

March 2021 #104

SURVEYING + SPATIAL

Magazine

**GIS - UPSKILLING
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**SURVEYING AND
SURVIVAL ON
MOUNT KILAUEA**

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Refreshing your skill set

Rachel Harris

As the world makes headway out of lockdowns and into economic recovery, many people are turning their attention to their careers and professional development to future-proof and add value to their current skill sets.

In this edition, we look at moving ahead both professionally and as an industry, a timely theme in the post-Covid recovery phase and as the survey and spatial industries continue to evolve and adapt to the future with new innovations and technology.

In the wake of Covid-19, many people are reassessing their professional lives, looking at greater flexibility in the way they work and ensuring their career is more adaptable and future-oriented.

One of the few positives that has come out of the pandemic lockdowns has been a chance for people to re-evaluate their career skills, professional roles and consider new ways to diversify their skill sets.

Although New Zealand has for the most part emerged relatively unscathed from the global fallout of redundancies, reduced working hours and restricted working environments, many professionals are now looking at new opportunities, switching sectors, retraining, or setting up their own businesses.

In these uncertain economic times, it certainly seems to make sense to pursue a broad portfolio of skills

and reach out to your professional network. There are many avenues you can take to learning new skills, including professional development courses, online learning modules and courses through established tertiary providers.

Survey + Spatial NZ also has some excellent workshops, seminars and webinars under way, as well as the forthcoming 2021 conference in Auckland which has an outstanding presentation programme scheduled as well as excellent networking opportunities for attending delegates.

Get involved with your professional organisations and membership bodies, gain support from other professionals in your field and become active in their group endeavours and events, or stay local within your region, attend branch meetings and get up to date with the latest issues, local discussions and workshops (Survey + Spatial NZ has 16 branches nationwide).

With plenty of opportunities for broadening your professional and career horizons across many different organisations and platforms, now is the perfect time to continue to progress and evolve your professional skills for the survey and spatial industries.

In this edition of *Survey + Spatial* we feature a topical article by Duane Wilkins on adding GIS skills to your professional skill set.



With an increasing demand for GIS skills and a current skills shortage in New Zealand, skills in data management, feature analysis, integrating data as well as presenting GIS applications are becoming increasingly valuable skills across many industries. Duane takes a look at how you can add GIS skills to your toolbox and what learning options are available to develop your skill set and knowledge.

SITECH NZ reports on an innovative, new digital shield project for KiwiRail that increases operator safety and protects rail lines and structures during civil works. The digital shield technology has prompted an enthusiastic response from the industry, ensuring safer civil operations and further potential application across other sectors of the industry.

Ensuring your business is working smartly and efficiently in 2021 is the topic of discussion in our business management feature in this edition. With another extraordinary survey adventure encountered in the line of duty, Peter Otway recalls his fortuitous escape from an eruption on Hawaii's Mt Kilauea.

And in our Personal Perspectives column, Senior Survey Adviser Toni Hill reports on her personal experiences on joining the Office of the Surveyor-General and the new developments and projects under way at LINZ. ●

In the wake of Covid-19, many people are reassessing their professional lives, looking at greater flexibility in the way they work and ensuring their career is more adaptable and future-oriented.

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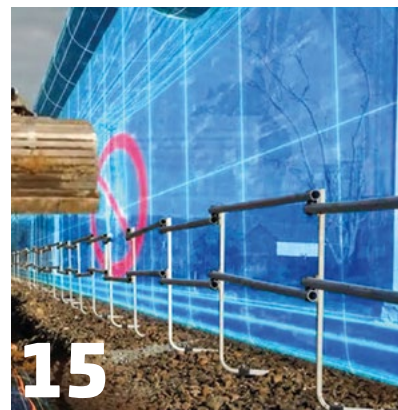
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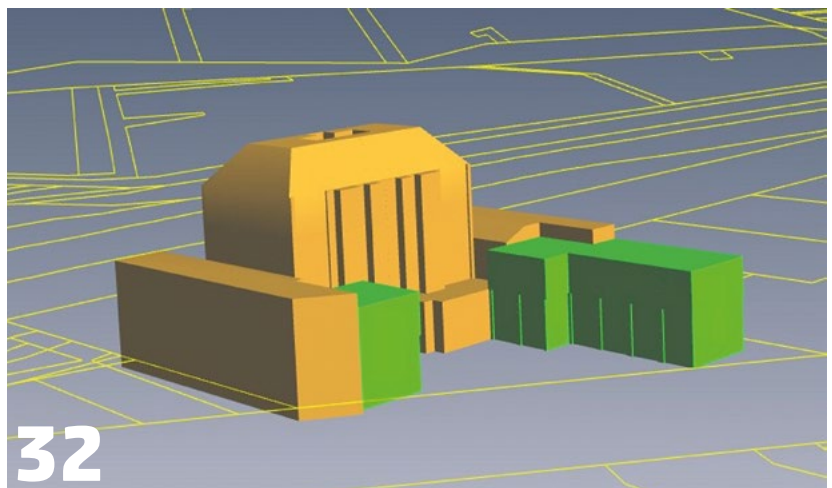
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Now even stronger, together

It's been nearly a decade since we learnt you weren't getting the cover you needed. So, in 2013, we partnered with Survey and Spatial New Zealand to develop specific, proven cover for your industry. Our knowledge of what you do allowed us to identify the gaps that used to be prevalent in your insurance options.

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Alongside evolving our knowledge base, we've also evolved our brand so that it better reflects our business and focus on client partnership.

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OPTIONS FOR ADDING GIS TO YOUR SKILLS TOOLBOX

Duane Wilkins, Senior Adviser Geospatial Capability Building, Land Information New Zealand

In 2008, I directed a programme for the United States Agency for International Development (USAID) to establish city and infrastructure mapping teams in 20 cities in the Middle East. We employed more than 80 engineers who could demonstrate familiarity using AutoCAD and we taught them how to use and apply geographic information systems software, data, tools and related technologies.



Survey plan sources and scanning by engineer Ammar Dosky. Photos: Survey Spatial

We provided scanners, printers, computers, differential Leica GPS, and a range of survey tools to help scan and align rapidly deteriorating paper and goat skin survey plans with satellite imagery to develop a basic parcel/title layer, which became the basis for identifying landowners, infrastructure and utilities.

We couldn't have large gatherings or team meetings as H1N1 influenza, or swine flu, was spreading rapidly throughout the community, causing great uncertainty, and with many working from home. Over a year, we had only a few days together face to face, and generally kept in touch via Skype, and audio conferences. Sounding familiar?

The engineers had an overwhelming desire to learn new skills and

knew they needed GIS for the task; they also had to overcome a number of overwhelming challenges. We were very fortunate to have scanned all of the historical survey plans because they were all lost to fire when ISIS burnt out most of the regional government buildings. Fortunately we had copies of most of the data squirrelled away all around the world on USB drives.

Long story short: If Iraqi engineers



working in a post-conflict, civil war zone with sketchy satellite internet and no wifi, reliant on diesel generators, generally in temperatures of 30

Long story short: If Iraqi engineers working in a post-conflict, civil war zone with sketchy satellite internet and no wifi, reliant on diesel generators, generally in temperatures of 30 to 50 Celsius, could become proficient in GIS in spite of ISIS in Iraq (who destroyed their offices and all the old maps), then you can too.



Getting ready for a Sunday drive across Baghdad to talk about GIS with local engineers, 2009.

to 50 Celsius, could become proficient in GIS in spite of ISIS in Iraq (who destroyed their offices and all the old maps), then you can too.

Eight(ish) reasons you might like to add GIS to your skills toolbox

FAMILIARITY: If you're familiar with surveying or engineering software, you are very likely to already know more than most GIS analysts about

projections, datums and coordinate systems, so it makes sense to build on the knowledge you already have.



Many GIS users have difficulty understanding datums and projections. PS: When oranges are not working, we also try pear shaped (bad dad joke).

RAIN: GIS people are always in high demand during disasters, and emergencies are becoming more frequent. Most GIS work can now be performed remotely, on remote servers or desktop PCs.

42: GIS will help map the answer to "the ultimate question of life, the universe and everything". It has been applied to thousands of situations, within almost every sector of work from health mapping, restaurant location planning, 3D visualisations of forestry and flood mapping. Check out this amazing list of 1000 uses of GIS from Agriculture to Weather: hae.re/1000.

FREE: GIS software is incredibly accessible, there are a variety of options to suit your interests, from storytelling with Google Earth Pro (free), desktop analysis with open source desktop QGIS (free), to deploying integrated online tools with Esri ArcGIS Online (free, trial, personal and NGO licence options).

DATA: There are petabytes of New Zealand geospatial data freely accessible from most agencies like LINZ, DOC, MFE, Stats NZ, Manaaki

Whenua, NIWA, GNS Science, most councils, and data.govt.nz is a great place to start your quest.

YOUTUBERS: There are a huge variety of online resources to help you learn GIS skills, including 1,050,000 video tutorials on YouTube hae.re/tutorials, online webinars, free and low cost online courses, university courses and professional development training available. You can also view our growing collection of GeoBites video recordings here: hae.re/webinars.

DEMAND: Good GIS help is hard to find. GIS skills are listed on the New Zealand immigration skills shortage list under 'Spatial Scientists' of various types. Skills in managing data, analysis of relationships between features, and integrating data from different sources using GIS and then being able to create summary reports, communicating by creating interactive StoryMaps and creating online dashboards are a desirable skill, readily applied to most sectors. skillshortages.immigration.govt.nz/. Search: *Spatial Scientist*.

FUN: Now with 50 per cent more added colour! Are you tired of black backgrounds and grey user interfaces? Do you wish everything could use a rainbow palette? Understanding the art and science of colour use in mapping is important, and a useful skill when painting your house too. Have a look at this LiDAR 3D viewer of Paeroa at OpenTopography.org: hae.re/tree.

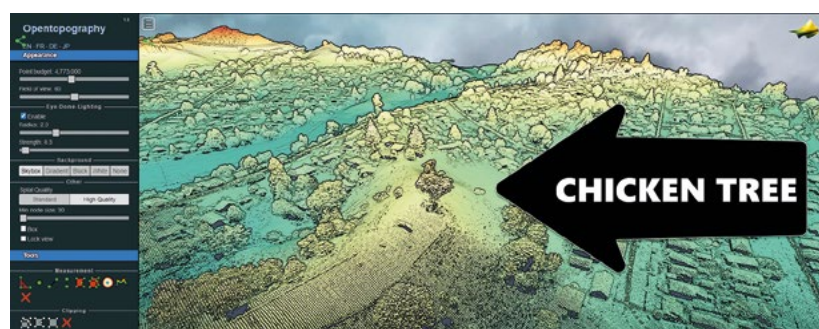
MONEY. In these uncertain economic

times affected by Covid-19, it's always useful to have a few backup skills that can help you step out of your normal role. Skills in data analysis can make you a very valuable resource for contracting or a little extra work on the side, leveraging your unique skill set in the growing area of data analytics, and analysis.

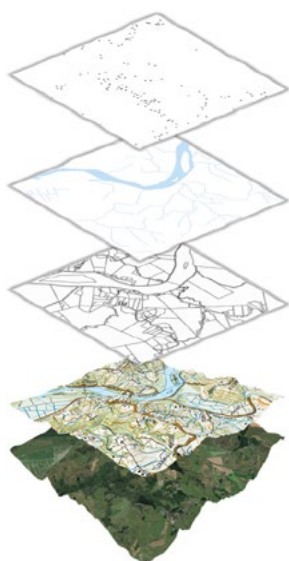
So what is GIS?

I often describe GIS as like pizza: you'll want different flavours of maps, for different user needs, and not one with everything on it.

- You can layer anything, as long as fits within our pizza box coordinate system.
- We do spatial analysis to find the slices with the highest density or least areas of pineapple.
- Different types of pizza need different basemaps depending on what you're adding on top.
- Quality of data ingredients is usually more important than quantity.
- Metadata describes where the ingredients came from and who made it, how and why.
- We bake the pizza as best we can, with what we have, in the time available.
- You don't need to make the pizza yourself, if you know the gist of it you can ask someone else.
- The colours used are important, and the GIS pizza must be visually consumable.



Enjoy this LiDAR rainbow colour palette and chicken shaped tree (-37.3809, 175.6764).



