

# Ontario Professional Surveyor



*on the cover ...*

**Sergeant-at-Arms  
Saeid Sedaghat  
presided over the  
130th AGM**

**Also in this issue ...**

**Know your History - Part 11  
The Effects of Changing Water  
Levels on Shoreline Sinuosities  
Quantifying Sustainability in  
Infrastructure Project Delivery**

**plus our regular features**

**Educational Foundation  
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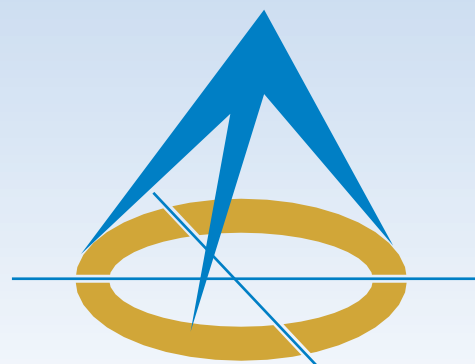
## ON THE COVER ...

Sergeant-at-Arms, Saeid Sedaghat, chose to portray Dr. Ugur Sahin, the chief executive and scientist of BioNTech, who along with his wife Dr. Ozlem Tureci, are the scientists behind the coronavirus vaccine breakthrough. See more information about Dr. Sahin in The Last Word on page 40.

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# President's Page

By V. Andrew Shelp, O.L.S.



It is the eve of the BCLS AGM. As I sit in my hotel room in beautiful Kelowna, British Columbia, I take in the landscape of the Okanagan, and I am strangely saddened. Not because this is my second AGM in as many weeks but saddened that we have all had to endure the past two years without any in-person experiences or the camaraderie of face-to-face contact. I am saddened that past presidents Mantha and Lawrence did not get to partake in the interactions and connections that in-person meetings provide. I am saddened that the past two years have separated us as a community. And I am saddened that we have become more comfortable with Zoom meetings than we have with meeting in person. Trust me, I believe that both past presidents did an amazing job “Zooming” all over the country. However, my sincere hope is that we, as an association and as a profession, will return to the practice of regularly bringing our provincial/national associations together *in person* to share our most pressing issues and come up with unified ideas and strategies going forward.

Although saddened, I am also excited and optimistic about what the next few days will bring. I am excited to meet with my provincial contemporaries to understand the challenges they face. And I am excited to hear what solutions they propose. I am optimistic that we will continue the great work done by those who have come before us. I am optimistic that the bonds we establish will continue to grow and strengthen the unity between our associations. And I am optimistic that we are stronger together than we are as individuals. We face similar challenges; hopefully, by coming together, we can develop collective strategies to deal with them.

It is Wednesday, March 10, 2022. Day 1 of the first in-person AGM I have attended since Deerhurst 2020—and my first as AOLS President—begins. Although I know no one, I look forward to learning how the past years have affected the attendees.

The large conference room is filled with people. Most are seated, maskless, and chatting amongst themselves. As I survey the room, I notice something that brings me comfort. The once-hidden faces are now smiling and reminiscent of days gone by. They look familiar to me; this could just as easily be the AOLS AGM. It brings me

comfort knowing that relationships forged over previous meetings remain intact, despite COVID-19, and that people are laughing, shaking hands, and seem genuinely glad to see one another.

My wife Tanis and I find an empty table near the front of the room. A young BC articling student asks to join us, as does a delegate from Saskatchewan, and the student's mentor. We unmask and strike up conversations. Initially this chit-chat seems insignificant, but I quickly realize that these exchanges are, in fact, *crucial!* They provide opportunities not only to connect with old friends, but also to reach out to strangers and make new connections.

This meeting is both in-person and virtual. The keynote speaker is a well-spoken, well-educated professional engineer and Indigenous woman. Her presentation entitled “Walking Together with Indigenous Communities—How to Start Building a Trusting Relationship” is insightful and thought-provoking, and her approach warm and welcoming. She speaks of issues that she has faced personally and issues that continue to affect her community resulting from years of colonialism and governmental policies. She is not angry, and she does not cast blame, she simply provides a historical account. Although the topic is difficult, her body language and tone are engaging and inclusive. I am not sure that this would come across the same way to those attending virtually. As she concludes, she provides opportunities for questions. There are many questions from the floor, but none from the virtual audience.

After the coffee break, the second presenter takes the stage. At the conclusion of his presentation, the same thing happens: multiple questions from the floor, but none from the virtual audience. This pattern repeats itself for the remainder of the presentations.

Lunch is a sit-down event, and the keynote speaker joins our table. The lively and educational conversation that ensues could never have happened in a virtual platform! I learned more about the woman, diversity, inclusion, and equality than I ever could have learned from behind my computer screen. A real person, with real experiences, confirms my belief that we, despite our two-year break from sharing human interactions, are social animals and do far better together than apart.

For me, the afternoon and evening events centre around

*cont'd on page 4*

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# Executive Director's Notes

By Brian Maloney



As I pondered what to write about this quarter, I considered some items that were submitted by the members for the Open Forum at our Annual General Meeting (AGM). One, in particular, was about how the AOLS should set prices to ensure that surveyors could earn a better living. Not only is this the opposite of what a modern regulator should do, it could be considered illegal and would clearly indicate that we learned nothing from our last encounter with the Competition Bureau. Instead of ranting about our role as a regulator, I thought I should take a more positive position for this article.

This year we had 210 members participating in Association committees and task forces. While I recognize that not all of these members are completely active, most are. This is remarkable for an Association with just over 500 members. Most colleges or regulatory associations would be happy just to have that percentage of members attend meetings, let alone participate in furthering the work of the Association. With roughly a week to go before the AGM at the time of this writing, we have well over 500 people registered for the meeting. We are truly lucky to have a culture in which our members feel the need to participate, learn, and help improve the Association.

As you will have heard at the AGM, regulators are under increasing scrutiny, and there are some people who believe small regulators cannot establish and maintain the systems and practices necessary to properly conduct themselves. The participation rate of our members is a real advantage that we have over larger regulators in being able to properly respond to changing requirements designed to improve public protection. The Steinecke Report made several recommendations related to committee appointments and training. We can certainly help strengthen or ensure the effectiveness of our committees through addi-

tional training and support from staff and consultants.

As Executive Director, I have been able to sit in on most non-statutory committees and task forces and have witnessed the results of the statutory committees. We have seen great work from committed members. I am quite impressed by the amount and quality of the work performed.

As a professional, volunteer work can be a very rewarding experience, but it takes valuable time, which is in short supply for most surveyors due to their heavy workloads. Despite that, we have approximately 40% of our members involved. We should all be thankful to those members who volunteer their time and effort. Without them we would not have the successful, well-functioning Association that we have.

For those of you who have yet to join a committee or task force, you should consider it. It will help you gain and hone new skills and grow professionally. I can assure you that my involvement with the Association over the years has helped me to further my career and provided me with new skills and knowledge.

On a related note, Council has approved the establishment of a voluntary mentorship program. Hopefully, by the time you read this, it will have been launched. This is another great way to help ensure the success of our profession. As many of us age and start to consider taking on other challenges, this is a great way to give back to the profession that has been good to most of us. We should all be proud to be professional surveyors and pleased with the work that we do to serve the public and further the economy of Ontario. By continuing to support each other and the profession, we all benefit.



## President's Page (cont'd from page 2)

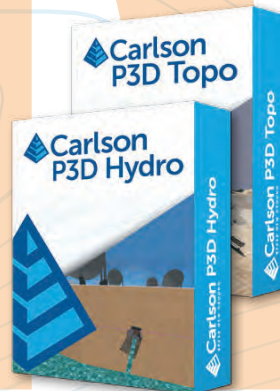
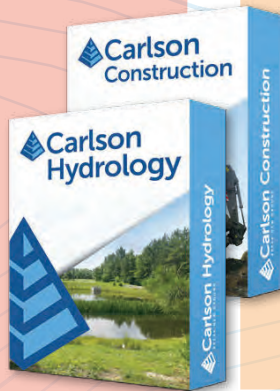
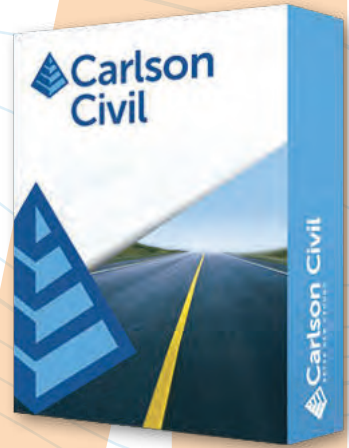
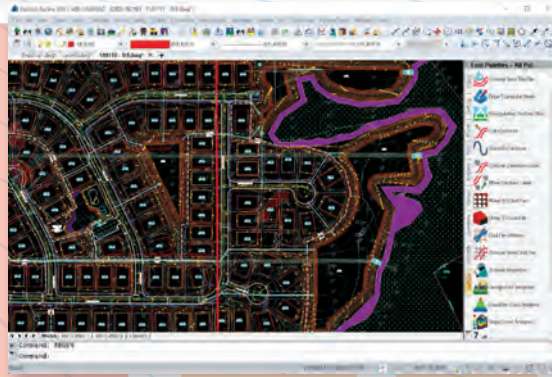
the Presidents' Forum, which included a dinner with the presidents of provincial and national associations and their partners. The events are filled with lively discussions. Within minutes it feels like we have known these people for years. We discuss the issues we face as individual associations, find common ground, and share potential solutions. It is collaborative, informative, and, I believe, *essential* to the continued success of our profession.

I am not sure what the next two days will bring, but we are all in this together, so I hope that the meetings will continue in the same interactive way. I find it reassuring that we, as a profession, and as a society, have come out of the past two years intact. And I am invested in us coming together in person because that, I believe, is when the magic happens. The future looks good.

Take care...I am off to Day 2.



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# The Effects of Changing Water Levels on Shoreline Sinuosities

By R.J. Stewart, B.Sc., O.L.S., C.L.S.

Clients are sometimes surprised when they see survey plans that show changed configurations of shorelines adjoining their property. This is not usually a surprise to surveyors; but it is sometimes an important principle to consider when researching historical records, including any recorded water levels, and comparing survey plans from different eras.

Significant change in shape will occur when the shore has varying slopes, as demonstrated in Figure 1. Changes in water level will result in larger displacements in the locations of gradual or shallower slopes as opposed to steeper slopes.

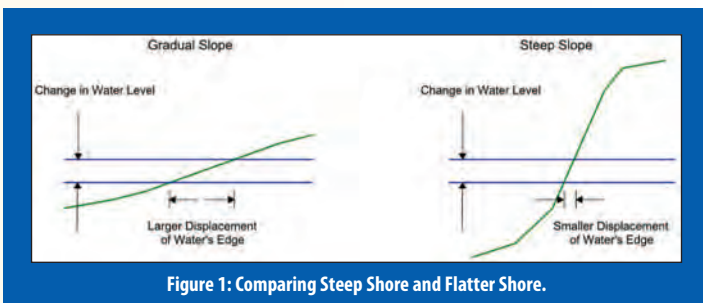


Figure 1: Comparing Steep Shore and Flatter Shore.

