of its efforts on raising the professional status of its surveyors worldwide, focusing on people. But the modern world is about more than people: it is awash with data, software applications, hardware components and digital companies, all interacting with each other.

Expressions such as the “Internet of Things” are becoming more than concepts, so behind every device should be a standardised way of communicating and representing data objects. Developers rely on clear standards to ensure that the data they are processing can be read consistently and potentially used in ways they have not considered. Costs, valuations and building measurements are clearly embedded in much of what will be digitised in the future and RICS must offer value to its members by staying relevant as the profession sector is transformed. Part of this value comes from defining schemas for the representation of data, providing guidance and ensuring that software tools comply with the relevant standards and regulations.

An invaluable role
Data standards form the link between the standards RICS professionals follow and the software products that they use. Often they are invisible, but they serve an invaluable role in ensuring that data is portable, comparable and re-useable. However, data standards guarantee only the correct format, not its quality. They complement rather than replace written standards and are another way of checking the requirements of RICS’ professional statements. It is envisaged that defining the data standards will be vital to every standard-setting initiative and arguably the most important part for many users.

New challenges
RICS is committed to developing a suite of data standards to help professionals interact with the digital world. One of the first of these is designed to support the International Property Measurement Standards (IPMS) and define how a building’s measurements can be exchanged between applications. Ethical and compliance issues must be recorded as part of this standard, as these areas are critical to the profession.

New challenges are also being met: for example, how can data be recorded in the measurement process where RICS-adopted standards do not officially recognise it? Many users of measurement data report the maximum width and length of rooms, or “components”, as they are defined in IPMS. If maxLength and maxWidth are part of the data standard, this could suggest that these measurements are pertinent to the IPMS, though this is not the case. If this requirement is omitted, however, the data standard will be less helpful to a large user base. Making the measurement optional but without pointers as to how they should be named – for example, maxLength, maximumLength or maxLen – could in turn mean the standard is not used in a consistent way.

Other challenges include data that is barely in use today but could become essential in future, such as volumetric measurement and height information. Even though volumetric and height data are not currently part of IPMS, when the IPMS second edition is published, measurers will update their skills and should work just as efficiently, armed with their new information.

It is not so easy with software. Firmware – that is, embedded software – must be updated, database tables modified and reporting tools redesigned. Then there is the issue of how to support different versions of the same data standards because no one wants to have to ask: “Which version of IPMS does your tool support?”

Positive points
The surveyor’s role can be defended and improved by introducing digital signatures to professional reports. Exploring this technology, we can demonstrate how professionals can sign off on their work, ensuring changes to their output are detectable. Furthermore, compliance documentation included in measurement data can be enhanced to enable large-scale audits – all with the goal of providing first-class service.

The first data standards are scheduled for publication by early 2018. This will involve working closely with RICS’ technical affiliates and consulting with floor-plan specialists, software suppliers and measurement professionals to ensure a quality output and that the value RICS is aiming to provide is articulated and quantifiable.

There will be future updates on this in RICS journals and on the website.

RICS is committed to developing a suite of data standards to help professionals interact with the digital world.

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Related competencies include Data management, Property records/information systems
Robert Walker provides a useful reminder of the benefits of land remediation relief

If you are looking at the feasibility of developing a brownfield site, or indeed any other site that is contaminated or has been derelict over the long term, it is worth considering whether you can benefit from any tax relief for land remediation.

Land remediation relief was introduced in 2001 and extended in 2009, to address the market’s perceived failure to bring back into use land blighted by previous industrial use or long-term dereliction.

Key benefits
Subject to satisfying certain conditions, relief is available for 150% of the costs incurred by companies in bringing contaminated or long-term derelict land into productive use.

The relief applies to costs irrespective of whether they are immediately recorded as expenses in the profit and loss account or capitalised on the balance sheet. Qualifying costs will include staff, materials and payments made to subcontractors.

Of particular benefit is that, to the extent that the deduction creates a tax loss, this can be “surrendered” to HM Revenue & Customs in return for a cash refund equal to 16% of the amount.

To take an example, £1m of qualifying expenditure would create a deduction of £1.5m. If in turn this led to a loss of £1.5m, the repayable cash credit would be £240,000, that is, 16% of £1.5m.

Main conditions
The principal conditions for making a claim are as follows:

- The entity that is incurring the spend must be a UK corporate taxpayer
- The costs must relate to the remediation of land that is either contaminated or in long-term dereliction
- The expenditure is not being subsidised
- Where the land is contaminated, neither the company making the claim nor anyone who is connected to it must have been responsible for that contamination
- The company holds a “major” interest in land; that is, a freehold or lease of at least seven years.

A site does not need to be both derelict and contaminated to qualify. The relief for land in a contaminated state and that for derelict land address different issues.

Contamination
Land is in a contaminated state if there is something in, on or under the land that causes “relevant harm”, or there is a serious possibility that “relevant harm” is going to be caused. Such harm includes death or significant injury or damage to humans or animals or other organisms, significant pollution of controlled waters, significant adverse impact on the ecosystem, or damage to buildings that would affect the way that they are used.