Points - Places

Used for: Pou poles, place names, trees, posts, sites of significance, urupa, pa, springs, cultivations, middens, any pin or latitude longitude type location.

Lines - Paths

Used for: Awa, tracks, paths, roads, fences, ridges, tree lines, boundaries

Polygons - Areas

Used for: Areas of interest, rohe, blocks, boundaries, rahui, buildings, urupa, cultivations.

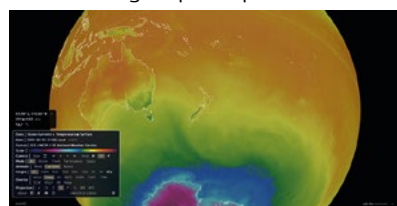
Raster - Imagery

Used to represent: Topographical maps, satellite images and aerial photography, historical scanned survey plans, 3D elevation surfaces, processed LIDAR elevation, depth and bathymetry.

An example of the layering concept used in GIS.

Learning GIS can be overwhelming and difficult for those starting out. GIS practitioners are focused on the collection, analysis and maintenance of data which can be time consuming, frustrating and expensive. GIS software focuses on operations, and processes, and is a constantly developing area as all aspects expand exponentially.

Geographic information systems are a collection of tools that work with spatial data or location based services. GIS traditionally is used to capture, store, manage, analyse and visualise spatial data in a software environment. Developments in remote sensing, artificial intelligence and research are changing the breadth and definition of what a GIS is. As ever more satellites stream live data back to earth, remotely sensed data and imagery are now managed using cloud storage systems and automated geospatial processes.



Try out this fascinating online weather app from earth.nullschool.net, which provides dozens of different live feeds inferred from near real-time satellite measurements. hae.re/earth.

Where can I get a slice of this pizza?

There are a few options to just dive in and get started – here are four that I'd recommend:

1. **Google Earth:** Download and install Google Earth Pro for your desktop from google.com/earth/versions/ and say goodbye to the rest of your evening as you fly from place to place, you must of course zoom to your own home first, this is obligatory!
2. **ArcGIS Online:** Sign up for a free ArcGIS Online account, and begin learning about StoryMaps from storymaps.arcgis.com, browse the gallery and then start making your own.
3. **QGIS:** When you're ready for a deep dive, download and install the free QGIS desktop from QGIS.org, then head to YouTube for thousands of tutorials.
4. **Kobotoolbox.org** is an option to start creating your own forms for offline field data capture, and is a useful free alternative to get started if your organisation doesn't have access to Survey123.

You'll be able to find a heap of ready-to-use data available in a variety of formats – like the LINZ data service – from many government agencies to use with these apps: data.linz.govt.nz.



Earth.google.com 3D is great fun: start there.

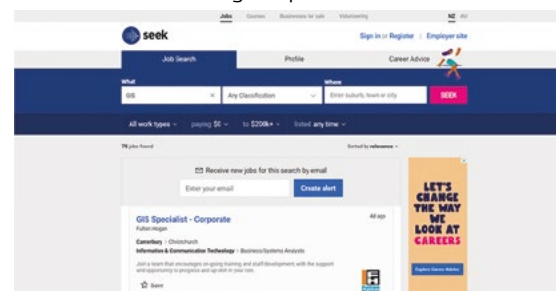
If you've never used any mapping software before, and are not technically confident, a gentler and often satisfying approach to mapping can be found in mymaps.google.com; here is an example map I created: hae.re/huntly.



A made-up example map on a wetland just north of Huntly.

But are there jobs in GIS?

At the time of writing in February 2021, there are 75 GIS-specific jobs advertised across New Zealand at seek.co.nz/GIS-jobs – this dipped to 54 in mid-2020 during the pandemic.



Seek.co.nz, Trademe.co.nz, and Jobs.govt.nz are useful sites for exploring GIS jobs.

As in many fields, many roles are not advertised and instead recruited through networks connections and colleagues.

Having a basic understanding of GIS tools, processes and data in your CV can help you stand out in a tsunami of resumes for a manager desperate for staff. It indicates you have developed useful technical skills, or for some it is interpreted: this person is skilled in the dark arts of mapping sorcery.

If you are thinking about moving into a GIS-focused role, you will want to make a moderate investment including some tertiary study beyond the basics of software including cartography, geo-processing, data management and creating online GIS web applications.

What should I focus my learning on?

Start small, and simple – there are videos and short online tutorials, which will help feel like you're making progress. Or go all in, and sign up for an online tutor-led course; whatever works for you is the right choice.

My path started when I was about 25 years old, after visiting a university display one Saturday at the Mystery Creek agricultural field days. In short order, I left my 'promising' fast-track career in low-wage retail garden centre management (which I didn't enjoy), moved house the next Friday, and started a remedial study course at the University of Waikato the following Monday. I didn't have a mortgage though.

To be successful in applied GIS, after learning a lot of this the hard way, here are my suggestions:

1. **Communication:** We are data geeks, and maps are a powerful communication tool, but we often have difficulty describing the value of GIS, and presenting

it in an engaging manner. Start now by exploring [StoryMaps](#). [ArcGIS.com](#) as an alternative tool to PowerPoint. Watch a few of the most popular TED talks to understand great communication and avoid bulletpoint presentation design. We may never quite get there, but an aspirational journey is important. Top 20 Ted talks: [hae.re/ted](#).

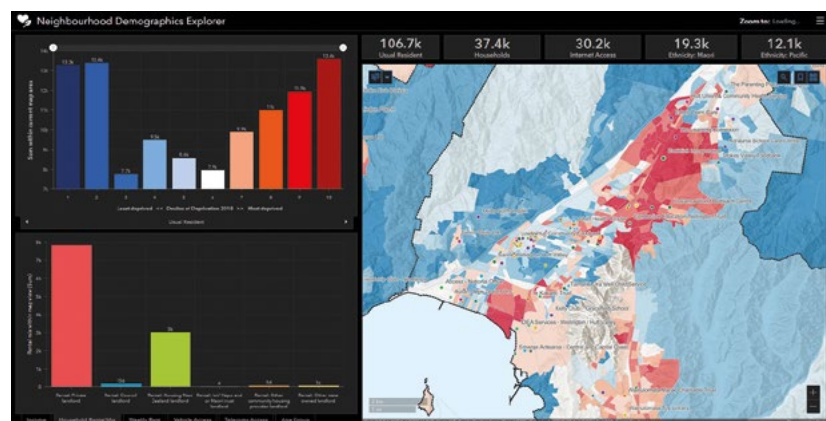
2. **User needs:** People will often ask for what they think they can get, and they may not quite understand what they really need. For example, they might ask for a map, but may really need a form to fill in on their smartphone and a dashboard summary of results. By asking a few open-ended questions and exploring what they're doing, you can often provide an online tool for much less time than creating a printed cartographically splendid map.
3. **Project management:** I will often ask in training workshops: "How long does it take to cook an egg?" It's a trick question, and the answer is not three minutes. "It depends" is always the correct answer. Depends on what, where, when, how and importantly why you are asking me to cook you eggs now in the middle of this workshop?

(The answer is usually more like hours). Quadrupling the initial estimate of time is normal in GIS tasks as it "depends" on the data being "just so", when it seldom ever is.

The best answer I had to this cooking eggs question was: "How about you just have this Moro bar instead?" Finally, a user-needs interpretation that hit the jackpot!

4. **Real-world applications:** Most online tutorials will use US or non-New Zealand datasets. It's extremely important to discover what data exists and also does not exist for Aotearoa. Explore the services from LINZ, MfE, Stats NZ, and Manaaki Whenua available on [data.govt.nz](#).
5. **The technical stuff:** It is still important to know the basics of using desktop GIS, finding data, geo-processing and working with tables and making a map for printing. QGIS and ArcGIS Pro are desktop tools that do this. At the moment though, 95 per cent of my work has focused on using and teaching online tools as they don't require any infrastructure or software installation.

Often GIS involves creating data collection forms and maps tailored for smartphones,



An interactive 2018 census demographics explorer created for the Covid-19 response. [hae.re/demo](#).

interactive StoryMaps, 3D visualisations, and summary dashboards for decision makers, all of which are online focused. During Covid-19 restrictions, I spent four months working from home on the operational response almost entirely in Google Chrome, but desktop geo-processing still has its place in analysis and business as usual data management.

Let's start with good, fast, easy and cheap

Online courses

Get started with a gentle overall introduction now with this free online introduction to GIS from the University of California, Davis and a certificate of completion: hae.re/gis-awesome.

Penn State University also has a range of free open courses available. Who wouldn't want to learn GIS from Professor Handwerk? hae.re/handwerk. Check out this introduction video, and browse the courses available: open.ems.psu.edu/courses.

There are a vast number of free online courses available from universities and enthusiasts, and Google will be more than willing to help you find them, try using the keyword 'MOOC' or massive open online courses.

Online webinars

GEOBITES

Toitu te Whenua (Land Information

NZ) is currently running a series of GeoBite webinars for NZ GIS practitioners, exploring a range of topics specific to New Zealand geospatial workflows, data and explanations from a variety of NZ GIS experts.

hae.re/geobites.

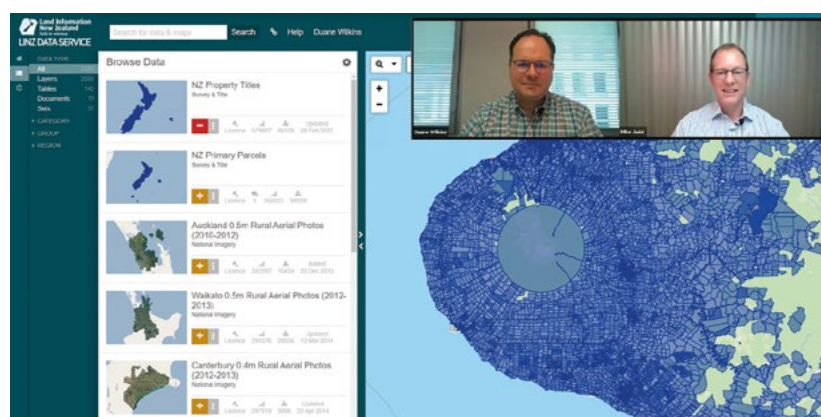
BROWN BAG RESILIENCE SERIES

This is a series of short webinar presentations by subject matter experts for those interested in improving the resilience of New Zealand and New Zealanders. Although they are not always strictly GIS focused, they are more often than not. These are hosted by Land Information New Zealand and the Ministry of Transport. hae.re/bbbs.

NGĀ POUTAMA MATAWHENUA

For those with iwi and Māori interests, throughout 2021, we're also running the Nga Poutama Matawhenua – Practical Māori GIS Mapping Wānanga, linz.govt.nz/poutama, a programme of fortnightly online mapping wānanga in collaboration with Te Kahui Manu Hokai – the Māori GIS Association to help learn how to map the whenua and tell stories through GIS mapping.

These interactive wānanga are specifically tailored towards those working for iwi, Māori trusts and environmental groups and could be useful to those wanting to learn more about applied GIS workflows and tools for land management, environmental monitoring and storytelling.



GeoBites: Practical demonstrations for GIS users.

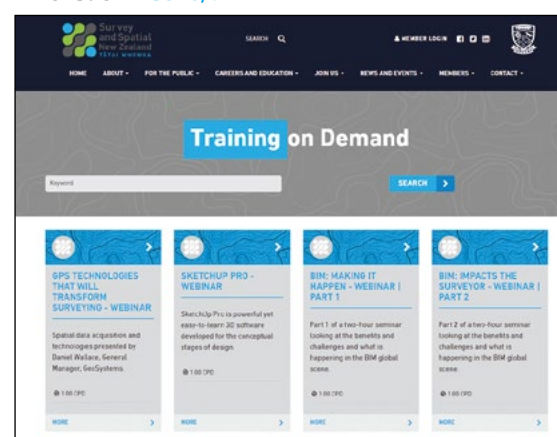


One of the StoryMap-based resources used to share data sources for Māori GIS Projects: hae.re/md.

LINKONLINE SEMINAR SERIES

Manaaki Whenua – Landcare Research Link is a series of short seminars and discussions for environmental policy-makers. These sessions provide an informal way for scientists to deliver key research outcomes or share the science challenges with a broad-based policy audience.