This principle is more noticeable where shorelines have larger sinuosities; prominent headlands generally have steeper slopes, while the shores at the upper reaches of bays have more gradual slopes. As a result, the water's edge will recede faster from the upper portions of bays than at the points that protrude into the adjoining lake. Following are examples of significant shape change resulting simply from changing water levels.

## Georgian Bay of Lake Huron

Lake Huron fluctuates naturally with a range of about 6 feet (2 metres). This has caused significant confusion over the years, where involved parties—including surveyors—failed to understand the effect of changing water levels on shorelines.

The point is illustrated at a specific location on Georgian

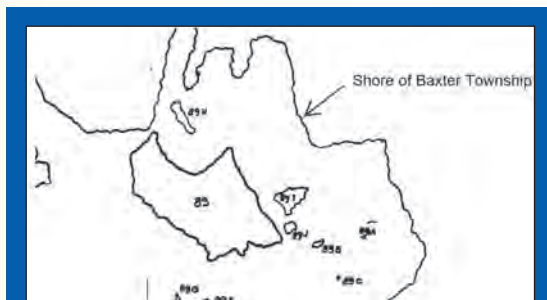


Figure 2. Portion of 1896 Plan of Islands Recorded as Plan 385 CLSR.

Bay—one of many—where the Township of Baxter was surveyed by the Province in 1878, and offshore islands were surveyed by the federal Department of Indian Affairs in 1896. (Ontario had jurisdiction to survey the mainland; the Department of Indian Affairs had jurisdiction to survey the islands.) The water was higher in 1896 than it was in 1878, resulting in an overlap of surveys; some of the islands identified in 1896 were part of the mainland in 1878. Figure 2 shows Island 89 as surveyed in 1896.

When the Lake Huron water level is low (as it was for several years in the early 2000s), Island 89 is joined to the mainland on the north, as well as to Islands 89H, 89I and 89J; under those conditions, the bay northeast of Island 89 is simply a creek, as shown in Figure 3.



Figure 3: Google Earth Image of Island 89 at Low Water Level.

The problem was even more significant a little northwest of Island 89. Figure 4 shows Island 95 (west of Island 89) as surveyed in 1896. Figure 5 is a portion of a 1947 plan that was produced to illustrate the overlap of “Island 95” and the mainland lot fabric of Baxter Township.

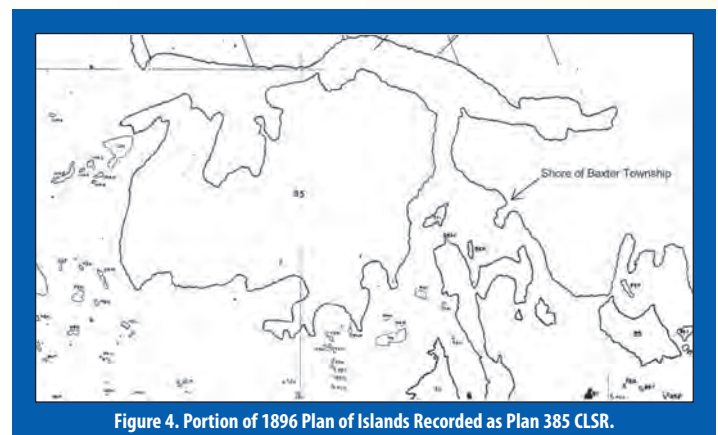


Figure 4. Portion of 1896 Plan of Islands Recorded as Plan 385 CLSR.



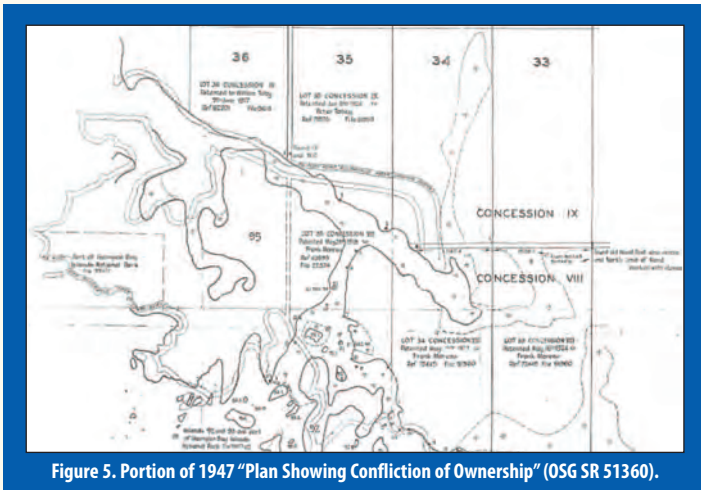


Figure 5. Portion of 1947 "Plan Showing Conflict of Ownership" (OSG SR 51360).

The overlap of the provincial 1878 and the federal 1896 original surveys has been the cause of litigation.

### Rainy Lake Indian Reserve 18C

The shoreline of Reserve 18C was initially surveyed in 1875 by E.C. Caddy, DLS. The information recorded in his field notes was plotted on the resulting 1876 plan recorded as Plan 91 CLSR.

DLS Caddy did not complete the survey of Reserve 18C. He was recalled before the north boundary of the reserve was surveyed; consequently, he had no check on his shoreline field work. When D.J. Gillon, OLS, resurveyed the Reserve in 1908, as shown on Plan 827 CLSR, it became clear that there were significant blunders in DLS Caddy's 1875 work.

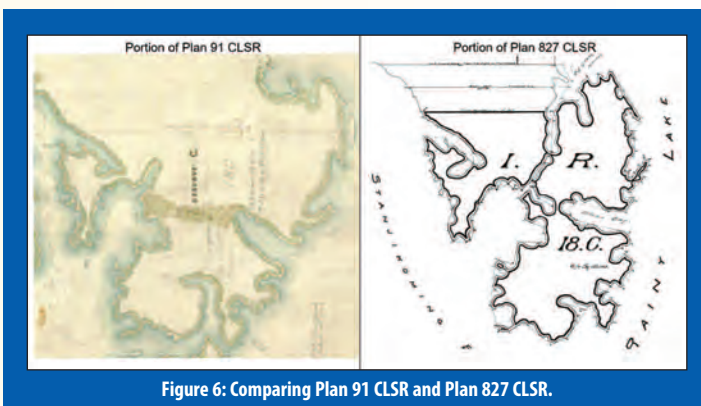


Figure 6: Comparing Plan 91 CLSR and Plan 827 CLSR.

Notwithstanding DLS Caddy's blunders, many similar shoreline features can be identified on both Plan 91 CLSR and Plan 827 CLSR, as shown in Figure 6. DLS Caddy did not attend personally for most of the shore traverse of Reserve 18C; the work was done 22 November to 2 December 1875 by a field party in his employ, when the weather was "fine and clear", with a mixture of "cold" and "moderate" temperatures.<sup>1</sup> OLS Gillon did his work in the winter of 1908, between 13 January and 21 February. It is likely that both surveys were done under similar conditions; that is, the lake was frozen (at least near the shore) and there would have been some snow accumulation at the time of both surveys, making it difficult to distinguish between marsh land and open water.

When considering similar features, the two plans demonstrate some notable differences that can't be entirely attributed to blunder or even error. For example, DLS Caddy identified a low area between Shoe Bay and Stanjikoming Bay. The distance across that low area scaled from DLS Caddy's plan is at least 95 chains; the same distance on OLS Gillon's plan is about 11 chains. Furthermore, the low area between Stanjikoming Bay and the Big Grassy Narrows Bay is not shown at all on the DLS Caddy plan but, is only 6.5 chains across in OLS Gillon's survey. The implication is that the bays were not as long in 1875 as they were in 1908, which means that the water level was higher in 1908 than it was in 1876.

The water level of Rainy Lake at the time of DLS Caddy's 1875 survey is unknown. However, it is possible to test whether the water level in January/February of 1908 was higher than normal. The best information we have indicates that the water level in January and February of 1908 ranged from about 491.65 feet to 490.6 feet DPW datum (336.02m to 335.70m CGVD1928), averaging 491.1 feet DPW datum, which converts to about 335.85m CGVD1928. Computed natural water levels for January 11 to February 20, 1909 to 1930 (inclusive), are in Table 139 of the 1931 Final Engineers' Report for the International Joint Commission Rainy Lake Reference.<sup>2</sup> From Table 139, the average water level for that portion of the year would have been about 334.95m CGVD1928.

The analysis demonstrates that the water level at the time of the OLS Gillon survey was, indeed, very high—higher than average by about 0.90 metre, or about 3 feet, and approaching the maximum under normal conditions, probably as a result of the coffer dams that were in place at that time as part of the construction process for the Fort Frances-International Falls dam on the Rainy River. This corroborates (a) the proposition that water levels were higher at the time of Gillon's 1908 survey than at that of the 1876 Caddy survey; and (b) the observations noted above when comparing shoreline shapes on the 1876 DLS Caddy plan with the 1908 OLS Gillon plan.

### Conclusion

There are many more examples that could be illustrated, and most surveyors will have encountered their own experiences with this issue. The important point is that the horizontal displacement of the water's edge due to water level changes is not consistent on all shore areas. Some shores will have little displacement while others will experience significant displacement with the same change in water level. The result is a changed configuration of the shoreline—something that may well need to be explained to a client less experienced in mapping issues.

<sup>1</sup> Diary, FB634 CLSR, pages 19 and 20.

<sup>2</sup> International Joint Commission, Lake of the Woods Reference, 1916 Report of the Consulting Engineers, Table 76, page 261; and International Joint Commission, Rainy Lake Reference, 1931 Final Report of the Consulting Engineers, Table 139.



# Quantifying Sustainability in Infrastructure Project Delivery

By Dr. Robert Radovanovic, P.Surv., P.Eng., CAMA, ENV SP. and  
Simon Armstrong-Bayliss, M. Constr Law., P.Eng., CPEng., PMP, ENV SP.

**T**he concept of “sustainability” is one that is popping up in more and more places and has extended into almost every aspect of our lives – at the possible risk of becoming a buzz word! While it is often associated with generalized concepts like “environmentalism” and “Environmental-Social-Governance (ESG)”, there is a distinct and growing discussion about the idea of “sustainable infrastructure delivery”, and how proper planning and design of infrastructure projects can minimize environmental and social impacts as well as overall lifecycle costs.

In practice, given the difficulties in an “apples to apples” comparison of potential environmental impacts and a lack of standard methods for expressing impacts in dollar values, it is difficult for project managers to reliably outline how a particular course of action can be shown to be more or less “sustainable.” For example, if one is routing a new roadway near a community, is it more important to avoid impacting a wetland or is it more important to minimize noise pollution to nearby residents? What about social factors related to impacts on access to services by a new thoroughfare?