Although the level of risk from a contaminant will vary according to the land use, the contamination must be present as a result of industrial activity rather than as a result of the presence of living organisms or decaying matter from them. The three exceptions to this are Japanese knotweed, radon and arsenic, which are regarded as contaminants for the purposes of the relief.

Land will not count as being “in a contaminated state” simply as a result of the presence of air or water, unless there are pollutants present in those.

In most cases, developers will have gathered the information needed to show whether the land is contaminated for the purposes of remediation relief during the planning process.

As ever, there are some complexities with claims. For example, relief for remediation of Japanese knotweed will be denied where this involves removal to a landfill site, or where the company planted it – which is unlikely – or permitted its proliferation.

Derelict land
Land is defined as being derelict for the purposes of the relief if it meets the following conditions:

- It is not currently in a productive state
- It cannot be put into a productive state without removing buildings or any other structures.

The term “productive state” has a broad meaning, and includes land that is in economic or social use. Therefore, land that is being used as retail premises or a car park or has a social use such as a recreational area will not qualify.

The presence of buildings or structures on the site must also be preventing the site being brought back into productive use.

Relief will be available for certain specified costs of improving derelict land, for example the removal of concrete, foundations, pile caps, basements and underground services.

Conclusion
The message to take away is that, while developing land that is contaminated or has been derelict for the long term may be commercially challenging, it is worth looking at whether any tax relief is available to improve the financial returns.

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Related competencies include Environmental assessment, Taxation
When it comes to settling disputes, whether they concern consumers or construction, commercial or international, there has been a huge shift in recent years from litigation towards mediation, arbitration and adjudication.

However, the trend for settling smaller rural disputes has actually seen a significant movement away from arbitration. This is partly due to escalating costs, as well as the potential impact that arbitration can have on long-term relationships between parties. This is unfortunate, because, when managed properly, arbitration provides a quick and cost-effective way of resolving disputes, including those of relatively low value.

When a dispute is heading for arbitration, it can focus the minds of the parties on what the issues and priorities are. In some cases, expert witnesses may be involved, and if they understand their roles properly, and are encouraged to meet and consider what can and cannot be agreed, usually in the form of a joint report, areas of disagreement will be significantly reduced and cases can often be settled quickly and cost-effectively.

RICS’ Dispute Resolution Service has been working with the Dispute Resolution Standards Working Group to try to address this move away from arbitration in the rural sector, which we believe is to the detriment of clients.

In addition to launching the Simplified Arbitration Scheme, RICS has published a guidance note on rural arbitrations.

**Intentions**

In preparing the guidance, there were three intentions:

1. to advise on best practice
2. to provide a comprehensive guide for those operating in the rural sector, particularly younger members, who may have viewed arbitration as fraught with traps and a significant risk of costs and dented professional reputations
3. to show those outside the profession what to expect when dealing with arbitration in the rural sector.

The guidance note is structured in two parts, the first aimed at the practitioner and the second at arbitrators. That is not to say that practitioners should not read part two, as this provides insight into the challenges and issues facing an arbitrator, as well as guidance on how an arbitrator ought to deal with practical matters. Arbitrators might also benefit from reading part one.

**For the practitioner**

Most important for the practitioner in this guidance note, perhaps, is the realisation that while arbitration is adversarial it does not have to be bitterly fought or contentious.

The overriding theme of the Arbitration Act 1996 is party autonomy; that is, it is for the parties to tell the arbitrator how they want their arbitration to be run. The arbitrator can and will step in if the parties cannot agree, for example on procedure, or if one of the parties refuses to participate or acts unreasonably. But if both parties act sensibly and reasonably, then the arbitrator’s role will be to guide the process and make an impartial decision to reach an agreement.

Part one of the note is written to guide someone who may be relatively new to arbitration through the process, explaining the various stages as well as any language...
meeting and what to prepare in advance

- what to expect at the interlocutory stages, that is, the run-up to the hearing
- what to expect at the hearing itself

The duties of the parties in arbitration are set out in section 33 of the 1996 act, for the arbitrator, and section 40, for the parties themselves. The arbitrator is described as the “tribunal” throughout the act, but that term includes “arbitrator”.

Section 33 obliges the arbitrator to act fairly and impartially, and give each party a reasonable opportunity of putting their case, dealing with that of their opponent and avoiding unnecessary delay and expense.

This is self-explanatory, but it is one of the key principles of the act. When considering anything that may arise during an arbitration, before or during a hearing, an arbitrator will always revert to their duties under section 33. This is explored in much more detail in the guidance note.

Similarly, the parties have a duty under section 40 to act properly and expeditiously, which means acting reasonably and complying with procedural and evidential directions that are either agreed by the parties or made by the arbitrator.

Again, what a party to an arbitration can do if the opponent does not act in this way, or indeed if the arbitrator does not appear to be complying with their duties under section 33, is explored in the note.

Such scenarios can include one party refusing to cooperate or constantly delaying matters. A party may also become concerned that potential costs are becoming out of proportion to the matter in dispute. These scenarios can be dealt with by the arbitrator either of their own volition or at the request of one of the parties, and guidance on how to deal with these circumstances is included in the note.