Themes to date have included a range of ecosystems services topics, the aspiration for a pest/predator free New Zealand, modelling of economic impacts of land use policy, freshwater management, Māori land, biodiversity, soil mapping and policy innovation. hae.re/link.



Training on demand available from the Survey and Spatial New Zealand website.

SURVEY AND SPATIAL NEW ZEALAND

also regularly organises webinars with a focus on geospatial, surveying and data use. These are made available on demand for a fee, and

include a range of themes including positioning, aerial survey and imagery, datums and projections, climate change, and even conference presentations. hae.re/ssnz.

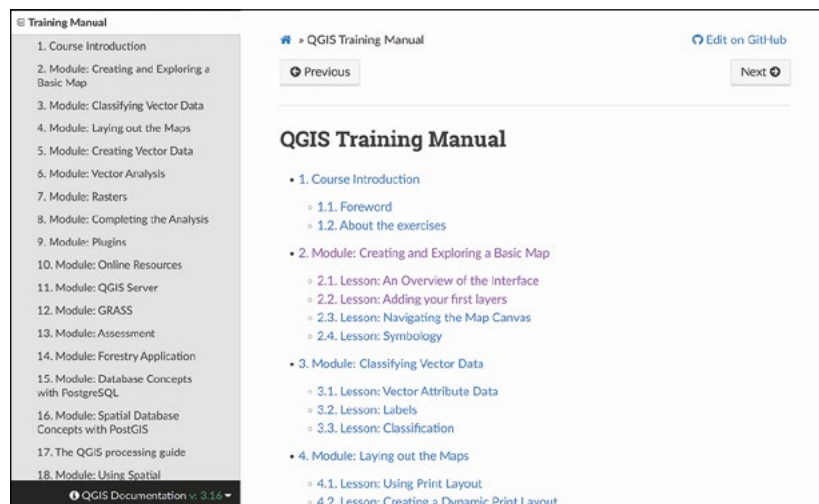
Self-directed step-by-step short courses

If you prefer a more structured and detailed approach, there are a good range of free online courses available that also provide certificates of completion.

Esri ArcGIS is a commercial software suite, the geospatial equivalent of Microsoft enterprise and office applications, including a range of mobile, desktop, online, cloud and server based applications.

There are currently 355 free online courses available, ranging from a couple of hours to several hours learning. They are arranged by learning streams, categories, workflows and applications.

You will need to sign up for an Esri 'Public' account. The simplest option is to use one of your existing Google or Facebook accounts to set up a login. If you already have access to an ArcGIS Online subscription through work, you will be able to access a wide range of additional tutorials on a wide range of software applications.



The **QGIS Training Manual** from qgis.org is very comprehensive and thorough.

There are also a range of in person, virtual or hybrid instructor-led ArcGIS suite courses available from Eagle Technology that are 1-3 days focusing on workflows or a particular application. Well worth a look: eagle.co.nz/learn.

At last! A desktop GIS that runs natively on MacOS and is free

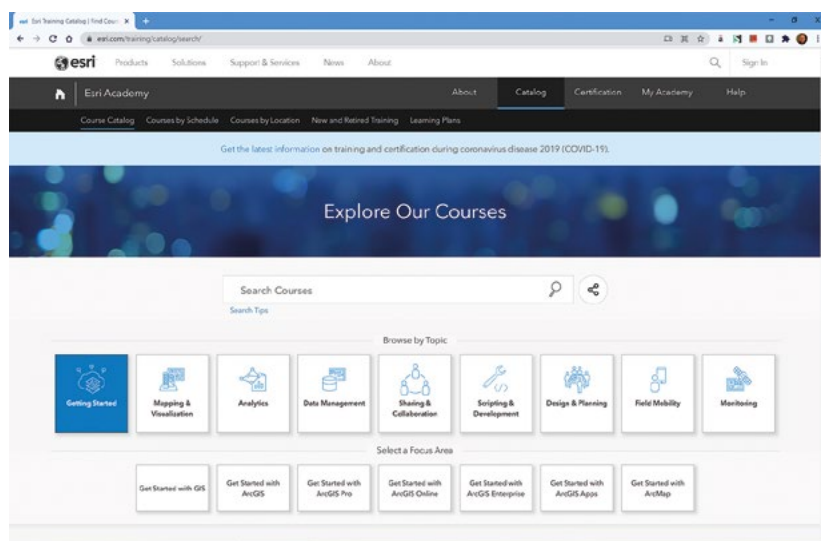
QGIS desktop is a professional GIS application that is free and open source software (FOSS). QGIS runs on Linux, Unix, Mac OSX, Windows and Android and supports numerous vector, raster, and database formats and functionalities. You can download it now and there are extensive and

numerous training courses, YouTube videos and an online training guide and sample data available from the QGIS.org website, or use this link to go directly to the training material: hae.re/qgis-training.

Low-cost online options

There are several sites offering relatively low-investment online courses, but a couple stand out. Try searching using keywords like GIS, geospatial, spatial, or remote sensing.

- **Coursera.org:** Coursera provides a wide variety of high quality courses from well-known international universities (Yale, Stanford, John Hopkins) and companies (Google, IBM, SAS) offering short courses to a range of online degrees. Coursera has a base monthly subscription of US\$49 a month, with additional fees for some degree-based programmes.
- **Udemy.com:** is the largest online provider, starting from US\$12.99 to US\$169 for courses. There are an astounding 673 courses when searching for 'GIS'. Because anyone can sign up to create a Udemy course, the quality may not always be up there, so be sure to check the reviews before making a commitment in terms of time and finance.



A wide range of ArcGIS online courses are available at no cost at the online campus.

Home / About LINZ / New Zealand tertiary GIS papers, programmes and contacts

New Zealand tertiary GIS papers, programmes and contacts

Find New Zealand tertiary GIS papers, programmes and contacts.

Institute	GIS papers / programmes	Institution GIS contact
University of Auckland	Geographic Information Science (GIS) - introductory material Links to undergraduate GIS papers below: Geographic Information Science (GIS) - Undergraduate Geographic Information Science courses (GIS) - Postgraduate	Katarzyna Sila-Nowicka ~64 9 9235930 katarzyna.sila-nowicka@auckland.ac.nz
Auckland University of Technology	Geospatial Science: Bachelor of Science (GIS) - includes links to individual papers Postgraduate Diploma in Geographic Information Science (GIS) Master of Geographic Information Science (GIS)	Dr Barbara Breen ~64 9 921 9999 Ext 8837 barbara.breen@auct.ac.nz
University of Waikato	Geographic Information Systems (GIS) (GIS) - links to undergraduate and postgraduate options, including the GIS Specialisation for the Master of Social Science and the Master of Information Technology Postgraduate Diploma in Arts (Geospatial Science)	Dr Lar's Bradyn ~64 7 856 2889 laris@waikato.ac.nz

About LINZ

- Our Kaupapa
- Our location strategy
- Growing New Zealand's geospatial industry
- Studying GIS

Our location strategy

You might be interested in

- LINZ Data Service
- LINZ data
- Cadastre 2034: a 10-20 year strategy
- Topographic Strategy
- Maps

A comprehensive list of study options is available on the LINZ website: hae.re/studygis.

Go large or go home – enrolling in university paper or programme

If you prefer an in-person option (Covid-19 permitting) then enrolling at a university near you is a popular mid-career option. You'll get to meet like-minded people and be exposed to a different way of thinking.

Invest in yourself

You can start with just a single paper, generally requiring a lecture and tutorial session each week for about 12 weeks, and costing about \$800-\$2000, which you can put on a student loan and pay off over time at low or no interest.

Most workplaces will provide support or make a contribution

toward career planning and professional development, or you can discuss adding this to your annual performance agreement. Contractors and sole traders should check with your accountant first as you may be able to offset it against your taxes for certain courses.

Learning institutions teaching GIS in Aotearoa

For a comprehensive table of programmes including direct links to papers, and contact details for options: hae.re/studygis.

I'd like to learn more, just tell me what to do

Woo-hoo. Here is list of suggestions to get you started:

1. Begin your quest by embracing YouTube. Look for videos by Esri, by universities, and temper your enthusiastic approach with a healthy 'daily dose of the internet' clips. Search for GIS + keywords of interest, like flood modelling, 3D, survey, drones, environment, conservation or GIS + crime is interesting too.
2. Download and install Google Earth Pro desktop from google.com/earth if you've never used it before, then explore StoryMaps.ArcGIS.com, and then try QGis.org when you're ready to take a deep dive in.
3. The next step is to complete a few free introductory GIS courses from Esri Campus or Udemy.
4. And then when you are ready, find an online or in person university paper to test the waters (before committing to a GIS-based PhD as several of my Iraqi engineering colleagues did and have now successfully completed them).

So give learning a bit of GIS a go, watch a few webinars, try a few online courses, invest in your own professional development. Your learning journey may see you visiting places you'd not expect (and next time I'll tell you about that time I did infrastructure GIS in Afghanistan and interviewed a member of Taliban for a GPS survey job). ●



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GSI INSURANCE PARTNERS' GENEROSITY A BOOST FOR KAIRŪRI COMMUNITY TRUST



Trust funds grow, thanks to GSI Insurance Partners grant

GSI Insurance Partners, long-term supporters of the Kairūri Community Trust, have again shown their dedicated support for the future of the surveying and spatial sector with a generous donation of \$11,500.

KCT chair Simon Jellie says, "The trust is thrilled to receive GSI Insurance Partners' support once again. Although our operation has been affected by Covid-19 this year with the cancellation of events, this and previous donations are highly valued and greatly appreciated.

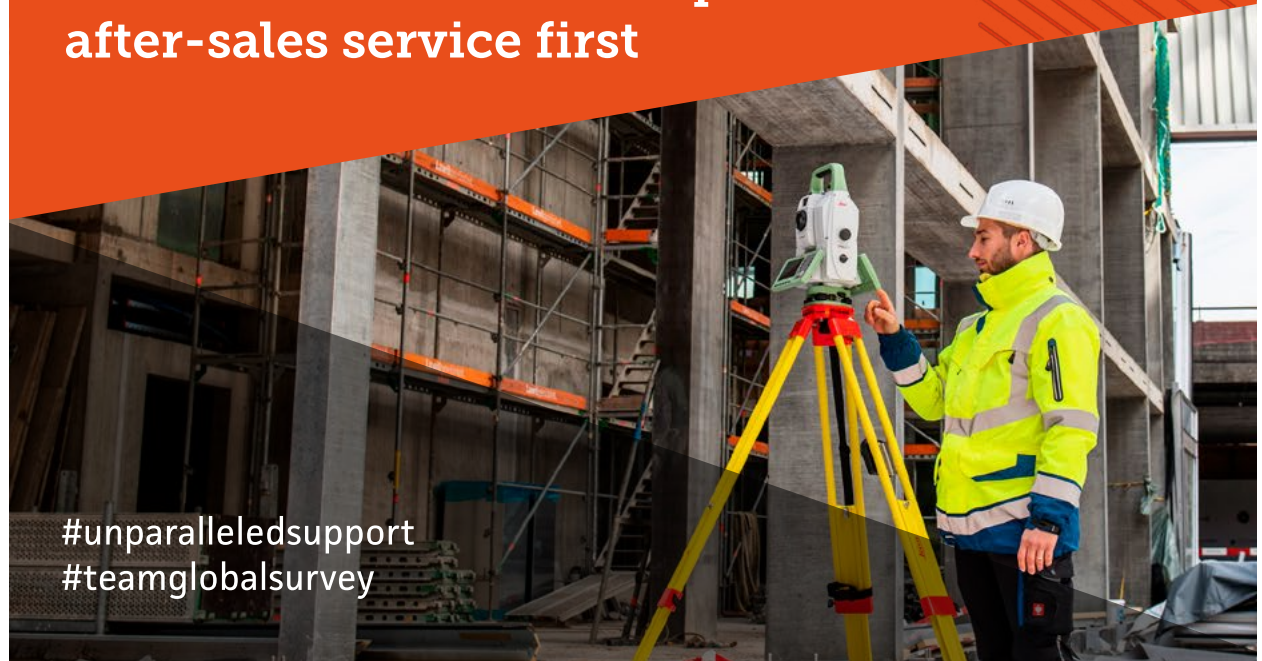
"They allow the trust to continue building a legacy that our young professionals gain benefit from both now and in the future. The trustees are looking to raise the profile of donation opportunities in 2021 and, in the short term, will be establishing a surveying and spatial scholarship targeting improved diversity in the profession.