Fortunately, sophisticated frameworks and guides have been developed to measure and compare the sustainability of projects. These tools provide a mechanism by which informed decisions can be made by one party and quickly digested by another within the common language of sustainability across sectors. Interestingly, by finding themselves at the intersection of land-use planners, regulatory bodies and clients looking to complete projects, surveyors may be particularly well placed to understand these tools and help guide projects to a more successful completion.

## **Dimensions of Sustainability**

The first step in successfully comparing the “sustainability” of different project choices is defining what “sustainability” actually means! In 1987, the United Nations defined sustainability as “meeting the needs of the present without compromising the ability of future generations to meet their own needs.” Four generally accepted pillars of this concept are economic, environmental, social and governance – the latter three forming the oft-encountered acronym “ESG”.

- **Economic:** Development that provides opportunity for growth and improvement in peoples’ quality of life.
- **Environmental:** Recognition that all life (including people) depends on the proper functioning of delicately balanced and complex natural systems, and that development should minimize impacts on these systems.
- **Social:** Balancing the needs of the individual with the needs of the community toward maintaining an equitable and

sustainable social system, which includes issues such as safety, equity and access.

- **Governance:** Ensuring that decision making is transparent, accountable and properly includes the considerations of impacted stakeholders.

It is important to recognize that sustainability requires a balance of these four pillars – for example, while one could argue that all industrial development should stop in the interests of minimizing environmental impacts, doing so would significantly and negatively impact economic and social outcomes for communities.

This is particularly true when overcoming an overly narrow focus on greenhouse gas (GHG) emissions in evaluating sustainability. Most evidence points to GHGs as a major driver of climate change, and several tools have been developed to quantify the emissions released during construction and operation of a project. For these reasons, it is relatively simple to quantitatively compare alternatives from a GHG perspective, which makes it an attractive decision-making tool – it’s easy to demonstrate that investing in putting solar panels on 80 acres will generate less carbon than expanding the capacity of a coal fired power plant.

However, climate change and GHG emissions are only one aspect of sustainability. The situation becomes even more complex when limited investment dollars are available to put towards a suite of different infrastructure projects. Expanding on the example above, imagine that there is an opportunity to either invest in the solar farm or to build a new recycling facility (but not both). How do you choose the project that is the most sustainable? Is minimizing GHGs or plastic waste more important? What about the different number of jobs created by the two projects?

## **The Envision Framework**

Following a systematic approach to evaluating and balancing sustainability considerations is extremely important in situations such as the above to avoid implicit biases that decision makers might have and to improve the transparency of decision making. The Envision framework is one such system that is increasingly popular for infrastructure projects.

Launched in 2012, and now in its third version, the Envision framework was jointly developed by the Zofnass Program for Sustainable Infrastructure at the Harvard University Graduate School of Design and the Institute for Sustainable Infrastructure. A decade later, the framework has been utilized throughout the planning and delivery of billions of dollars of infrastructure, including projects in Ontario, Quebec, Alberta, and British Columbia.

Envision breaks down sustainability considerations into the five major categories of *Quality of Life, Leadership, Resource*

| Major Category                                      | Sub-category  | Sample Considerations  |
|---|---------------|--|
| <b>Quality of Life</b><br>(200 total points)        | Well-being    | How does the project improve construction safety?<br>How is light pollution minimized?   |
|   | Mobility      | Does this improve access for a community?<br>Does this encourage sustainable transportation?   |
|   | Community     | Does this project protect historic and cultural resources?<br>Are Public Spaces and Amenities enhanced by this project?                                  |
| <b>Leadership</b><br>(182 total points)             | Collaboration | What opportunities for Stakeholder Engagement are provided in the project planning?<br>Does the project demonstrate effective leadership and commitment? |
|   | Planning      | Does the project include plans for long-term monitoring and maintenance?   |
|   | Economy       | Does the project develop local skills & capabilities?  |
| <b>Resource Allocation</b><br>(196 total points)    | Materials     | How is construction waste minimized?<br>Is there a consideration for balancing earthwork on site to minimize import / stockpiling of material?           |
|   | Energy        | Does the project reduce energy consumption over its lifetime?  |
|   | Water         | How is water use minimized during construction?  |
| <b>Natural World</b><br>(232 total points)          | Siting        | Is the project situated to avoid wetlands and surface water?   |
|   | Conservation  | How does the project improve drainage and management of stormwater?  |
|   | Ecology       | Does this project enhance functional habitats?   |
| <b>Climate and Resilience</b><br>(190 total points) | Emissions     | How does the project reduce GHG emissions?   |
|   | Resilience    | Have climate change vulnerabilities been considered in the planning of this project?   |

Table 1. Categories and considerations within the Envision framework.

Allocation, Natural World, and Climate and Resilience. Within each of these major categories, additional sub-categories are included as shown in Table 1. The sub-categories are further

divided for a total of 64 distinct “sustainability and resilience indicators”, each with a clear workflow and criteria for evaluation on a scale from “Improved” to “Restorative.” A sample guideline for the “NW1.2 Provide Wetland & Surface Water Buffers” indicator is provided in Table 2 and is sourced from the Envision Guidance Manual Version 3 (Institute for Sustainable Infrastructure, 2018).

Points are allocated for each sustainability and resilience indicator by level of achievement for a maximum total of up to 1,000 points. Projects that achieve 50% of the total available points are awarded *Platinum* status, *Gold* for 40%, *Silver* for 30% and *Verified* for 20%.

As is often the case, perfection is an unrealistic goal. In fact, achieving 50% of points to achieve *Platinum* status proves to be quite challenging in practice as any given project will require a complex balancing of trade-offs – it is extremely difficult and perhaps unrealistic to expect to have no environmental impact and to empower underprivileged communities, while releasing no greenhouse gases and creating new jobs.

The rating scale incorporated into each indicator also allows project teams to identify and align priorities against a common scale amid difficult trade-offs. In essence, project teams can use the rating requirements as inspiration for practices and mitigation methods to make their projects more sustainable. Done consistently over time, an organisation can then use the Envision process to ensure that sustainable practices are progressively

cont'd on page 10

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| NW1.2 Provide Wetland and Surface Water Buffers (20 points)  |   |   |   |   |
|--|---|---|---|---|
| Intent – Protect, buffer, enhance, and restore wetlands, shorelines and waterbodies by providing natural buffer zones, vegetation and soil-protection zones. |   |   |   |   |
| Level of Achievement (points awarded by level shown in parenthesis)  |   |   |   |   |
| Improved (2)   | Enhanced (5)  | Superior (10)   | Conserving(16)  | Restorative (20)  |
| A) The project team identifies wetlands and surface water on or near the site, or with the potential to be impacted by the projects.                         |   |   |   |   |
| B) The project team identifies the appropriate type and width of buffer zones for wetland and surface waters.  |   |   |   |   |
| The project provides vegetated or natural buffer zones around at least 90% of wetlands and surface waters on site.   | The project provides a buffer of managed vegetated zones around all wetlands and surface waters.                | The project provides a mixed buffer of managed vegetation and natural zones around all wetlands and surface waters. | The project provides a buffer of natural zones around all wetlands and surface waters.  | The project provides a buffer of natural zones around all wetlands and surface waters.                                      |
| The remaining areas (<10%) are protected with engineered controls.   | Managed zones may include grass.  | Natural areas are not managed and consist of natural habitat.   | The buffer is of sufficient width to slow surface runoff, and trap sediments, pesticides, and other pollutants.                     | The buffer is of sufficient width to slow surface runoff, and trap sediments, pesticides, and other pollutants.             |
| Together they are sufficient to slow surface runoff, and trap sediments, pesticides, and other pollutants.   | The buffer is of sufficient width to slow surface runoff, and trap sediments, pesticides, and other pollutants. | The buffer is of sufficient width to slow surface runoff, and trap sediments, pesticides, and other pollutants.     | The buffer is of sufficient width to slow surface runoff, and trap sediments, pesticides, and other pollutants.                     | The buffer is of sufficient width to slow surface runoff, and trap sediments, pesticides, and other pollutants.             |
| Minimum buffer width is 50 ft/15 m unless otherwise justified under criterion B.   | Minimum width is 100 ft/30 m unless otherwise justified under criterion B.                                      | Minimum width is 150 ft/45 m unless otherwise justified under criterion B.  | Minimum width is 200 ft/60 m unless otherwise justified under criterion B.  | Minimum width is 200 ft/60 m unless otherwise justified under criterion B.  |
|  |   |   | (OR) The project team can demonstrate the site was intentionally chosen to avoid development on or near wetlands or surface waters. | (AND) The creation of the protective buffers includes returning previously developed or disturbed areas to a natural state. |
|  |   |   |   | Project teams may alternatively demonstrate the recovery of pre-existing buffer zones that have degraded in quality.        |

Table 2. Sample Envision Version 3 guideline for evaluating NW1.2 Provide Wetland & Surface Water Buffers

incorporated across multiple project types. This leads to broader improvements in ESG considerations such as internal accountability, incentivized performance, identification of partners with shared goals, positive public attention, project-government collaboration, and transparent governance.

Envision is not the only sustainability evaluation framework available – LEED for example is well known within the buildings and vertical infrastructure industry, and NRCan’s PIEVC protocol toolkit heavily focuses on climate resiliency. However, given the fact that many projects that surveyors participate in are of the horizontal variety, Envision is most likely to find immediate application in a surveyor’s practice.

### Geomatics-focused Sustainability and Resilience Indicators

As can be seen in Table 1, the range of sustainability indicators spans over many different technical disciplines. So, while a project is actually verified by an independent, 3<sup>rd</sup> party, certified Envision Sustainability Professional (ENV SP), the preparation of the supporting documentation and implementation of the sustainability strategy requires a diverse technical team of experts. In particular, many of the sustainability and resilience indicators have distinct measurement science and geospatial aspects that place geomatics professionals as central contributors to the process.

For example, within the *Natural World* category is the subcategory of *Siting* which guides and recognizes the importance of avoiding and mitigating the impacts on ecological areas including farmland and areas that serve as a diverse habitat, such as waterbodies or wetlands. It includes four credits:

- NW 1.1 Preserve Sites of High Ecological Value
- NW 1.2 Provide Wetlands and Surface Water Buffers
- NW 1.3 Preserve Prime Farmland
- NW 1.4 Preserve Undeveloped Land

In each of these cases, achieving credits requires the mapping

of the extents of a landscape feature (and in the case of NW 1.2, evaluating the edges of waterbodies, which has a long-standing relationship to the land surveying profession). It is worth noting that NW 3.3 “Maintain Floodplain Functions” requires the delineation of floodplains, while CR 2.1 “Avoid Unsuitable Development” further requires the mapping of severe slopes and flood-prone areas.