The hearing
There is no need for a competent practitioner to be overly wary about the hearing or the preliminary hearing. While an arbitrator must not allow unprofessional or incompetent behaviour, they have a duty under section 33 to “give each party a reasonable opportunity of putting [their] case and dealing with that of [their] opponent” and this will include assisting in an impartial way any party who is unsure of the processes involved.

Younger or inexperienced practitioners should not therefore be discouraged from getting involved in arbitration, and indeed should be encouraged to ask the arbitrator to clarify anything that may be unclear in terms of directions or processes being applied.

It is critical that any surveyor adheres to the other RICS guidance notes and professional statements relevant to all forms of dispute resolution, such as Surveyors acting as expert witnesses and Surveyors acting as advocates. As long as these are followed and the surveyor acts professionally and within their duties as a representative of one of the parties under section 40, then arbitration should not hold any fears.

If you look back to rural arbitrations from the 1960s to the early 1980s, when the 1984 rent formula in Schedule 2 of the Agricultural Holdings Act 1986 came into being, they were often held around the farmhouse kitchen table between two local surveyors acting as advocates and a third, perhaps not so local, surveyor as arbitrator, especially when it came to rent review arbitrations. After the hearing and maybe some lunch, they would all walk the farm and the arbitrator would go away and determine the award. Not a solicitor was in sight, and it was all conducted at a relatively low cost.

There is sentiment in the rural profession that it would be good to return to those days, especially for rent reviews, and this guidance note should encourage all rural surveyors to familiarise themselves with arbitration and the Arbitration Act 1996 and have the confidence to get involved.

Key issues
Issues discussed in detail in the guidance note include:

- setting out the duties of the arbitrator and the parties to an arbitration
- what to do if certain fairly common scenarios arise
- the powers an arbitrator has and how they can be asked to exercise them
- what to expect at a preliminary meeting

that may be unfamiliar. It sets out the best practice at each stage, so it is hoped that surveyors who are apprehensive about running an arbitration for their client will be encouraged to get more involved, especially in the lower-value, less technical arbitrations such as farm rent reviews.

The stakes can, of course, be significantly higher if a notice has been served that threatens the security of tenure on a farm, such as a notice to remedy or notice to quit, and the individual practitioner will have to make a judgement on whether they are confident enough to deal with this. There is, however, enough information and instruction in the guidance to give most practitioners the confidence to manage arbitrations themselves where the stakes are lower.

Philip Meade FRICS is a rural arbitrator, Chairman of the RICS Dispute Resolution Standards Working Group and the technical author of the RICS Rural arbitration guidance note philipmeade@dmpropertyconsultants.com
Deep impacts

Laws that require local planning authorities to consider the potential effects on the environment of planning applications have been revised. Charles Felgate considers the changes.

Local planning authorities and developers with projects that may have significant environmental impacts need to ensure that they are familiar with new regulations.

Environmental impact assessment (EIA) is an EU-derived concept, and the legislation is intended to bring environmental considerations into the preparation of projects. It aims to ensure that development proposals that are likely to affect the environment significantly are subject to assessment and development consent before planning permission is granted.

Some types of development are always likely to have significant effects on the environment, so must always be subject to an EIA; but the effects of others will depend on factors such as their nature, size and location. The legislation therefore needs to make provision to determine when such projects will be subject to EIA.

The changes were necessary to give effect to amendments made to the EU directive relating to such assessments, made in a more recent directive that member states were required to implement by 16 May this year. Both the UK and Welsh governments consulted on amendments to relevant regulations and made new regulations accordingly. The Town and Country Planning (Environmental Impact Assessment) Regulations 2017 and the Town and Country Planning (Environmental Impact Assessment) (Wales) Regulations 2017 cover town and country planning, while the Infrastructure Planning (Environmental Impact Assessment) Regulations 2017 cover nationally significant infrastructure planning.

Changes made in the new regulations include:

- introduction of coordinated procedures for projects that are also subject to assessment under the Conservation of Habitats and Species Regulations 2010
- a requirement for EIAs to identify, describe and assess the direct and indirect significant effects of a proposed development on: population and human health; biodiversity; land, soil, water, air and climate; material assets, cultural heritage and the landscape; and the interaction between these factors
- an amendment to the information required in an environmental statement, which must now be based on a scoping opinion if one has been obtained; in England, an environmental statement must be prepared by competent experts and accompanied by a statement from the developer, outlining the relevant expertise or qualifications of such experts; in Wales, it must be prepared by persons who in the opinion of the relevant planning authority or the Welsh ministers, as applicable, have sufficient expertise to...
ensure the completeness and quality of the person who prepared the environmental statement. On the face of it, these requirements could make it difficult to question anyone’s expert credentials, but this may prove controversial if applicants or objectors seek to challenge whether the persons who prepare particular environmental statements are competent or have sufficient expertise to ensure the completeness and quality of a statement.