"Earlier this year we had some changes to our KCT trustees", says Simon. "Long-term chair Bill Robertson stepped down, handing me his mantle, and David Fox, also a founding trustee, passed his trustee role to Katherine Sandford. Jayne Perrin remains as the third trustee".

The Kairūri Community Trust was first set up in 2016 to foster the future of the surveying and spatial community. The purpose of the trust is to benefit the profession and the community and create a legacy for the future.

The trustees' objective is to build up awareness, grow and educate the public on the surveying and spatial community. This future focus gives benefactors the opportunity to provide educational scholarships, support inclusive school programmes, foster diversity and encourage the next generation of surveying and spatial professionals. ●

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SITECH NZ



Figure 1: KiwiRail's Digital Shields video.

Digital Shields and the SITECH NZ Machine Avoidance System

In September 2020, KiwiRail released the 'Digital Shields' video, which quickly trended on social media. The video features excavators working next to a fluorescent blue 'barrier', which appears to protect the rail line and physical structures adjacent to it. A simple written narrative about the development and use of the technology is delivered throughout. The industry and the public responded positively with approving comments and more than 60,000 views on LinkedIn alone.

The 'barrier' is a visual representation of a 3D digital avoidance model which surrounds the live rail and other assets on Downer NZ's T2UH project in the Hutt Valley, or as we now call it, Technology Valley. The machine technology shown in the Digital Shields video is the SITECH NZ Machine Avoidance System, fitted to excavators on the project, which detects when the machine has breached the avoidance model, locking the machine's controls. This world-first solution was developed thanks to first-class collaboration and Kiwi innovation during a year disrupted by a global pandemic.



Figure 2: Conrad Robertson from Robertson Battock Civil uses both grade control and avoidance zone GNSS technology.

Industry Leadership and Collaboration

Driving the technology development was KiwiRail, which had looked ahead at improving project delivery. Andy Lyon, Programme Director for digital engineering at KiwiRail said in 2019 KiwiRail started to change the way it delivers its capital works projects by using BIM [building information modelling] and digital engineering.

"The pilot projects were designed to create a bed for innovation that would benefit both KiwiRail's business and the wider AEC industry".

Early on at T2UH, a rail double tracking project, the project team

was striving to improve productivity by adjusting the methodology to be used for excavation works. As the new methodology would mean that the excavators would work closer to the live rail and overhead assets, safety was a concern, especially given the controls that were available. Rather than looking for solutions elsewhere, KiwiRail put its faith in the project team to find the technology that would eventually be adopted.

As luck would have it, T2UH was the perfect project to pilot the new technology. Key personnel from a group of innovative organisations (KiwiRail, Downer, Robertson Battock, SITECH NZ and CablePrice) happened to be already involved in the project

or working closely with those who were. KiwiRail's decision to run the pilot with a collaborative approach allowed faster development and improvements to the solution. Amazingly, the timeframe between the concept and release of Digital Shields was less than six months (including a national Covid-19 lockdown).

Technology and Innovation

When SITECH NZ became involved, laser scanning and CAD software had been used for data acquisition and 3D modelling respectively, and a 3D avoidance model had been created. However, the technology that could harness the model to protect the assets had not yet been developed. This part was made possible by SITECH NZ's Advanced Solutions Team.

SITECH NZ's Advanced Solutions Team is a group of qualified surveyors with decades of industry experience. Employing the help of Trimble, the team worked out how to extend the capability of the Trimble Earthworks GNSS machine guidance system, by incorporating another Trimble system called TMC (Trimble Marine Construction). The result is a seamless integration of Trimble Earthworks and TMC, where the operator has two interfaces driven by one positioning platform. The operator can dig accurately to grade using Trimble Earthworks, and if the machine is moved too close to the avoidance zone, TMC triggers a shutdown of the machine's controls.

Other technologies were considered before SITECH NZ's machine solution was selected but what makes the chosen solution stand out is the way it accommodates a full machine model, providing absolute positioning for the excavator, and also its ability to rapidly calculate the model against a complex 3D avoidance zone model.

BIM in Action

Rail corridors are dynamic environments, especially over the course of projects that take months or years. Maintenance work or other improvements can take place that change the layout of assets in the corridor, therefore avoidance model updates are required. Further to this, the model itself is also dynamic as it starts life as a point cloud, is repurposed by different users in different software packages, and eventually used by TMC on the excavator. For these reasons, a BIM approach is very suitable.

A great example of BIM during the pilot is the avoidance model verification process. To ensure that the model comprehensively covers all assets, augmented reality technology is used on site to view the model in the real world. When an engineer takes a Trimble SiteVision device out on site for model verification, the device connects to the Trimble Connect cloud service to synchronise the data files. Once verification is complete, the Machine Avoidance System synchronises the same model which then becomes the virtual barrier. Two different applications, one common model.

Pilot Outcomes

Cameron Hyndman, Digital Engineering Manager for Downer NZ, is passionate about the solution that he helped develop.

"We are claiming a 30 to 40 per cent increase in productivity,"



Figure 3: Data validation using Trimble SiteVision.

"Typical clearance restrictions would require the construction team to either work under a block of line or under strict train stop controls."

KiwiRail is also impressed with the fruits of its labour, Andy Lyon said the elegance and simplicity of the solution, and the coming together of multiple people across a number of organisations, has delivered a true innovation that offers a significant improvement to the safety of their people and security of assets.

SITECH NZ continues to develop the Machine Avoidance System,

making enhancements and even looking at ways the technology can monitor operator behaviour. There are encouraging signs that New Zealand is yet again at the forefront of technology. SITECH dealerships worldwide continue to reach out to SITECH NZ for information about what they have seen in the Digital Shields video and SITECH WA (Western Australia) has just launched a pilot project with SITECH NZ's help. ●

CADASTRAL STREAM NEWS

In 2021 Toni Hill stepped down from the role as Chair of the Cadastral Stream, with Hannah Reader taking over. Thanks Toni, for all the work you put in as Chair, and it is great you are still able to be a huge help on the committee. Karl Wilton remains as the cadastral representative on the Council. We also welcome a new member to the committee, Andrew Blackman, joining Matt Ryder, Trent Gulliver, Richard Hemi and Rita Clark.

Over the next month, the Cadastral Stream wants to make a submission on behalf of the membership relating to the Cadastral Surveying Licensing Board's proposed new standards and is keen to hear from members by Monday, 15 March, to get the stream submission completed by the closing date.

The stream is also aware that the new Cadastral Survey Rules will be published this year and is focusing on ensuring the membership will be informed via whichever method of communication is appropriate on the changes they need to be aware of and how compliance can be achieved. Additionally, we are contributing to the planning of this year's conference in Auckland, along with still looking at how we can contribute to a good survey practice guide.

As always, if anyone has any feedback, please contact cadastral@surveyspatialnz.org.

Hannah Reader, Cadastral Stream Chair

ENGINEERING STREAM NEWS

Certification of engineering surveyors is finally making real progress. On February 10, 2021, the Survey and Spatial Council agreed to proceed with the next stage of the certification project.

This is to develop and design the competencies and the test of those competencies for not only the Engineering Surveying Stream, but also the Land Development and Urban Design Stream. The target is to have Stage 1 completed by July 12, then we move to Stage 2, when we look at implementation. If you have any questions or

feedback about this, please email me at: engineering@surveyspatialnz.org.

The S+SNZ Engineering and Positioning Workshop is on April 16 at the Ellerslie Events Centre. This is our fourth workshop and it looks to be another one to remember with a great line-up of speakers, sponsors and display stands, and we are all looking forward to (physically) catching up with those we haven't seen in a while.

Otherwise, the workloads out there don't appear to be getting any lighter, and luckily most of us can continue working during the Level 2 and 3 restrictions, with only a few modifications to the way we do things.

Stay safe, everyone, and feel free to email with any feedback or suggestions.

Mike Cutfield, Engineering Stream Councillor

HYDROGRAPHIC STREAM NEWS

Discovery Marine Ltd started off the year by returning to Taranaki to complete hydrographic survey for LINZ. Before the end of the year, most of the offshore work was completed using a larger boat (the Sea Surveyor), leaving the inshore work to be mopped up with DML's new boat, Tupaia. In November, iXblue completed fieldwork off the east coast of the Coromandel, close to the Alderman Islands, again for LINZ. The survey used iXblue's uncrewed surface vessel, Drix, to map the seafloor and better delineate some offshore reefs.

Declan Stubbing (DML) will make a presentation to the Engineering Stream in April about the use of multibeam echosounders and vessel-mounted laser scanners in support of engineering projects.

Emily Tidey reports that this year's intake at the University of Otago has the largest group of students (35) enrolled to take hydrographic papers in the past decade. Welcome back, Emily, from parental leave.

The Australasian Hydrographic Society (AHS) has opened applications for the Society's 2021 Education Award. The A\$3,500 award is provided to a student whose study best promotes hydrography and related sciences and best recognises the efforts of the student involved in the study of hydrography and related sciences. Applications opened February 1 and close March 31. Further information can be found at the AHS website: <http://www.ahs.asn.au/Education.html>.

From February 17-19, LINZ hosted the 18th South West Pacific Hydrographic Commission (SWPHC) meeting by virtual teleconference. More than 60 participants from around the world took part, including a number of Pacific Island countries. Normally held in person, the meeting

(continued p40)



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School of Surveying Te Kura Kairūri academic instrumental in supporting Nepalese surveyors to measure Mount Everest for the first time

Dr Chris Pearson and Guy Frederick, Sciences Communications Adviser, University of Otago



Geodesist Dr Chris Pearson has taken a lead role in New Zealand's MFAT Head of Mission Fund project by providing Nepal's Department of Survey with training and expertise to undertake the work themselves.

David Pine, New Zealand ambassador-designate to Nepal, says supporting this partnership between the Government of Nepal and the University of Otago honours the legacy of Sir Ed Hillary and Tenzing Norgay Sherpa, as well as fostering New Zealand-Nepal relations.

Dr Pearson, an Honorary Senior Fellow of School of Surveying, says his involvement supporting Nepalese surveyors reach the goal of measuring Mt Everest, and also contributing to the development of the country, has been immensely gratifying.

Mt Everest's new height of 8,848.86 metres was announced in a joint statement by Nepal and China, marking a small increase from the commonly referenced height of 8,848m, established by the Survey of India in 1954, the year after Sir Ed reached the summit of the world's highest peak.

"Owing to tectonic activity such as the significant 2015 Gorkha Earthquake, the height of Everest is constantly changing and using the latest technologies allowed the new accurate measurements to be made," Dr Pearson says.

He has led New Zealand's involvement in surveying mapping projects in Nepal since the 2015 earthquakes which caused massive ground displacement across the landlocked country and resulted in significant inaccuracies in coordinates and geodetic databases.

"As New Zealand is so seismically active, we have developed specialist surveying knowledge and technological expertise such as developing semi-dynamic datum models that allow for the fact everything is constantly moving," Dr Pearson says.