Aside from field operations to assess, survey and map these features, there is additional desktop planning work to properly design and layout projects to avoid sensitive features. To the authors, it is somewhat eye-opening that everyday activities that surveyors have been quietly undertaking for some time, such as developing contour maps for appropriate site selection or routing pipelines to optimize river crossings, can be now viewed as crucial elements of sustainable infrastructure development!

The scope of geomatics-applicable credits expands considerably when one considers areas that involve 3D modelling or measurement technologies. For example, RA 1.5 “Balance Earthwork on Site” requires the evaluation of cut and fill volumes related to civil works, which is an area that surveyors assist in through their creation of LiDAR-derived digital elevation models to support earthworks design (and indeed, where progressively more surveyors are completing volume calculations and grading calculations directly in their CAD packages).

Other credits, such as QL 1.4 “Minimize Noise and Vibration” offer the opportunity to provide services in verification that noise or vibration do not exceed certain limits, while credits such as CR 1.2 “Reduce Greenhouse Gas Emissions” provide the opportunity to leverage the surveyors’ comfort with computations to execute various GHG calculation methodologies.

Finally, it should be recognized that surveyors have often played an important part in project planning as a trusted reference on regulatory requirements, be it navigating the subdivision process or being aware of potential environmental restrictions on development. In this light, it would seem natural that more surveyors familiarize themselves with the overall Envision process to allow them to assist in the coordination of a sustainability plan or validate submitted projects.

As momentum towards sustainable development continues to grow, what has historically been subjective and challenging to quantify is now supported by transparent and objective tools. Surveyors, who establish key early-stage relationships with clients planning development projects, can now leverage tools such as Envision to further drive sustainable outcomes for their clients and communities.



**Dr. Robert Radovanovic** has over 20 years of experience in land surveying, advanced positioning technologies, and 3D scanning, and is actively involved in educational initiatives in the land surveying and infrastructure asset management professions. He is the Calgary Engineering Branch Manager with McElhanney Ltd., as well as an Adjunct Associate Professor in the Department of Geomatics Engineering at the University of Calgary. He can be reached via email at [rradovanovic@mcelhanney.com](mailto:rradovanovic@mcelhanney.com)

**Simon Armstrong-Bayliss** has over 10 years of experience advising clients in the technical and commercial aspects of infrastructure delivery and is a Senior Project Manager at McElhanney Ltd.

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# Know your History — Part 11

By Tom Bunker, O.L.S., C.L.S., P.Eng., C.P.A. (Ret)

The following article is Part 11 in a series of historical articles by Tom Bunker.

## Canadian Land and Emigration Company Roads

The July 8, 2021 edition of *County Life* (Haliburton) included a reprint of the June 9, 2009 front page of the *Haliburton County Echo* with a headline **Road's history has two versions**. Of course, my interest was piqued.

The article, by Jenn Watt, Staff Reporter, explained “Either Kennaway Road has connected with Fishtail Lake Road since the colonization of Haliburton County or it has never existed and has been private property infringed upon by ATVers looking for a connection to their routes around Harcourt Park”. The Fishtail Lake Sportsman’s Club argued before Dysart et al Council<sup>i</sup> that they had “already fought the battle at council in 1974 and 1984, each time the council ruling that the land was private”.

The road discussion at the June Council meeting followed issues raised at the previous May meeting related to trail mapping by the ATV Club along possible municipal roads<sup>iii</sup>.

- There were requirements for the rates of settlement, subject to reversion of the land to the Crown if not settled
- A Contract for Sale would be entered into with the *en bloc* purchaser but Patents issued only to the actual settler that fulfilled conditions.

The Canadian Land and Emigration Company (CLEC) was incorporated in England<sup>v</sup> to generate shareholder value by participating in the advancement of the settlement of mid-Ontario.

According to the 1900 Report of the Commissioner of Crown Lands<sup>vi</sup>: “The Canadian Land and Emigration Company in the year 1861 purchased ten Townships from the Government. The Townships were Dysart, Dudley, Harcourt, Harburn, Guilford, Bruton, Havelock, Eyre, Clyde and Longford, containing 403,125 acres, deducting therefrom

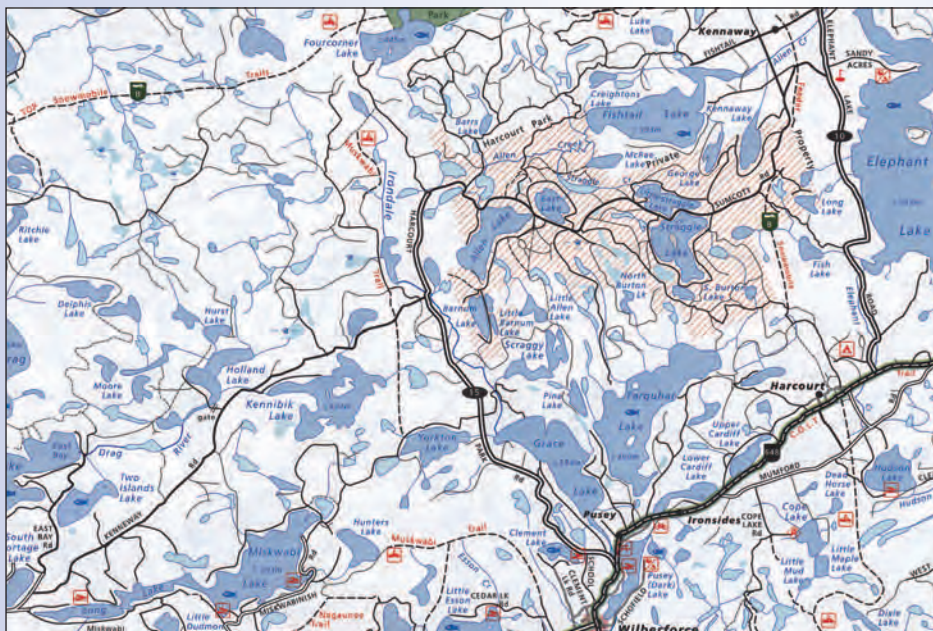
41,000 acres for swamp. The price was 50 cents an acre, being \$181,062.50, **one-tenth of which the Company was allowed to expend on roads**. The area subject to settlement duties was 261,544 acres, 1/9th to be settled within 3 years from date of agreement; 5/9ths to be settled within 10 years; the whole to be settled within 15 years.”

The Company had difficulty selling the lots due to the rough nature of the country, the distance from already settled areas and with few good roads, and competition from the Crown that was later offering free grants in other areas. As a result, there was a request to extend the completion of the first of the required conditions of the 1861 *en bloc* sale to January 1, 1868.

Because of failing economics, by 1883 the CLEC had sold its holdings and in 1889 a new Canadian Land and Immigration Company of Haliburton Limited (CLICH) was created to own the land<sup>vii</sup>.

## Township Surveys

The townships identified in the purchase agreement had their outlines determined by PLS James W. Fitzgerald’s surveys in 1858<sup>viii</sup> with the required subdivision work under the 1,000-acre double front system generally completed “under Instructions” in 1861 and 1862.



<sup>ii</sup> Ontario Cottage Country, Backroads Mapbook

## Background

Regulations were enacted in Upper Canada in 1859<sup>iv</sup> to allow the government to sell Crown lands *en bloc*. In general, the intended conditions of sale were:

- The Crown would survey the Township’s exterior
- The purchaser was responsible for the cost of the subdivision of the interior pattern by a Provincial Land Surveyor (PLS) under instructions from the Crown

## The Peterson (Colonization) Road

The Peterson Road was constructed between the Opeongo Road in the east and the Muskoka Road in the west. Starting in the east in 1857, by 1860 it had reached the northwest corner of Harcourt Township and the following year the northwest corner of Dysart Township<sup>ix</sup>. Contemporary observations of period roads suggest they were not much more than trails. “The road builders tried to follow the highest ground to avoid mud holes. But after a rain, or in the early spring or fall, the road frequently became almost impassable as the sun and wind could not get through to dry them and there were no ditches for drainage. When the mud holes became too deep to cross, they cut another road around them”<sup>x</sup>.



This road in Draper Township near “south falls” was sketched by George H White in 1972 and possibly illustrates the track of the rudimentary Peterson road in that location. Baldwin Collection of Canadiana, <https://digitalarchive.tpl.ca/objects/337474>

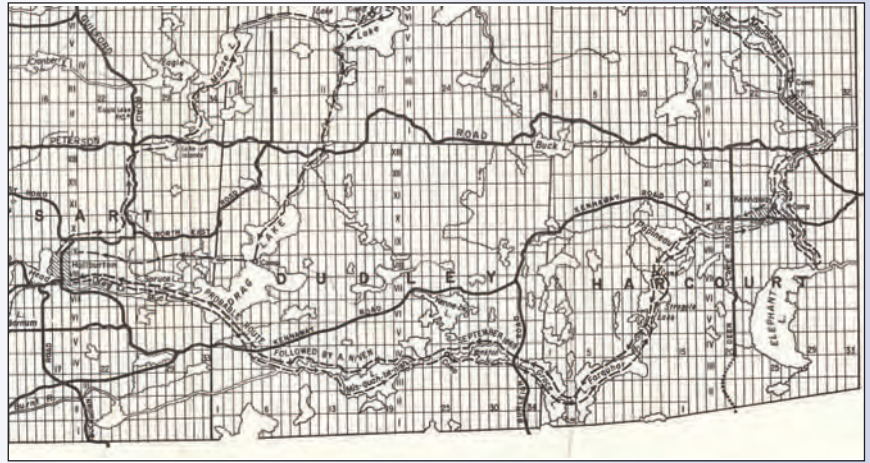
William Morrison’s Report on the Peterson Road, 1863<sup>xi</sup> indicates that the CLEC should be requested to clear the underbrush on the road through its lands, as part of its purchase agreement.

Work on maintaining the road is subsequently reported in 1867: “Between 30 and 40 miles of the road now passes through the Canadian Land and Emigration Company’s Townships, a portion of which has been slightly improved by that Company, in the past season”<sup>xii</sup>.

As late as 1869 the Ontario Department of Agriculture and Public Works<sup>xiii</sup> recognized the old Government Peterson Road passing through CLEC lands. Little was spent annually to maintain the road and by the 1870’s many parts of the road were impassable due to re-growth of the wilderness<sup>xiv</sup>.

## The Kennaway Road

The Kennaway Road is labelled on the CLEC map from the 1870’s running north-easterly through Dudley Township to the boundary with Harcourt, then from the township boundary easterly through Concessions 10 and 11 until joining the Concession 9/10 Road Allowance in about Lot 17 west of the hamlet of Kennaway. It continues easterly to



<sup>xv</sup> Portion of Map Insert in “Early Days in Haliburton”, (1963)

connect with the Peterson Road at the easterly Harcourt Boundary.