- a duty for authorities and the secretary of state or Welsh ministers to perform their duties in an objective manner and in such a way as to avoid any conflict of interest; the regulations also require authorities and the secretary of state or Welsh ministers to make arrangements for separation of functions when they make proposals for development that they will also be responsible for determining, so that the same persons will not be responsible for both functions. In practice, the need for objectivity is a well-established principle of public law and authorities are familiar with the need for separation of functions, so the inclusion of specific provision in the regulations is unlikely to make much difference.

- the deadline for a local planning authority, the secretary of state or the Welsh ministers to adopt a screening opinion in response to a request to do so remains three weeks from the date of receipt of the request, with provision for the authority and the person who makes the request to agree a longer timescale; however, this is now subject to a limit that the longest deadline that can be agreed is 90 days from the date on which the person submits the request.

Environmental assessment is now well established as an adjunct to the planning systems in the UK.

New regulations require more stringent assessment of potential environmental impacts before work can begin.

Environmental assessment is now well established as an adjunct to the planning systems in the UK. However, the EU directives on environmental assessment and thus the related UK regulations are procedurally prescriptive, and have been a fruitful source of legal challenges to planning decisions. It will therefore be interesting to see if the UK’s withdrawal from the EU and the “repatriation” of powers over environmental assessment will see a reversion to the more traditional British approach of less procedural formality backed up by administrative policy or guidance.

Changes specific to England include greater scope for exemption from the requirements of the regulations, with the secretary of state having the power to direct that a proposed development is exempt if there are exceptional circumstances and the secretary of state considers that compliance would have an adverse effect on fulfilment of the development’s purpose and the objectives of the EU directive. The secretary of state may also direct exemption if a proposed development has national defence or the response to civil emergencies as its sole purpose, and the secretary of state considers that compliance would have an adverse effect on that.

Developers and local planning authorities will need to ensure that they operate to reflect the amendments to regulations relating to EIAs, for example by meeting requirements for more details. They will also need to be prepared for objectors to planning applications to examine the requirements of the new legislation closely, with the aim of using any evidence of non-compliance as a basis for challenging decisions.

Environmental assessment is now well established as an adjunct to the planning systems in the UK. However, the EU directives on environmental assessment and thus the related UK regulations are procedurally prescriptive, and have been a fruitful source of legal challenges to planning decisions. It will therefore be interesting to see if the UK’s withdrawal from the EU and the “repatriation” of powers over environmental assessment will see a reversion to the more traditional British approach of less procedural formality backed up by administrative policy or guidance.
Daphne Yin, Jeffrey Hatcher and Yijia Chen argue that rural land can be valued by locals using a low-cost tool that assesses both natural and social capital.

Valuing land

Limited property rights constrain rural residents. Missing or incomplete markets for land – often the norm in remote settings – exacerbate ownership-related insecurities. Indeed, serious estimates of the value of land are beyond the reach of many rural smallholders, raising the risk of ownership disputes that the poor cannot afford.

On the other hand, knowledge of the true value and potential of one’s land can encourage productive investments, improve management practices and strengthen rural property rights. The inherent value of land can no longer be ignored. New economic opportunities and pressures, climate change, natural disasters and human conflict are all transforming land use and ownership in rural areas.

Overlooked value
Conventional land valuation approaches usually cover benefits and costs that have a clear market value, while neglecting those that have weak market signals or are “priceless” – such as those related to biodiversity or aesthetics. Residents in emerging rural markets often cannot quantify or document the value of their land from their broader perspective.

In cases of displacement, for instance, land values are often determined by government agencies based on inadequate proxies that do not fully recognise the benefits that rural land and its resources provide to local users. Valuation challenges include limited market information, the frequent disconnect between de facto land use and legal use classification, and tenure insecurity. In addition, some of the benefits provided by rural land may be intangible and hard to quantify. The commons, in particular, often lack market values, despite being a key source of wealth for communities.

Land valuation tool
Given the above, there is a need for a new kind of land valuation tool that people can use to account for the wide range of social and natural capital on their land. Such a tool could enable people to understand better their relationship with the land, defend their claims to it, manage it sustainably, or seek an appropriate level of compensation.

To address this need, Indufor North America together with the Foundation for Ecological Security (FES) and Ulster University have developed the free Rural Valuation Tool, with support from Omidyar Network. The tool integrates market and non-market methods to value a land parcel, balancing rigour with efficiency and affordability. It draws inspiration from Namati’s Community Land and Natural Resource Valuation Activity (http://bit.ly/2eAjhWI), but differs by:

- projecting benefits and cost flows over 10–15 years, rather than a single year, using a simplified discounted cash flow model
- incorporating tenure security evaluation as part of a discount rate calculation
- assessing a broader set of non-market goods and services, going beyond replacement cost
- being applicable to both communally and privately held land.

The Rural Valuation Tool was first used to value commons for six villages in Rajasthan, India, in collaboration with FES, which has decades of experience with communities to restore and conserve land and water across the country.

Natural capital
For rural residents, land is a bundle of natural capital that provides tangible benefits such as income, shelter, food and energy, as well as intangible benefits such as spiritual or recreational value. Tangible forms of natural capital, such as non-timber forest products including fodder or honey, can be valued using income capitalisation and stated-preference approaches.