New Zealand's role also involved Land Information New Zealand (LINZ), and New Zealand company Trimble

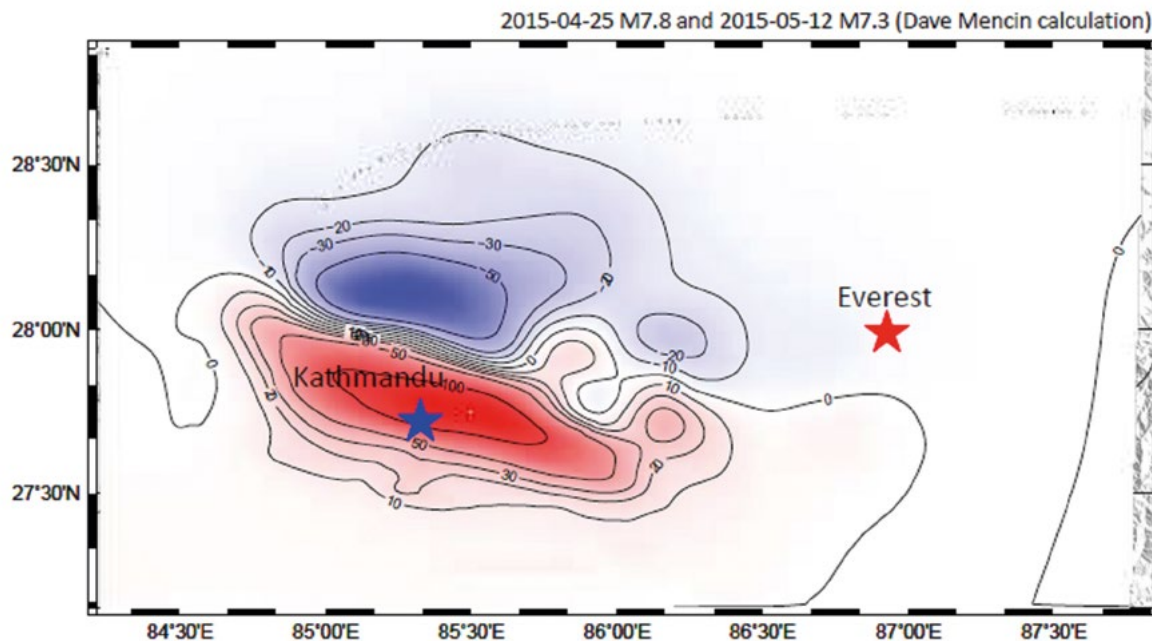


Figure 1: Uplift (red) and subsidence (blue). Values are in cm.

which donated equipment including GPS receivers, and other advanced surveying technology and software. One of the GPS receivers was installed at the summit of Everest to determine its final height.

"The School of Surveying has a long association with Trimble and together our surveying expertise and specialist technologies have really been harnessed for benefit of the Everest project," Dr Pearson says.

This year Trimble generously donated five robotic total stations and other equipment to the School of Surveying Te Kura Kairūri, providing

students with the latest technologies before starting professional careers.

Graduates at the school have had internships at Trimble, and about 50 graduates have worked in Trimble's research and development area over the years, both in Christchurch and overseas.

Dr Pearson was invited to assist with the Mt Everest project through his involvement in a mapping project after the 2015 earthquakes, which included spending about six months in Nepal and providing technical assistance from New Zealand. His work involved developing a New

Zealand-style 'semi-dynamic' datum for Nepal based on ITRF2014 with a reference epoch of 2016.0 (a long enough time after the earthquake to ensure that the coordinates were not affected by ongoing post-seismic relaxation).

He developed tools to allow the Survey Department to calculate accurate coordinates for the new datum and a New Zealand-style 'deformation model' to correct for tectonic motion including the earthquakes and a special version of LINZ's Survey Net adjustment program (SNAP) to allow the deformation





Figure 2: Survey officer Khim Gautam on the summit of Everest. Note GNSS antenna from Trimble NZ on the right-hand side.

model to be applied in least square adjustments.

To implement the new datum, it was necessary to develop a Nepal national network of continuous GNSS (cGNSS) stations. Dr Pearson realised a network of suitable stations already existed but before they could be used, they needed coordinates in the new datum. Chris collaborated with Paul Denys (also from the School of

Surveying) to develop coordinates for these stations in the new datum.

As a capacity-building exercise, Dr Pearson conducted the first readjustment of Nepal's triangulation network by working with survey officers to identify geodetic-quality GNSS observations from the Nepal first order network. "We then tied these into the CORS network and processed the GNSS data to provide reliable

coordinates in the new datum," he says.

However, the Gorka Earthquake caused vertical changes with 1m uplift in the Kathmandu Valley and nearly 1m subsidence by the China border 50km to the north (see Figure 1). This caused concern that the height of Everest might have been affected, but it also is a serious problem to all surveyors in central and eastern



Nepal and an impediment to national development projects.

So, when the height of Everest project began, Dr Pearson was keen to support the Survey Department because it was an opportunity to develop expertise in Nepal to produce an improved vertical datum.

He attended an international workshop on the measurement of the height of Mt Everest (Sagarmatha) in December 2017 as the New Zealand representative and was invited to spend a month in Kathmandu to assist the Survey Department in planning the Everest programme. As part of this visit, he coordinated with Trimble Navigation (New Zealand) for the donation of survey equipment and provided a course of lectures on geodetic surveying to Survey Department staff, along with training in the Trimble software TBC.

He explains that measuring peaks in the Himalayas comes with additional challenges, such as gravity, which need to be accounted for when conducting survey work.

"Nepal has an extreme geoid undulation that is unique on the planet, and is the result of something really heavy under India on one side of Nepal and the extraordinary light Tibetan Plateau on the other,"

Dr Pearson says. As a result, the Survey Department incorporated a programme of gravity measurements to develop an improved geoid in eastern Nepal so GNSS technology could be used as one of the height measurement techniques.

"We don't know exactly why this is, but the levelling network and models have to be adjusted to take this big variation across the country into account."

The new measurement is by far the most accurate sea-level height for Mount Everest due to the technology used, and the new models will also make it easier to measure the exact heights throughout Nepal using modern GPS techniques, Dr Pearson says.

Mr Pine says, "Sir Edmund maintained strong links to Nepal for the rest of his life and went on to serve as New Zealand's ambassador to Nepal. Our support for this project honours his and Tenzing Norgay Sherpa's legacy, as well as underlining the warmth of contemporary New Zealand-Nepal relations."

Chris says of his six-year involvement with the Survey Department of Nepal; "When I arrived in Kathmandu in September 2015, I asked to see their geodetic database and I was

conducted into basement vault where I saw shelves of dusty notebooks, and the GPS equipment was at least 20 years old.

"When I compare this to the confident, technologically savvy department that just carried out one of the most challenging geodetic surveying projects in the world just six years later, I am amazed at the transition that has occurred in such a short time. I played no role in redetermining the height of Everest. That is as it should be. It is a Nepali project after all.

"However, I think that all New Zealanders can take pride in the fact that we provided critical training and equipment that enabled the Survey Department of Nepal to carry out the measurements."

Figure 2 shows a GNSS antenna provided by Trimble NZ on the summit of Everest. This figure shows the importance of New Zealand's contribution and the technical challenges that the Survey Department had to overcome to complete the measurements. The photo has a black background because it is taken in the middle of the night, the only time that the summit is not crowded by climbers." ●



DO YOU WANT BUSINESS GROWTH IN 2021?

Edward O'Leary, Abtrac

As the financial markets take another dive, the focus is once again on how to make sure your business is working as smartly and as efficiently as possible. Motivation could be the key. This is the first of two blogs where we look at how motivation must start from the top and the impact this has on your employees.

For your company to achieve sustainable growth, workplace engagement is essential. However, according to *Gallup*, only **13%** of employers worldwide are engaged at work. Only **one in eight** workers are psychologically committed to their jobs and are likely to make positive contributions to their organisations. Now, here in Australia and New Zealand, we are doing ok. We have the second-highest proportion of engaged workers globally at **24%**. Yet that still leaves **three-quarters** of our workforce who are not engaged or worse still, actively disengaged.

This is really going to affect your business potential in 2021.



To be fair, your team might be great, way above the national average. Yet it's been proven that you will still be missing out on the vibrant productivity that stems from an engaged member of staff, and consequently miss out on the chance to increase profits and experience business growth.

Imagine what you could achieve by the end of the year if every one of your employees is focused on contribution, producing their best work for your company?

As the Christmas and the long summer holidays are put on the shelf for another year, you slip back into your work routine so quickly it's as if

In a global survey, Australia and New Zealand have the second-highest proportion of engaged workers. But it's still only 24%.

the summer never happened. Now is a great time to rediscover what motivates you. This will then set the tone for the kind of behaviour and performance you expect from your team. It is often said that organisations are only as good as the people who work for them. Returning to the workplace is inevitable, and everyone coming back has had a chance to recharge and reset. Now is the time to capitalise on that energy, that clean slate, and make your team great from **the word go**.

But how do you generate the oh-so-elusive golden business tool of motivation? Gallup has told us that the vast percentage of companies globally are failing to engage their employees, so how can you succeed where so many others are failing?

You will have probably heard it all before, and as a leader, it is so easy to blame the staff. Yet a great leader will take on all the responsibility for his or her team's failings. Not many people get up in the morning and come to work with the intention of causing problems. How many people really want to go home at the end of the day feeling as if they have failed? Therefore, lack of engagement, more often than not, stems from structural and managerial inadequacies. All the fault should not be pinned on the staff.

Every person is motivated by something, the trick to business success is to generate an environment

where that motivation is encouraged, flourishes, and becomes contagious.

Why do you get up in the morning? What passion fuels you to start the day? How is this reflected in your work?

Motivation starts at the top with trust and validity

- Imagine you are an employee working nine to five, Monday to Friday. You have an employer who actively displays a passion for the business, loves the mission and the vision, has realistic goals and a plan to get there, puts in the work yet maintains a balance, and seems to genuinely enjoy what he does. This is infectious, wouldn't we all like to be that employer! You and your colleagues will be swept along with this motivation and see validity in what is being asked of you. There will be trust in your employer to deliver and you will want to be a part of it. Trust and validity are solid foundations for engagement from employees.
- Why not use the New Year to recover *your* motivation and watch what effect it has on your staff. Motivation and performance, regardless of position, result from how we make meaning and perceive the world around us. Evaluate your mind-set, it may need a revamp. **2021 is not the year to reside in our comfort zones.**

If we do then we can expect very little growth.

- David L Hancock's book, *Performance Driven Thinking*, is all about how the *mind* drives performance. If you are struggling for motivation, try thinking differently. Approach work from a new angle, explore a new market, diversify projects, and make things happen – don't wait for that ship to come in, swim out to it instead.
- Use others to help you rekindle motivation. You might be the boss, the business owner, the top guy, however, you don't need to be isolated. Talk to those people who are open and honest, a mentor or a colleague or maybe a family member, and they will recommend ways to improve and advise on directions to take. Don't let the 'I can look after myself' frame of mind keep you from the company of others who can help.

At the end of the day, you just need to consider what message you're emitting through your actions and emotions. Put yourself in your employees' shoes, how would you respond to a boss like you? Would you be encouraged and inspired or disheartened and fed up?

Come to work every day with a renewed focus and energy to motivate your staff. ●



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2021 SURVEY & SPATIAL CONFERENCE

4-5 August 2021

With the changing environment and economic impact caused by Covid19, we've all experienced changes we couldn't have imagined in our lives over the past year, and our 2021 conference theme of 'Building Back Better' is on-point.

We will be drawing on the ability of individuals and teams adapting to change, adversity and setbacks in the current environment. The conference program will include presentations on rebuilding and improving the economy, with a focus on resilient mindsets to support our members while they navigate the challenges and changes ahead. By sharing concepts, ideas and knowledge, we all have opportunities to help build back the survey and spatial sector.

Of course, being in the city of sails offers delegates the ability to do a bit of business while they're in the city,



S+SNZ ANNUAL CONFERENCE 2021

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or to enjoy the many entertainment options that are available in the central city.

The conference itself gets underway on 4th August with a full programme covering specialist workshops and offsite hydro-vessel visits.

Alongside the workshops there is a line-up of top speakers and over the next couple of months members should keep an eye on the S+SNZ Conference website, www.surveyspatialnzconference.org to find out the latest confirmed additions to the agenda. ●

<https://www.surveyspatialnzconference.org/>



ORANGAPAI CAMP



School of Surveying
Te Kura Kairūri

Richard Hemi

In mid-February, the School of Surveying's first professional year field camp was held in a new Central Otago location – Orangapai, or the En Hakkore Religious Retreat. In the bible 'En Hakkore' was a spring that miraculously came to life to quench the thirst of 'He who prays' – in this case, Samson, after a hard day battling Philistines.

The new camp is in the Maniototo above Ranfurly in what was originally the Waipiata Sanatorium, a hospital complex designed to cure patients of tuberculosis. The site is more than 500m above sea level and at the time of its construction in 1914, it was believed that the 'rarefied air' and lots of exposure to sunlight was the best cure for TB. Students and staff certainly experienced both of these things with chilly morning starts and some very hot afternoons to boot. From the site's elevated position, we are able to enjoy stunning vistas across the Maniototo plain and surrounding Kakanui, Rock and Pillar and Hawkdun ranges.