Harcourt Township was subdivided by PLS Wm. Drennan in 1862. His field notes make reference to the Peterson Road, and it is shown on the plan filed with the Crown as passing diagonally through Lots 29 – 33 Concessions 11 and 12 and then weaving along the northerly township boundary until Lot 14 where it turns northerly into Bruton Township. The original Peterson Road location is also shown on adjacent Township surveys and is shown on the map above. Elsewhere alterations to more favourable locations were sometimes recorded<sup>xvi</sup> but often not<sup>xvii</sup>. On subsequent Colonization Road map versions, Kennaway Road here is re-labelled as Peterson Road!

Commissioner of Crown Lands reports mention connecting roads being constructed in adjacent townships:

- 1) Burleigh Extension in Monmouth Township commencing at the Monck Road and to form a connection with the *Canada Lands and Emigration Company* road called the Kennaway Road. The arrangement is such that “the company should connect, at its own expense, the terminus of this road, at the boundary of Dudley, with the Kennaway Road in said Township”. (page 25, 1874 report)
- 2) Monmouth Road is a new road to connect from the Kennaway Road in Concession 5 near the Dudley/Dysart boundary to the Monck Road. (page 62, 1881 report)

What is the status of roads constructed within the Canada Lands and Emigration Company townships, and in particular the Kennaway Road?

## Facts and the Law

The events that create public roads are well documented<sup>xviii</sup> and are considered in the context:

- Road allowances laid out by the Crown (Harcourt township surveyed under Instructions)
- Roads actually constructed by the Crown (e.g. the Peterson Road)
- Roads upon which public monies are spent (offset in

*cont’d on page 14*

purchase price allowed to CLEC?)

- Private roads dedicated and then accepted by the road authority

## Ownership Pattern

- The *en bloc* purchaser was not originally intended to acquire ownership in the land, only the right to sell (on behalf of the Crown) with reversion if not settled.
- Patents to lots were to be issued only to *bone fide* settlers. This process was altered through early purchase negotiation between CLEC and the Crown with an offsetting performance bond<sup>xix</sup>.
- The fee in surveyed road allowances and un-surveyed Colonization Roads was consistently vested in the Crown until the “great road flip” of 1913 when they fell under municipal jurisdiction<sup>xx</sup>.

The transfer from public road to private status requires formal documentation<sup>xxi</sup>.

## Analysis

A road was completed<sup>xxii</sup> by 1873<sup>xxiii</sup> from Haliburton to the hamlet of Kennaway at Lot 20, Concession 9/10 with the expenditure of £730.00 by the CLEC and a mail stagecoach ran weekly<sup>xxiv</sup> by 1881. PLS Alex Niven was the CLEC agent at Haliburton between 1868<sup>xxv</sup> and 1879<sup>xxvi</sup> and one of his tasks was location of roads.

The *current 2006* map above shows Kennaway Road between South Portage Road and County Road 15 (Harcourt Park Road) in a similar placement to the Kennaway Road on the CLEC map<sup>xxvii</sup> and later as “Peterson Road” on the Crown Colonization Roads map. Commissioner of Crown Lands reports called this road the Kennaway Road until at least 1881 so it’s labelling as the Peterson Road seems in error as the Crown road by that name had been abandoned a few years earlier.

“The first settlement in the Harcourt area, Kennaway is recorded as being settled prior to 1850<sup>xxviii</sup>. A post office was established in 1876 and ran until 1923. In 1868 it was recorded that 9 settlers, 50 dependents, 15 cattle, 5 sheep, 9 hogs and 2 horses lived in this settlement. As settlers moved out west to greener pastures, the school closed in the late 1930s and the children were transferred to Harcourt. The school still stands and is now being used as a hunt club.

You will find this settlement located on Fishtail Lake Road.”

Portions of County Road 15 follow the original Kennaway Road, although named Burleigh Road in the Dysart et al By-law<sup>xxix</sup>. The creation of the Burleigh extension was in 1874 to connect to the existing Kennaway Road.

## Public Monies Expended

Was the CLEC compensated by the Government for construction costs of Kennaway Road under the purchase agreement? The 1871 Annual General Meeting of the Company reported that “the expenses incurred during the past year in road-making have been heavy, ...: the greater portion of the cost, will however, be repaid out of the 10 percent reserve in the hands of the Government.”<sup>xxx</sup>

This suggests not all the \$18,106.25 road reserve funds had been allocated by 1871. Cummings reports that the funds were exhausted by the end of 1872<sup>xxxi</sup>.

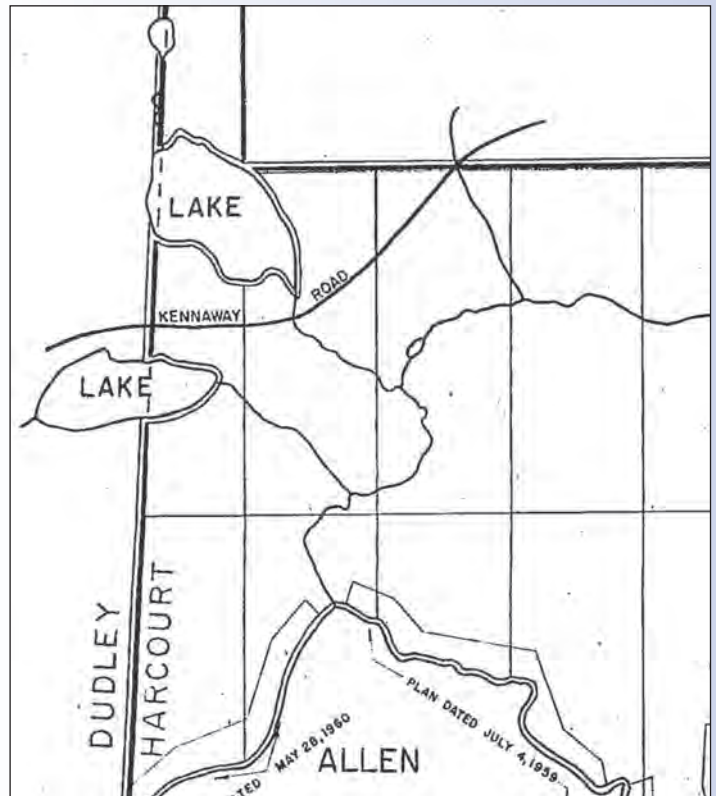
The records of the CLEC are housed at the Trent University Archives<sup>xxxii</sup> and could be reviewed for compensation evidence. The Commissioner of Crown Lands reports for the period make no specific mention of payments to CLEC but there are “refunds” documented under expenditures.

## Acceptance by the Municipality

A review of the Registry Office records for Harcourt Lots 1 – 20, Concessions 10 and 11 revealed that the lots were patented to CLEC in May 1865, each described as “all of Lot ...”. The single Patent document<sup>xxxiii</sup> included “The Whole of the Townships of Dysart, Dudley, Harcourt, Guilford, Harburn, Bruton, Havelock, Eyre and Clyde in the aforesaid County of Peterborough and the Whole of the Township of Longford in the aforesaid County of Victoria with the Exception of the Navigable Waters and Streams and the allowances for Roads in all the said Townships which are hereby reserved together with free access...”.

The municipal Township of Dysart et al was formed January 7, 1867<sup>xxxiv</sup> and would have been responsible for roads in its jurisdiction from that date. By 1869 “some 25 miles of new road have been constructed and 25 miles of the old Government Peterson Road have been brushed out and repaired. The Company *has shared the expense of many of the improvements*, with municipalities interested.”<sup>xxxv</sup> A review of Township records would be required to determine where it’s expenditures, if any, were made.

On January 13, 1934, the Township of Dysart et al regis-



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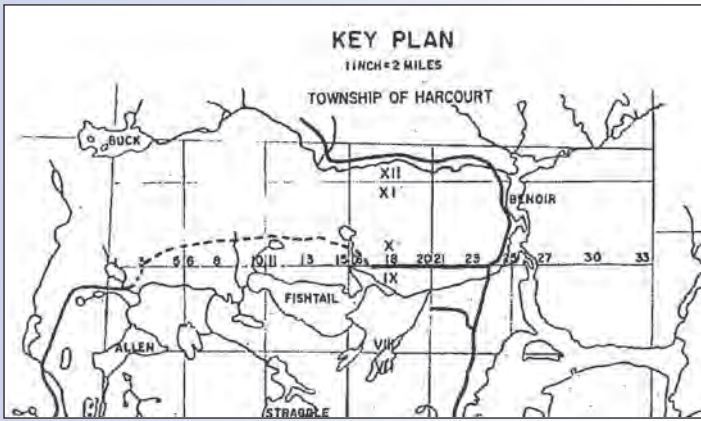
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tered a Tax Certificate<sup>xxxvi</sup> against the noted Lots 1 to 20 in Harcourt. The owner CLICH cleared ownership via a Redemption Certificate<sup>xxxvii</sup> registered the following year, on property described as “all of Lot...”. There is no mention of any road closing by-law and all subsequent dealings reference “all of Lot...”.

The municipality has obtained, in the 1960’s and 70’s, a registered ownership of portions of the Kennaway and Burleigh Roads in the abutting Dudley township through direct transfer or quit claim from the township lot owner. In Dysart township portions of the Kennaway Colonization Road were stopped up and sold<sup>xxxviii</sup> where the alternate Highway 118 has been constructed.

OLS H. Curry Bishop prepared a plan in March 1961<sup>xxxix</sup> of a large block of land in Harcourt and shows the Kennaway Road crossing from Dudley Township through Lots 1 – 3, Concession 9. His “Key Plan” illustrates the road extending easterly to connect with the Concession 9/10 Road Allowance.

<sup>i</sup> <https://haliburton.civicweb.net/document/89085>

<sup>ii</sup> Part of page 28, Ontario Cottage Country, Backroad Mapbooks, 2006, Mussio Ventures Ltd. Note Kennaway Road running northeasterly from near South Portage Lake and Fishtail Road to the east of Fishtail Lake.