Intangible forms, such as erosion control or waste water treatment, call for different approaches, ranging from income capitalisation through payments for ecosystem services or ecotourism to direct market valuation.
approaches such as avoided cost, travel cost, hedonic pricing – using both internal characteristics and external factors – and contingent valuation. A range of natural capital types is shown in Table 1.

Using historical data collected through a survey, the Rural Valuation Tool uses a discounted cash-flow model to estimate the value of natural capital on a land parcel. It covers tangible benefits and the costs associated with harvesting of forest products, grazing, agriculture, mining and water supply. Intangibles are valued based on a direct use-value approach, for more conservative accounting and comparability across parcels.

Social capital

Land tenure, institutions, and rules governing any resource or land parcel can vary dramatically. Social capital reflects communities’ or individuals’ capacity to steward land sustainably, based on a mix of tenure security, institutional capacity and community cohesiveness. Together, these factors influence whether natural capital is exploited for the short term or managed for the long run.

Mounting empirical evidence demonstrates the positive correlation between ecosystem health and the strength of social capital. The latter is key to determining the condition of the land, yet often left out of conventional approaches to valuing it. Previous efforts to assign a monetary or other discrete value to social capital are rare. Hedonic pricing has been used very infrequently to monetise social capital. The method relies strongly on income and price information for market-based goods such as house values, which do not readily lend themselves to emerging rural markets.

The tool assumes that community or household ability to manage the land sustainably will increase its value to users. It includes a survey to score the social capital associated with forestry, agriculture or a different type of resource use. The survey answers reflect a community’s or individual’s ability to manage and benefit from a specific parcel sustainably, based on core indicators in the following categories:

- **land tenure rights:** breadth, legality, and security
- **institutions and rules:** presence, inclusivity and fairness, and robustness

Answers are aggregated into a social capital score of 0 to 20, where 20 represents the highest level of social capital. Each possible score corresponds to a rating, from “Aaa” to “Ca”, adapted from Moody’s Analytics risk assessment criteria. The rating in turn links to an estimated discount rate spread, from 0%-12%. This is fed into a general discount rate that incorporates risk premiums for both country sovereign risk and social capital risk at the location being valued. The discount rate is then used in the discounted cash-flow model to adjust the overall value of the parcel.

Facilitators

The tool can be used by a community to value a communally managed parcel, or by individuals, households, or organisations to value privately held land. Ideally, a facilitator from a locally active NGO or community organisation who is trained in the tool should guide users through the valuation. Facilitators with experience of conducting socioeconomic surveys or rapid rural appraisals will have an easier time. Any data that is collected should be validated through other primary or secondary sources, for example through other surveys or technical studies, or review by additional community stakeholders.

Land valuation needs to be affordable and replicable, so trade-offs between cost and accuracy must be considered. If data is scarce or inaccurate, the quantitative valuation will need to be accompanied by appropriate caveats and qualitative information.

Lessons

Lessons learned from initial use of the tool include:

- free, prior and informed consent must be obtained from local stakeholders who are using a land parcel – ensuring their equitable representation and participation – before valuation and sharing of information with other parties, to avoid unwelcome valuation or misuse of data
- rough valuation estimates can be improved by using creative, local survey methods adjusting for education and culture, especially in rapid, community-deliberated settings
- the tool works best where communities, local NGOs or other parties have the capacity to validate their findings using past data or to help improve recordkeeping
- assumptions about opportunity costs must factor in labour costs, even if people managing the land parcel are not being paid
- while the historical data can help quantify the value derived in actual use, it may not represent a land parcel’s full potential.

Moving forward

Future development of the tool may seek to automate parts of the data collection and analysis processes, to make valuation of rural assets more efficient. Indufor is also exploring the potential for geographic information systems and remote sensing to validate data used for valuation, as well as to infer the value of land across much larger areas, informed by the computer-assisted mass appraisal approach that is used in more liquid markets.

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To download the tool, field manual and case study documentation, visit http://bit.ly/2W4dAXu

Related competencies include GIS, Legal/regulatory compliance, Valuation

### Table 1

<table>
<thead>
<tr>
<th>Land use activity</th>
<th>Resource or benefit flow</th>
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<tr>
<td>Forestry</td>
<td>Timber</td>
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<td></td>
<td>Non-timber forest products</td>
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<tr>
<td>Agriculture</td>
<td>Crops</td>
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<tr>
<td>Grazing</td>
<td>Fodder</td>
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<tr>
<td>Mining</td>
<td>Minerals, stone and clay</td>
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<tr>
<td>Other</td>
<td>Other resource or benefit flows without standardised sections in the tool (e.g. other products/ecosystems not recorded above)</td>
</tr>
<tr>
<td>General (can apply to multiple categories)</td>
<td>Water provision, Spiritual/cultural/recreational value Buildings</td>
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Protecting historic Wales

Bill Zajac explains how ground-breaking legislation is helping to protect the historic environment in Wales

The Historic Environment (Wales) Act 2016 became law on 21 March last year, and the greater part of the legislation – the first enacted specifically for the Welsh historic environment – is now in force.