Orangapai now replaces our previous camp at Otematata in the Waitaki Valley, which served the school very well for 18 years. The Survey School is greatly indebted to Hugh Cameron of Otematata Station who very graciously allowed us full rein over his farm paddocks adjoining the town. In fact, our survey area was formed by a number of the old streets of the former construction town that were returned to the family after the dam was completed and houses

removed. The move to Orangapai had become somewhat inevitable with new irrigation on the farm making survey work difficult, and the space limitations and condition of the dormitory facilities.

The new era at Orangapai has started very well and it is hoped the school will enjoy many years of association with the camp and its owners – Anthony and Sarah Bradfield. Some real benefits of Orangapai are bigger dormitories, much improved kitchen facilities and much more room for students to work on their evening calculations and office work. Another significant advantage is that the field work is able to be carried out in and around the various buildings and surrounding grounds of the camp, saving travel time and allowing easier access for students and staff to shade, water and facilities.

As luck would have it, the nationwide move to Alert Level 3 for Auckland and Level 2 elsewhere hit the 2021 camp on midnight of the day of our arrival. The university's protocols for Level 2, such as social distancing, would have been extremely difficult to comply with at our previous camp but the greater room at Orangapai allowed us to proceed with meals in

shifts, albeit with friendly reminders for students to keep their distance. Local farmers will no doubt have been surprised to see our convoy – the vans loaded with facemask-wearing people cruising their back roads – but our presence may have become clearer on Thursday night when 70 students and staff converged on the Waipiata pub for the last evening meal and refreshments.

So at the time of writing, the new university semester is about to begin for 2021. Enrolment numbers in the first year for surveying at Otago are very positive and appear consistent with last year which had had an increase from previous years. This year's entry class will not include any of the relatively small number of international students that the school usually has so numbers do not appear to have suffered at all from the effects of the Covid-19 pandemic.

This is looking good for future professional year numbers, and the knowledge that we have a camp facility that can easily accommodate larger numbers. Indications from our other New Zealand tertiary providers are that enrolment numbers in the New Zealand diploma courses are also very positive for 2021. ●

Local farmers will no doubt have been surprised to see our convoy – the vans loaded with facemask-wearing people cruising their back roads...



Figure 1



Figure 2

KILAUEA ERUPTION

Not your usual Hawaiian holiday

Peter Otway

When someone mentions Hawaii, the first thought that comes to mind for most people is probably a golden beach and perfect surf or being immersed in the soft evening sea air sipping a mai tai and swaying to the hula. But for Peter Otway, it is simply a towering column of fire.

Surveying in potentially dangerous situations had already brought me unexpectedly face to face with my maker on two earlier occasions – captured by serious gun-toting bandits in Iran and surviving a violent Ruapehu eruption. So maybe I rely a little too heavily on Lady Luck. At least, this was the thought that occurred to me as I was scrambling out of a crater of Kilauea volcano as a spectacular fire fountain eruption was building up rapidly and uncomfortably close.

My alternative Hawaiian adventure had its origin in a five-month stint I had experienced in 1984 as a surveyor in the NZ Geological Survey on exchange with US Geological

Survey (USGS) geologist Don Swanson at the Cascades Volcano Observatory in Washington State, USA.

I was there to make regular surveys to monitor volcanic deformation and, using Don's system, accurately predict dome-building eruptions in the new, unstable crater of Mt St Helens four years after its catastrophic eruption. This had caused the volcano to collapse, burying houses and killing 53 residents beyond the red zone below and USGS geologist David Johnston as he monitored the volcano and sounded the alarm.

This led on to brief monitoring surveys on three other Cascades volcanoes, in Oregon and California, followed by a month, in September



Figure 3



Figure 4



Figure 5



Figure 6



Figure 7

1984, at the USGS Hawaiian Volcano Observatory to carry out similar surveys on the large basaltic volcano of Kilauea, famous for its frequent voluminous lava eruptions.

In the 1960s, resident geologist Bob Decker had pioneered surveying techniques to detect volcanic inflation (the swelling of a crater as magma forces its way upwards) and make the first-ever successful predictions of lava eruptions. Although he was no longer at HVO, his legacy remained and there was much for a relative novice – like me – to learn in that field.

On arriving at the observatory to meet the team, I found a discussion in progress concerning a field trip that the geochemist, Paul Greenland, was proposing to make to collect fresh gas samples from the small hot vent inside the crater of Pu'u'O'o, a young active crater of Kilauea, downslope in the East Rift Zone and fed from its summit caldera. Pu'u'O'o had been erupting increasingly spectacular fire fountains of lava almost regularly every four weeks.

It was now five weeks since the last eruption and Paul was determined to get the freshest possible gas sample immediately preceding the overdue eruption (Phase 35) in the hope of finding his own prediction clue. His problem was that he needed an assistant to carry some of his gear – but for some reason no-one seemed particularly interested. That is until I innocently put up my hand and was immediately handed a pack loaded with his valuable titanium tubes, together with a gas mask, heavy gloves and a hard hat. Maybe gas sampling was not exactly the surveying experience I had come for, but I could certainly carry a pack.

Several hours later, Paul and I were flying around the sinister-looking Pu'u'O'o to make sure the metre-wide vent was still relatively quiescent (in

the left corner of the crater in Fig. 1, with a closer view in Fig. 2) before the helicopter put us down at the foot of the cone. From there, we made the relatively short climb of 60 to 70 metres up the cone of congealed lava, through a low saddle in the crater rim (at left in Fig. 1) and down onto the warm freshly crusted-over lava floor of the crater.

As we reached the red-hot roaring vent, Paul took the titanium tubes out of my pack and screwed them together. He then began calmly poking the long string of tubes down the vent with his gloved hand mere centimetres from the jet of superheated acidic gas, determined to capture a pure sample uncontaminated by air. Unlike Paul, whose lungs were obviously used to such punishment (maybe thanks to his chain-smoking habit), I was soon choking on the fumes in spite of my gas mask, and stumbled back 30 or 40 metres from the vent into the relatively clear air.

Looking back at him working on the far side of the vent, I was surprised and slightly alarmed to see spatters of bright red-hot lava spurting out, head height at first, but growing rapidly. As I took a photo (Fig. 3), he yelled out: "The eruption has started. Get out!" He abandoned his precious tubes and, being cut off from my position by the spattering lava, began running towards the open far side of the crater.

Perhaps pushing my luck to the limit, I felt I was still safe enough, just, from the spurting lava and couldn't resist hanging back another minute



Figure 8

or two, watching the spatters grow into a small but vigorous fountain (Fig. 4). I could now feel its hot glow on my face and see that the fountain was already forming a lava lake covering our tracks – and my abandoned pack. Paul was right. The eruption was growing more quickly than I had expected: I should have already been getting well clear of the

building eruption. I began climbing as fast as I could back up the way we had entered the crater and was quite relieved on reaching the saddle.

As I turned around again, it was obvious that the fountain had continued to grow rapidly as it was shooting out of several wide fissures, even higher than my new location. The glowing lava lake now covered much of the

crater floor and was about to spill out of the open side of the crater (Fig. 5). Paul was out of sight, hopefully already well clear.

As I put my camera away to start heading down to our landing site, the helicopter magically appeared from behind the volcano and came straight in to hover beside me so I stepped onto the skid and grabbed hold of the luggage rack as it flew off, allowing me to jump off several minutes later onto a prominent ridge about 1.5km away before zooming off again, presumably in search of Paul. Shades of my helicopter rescue from the erupting crater of Ruapehu 13 years earlier! Yes, I'm obviously still a slow learner, at least when it comes to erupting volcanoes.

I had been landed behind at least a dozen TV cameras lined up on the edge of the ridge, all trained on the developing fountain of fire. (I later learnt the TV crews had been camped there for up to a week waiting to catch the very start of the anticipated eruption.) As I watched the column of red-hot lava climb ever higher, my concern for Paul grew as he still hadn't been retrieved.

The pilot later told me he finally spotted him under the curtain of falling ash and hot lapilli (small lava pellets) as he tried to outrun the river of lava spilling from the crater, but abandoned the attempt and turned away when he saw the chopper, sprinting to get out into clear air for a pick-up. He arrived back covered in grey ash from head to foot and apparently unharmed but immediately lit up to replace all that nasty acid air in his lungs with his more familiar cigarette smoke and tar. (Paul was indeed a tough cookie but I later discovered he was human after all when he took me snorkelling with my wife, Rosemary, in the clear tranquil waters of Kailua-Kona.)

But now we were both surrounded by a mass of cameras and reporters interviewing us as survivors – perhaps even 'heroes'? – of a dramatic eruption. However, the interviews were mercifully brief, being interrupted by the fire fountain climbing ever higher and beginning to roar like an approaching express train.

As it rose high above the saddle where the chopper had retrieved me just 10 minutes earlier (Fig. 6) which was now being peppering with incandescent 'bombs', I was also shocked to see our 'safe' helicopter landing site at the foot of the cone splitting open as several fissures began a small eruption of their own (Fig. 7). Perhaps my hesitation in evacuating from the crater had saved me from reaching that exact spot to await my prearranged pick-up – and being fried instead.

At the same time we could see an impressive standing wave forming over a large obstruction as the river of lava rushed out of the crater and down the right-hand flank. I remained transfixed as the main fountain climbed higher still (Fig. 8), eventually peaking, according to observations from the observatory, at a record 400 metres – or 1.5 times the height of Rangitoto. It occurred to me that I was watching exactly the same sort of eruption that had occurred many times prehistorically to form the numerous craters now largely buried under Auckland, and in historical times at Rangitoto – and will undoubtedly occur again sometime in the future. However, as the years rush by, my prospects of seeing it burst through a city street or out of the harbour are becoming ever more remote.

Meanwhile, my stroke of luck, which I admit pushing right to the limit, presented me with the unique privilege of witnessing, with Paul

Greenland, the birth of probably the biggest fire fountaining eruption from Pu'u'O'o at such close quarters – and living to tell the tale. That is *my* memory of Hawaii which has endured for more than 36 years.

Postscript: The next fire fountaining display from Pu'u'O'o was apparently less spectacular and occurred after I left for home (and had a month living on the frigid summit crater of Mt Erebus), not giving me the chance to test my system of theodolite intersections to the disposable targets I had set up on the flanks of the cone.

My replacement observer put himself out of action by breaking through newly formed crust into fluid lava and suffered serious burns to one foot. Luckily, he recovered but too late for the eruption which went on to destroy my targets. Pu'u'O'o then changed its style of eruption, pumping out copious quantities of lava every few months but with no further spectacular fountaining, flowing all the way downslope into the sea.

Over the following decades, Pu'u'O'o, and new vents along the East Rift also fed from Kilauea, have continued frequent eruptions with vast amounts of fluid, unstoppable pahoehoe lava cutting through and burning forests, highways and houses, and whole villages in 2018, on its way to the sea.

There, it has been entertaining tourists arriving by car and boat for years, pouring off cliffs like red waterfalls into the ocean creating hydrothermal explosions and billowing clouds of steam. The lava has been able to build up a series of deltas, steadily winning its war against the eroding surf, and expanding the 'Big Island' of Hawaii – a prime example of our living planet continuing to build its volcanic island chain. ●



Lodgement of Fully Digital Cadastral Survey Datasets Draws Closer

Work has started on the foundations that will eventually enable surveyors to lodge cadastral survey datasets in a fully digital format.

Today's survey processes are highly digital. Virtually all the information is collected electronically, including from total stations, GNSS receivers, scanners and drones. The collected digital data is processed using survey software and the finished product is usually provided in digital form. However, in the case of cadastral survey, much of the final product is still in 'paper form'.

The introduction of Landonline yielded significant benefits in the quality and availability of cadastral survey data. Currently 90 per cent of '2D' cadastral survey datasets (CSDs) lodged in Landonline have used the import of a LandXML file as a means of loading the data into an eSurvey. Further work is then required to capture the missing elements and to add additional information in the form of user-added text. CSDs containing 3D elements, such as for units, leases or strata parcels, are not transferred or captured in digital form at all.

As part of the Rebuilding Landonline programme, LINZ is looking to complete the digitisation of the cadastral survey process that commenced some 20 years ago with the launch of Landonline.