<sup>iii</sup> Page 3, Minutes of Council meeting May 11, 2009

<sup>iv</sup> Article F 36, page 272, Muskoka and Haliburton, 1615 – 1875; Florence B. Murray, 1963, The Champlain Society  
Page lxxxvi, *ibid*

<sup>v</sup> Page 80, Appendix 32, Land Tenure in Canada

<sup>vi</sup> See company history; Cummings, H.R. “Early Days in Haliburton.” Ontario: Department of Lands and Forests, 1963

<sup>vii</sup> Article D14, Fitzgerald’s report; page 165, Muskoka and Haliburton, 1615 – 1875; Florence B. Murray, 1963, The Champlain Society

<sup>viii</sup> Pages lxxiv – lxxvi, Muskoka and Haliburton, 1615 – 1875; Florence B. Murray, 1963, The Champlain Society

<sup>x</sup> Likely describing the Muskoka Road; recollections of Dr. Howard Anderson, page 54, The Lake in the Hills, Strong Township and Sundridge 1875 – 1925, Patricia Lee, Highway Book Shop, 1989

<sup>xi</sup> Article E39, page 216, Muskoka and Haliburton, 1615 – 1875; Florence B. Murray, 1963, The Champlain Society

<sup>xii</sup> Report of the Commissioner of Crown Lands for the Year 1867, page 49

<sup>xiii</sup> Article F48, page 284-285, Muskoka and Haliburton, 1615 – 1875; Florence B. Murray, 1963, The Champlain Society

<sup>xiv</sup> Pages lxxiv – lxxvi, Muskoka and Haliburton, 1615 – 1875; Florence B. Murray, 1963, The Champlain Society

<sup>xv</sup> Portion of map insert in “Early Days in Haliburton”, H. R. Cummings, 1963. See also compilation on 1936 Map 19A, Huron and Ottawa Territory, Province of Ontario, Department of Lands and Forests, ref#8827. Note: similar information shown on Algonquin Provincial Park – Colonization Roads Map, Crown Survey reference 3522-A4P2-506, 1857 - 1946

<sup>xvi</sup> Deviation of the Muskoka Road; Report of the Commissioner of Crown Lands for the Year 1875, page 54

<sup>xvii</sup> Undocumented relocation of the Peterson Road in Lot 8, Concession 5, Draper Township

<sup>xviii</sup> Beginning with The Highway Act, 1810: page 28, Russell on Roads, 3<sup>rd</sup> Edition,

A review of Dysart et al Council minutes notes that “Mr. Nicholson is to contact Mr. Curry Bishop to ascertain any available information on the colonization road.<sup>xi</sup> No report was found in Curry Bishop’s records.

July 2009 deputations by the Fishtail Lake Sportsman’s Club included a letter from Rusty Russell, QC, noting that the municipality had not taken title to the road in question<sup>xii</sup>.

Nothing further on this matter is found in an on-line search of subsequent Council minutes.

## Observations

The Kennaway Road was built in 1872-1873, physically exists and is presently travelled in part.

It may have been completed under the cost offsetting provisions of the original purchase agreement (public monies expended) and no formal acceptance would be required to create a public highway.

There is no specific survey for the Kennaway Road registered in Harcourt Township where it lies outside established road allowances, nor any by-law registered against any of the subject township lots either accepting or closing the road.

Where it was constructed outside of surveyed Road Allowances it was certainly dedicated by the CLEC to public use. Research would be required to determine if Dysart et al spent money to maintain the Harcourt portion and thereby accepted the road.

I haven’t determined if either of these scenarios has been fully researched. They don’t seem to have been tested in Court and the road’s status may continue to be subject to varying opinion and confusion.



Carswell, 2015

<sup>xix</sup> The bond was released by the Province by agreement in 1881. Page 166, Cummings, H.R. “Early Days in Haliburton

<sup>xx</sup> Article 5.16, page 116, Russell on Roads, 3<sup>rd</sup> Edition, Carswell, 2015

<sup>xxi</sup> Road Principle 33, page 411, *ibid*

<sup>xxii</sup> CLEC records referenced page 207, Alexander Niven, The Biography of an Early Haliburton County Surveyor, Kim Emmerson, 2015

<sup>xxiii</sup> Date for this work reported as 1872 on page 114, Cummings, H.R. “Early Days in Haliburton”

<sup>xxiv</sup> page 208, Alexander Niven, The Biography of an Early Haliburton County Surveyor, Kim Emmerson, 2015

<sup>xxv</sup> Page 90, Cummings, H.R. “Early Days in Haliburton”

<sup>xxvi</sup> Page 165, *ibid*

<sup>xxvii</sup> Kennaway Road is identified in Dysart et al Road Naming By-law 2021-52 and shown on the by-law mapping as lying west of Burleigh Rd (County Rd 15)

<sup>xxviii</sup> <https://www.highlandseast.ca/en/explore-and-play/history.aspx#Kennaway>. Quoted date is Doubtful!!

<sup>xxix</sup> Dysart et al By-law 2021-52 names and illustrates both Kennaway and Burleigh Roads in Dudley Twp

<sup>xxx</sup> Article F50, page 287, Muskoka and Haliburton, 1615 – 1875; Florence B. Murray, 1963, The Champlain Society

<sup>xxxi</sup> page 114, Cummings, H.R. “Early Days in Haliburton”

<sup>xxxii</sup> <https://archives.trentu.ca/index.php/77-023>

<sup>xxxiii</sup> Reproduced on page 16, Alexander Niven, The Biography of an Early Haliburton County Surveyor, Kim Emmerson, 2015

<sup>xxxiv</sup> Page 56, *ibid*

<sup>xxxv</sup> Article F48, page 284, Muskoka and Haliburton, 1615 – 1875; Florence B. Murray, 1963, The Champlain Society

<sup>xxxvi</sup> INST HR203A

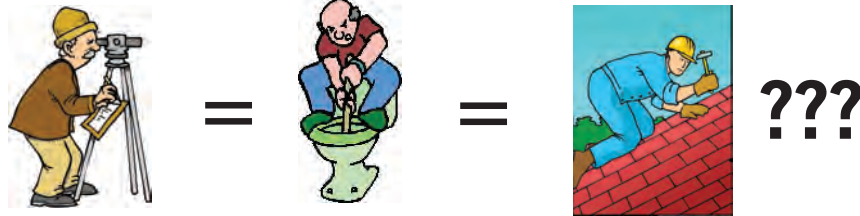
<sup>xxxvii</sup> INST HR214 registered 2 May 1935

<sup>xxxviii</sup> Lot 27, Concession 4, Dysart

<sup>xxxix</sup> Plan deposited as INST H64134 on 8 Mar 1973

<sup>xl</sup> Page 3, Minutes of Council meeting May 11, 2009

<sup>xli</sup> Page 3, Minutes of Council meeting July 13, 2009



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# Convocation Address Charge to the New Surveyors



By Izaak de Rijcke, O.L.S.

**T**hank you very much Registrar Kevin Wahba for those kind introductory words.

I would like to begin by thanking President Gavin Lawrence for entrusting me with the honour of addressing this year's class of new surveyors. I speak to each and every candidate, so full of promise and potential, and to the many persons who have stood by your side in giving support over the years. Now, as you embark upon your careers in the profession, I am going to bluntly state my advice to you in just three words: *always remain curious*.

You are entering a profession that has evolved so significantly over the decades that the original tools of old are now almost unrecognizable. Certainly, monuments like the iron bar have persisted in their near original form; but consider the trusted measurement tools of before, like the simple Gunter's chain, used for centuries, being replaced with GPS equipment. Surveying today requires a sophisticated understanding of techniques and equipment that is ever advancing in the collection of data. You then convert that data to sustain the survey fabric and, in doing so, become the gatekeepers of information that facilitates transactions of interests in land – a critical role in the economic functioning of our society. But it is curiosity that leads to technological advancements and inventions that allow you to do your work more efficiently, safely and with more precision than ever before in history. All the while, you remain critical thinkers in how these new developments will better serve the public interest.

Your role in safeguarding the survey fabric is really quite fascinating when you think about it in its full context. But I think it is fairly safe to say that the role and the value of that role is not well understood by the public, even though they benefit greatly from your work. With the technical advances it is an exciting time to enter the profession. But you are also entering a profession at a time when the widespread availability of information to the general public can mean that there may be questions as to the need for our profession at all.

Everyone is suddenly an expert. If I'm having a dispute with my neighbour over a boundary, why hire you when I can pick up a GPS unit at Best Buy or Canadian Tire and figure it out for myself? The cheap and widespread availability of geo-positioning information to the general public through tools like Google Maps may mean you are faced with questions from clients as to whether or not your services are needed at all. Where do you begin to explain that you bring them added value?

Well, as you know from the course work and articling experience you undertook to get here today, a surveyor's work is much more than sophisticated measurement techniques.

There is a deeper understanding of land and the different types of interests that exist in that land that surveyors possess and need to call upon when faced with boundary retracement questions. Here is where the "art" of the surveyor's work comes into play along with the "science" and technology of precise measurement. It is in these questions you must draw upon a diverse skill set that goes beyond the technical.

When tackling complex survey issues and developing an opinion on boundary location, curiosity will serve you well. You may find yourself doing work and exploring ideas that you probably did not consider to fall within the surveyor's job description when you enrolled in the program years ago:

- You may wear the hat of a historian, pouring through archives in order to understand the state of a natural boundary at the time a crown patent was issued 150 – 200 years ago.
- You may wear the hat of a lawyer, in understanding how courts have established principles of common law that inform how the land surveyor weighs evidence in arriving at an opinion on boundary location.
- You may wear the hat of an ecologist or geologist in understanding how a physical landscape has changed over time and impacted boundaries.

Your value as a licensed surveyor lies in the comprehensive research and analysis of evidence that contributes to an opinion on boundary location. This is not something one can pull off Google Maps or purchase at a Best Buy Black Friday sale; it is something based in curiosity and the unique skill set and training you all now hold.

If you stay curious while tackling projects that come across your desk in the coming years, I can guarantee that you will never be bored. You may find yourself feeling frustrated with complex problems and, quite honestly, even overwhelmed at times, but never bored. Do not feel overwhelmed. There are mentors and supports out there to help you along your journey, professionals in other disciplines that you can call upon to assist you. There is never a need to take the journey on your own.

In closing, I want to congratulate every one of you on your accomplishments to date and wish you the best in your future careers. Your journeys of exploration have only just begun.

Congratulations to each and every one of you, and also to your families, your partners and everyone who has supported you in getting to this day. I extend to each of you a warm welcome to the profession. I look forward to meeting you some day in person when I can shake your hands in congratulations. Thank you.



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# 130<sup>th</sup> Annual General Meeting



Marisa Sterling, who is the Assistant Dean and Director of the Office of Diversity, Inclusion and Professionalism at the University of Toronto's Faculty of Applied Science and Engineering was a Keynote Speaker. See the article based on her keynote address on page 30.

The 130<sup>th</sup> Annual General Meeting was called to order as the Sergeant-at-Arms Saeid Sedaghat laid down the Standard Measure, which historically was used to control the accuracy of surveys in Upper Canada.



The Past President's gavel was presented virtually to Gavin Lawrence.



The AOLS medallion was presented virtually to Tanis Browning-Shelp.

Incoming President Andy Shelp and Tanis Browning-Shelp.