Several of the act’s provisions mark significant steps in the protection and management of the historic environment. For instance, Wales’s historic environment records have been placed on a secure, statutory footing. Those records, freely available online (https://archwilio.org.uk/arch) provide local planning authorities, developers and others with the information needed to make sound management decisions, as well as promoting public understanding of the historic environment. Their importance is underscored by statutory guidance, Historic Environment Records in Wales: Compilation and Use for certain public bodies (http://bit.ly/2wmIOKy).

The legislation established a statutory list of historic place names, a first for the UK, if not the world. The list, which is publicly accessible online and through the historic environment records (http://bit.ly/2vxrgOc) will raise public awareness of historic place names and encourage their continued use by public bodies and private individuals. The guidance includes instructions for the relevant public bodies on using the list to name and rename developments, streets and properties.

Consultation Wales has led the way in requiring formal consultation with owners and occupiers before the scheduling of a monument or the listing of a building. However, many people feared that open consultation would place historic assets at risk, as unscrupulous individuals might deliberately damage or destroy them to prevent designation. Interim protection was therefore introduced to safeguard an asset as if it were already scheduled or listed during the consultation period.

Owners and occupiers also have the right under certain circumstances to ask for a review of a designation decision. Such a review will be conducted by the Planning Inspectorate.

Scheduled monuments The 2016 act made important amendments to the Ancient Monuments and Archaeological Areas Act 1979, which provides the legal framework for the designation, protection and management of scheduled monuments in Wales. For example, it has expanded the definition of a monument to include any site that yields evidence of past human activity. This permits the designation and protection of a small number of nationally important early prehistoric sites – which are often nothing more than scatterings of artefacts – as well as battlefields and other sites devoid of structures or works.

There are more than 4,000 scheduled monuments in Wales and, for the most part, their owners manage them responsibly. However, every year a number are damaged by unauthorised works and other activities. The Welsh government’s Historic Environment Service, Cadw, can now serve a temporary stop notice to halt unauthorised works; a complementary enforcement notice can require restoration, or, if that is impractical or undesirable, the alleviation of the effects of the unauthorised works.

A loophole in the 1979 act that allowed people to escape prosecution for damage by claiming ignorance of a scheduled monument’s location or status has also been closed. A defendant has to prove that all reasonable steps were taken to find out whether planned works or other activities would cause harm to such a monument.

Cadw’s online, map-based designated assets database, Cof Cymru (http://bit.ly/2hC8zmN) makes it easy to obtain reliable information on scheduled...
monuments, listed buildings and other designated and registered assets.

**Listed buildings**
The 2016 act also made significant amendments to the Planning (Listed Buildings and Conservation Areas) Act 1990. The powers of local authorities to undertake urgent works have been broadened, so they can be used on any listed building if they do not unreasonably interfere with residential use. The legislation makes the costs of urgent works a local land charge and permits an authority to levy interest on any outstanding sums, the aim being to reduce the financial risk of urgent works for local authorities.

A temporary stop notice has been introduced for listed buildings. As with the comparable notice for scheduled monuments, this allows local planning authorities to halt unauthorised works immediately, and dovetails with the existing listed building enforcement notice.

**Preservation notices**
Measures for the creation of preservation notices are also contained in the 2016 act. These notices will give local authorities new tools to deal with listed buildings that have fallen into disrepair. The legislation makes specific provision for civil sanctions to support the notices, which could allow fixed financial penalties to be imposed on owners who permit listed buildings to decay. Although the act defines a framework for preservation notices, including offences and appeals, further regulations are needed to bring these provisions into effect.

**Historic parks and gardens**
Wales has had a non-statutory register of historic parks and gardens since 1994. There are now nearly 400 registered sites, and they will be transferred to a statutory register when a programme of boundary review and notification of owners is completed next year. The statutory register will place no additional legal restrictions on historic parks and gardens, and changes will continue to be managed through the planning system.

**Heritage partnerships**
Heritage partnerships are voluntary agreements into which owners, consenting authorities and other interested parties can enter for the long-term management of scheduled monuments or listed buildings. Crucially, they can incorporate relevant consents for agreed works, so will be particularly attractive to owners of multiple assets who need to make frequent, and often repetitive, consent applications.

While the negotiation of an agreement will require an initial investment of time and resources, it will promote the consistent management of the assets and ultimately result in savings by eliminating recurrent applications. Since these agreements will last for several years, it is important that the regulations and guidance are well founded and practical. Cadw is therefore seeking partners for pilot schemes in 2018.

**Complementary measures**
From its earliest stages, the 2016 act has been central to an integrated body of measures to support the careful management of change, its ethos derived from Cadw’s Conservation Principles for the Sustainable Management of the Historic Environment in Wales (http://bit.ly/2vwtzkM).

**Heritage impact statements**
A central tenet of Conservation Principles is that decisions about the future of an historic asset must be based on a sound understanding of its significance. Therefore, a heritage impact statement will be required for listed building and conservation area consent applications.