Through the Intergovernmental Committee on Surveying and Mapping (ICSM), I have been working with Australian surveyor-generals on a programme of work that ultimately aims to enable surveyors and jurisdictions to exchange fully digital CSDs – including 3D. Several Australian jurisdictions adopted an ePlan approach based on LandXML, but this has had limited uptake by survey software suppliers and surveyors, partly due to the different implementations required in each jurisdiction.

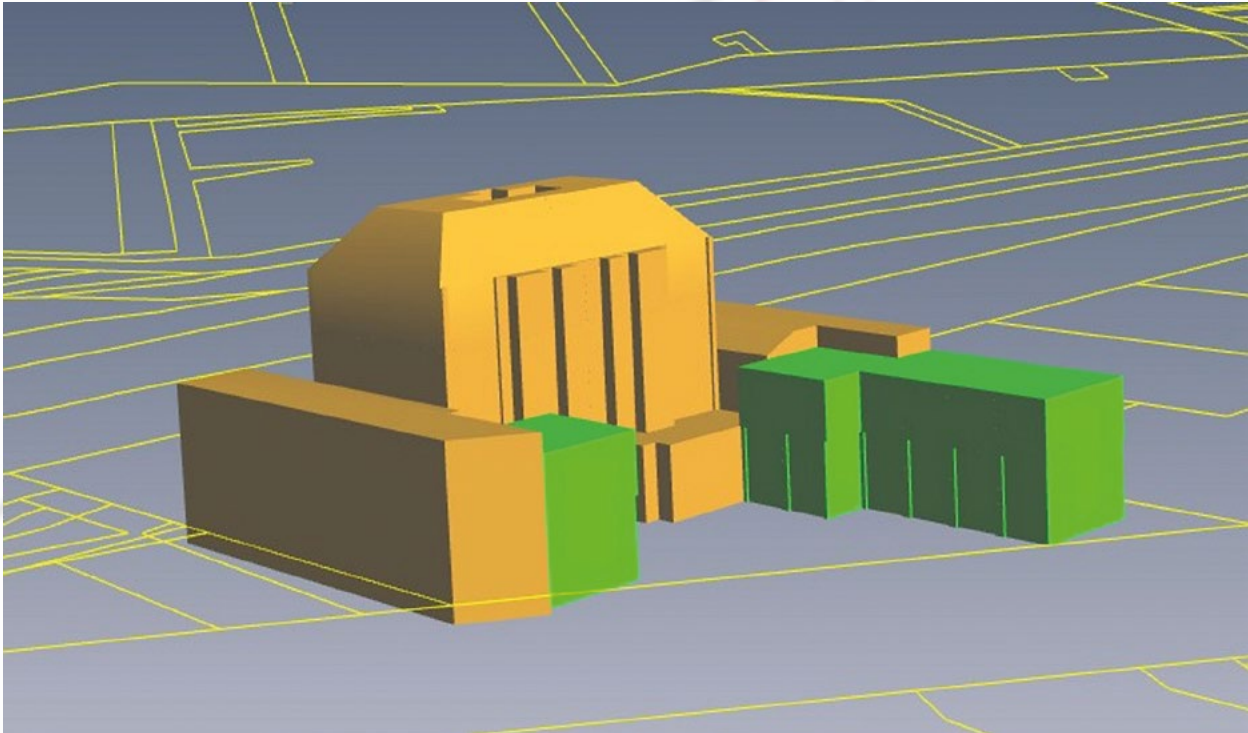
To overcome these problems, ICSM is working to develop a coordinated and robust solution that will be supported by the survey software suppliers operating in the Australian and New Zealand market. The aim is

to enable cadastral survey datasets to be exchanged using a common mechanism, no matter the jurisdiction. The approach is based on the premise that cadastral survey datasets in the nine jurisdictions have a lot in common. They all have survey marks, measurements, parcels of various types and coordinates, even though they might use different terms and have different parameters. The ideal solution would have a generic way of handling these common elements and minimise the amount of customisation required for each jurisdiction.

The 3D Cadastral Survey Data Model and Exchange (3D CSDM) project aims to enable, as far as possible, a standard way of transferring cadastral survey datasets across all nine jurisdictions. Land Information New Zealand (LINZ) is leading this project in partnership with key ICSM partners in Australia: Department of Environment, Land, Water and Planning (VIC), Landgate (WA), Department of Customer Service (NSW), and the Department of Resources (QLD).

The project has two primary outputs:

- A harmonised cadastral survey data model, including 3D elements, that supports all the essential elements of 2D and 3D cadastral survey datasets in the Australian and New Zealand cadastral systems. This will be developed using detailed information from all jurisdictions as well as information from existing data models and schemas. The model is intended to be vendor neutral and independent of any implementation.
- The second deliverable aims to identify how best to exchange that data operationally. We are looking for an internationally recognised, or widely adoptable, transfer format for encoding/



Digital 3d Unit Development in Christchurch

exchanging the cadastral survey data identified in the model.

We have contracted a consortium led by Surround NZ Ltd (a subsidiary of Surround Australia Pty Ltd) to undertake the work using an Agile methodology. The consortium includes NZ-based firms McKenzie and Co and OpenWork Ltd. The work started in February this year and is expected to be completed early in 2022.

Both Surround and the agency project partners recognise that the solution needs to be developed in close collaboration with survey software suppliers. We are keen to work closely with them to identify the best way of exchanging the cadastral survey data. Most importantly, we need a solution that they are prepared to support and implement in their products.

ICSM will be encouraging survey software suppliers to use the agreed foundation and incorporate the capability into the software that cadastral surveyors use for preparing and lodging cadastral survey datasets

and extracting them from the cadastre. ICSM will also be looking to adopt the standardised data model and encoding mechanism as the recommended framework for jurisdictions to implement. The aim is to give confidence to survey software suppliers that this framework will be supported by land administration agencies throughout Australia and New Zealand. We hope that this will lead to development of a more robust marketplace for this capability. Hopefully the framework will be adopted as the standard way of exchanging digital cadastral survey information between the survey industry and land administration agencies.

LINZ and the Australian land administration agencies will then look to adopt and implement the agreed solutions at their end. For New Zealand surveyors, this framework will form a foundation for LINZ's Rebuilding Landonline programme. LINZ's goal is to enable a complete CSD to be lodged from survey software without the need for facilities to capture or edit the data in

Landonline. This 3D CSDM project will provide a framework for a progressive implementation that will ultimately see even 3D CSDs lodged in fully digital format. In parallel with the lodgement changes, enhancements will be made to Landonline to hold the fully digital CSDs – including 3D.

Use of digital data for the full cadastral survey supply chain will deliver some great benefits. Digital workflows will reduce errors and improve quality, not just through using validation tools but by embedding quality throughout the survey process. The enhanced 3D data in the cadastre resulting from the digital supply chain will immensely benefit surveyors and other spatial professionals by increasing productivity and in turn positively impact the economy. ●

Anselm Haanen, Surveyor-General and ICSM 3D CSDM Project Sponsor

5 differences between a good recruiter – and a cowboy...

Here are 5 tell-tale signs to help you discern a kick-ass recruiter from a drop-kick...

1. Good recruiters will meet you face to face

Clever recruiters have deep insights of the companies they represent so they'll meet you in real life to get an understanding of your personality. This will help them decide whether you'll be a good cultural fit for a business or not, which contributes massively to how much you'll enjoy working at your new company.

2. Good recruiters have in-depth knowledge of the industry

The best recruiters usually work with a specific industry and have in-depth knowledge of that industry. Amateur recruiters "dabble" in multiple industries. Good recruiters have built exceptional relationships with the decision-makers in their chosen industry and have access to those jobs that don't even get advertised – often the best roles...

3. Good recruiters keep you updated

If you find yourself desperately emailing your recruiter, pleading for progress, move on. A good recruiter will happily (but metaphorically) hold your hand through the process – they won't leave you feeling needy, like a bad recruiter will.

4. Good recruiters respect your career goals

If you're ever involved in a conversation where the recruiter's trying to persuade you to accept a role that you're not really interested in and it makes you feel undervalued, despite you being clear about what you want? Hang up as soon as you can.

5. Good recruiters focus on long-term relationships, bad recruiters on one-night stands

Bad recruiters dump your CV into the recruitment pipeline and only contact you if there's good news. Maybe they hate to be the bearers of bad news, or maybe they're just emotionless pimps. Either way, it's no good for a candidate or a business. A good recruiter walks the extra mile to ensure their clients and candidates achieve what they want.

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MODIFYING AND EXTINGUISHING COVENANTS

Devon Allen and Mick Strack

Synlait Milk Limited v New Zealand Industrial Park Limited [2020] NZSC 157

Approximately 10 hectares of land in Pokeno, southeast of Auckland, was burdened by a restrictive covenant. The covenant restricted the land use on the burdened parcels to farming and forestry operations only in order to protect the ability of owner of the benefited neighbouring land to undertake quarrying. In 2018, a purchase agreement was made between the appellant, Synlait, and the predecessor in title, Stonehill Trustee Limited – Synlait agreed to purchase the then burdened land if the covenants were extinguished so that a milk treatment plant could be built on the property. Stonehill Trustee Limited applied to the High Court to have the covenants extinguished under s 317 of the Property Law Act 2007. The extinguishment of the covenants was granted in the High Court, but a successful appeal at the Court of Appeal confirmed the covenants. A further appeal to the Supreme Court clarifies the approach that should be taken by the court with regard to s 317 applications for modification or extinguishment of covenants.

Applications can be made to the High Court to modify or extinguish a covenant if the court is satisfied that it meets the requirements in s 317 of the Property Law Act 2007. It may be useful to recall Section 317:

(1) On an application (made and served in accordance with section 316) for an order under this section, a court may, by order, modify or extinguish (wholly or in part) the easement or covenant to which the application relates (the easement or covenant) if satisfied that—

- (a) the easement or covenant ought to be modified or extinguished (wholly or in part) because of a change since its creation in all or any of the following:
 - (i) the nature or extent of the use being made of the benefited land, the burdened land, or both;
 - (ii) the character of the neighbourhood;
 - (iii) any other circumstance the court considers relevant; or
- (b) the continuation in force of the easement or covenant in its existing form would impede the

reasonable use of the burdened land in a different way, or to a different extent, from that which could reasonably have been foreseen by the original parties to the easement or covenant at the time of its creation; or

(c) every person entitled who is of full age and capacity—

- (i) has agreed that the easement or covenant should be modified or extinguished (wholly or in part); or

- (ii) may reasonably be considered, by his or her or its acts or omissions, to have abandoned, or waived the right to, the easement or covenant, wholly or in part; or

(d) the proposed modification or extinguishment will not substantially injure any person entitled; or

(e) in the case of a covenant, the covenant is contrary to public policy or to any enactment or rule of law; or

(f) in the case of a covenant, for any other reason it is just and equitable to modify or extinguish the covenant, wholly or partly.

Synlait's application was made on the grounds of (a), (b) and (d). In s 317 applications, the court adopts a two-stage approach. First, the court must determine whether one or more of the grounds in the section are applicable. Secondly, the court must determine whether they should exercise the discretion to extinguish or modify the covenant.

The Court of Appeal took a traditionally conservative approach and found that none of the grounds in s 317 (1) were established. The court considered that subdivision of the benefited land, the residential growth of Pokeno, or the rezoning of the burdened land did not require the covenants to be extinguished. There was argument that removal of the covenants would adversely impact the private right to quarry on the land without disruption. Therefore, the court did not exercise its discretion to extinguish the covenants.

Covenants are an important component of property rights, and many precedent cases have denied applications for extinguishment because of the adverse impact on existing property interests. The Court of Appeal stated

that s 317 should not be used to free a burdened party from a covenant merely to improve the private enjoyment of their property and that the protection of both the contract and the private property rights are more important than the improvement of the private enjoyment of the burdened party.

The Supreme Court then examined the application for extinguishing the covenants under the two-stage approach discussed above. It was found by this court that three of the s 317 grounds applied for were met. The intended future subdivision of the benefited land and the change in ownership of those subdivided areas were seen as relevant factors, as these had changed the character of Pokeno (s 317 (1)(a)(ii)). The zoning change of the burdened land from rural to industrial and residential was also considered to contribute to change in the character of the neighbourhood. The predecessors of title to the benefited land only ever saw the now Synlait land being used for farming, therefore the continuation of the covenants was found to impede the reasonable use of the burdened land in a different way from what was foreseen when the covenants were entered into (s 317 (1)(b)). Finally, the benefited land had a lapsed resource consent for basalt quarrying. The court concluded that it was uncertain that the consent would ever be applied for again, and it would be difficult to gain the consent now. Therefore, the benefited land would not suffer substantial economic injury if the covenants were extinguished (s 317 (1)(d)).