"In 2018 I got to wear the vintage helmet that got passed around every year. This was the year I had Bob Tomlinson stickers made for everyone. RDT 1110." – Pat Hills

## The AGM Hockey Tradition

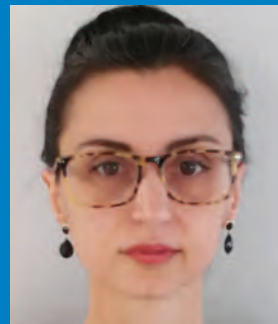
On every Thursday evening (except for COVID years) since 2005, many of our members got together at a rink near the AGM venue for a game of hockey/shinny, which was organized by Pat Hills. In 2006 Pat had special AOLS home and away jerseys made which he brought every year for the players to wear. In 2013 he even booked Maple Leaf Gardens for the game. In 2017, at the 125<sup>th</sup> AGM in Ottawa, he had commemorative red and white jerseys made for the players to keep as mementos. We thank Pat for his continued support for the AOLS, the Educational Foundation and of course the hockey game and wish him well as he retires. He was asked to share a few words.

*I will be retiring at the end of October this year, but I am counting the 2022 AGM as my 30<sup>th</sup> without missing! The annual hockey game was something we all looked forward to but for me there's been so much more over the years. You invited me into your homes and cottages; we skied together, paddled, hiked, biked, and golfed. And we laughed... a lot! I appreciate the friendships I've made, the trust you have put in me and the business we have done together. I will miss you all!*

*Thank you!*

*Pat*

## Members Commissioned in the Last Year



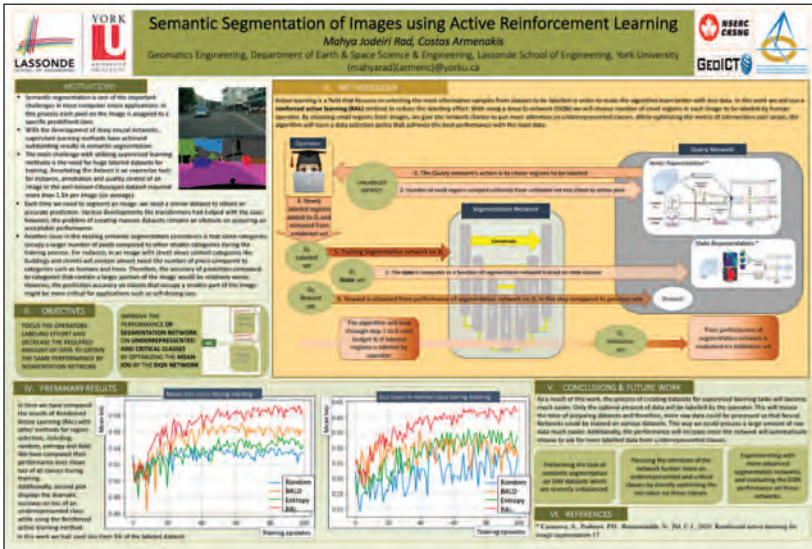
Row 1 • Prakhar Shrivastava, Sasan Ansariramandi, Mohamed Aroos  
Row 2 • Junnel Bravo, Amanda Bulua, Philip deJong, Bennett Faulhammer, Daniel Gautron  
Row 3 • Kosala Gunathillake, Humair Mallik, Jonathan McArthur, John Monahan, Stuart Moore  
Row 4 • Jeffrey Pengelly, Alycia Robinson, Mathew Thomas, Anna Tsvetanova, Thomas Cortens  
Row 5 • Daniel Berc, Victoria Donko, Ario Hadian, David Recchia, Coel Storey

# SIXTEENTH Annual AOLS Graduate Student Geomatics Poster Session Award Winners

**FIRST PLACE:** Mahya Jodeiri Rad, M.Sc. Student, Department of Earth and Space Science and Engineering, Lassonde School of Engineering, York University, supervised by Dr. Costas Armenakis.

## Semantic Segmentation of Images using Active Reinforcement Learning

**ABSTRACT** — The rapid improvements in the field of self-driving cars had made the need for High Definition maps more pressing than ever. High definition maps are maps of high detail, high accuracy-definition maps are defined as five-layered maps, including base map (standard map layers), geometric map (objects created from sensor data), semantic map (labeling and characteristics of objects), map priors (dynamic information and human behaviour data) and finally real-time layer (dynamically updated information). In this work, we will focus on semantic maps. Semantic maps are built by the semantic segmentation process, in which the input images are turned into a classified raster map. In this process, prior to the procedure, some classes are defined which contain the objects and things that could be in a scenery. With the developments in Deep Neural Networks, learning algorithms precisely perform the task of semantic segmentation.



However, for the neural networks to perform well, they need a huge amount of labelled dataset. This is usually done by human operators, which is a very costly and time-consuming process. Furthermore, for networks to perform well on a dataset, they should be trained on similar datasets before. Every single moment, tremendous amounts of data are being collected from self-driving cars in roads and also other sensors such as CCTV cameras. To take advantage of these data we need to be able to automatically turn them into usable information. Therefore, it is critical to minimize the human labour in the process and automate the process of semantic segmentation by supervised learning.

In this work, we will present an end-to-end method based on an active learning by reinforcement learning strategy for semantic segmentation with the metric of Intersection over Unions (IOU). The reinforcement learning network would choose regions of images that would provide the most information to be labelled, instead of the entire image. Our goal would be to maximize the intersection over union between networks prediction and the ground truth. This way human labour will be optimized so a human would label a smaller amount of data while obtaining the same performance from a supervised learning algorithm.  
Email: mahyarad@yorku.ca

## SECOND PLACE (TIE):

**Ding Yi, Ph.D. Student, Department of Earth and Space Science and Engineering, Lassonde School of Engineering, York University, supervised by Dr. Sunil Bisnath.**

## Resilient smartphone positioning using native sensors in real-world driving scenarios

**ABSTRACT** — The proliferation of smartphones and other low-cost portable devices equipped with Global Navigation Satellite System (GNSS) chipsets and



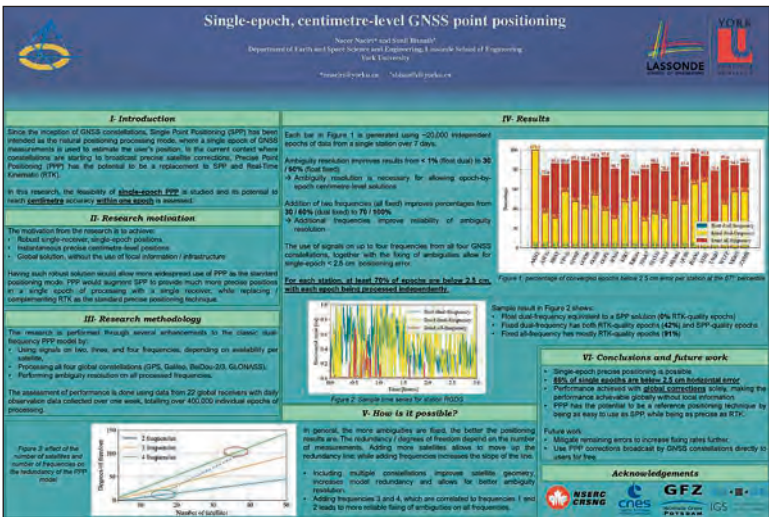


other sensors has become an integral part of daily life. Since 2016, Google made raw GNSS measurements available to Android smartphone and tablet users, enabling, e.g., Precise Point Positioning (PPP) services for smartphones. However, such low-cost GNSS hardware suffers from high multipath and noise effects, insufficient observations, and outages, leading to metre-level errors and discontinuities in positioning.

To tackle these problems, our research presents a sensor fusion technique utilizing the GNSS receivers and inertial measurement units (IMUs) native to smartphones. Meanwhile, due to the limited capability of tracking dual-frequency satellites, we adopted the uncombined PPP model constrained with Global Ionospheric Maps (GIM) to utilize all observed single and dual-frequency signals. Vehicle experiments were carried out in real-world driving scenarios including on highways, moderate urban roads, and through GNSS signal outages. The results reveal that the tightly coupled smartphone PPP/IMU solution is able to mitigate GNSS-only positioning errors significantly by reducing the overall horizontal rms from 5.2 m to 1.1 m. Furthermore, this fusion technique does no harm to positioning when visible satellites suffice. Despite the more expensive Xsens MTi-7 IMU sensor outperforming the MI 8 native IMU, it is impressive to note that native smartphone PPP/IMU integration is able to improve the horizontal rms over 80% with less than 4 visible satellites, showing great potential in providing robust and accurate positioning, velocity and timing for autonomous vehicles, and other mass market applications. Email: dingyi@yorku.ca

**SECOND PLACE (TIE): Nacer Naciri, Ph.D. Student, Department of Earth and Space Science and Engineering, Lassonde School of Engineering, York University, supervised by Dr. Sunil Bisnath.**  
**Single-epoch, centimetre-level GNSS point positioning**

**ABSTRACT** — Since the conception of GNSS constellations, Single Point Positioning (SPP) has been intended as the natural positioning processing mode, where a single epoch of GNSS measurements is used to estimate the user’s position. In order to achieve higher precision positioning, Real Time Kinematics (RTK) and Precise Point Positioning (PPP) have been used. While RTK was not embraced by the constellations due to its regional nature, PPP is being embraced through, e.g., Galileo and BeiDou broadcasting PPP corrections directly from the satellites. These corrections allow users to estimate their positions precisely with all necessary information coming from the constellations’ satellites.



In order to achieve high precision positioning, PPP relies on continuous estimation of carrier-phase ambiguities, therefore requiring several epochs to achieve high precisions. However, thanks to recent advances in PPP with the combination of multi-GNSS, multi-frequency, and ambiguity-resolved processing, instantaneous high-precision PPP is becoming a possibility. This means that sequential processing might not be necessary, as epochs of measurements can be processed independently in an epoch-by-epoch filter. The benefit from such epoch-by-epoch processing lies in improving the resiliency of the position solution.