Following a thorough but proportionate evaluation of a building’s significance, the statement will include a structured assessment of the objective of proposed works, design and access considerations, where appropriate, and strategies to mitigate any impacts. The regulations came into force on 1 September, and new best-practice guidance, Heritage Impact Assessment in Wales, has been published to assist owners, agents and local planning authorities (http://bit.ly/2gEnIvF).

**Planning policy**
It was clear that changes made in the 2016 act would have to be reflected in Planning Policy Wales. This afforded an opportunity for a thorough revision of chapter 6, on the historic environment; after a public consultation, the revised chapter was issued in Planning Policy Wales 9 in November 2016 (http://bit.ly/1OCQ0N9).

The new Technical Advice Note (TAN) 24: The Historic Environment has also been released (http://bit.ly/2veLR37). This is the first TAN for the Welsh historic environment, and it covers all circumstances in which the planning system touches on the management of historic assets. It replaces Welsh Office circulars 60/96, 61/96 and 1/98 on the historic environment.

**Best-practice guidance**
Cadw is preparing best-practice guidance that can be freely downloaded from its website (http://bit.ly/2I1fXjD). Two titles likely to be of general interest are Managing Change to Listed Buildings in Wales, aimed principally at owners and agents, and Managing Listed Buildings at Risk in Wales, for local authorities. Work is under way on further guidance titles, including one on the management of scheduled monuments.

**The future**
The 2016 act and these supporting measures will give Wales a robust structure for the effective protection and responsive management of its precious historic environment. That in turn will furnish a stable foundation for the future development of coherent legislation and policy.

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For updates on the 2016 act, please send your email address to historiimentleg@wales.gsi.gov.uk

Related competencies include Planning, Property management
Neighbour disputes can be hostile, fractious and expensive, so mediation can often appear inappropriate because destructive attitudes and intense emotions are already entrenched. But perhaps it is this perceived weakness that gives mediation a strong role: neighbour disputes are often more about the underlying issues and relationships between people than technical issues such as where a boundary is located, access rights or high hedges.

Strengths
Mediation is part of a portfolio of alternative dispute resolution (ADR) processes that enable conflicts to be resolved outside litigation. ADR can cover informal and formal negotiation, settlement meetings, arbitration, conciliation, mini trials, mediation and many other routes. Various forms of ADR are now supported by the judiciary, and ADR concepts have been added to many national, regional and international guidelines.


These guidelines have been adopted by all members of the UN General Assembly, and in many cases are the first opportunity for land professionals, including surveyors, to engage with ADR and mediation principles. One of the major strengths of many ADR processes, and especially mediation, is that they can be used across borders and legislations within any legal system.

This is especially important in the land sector, where different ownership rights, tenure and identification can co-exist even in particular countries: for instance, many developing nations operate official land registration systems that run alongside customary or shared ownership systems. Indeed, some customary systems have an in-built cultural process for mediation such as the “stool” system in Ghana where tribal elders will officiate over land and neighbour disputes (http://bit.ly/2glA91J).

Mediation
Mediation in the broadest sense is a voluntary, non-binding and private dispute resolution process in which a neutral person helps the parties reach a sustainable, negotiated settlement. One of the key tenets of mediation is that it is conducted “without prejudice”, which allows parties to be sure that the process is confidential, to the extent permitted by law, and any information that is disclosed, views that are expressed or positions or concessions that are offered will not be held against them if the case goes to litigation.

There are several different models of mediation, with the facilitative style being the most popular, as well as the most suitable for neighbour disputes. It enables a sustainable settlement to be reached by the parties, which can be structured...
Neighbours at war
into a legally binding signed agreement. The evaluative model of mediation is also helpful, as it allows a sometimes court-appointed expert from the relevant sector, in the role of mediator, to make suggestions for possible settlement.

The mediation process has five generally agreed stages – preparation, opening, exploration, negotiating and closing. It is vital for a mediator to understand each of these and how they interconnect. For example, if both parties have been strongly encouraged to engage with mediation, the preparation stage is vital for a mediator so they can get a grip on the case, before the opening and negotiating stages.

Bad cases
One of the foremost neighbour dispute experts in the UK, David Powell FRICS, often refers to his ongoing “psychological profiling” of the participants in boundary disputes – suburban Daily Mail readers, Ford Mondeo drivers, life members of the National Trust, recently retired people with time on their hands – and how even small disputes can escalate with breathtaking speed to expensive litigation, poisoning relationships for years, if not forever.

One dispute in Hertfordshire, Cameron v Boggiano [2012] EWCA Civ 157, began when planners used a thick pen to mark out boundaries. The area represented was just 60cm wide, yet the legal costs ran to £400,000. In Cheltenham, Gloucestershire, meanwhile, neighbours spent two years fighting over a 6 sq. m patch of land Charalambous v Welding [2009] EWCA Civ 1578. A recent report by the Ministry of Justice (MoJ) said that warring neighbours often use boundary disputes “as a weapon” to “bully” each other, and they are often motivated more by “jealousy and greed” than genuine disputes over boundaries (http://bit.ly/2wBGIZI).