As these grounds for modification applied, the court then examined the second stage – whether it should exercise the discretion to extinguish the covenants. The court considered that the covenants had no continuing purpose and this would justify the court's decision to exercise their discretion and extinguish the covenants. As events played out, a settlement between the two parties had already been established, but the Supreme Court

would have modified the covenants on Synlait's title by extinguishing the land use restriction clause.

The changes and amendments to the Property Law Act over recent decades in regards to modifying covenants suggest a legislative direction to facilitate modification when appropriate. The Court of Appeal seemed to prefer to support judicial precedents, while the Supreme Court supported the legislative developments.

This case is significant as it creates precedent about how the courts should approach applications for extinguishment or modification of covenants. The court exercised discretion in this case not because it made it more convenient for Synlait to build its factory, but because circumstantial changes had led to both the benefited and burdened land being used in a different way from what was once expected or projected. Land use, like most development, is not static – change over time should be expected and is hard to predict. Covenants are an extremely effective form of private property protection, but in a landscape that is changing significantly over time they cannot be expected to remain perpetually. In the High Court it was acknowledged that the benefiting land only opposed the application for modification to keep their options open, therefore, to maintain their private property rights. Maintaining inappropriate covenants would be both socially and economically detrimental to land that is experiencing change in use or circumstances and will need to be used for housing in a community that will require it. This case demonstrates a more flexible approach to modification decisions and the balancing of considerations that the court should use in the implementation of s 317 – the importance of the private property rights and the contract of the covenant, as well as other considerations (like zoning and environmental changes) that allow efficient and effective use of land. ●

Devon Allen is a 2021 BSurv(Hons) candidate researching her dissertation topic on covenants.



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MY VIEW FROM THE OTHER SIDE

Toni Hill, Senior Survey Adviser, Office of the Surveyor-General



In November last year, I left private practice for a role in the Office of the Surveyor-General (OSG). The following are a few of my observations and experiences from my first 90 days at LINZ.

The first thing I noticed was the use of acronyms. There are a lot of them, for everything, and matched only by te reo, which I unfortunately am not very familiar with. Meeting rooms, team names and labels on items around the office passively educate staff on everyday words. It is a great way to learn at your own pace and I am looking forward to expanding this knowledge. This is not something I expected or thought about when taking on this role.

The survey and title system is so dependent on the integrity of surveyors and the quality of their work. LINZ cannot check everything, so the public and the Crown are very much reliant on surveyors conducting their surveys correctly, impartially, accurately and in accordance with good survey practice and the law.

I was aware that LINZ is a large and diverse organisation, although I am not sure I yet comprehend all that LINZ is involved with. The range of work brings with it a larger variety of personalities than what I have experienced, even in larger multidiscipline companies. While we are all individuals, seeing/experiencing the diversity around the office and through wider communication, it seems to be on another level that companies that are predominately surveying or engineering based do not yet replicate.

From a more surveying-related point of view, I have had an opportunity to see the various roles involved with property rights – from sitting with a property rights analyst (PRA) processing cadastral datasets for approval and seeing what the titles processing team has to do to issue new titles to seeing how dedicated those Request Manual Copy staff are at locating plans, field notes, traverse sheets and survey reports, etc.

I have interacted and heard the advice shared between experts or specialists supporting the various teams in order to assist customers as much as they

can. The survey and title system is so dependent on the integrity of surveyors and the quality of their work. LINZ cannot check everything, so the public and the Crown are very much reliant on surveyors conducting their surveys correctly, impartially, accurately and in accordance with good survey practice and the law.

In terms of the work that I have been doing, it has been a really good time to join the team with new rules coming out this year. The OSG team along with the Cadastral Surveyors Group (CSG) are very busy pulling together guidance material we hope will help surveyors understand the new rules and hopefully improve first-time compliance with datasets. I have certainly gained a greater understanding on the topics I am writing and reviewing.

As I am sure many others in private practice can agree with, we do not have a lot (any) time to sit and read about subjects or topics we think we already know about. While I know where to find certain material I've referred graduates/technicians to – common references to look up to ensure they get things right, or particular topics I need to know more about myself, or refresh my memory on – there is so much more out there I wasn't aware of. The guidance material that is being developed, we hope, will be in an easier format for surveyors to use.

I would like to think the information I have discovered to date will be much easier for surveyors to discover than in its current form. It is a large project to prepare all this documentation, especially on top of business as usual work, so I really hope surveyors use the guidance and employ the new rules as soon as possible.

Other work I have been involved with includes undertaking a correcting survey of an historic survey where

the surveyor is no longer around and investigations where questions are raised either by a following surveyor or by the PRA/CSG as datasets are lodged or as they attempt to integrate the dataset into the cadastre and encounter issues.

The one piece of advice I would share based on that, is how important the survey report is. While you may be very familiar with the survey and decisions you have made and be confident in your final definition, anyone else looking at the survey report will generally have questions that the CSD plan or title plan haven't been able to provide.

I would recommend painting a picture for them, spell out the story. If there have been decisions that have been made of accepting one type of evidence above another then let us know you have considered that. When something is not mentioned, we do not know if it is because it wasn't considered or if it was forgotten or ignored because it didn't suit for whatever reason.

A non-definition example is, if you are amending easements and someone suspects an easement may have been accidentally removed, if the survey report indicates to refer to the easement schedule/memorandum, then this isn't particularly helpful to anyone checking if you intended on doing something or forgot.

The pressure I have experienced at LINZ is quite different to the pressure in private practice. I am very happy

to not have to deal with Auckland Council consents or certifications any more. The biggest highlight (for me) is not having to do a timesheet.

We still need to work with certain timeframes, budgets, and balance competing priorities along with unplanned issues that come up. At LINZ, I am a lot more conscious that my correspondence could be questioned by multiple parties. In private practice, you may be conscious of that for correspondence leaving the office but less so when you have a good relationship with the client or contractor.

I believe it is an energising time to be at LINZ. This month, I was treated to a presentation on how the survey and title enhancement programme (STEP) is progressing and there are some good, exciting things coming up for Landonline. There are plans in the future in the 3D cadastre space that I am looking forward to getting involved with.

Overall, I have enjoyed my time so far at LINZ. My team and others at LINZ have been very welcoming and great to work with. I have learnt a lot of new things but have not yet felt too far out of my depth with the specialist/difficult survey work the team can get involved in. I am sure that may come, although, with the experience in the team, I am sure I will have good support around me. I am excited about the evolution and development that is happening, and I am thrilled to be a part of it. ●

I would like to think the information I have discovered to date will be much easier for surveyors to discover than in its current form.

Giving Written Approval

Vicki Toan and Stephanie Harris

What does it mean when your neighbour asks you to give 'written approval' to their proposed development next door?

Your clients may be asked for written approval in the context of an application for a resource consent. An applicant may seek written approval before lodging an application for a resource consent. Or, during the processing of the application, the council may identify your client as an 'affected person' (being someone who may be adversely affected by the proposal to a minor or more than minor degree).

If your client gives written approval, it means:

- the council cannot legally consider any effects of the proposal on their property
- your client will not be 'notified' of the proposal and given the opportunity to make a submission on the proposal; and
- your client cannot appeal the council's decision to grant consent or the conditions imposed on the consent.

Even if your client has given their written approval, a resource consent may not be granted, unless the proposal is a deemed permitted boundary activity, in which case it will be approved.

Once a written approval is given, it can be withdrawn at any time until a hearing is held or a decision on the application has been made (unless your client has promised the applicant not to withdraw it). However, if they withdraw their written approval after the council has made its decision on notification, the withdrawal will have no effect on the council's decision

whether to notify the application to them or not.

A written approval is all or nothing – it cannot be conditional or equivocal. A written approval is a statement of unqualified support with the legal effect that the council must disregard any adverse effects of the proposal on the person who has given the written approval.

Although discussions between your client and the applicant could result in a separate agreement where the applicant may agree to do or not do certain things in consideration for your client's written approval.

Before signing a written approval form, we recommend that your client understands the proposal and understands how it may affect them and their property. It is important to see the applicant's plans and see an assessment of environmental effects. To help your clients understand the proposal and the effects your client



may need to seek advice from an appropriately qualified and experienced resource management lawyer or planning consultant.

If your client does sign, giving their approval, advise them that they should also initial or sign all other relevant documents and plans, as well as the written approval form. This prudent practice makes it clear which version of a proposal they are approving.

If you or your client have any concerns about what the applicant is proposing to do or what the effects of the proposal on your client's property may be, we recommend that advice is sought. •

Title Defects Holding Your Property Back

Stephanie Harris

Title defects are like one of the many dormant volcanoes that pepper the Auckland region: they sit quietly in the background causing no issues, until one day...

Property owners will often not realise their title contains a 'defect'

until they want to do something with the property; such as re-mortgaging, selling or starting building improvements. Fixing a title defect can be costly and time consuming, and if not resolved correctly, can scupper even the most carefully arranged plans.

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was held virtually this year as a result of travel restrictions due to Covid-19.

A focus of the meeting was the International Hydrographic Organisation Strategic Plan and considering what actions the SWPHC needs to take to meet the goals. The goals are aimed at looking to the future of navigation products (S-100 Universal Data Model); increasing the use of hydrographic data for the benefit of society; and participating in initiatives related to the knowledge and sustainability of the oceans.

The NZ Marine Geospatial Information Working Group (MGIWG) has completed a 'benefits and learnings' from the data stocktake; a study of data portals continues; and a newsletter, *Pānui Ahumoana*, will be published

shortly and available on the website: linz.govt.nz/sea/marine-geospatial-information.

Ngā mihi

Stuart Caie, Hydro Stream

SPATIAL STREAM NEWS

Jasmin Callosa-Tarr represents the Spatial Stream at the regular Geospatial Capability meetings in Wellington. She is scheduled to do a video quick fire interview that will be posted on the Grow GIS NZ. The questions that will be asked are around career challenges, growth and advice to young people. This interview is organised and sponsored by Land Information New Zealand (LINZ).

Jasmin Callosa-Tarr, Spatial Stream representative

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Limited as to parcels

'Limited as to parcels' means that when the first title for your property was created, a guaranteed title could not be issued. Simply put, this means the boundaries of the land are not necessarily correctly defined. This defect generally occurs with properties that were first subdivided in the early 1900s.

Why is 'limited as to parcels' a problem? There are several: if there is already a structure built close to the boundary, it could encroach on your neighbour's land; if you plan a new build where the structure will be close to the boundary, the council may require you to provide a new survey of the land before receiving building consent; and finally, if you are planning to subdivide to create unit titles or cross lease titles, the removal of the previous limitation is required.

Paper roads

'Paper roads' can often be found embedded in land that was formerly owned by the Crown. A paper road is an unformed legal road that the local authority set aside to ensure public access would be available once the land was developed. Roads are shown on survey plans but haven't been built or used, hence the term paper road.

Why is a 'paper road' a problem?

If you have a large tract of land that you plan to develop, you won't be able to build on any part of the paper road, even if your title completely surrounds it. This is because the local authority retains ownership of the land that the paper road sits on and treats it as an asset, even if it has no intention of building a road. Instead, you will need to apply to the local authority to have the status of the road changed through a road stopping process. Most local author-

ities require a valuation for the land that the paper road sits on, for which you will need to pay before having the land transferred to you.

Deeds land

'Deeds land' is land that was never transferred onto the Torrens system so there is no guaranteed title available on the land registry.

Why is 'deeds land' a problem?

Mortgage lenders will not provide finance to acquire a property that is deeds land because the lender can't register their interest on the title, and, therefore, the lender will have no protection. Instead, the land registry will require you to apply to bring the deeds land onto the land registry. This application needs to be accompanied by a land survey that clearly defines the boundaries of the land. ●

If you have a large tract of land that you plan to develop, you won't be able to build on any part of the paper road, even if your title completely surrounds it.

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