On a much larger scale, Ethiopia and Eritrea went to war in the 1990s over their international border, which was based on an ad hoc Italian survey from the 1930s, with the result that several thousand people lost their lives. The ongoing border dispute between Pakistan, India and China on the Siachen Glacier has also caused regional tension and sporadic outbreaks of conflict for decades. The International Court of Justice has introduced ADR processes to help resolve many of these disputes.

Costs
According to the MoJ report, boundary cases typically cost between £10,000 and £50,000. Mediation offers a valuable way to move towards a settlement without having to go to court. The issue of cost and the considerable possibility of negative verdicts – no matter how strong a party feels its case is – are good reasons to push parties towards settlement.

For example, the total costs in Faidi v Elliot Corporation [2012] EWCA Civ 287 were more than £140,000 (http://bit.ly/2wBnjHX); this was a dispute between neighbours about the timber flooring to one flat, which was said to cause noise that would not have been heard if underlay and a carpet had been in place. All three Lord Justices commended mediation in their judgments. However, neither side had even written to the other proposing mediation until shortly before the Court of Appeal hearing.

Role of the expert
In the UK, Ordnance Survey mapping information provides the basis of the property title plan, and is an indication only of the geographical extents of a parcel boundary. More in-depth title information may also be found in the deeds, assuming they still exist. Other systems, such as the Napoleonic land codes or the German Grundbuch, offer more accurate measured boundaries (http://bit.ly/2pCGZW7). However, no system can entirely eliminate neighbour disputes, which may open up from the least provocation or from historic issues that are often unrelated to the boundary problem.

RICS provides information and professional guidance for chartered surveyors on the following topics:
- how to research a boundary dispute case file professionally, in Boundaries: Procedures for boundary identification, demarcation and dispute resolution guidance note, third edition, 2014
- standardised documentation for party walls

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The judicial view

The judiciary and legal profession has a love-hate relationship with neighbour disputes, and has been trying to bring ADR into play. The Party Wall etc. Act 1996 is a successful legislative instrument that has at its heart a robust ADR model, employing a “third surveyor” (http://bit.ly/1PFImx0). Tens of thousands of party wall awards have been agreed and very few end up in dispute. Many of the ADR principles at work in these situations could be employed in other types of neighbour dispute. Under the Property Boundaries (Resolution of Disputes) Bill 2016–17 (http://bit.ly/2gD99gm) some court enforcement would be brought to ADR, either as an agreed settlement or as some kind of evaluative mediation, with an expert chartered surveyor and trained mediator making technical suggestions to help reach an agreement. This is already the approach taken in several countries such as Sweden and Denmark, where licensed expert land surveyors have the legal authority to impose a solution on parties in a dispute over boundaries or other land issues, and that solution is legally registered, being recognised by the cadastral authorities (http://bit.ly/2qD99gm).

Reforms

The MoJ report concludes that radical reforms are not needed. It says: “Responses suggested that often boundary disputes are caused by, or are merely symptoms of, personal disagreements between neighbours.” The study found that 170 boundary disputes reach the court a year, although surveyors told officials that they were seeing up to 1,000 a year. The report concludes: “We consider that the piecemeal improvement of the current system, without impinging on its flexibility, is likely to be a better approach to making boundary disputes easier and less expensive to resolve than adopting an untried and radical solution.”

The report should form the basis of a future agreement on a much more robust court enforcement process or even system of compulsory mediation for neighbour disputes. At the time of writing, RICS, the Law Society and the Civil Litigation Council are discussing these issues.

The future is bright

Expert mediation does now seem to have some momentum in neighbour disputes, with not only legislative and judicial support but also a dawning realisation by expert chartered surveyors and protagonists that such disputes can be settled without resort to litigation and courts.

There seem to be three major factors prompting parties towards a mediated settlement.

1. Costs: Litigation can cost a small fortune and often outweighs the actual value of the disputed land. Mediation offers a much more economical way forward.

2. Settlement at mediation allows the parties to agree solutions that the courts cannot offer

3. Permanency: neighbour disputes can have a nasty habit of recurring unless the agreement is registered as, for example, a determined boundary with the Land Registry. A mediated, sustainable settlement that engages both parties can be developed into a legally binding agreement.

Mediation has a lot of potential for helping people move away from entrenched, emotional positions and towards sustainable settlements. It also offers the expert chartered surveyor a way not only to hone their people and mediation skills, but also to draw directly on their strengths in the technical areas of practice.

The future is mediated.

Settlement at mediation allows the parties to agree solutions that the courts cannot offer. This could enable compromise or agreement on secondary benefits that might not be directly related to the physical problem; for instance, to keep a fence where it is but allow joint access to the back gate and driveway.

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Related competencies include Analysis of client requirements, Cadastre and land management, Legal/regulatory compliance
Rural Conferences 2017

Rural Mid-Session Conference, Scotland
23 November 2017, SNH Battleby, Perth
Join us as we discuss what role the rural profession can play to support Scotland’s forests and to increase their value and contribution to the environment and the economy.

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30 November 2017, Brockholes Nature Reserve, Preston
This event will offer some a timely opportunity to consider what a favourable outcome from Brexit will look like. Sessions such as environmental update will look at Brexit and how this poses significant issues for environmental law in the UK.

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