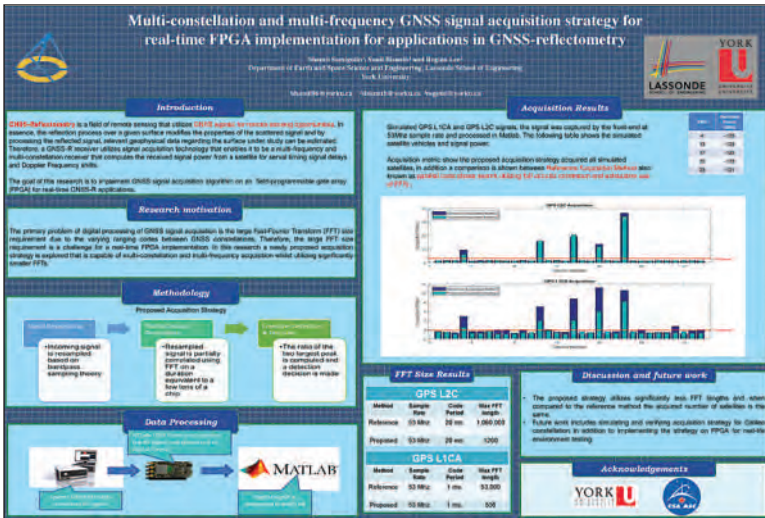
Results from this work show that single-epoch sub-decimeter positioning is possible 60% of the time. More impressively, station ARHT in Antarctica has upward of 95% of epochs with horizontal errors below 2.5 cm – RTK level, compared to an average of 60% of epochs being below 2.5 cm for other stations. These results are promising and pave the way to high precision point positioning becoming the natural positioning processing mode. Email: nnaciri@yorku.ca

**THIRD PLACE: Shamil Samigulin, M.Sc. Student, Department of Earth and Space Science and Engineering, Lassonde School of Engineering, York University, supervised by Dr. Sunil Bisnath and Dr. Regina Lee.**  
**Multi-constellation and multi-frequency GNSS signal acquisition strategy for real-time FPGA implementation for applications in GNSS-reflectometry.**

**ABSTRACT** — Global Navigation Satellite Systems were conceived for position, navigation, and time determination, but can also be used as signals of opportunity. A field focusing on such an application for remote sensing is called GNSS-Reflectometry. In essence, the reflection process over a given surface modifies the properties of

*cont'd on page 24*

the scattered signal and by processing the reflected signal, relevant geophysical data regarding the surface under study can be estimated. Therefore, a GNSS-R receiver utilizes signal acquisition technology that enables it to be a multi-frequency and multi-constellation receiver that computes the received signal power from a satellite for



serval timing signal delays and Doppler Frequency shifts. First approaches to build such a receiver consisted of sampling and storing the scattered signal for later post-processing. The use of field-programmable gate array (FPGA) technology enables a real-time solution to the problem by producing immediately useful surface data and reducing the amount of data.

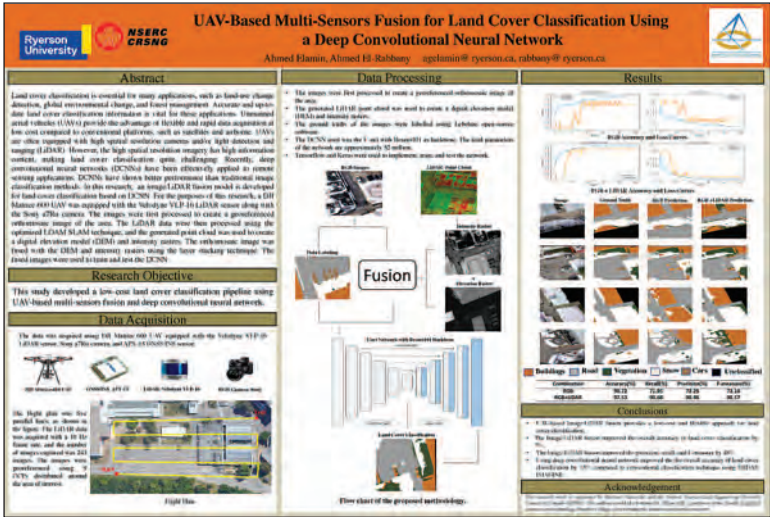
However, a real-time processing implementation when considering both multiple constellations and frequencies proves to be troublesome when considering traditional acquisition algorithms. In this poster, a new acquisition algorithm is proposed that demonstrates efficient multi-constellation and

multi-frequency acquisition on a FPGA. Results demonstrate the proposed algorithm is capable of weak signal acquisition and shows an average 70 times reduction in processing time when compared to traditional algorithms. Additionally, the resource costs and performance of the proposed algorithm when implemented on FPGA are assessed. Lastly, discussed are the improvements upon the application by increasing the number of scattered signals observable by a GNSS-R receiver. Email: samiguli@my.yorku.ca

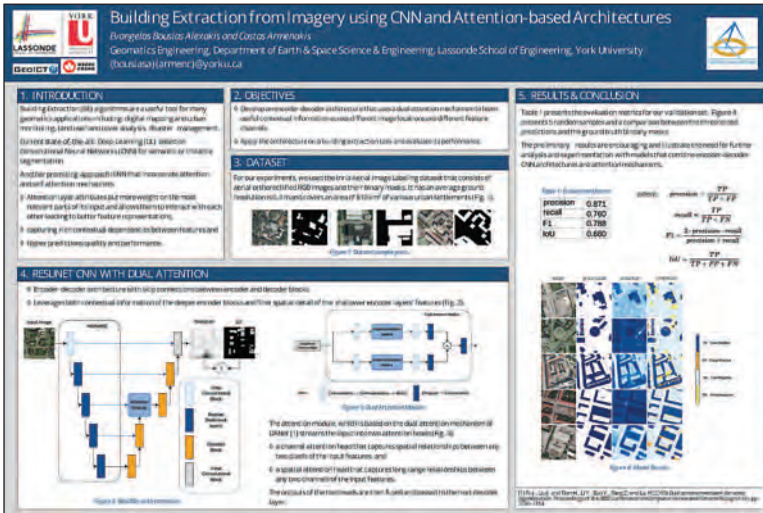
**FOURTH PLACE (TIE): Ahmed Elamin, Ph.D Student, Department of Civil Engineering, Ryerson University, supervised by Dr. Ahmed El-Rabbany.**

### UAV-Based Multi-Sensors Fusion for Land Cover Classification Using a Deep Convolutional Neural Network

**ABSTRACT** — Land cover classification is essential for many applications, such as land-use change detection, global environmental change, and forest management. Accurate and up-to-date land cover classification information is vital for these applications. Unmanned aerial vehicles (UAVs) provide the advantage of flexible and rapid data acquisition at low cost compared to conventional platforms, such as satellites and airborne. UAVs are often equipped with high spatial resolution cameras and/or light detection and ranging (LiDAR). However, the high spatial resolution imagery has high information content, making land cover classification quite challenging. Recently, deep convolutional neural networks (DCNNs) have been effectively applied to remote sensing applications. DCNNs have shown better performance than traditional image classification methods. In this research, an image/LiDAR fusion model is developed for land cover classification based on DCNN. For the purposes of this research, a DJI Matrice-600 UAV was equipped with the Velodyne VLP-16 LiDAR sensor along with the Sony a7Rii camera. The images were first processed to create a georeferenced orthomosaic image of the area. The LiDAR data were then processed using the optimized LOAM SLAM technique, and the generated point cloud was used to create a digital elevation model (DEM) and intensity rasters. The orthomosaic image was fused with the DEM and intensity rasters using the layer stacking technique. The fused images were used to train and test the DCNN. Email: agelamin@ryerson.ca



**FOURTH PLACE (TIE): Evangelos Bousias Alexakis, Ph.D. Student, Department of Earth and Space Science and Engineering, Lassonde School of Engineering, York University, supervised by Dr. Costas Armenakis.**



## Building Extraction from Imagery using CNN and Attention-based Architectures

**ABSTRACT** — Building extraction algorithms can be a very useful tool for many geomatics applications including digital mapping, urban monitoring, land use/land cover analysis and disaster management. Deep learning approaches based on Convolutional Neural Networks (CNN) have been established as the state-of-the-art approach for building extraction applications from high resolution images. Recently, another promising approach for semantic segmentation, in terms of predictions quality and performance, incorporates attention and self-attention mechanisms to capture rich contextual dependencies between features. Attention and self-attention mechanisms attribute more weight on

the most relevant input parts and allow them to interact with each other. They were first proposed in the field of Natural Language Processing and are the building blocks of the most successful deep learning architectures in the field. In this work we aim to investigate the potential benefits of using a self-attention-based model for the building extraction task by comparing its performance to a CNN-based architecture. We develop, train and evaluate two distinct architectures: the first one based solely on an encoder-decoder CNN with skip connections and the second based on a combination of a CNN backbone and two attention modules that model the feature inter-dependencies in the spatial and the channel dimensions respectively. For the training and evaluation of our models we use the Inria Aerial Image Labelling dataset that consists of RGB orthorectified images from multiple cities around the globe and the corresponding building masks. The evaluation of the predicted building footprints is based on the precision, recall, F1-score and Intersection over Union (IoU) metrics. Email: bousiasa@yorku.ca

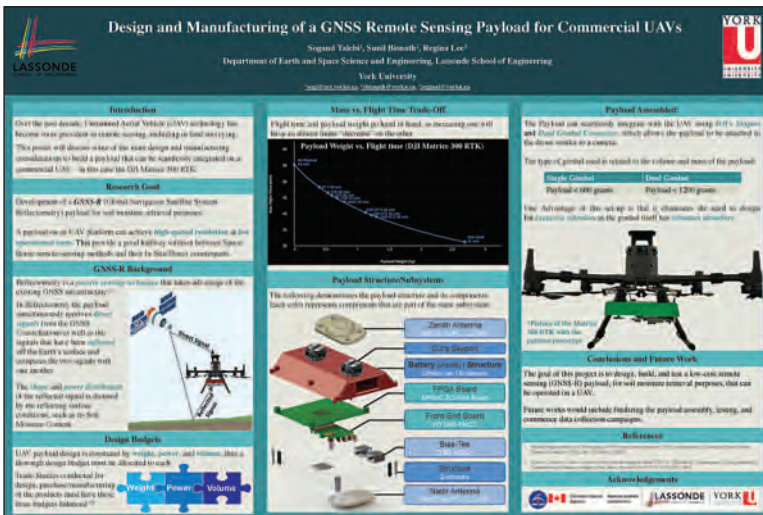
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**FIFTH PLACE:** Sogand Talebi, M.Sc. Student, Department of Earth and Space Science and Engineering, Lassonde School of Engineering, York University, supervised by Dr. Sunil Bisnath and Dr. Regina Lee.

## Design and Manufacturing of a GNSS Remote Sensing Payload for Commercial UAVs

**ABSTRACT** — Over the past decade, Unmanned Aerial Vehicle (UAV) technology has become more prevalent in remote sensing, including in land surveying. This poster will discuss some of the main design and manufacturing considerations to build a

payload that can be seamlessly integrated on a commercial UAV – in this case the DJI Matrice 300 RTK.

One of the main design concerns for a payload would include its mass budget and its trade off with the flight time. This poster will include a graph to showcase this trade off, as well as some mitigation techniques to reduce the mass. The structure is designed for ease of manufacturing with in-house production using only a 3D printer and minimal shop equipment, as well as simple testing and mitigation techniques to ensure it can withstand the vibration loading from the flight. The design must consider the balance of the drone during flight, that the components are arranged to minimize longitudinal moments in order to maintain the centre of gravity. The payload interface with the UAV provides both stability during flight, as well as to draw power from the drone. In this case, we utilized DJI's *Skyport*, which allows the payload to be attached to the drone similar to a camera. Lastly, the poster will include beneficial resources for anyone who is considering integrating their payload on an UAV. Email: [sogi@my.yorku.ca](mailto:sogi@my.yorku.ca)

# NEWS FROM 1043

## Changes to the Register

### MEMBERS DECEASED

|                    |      |               |
|--------------------|------|---------------|
| Malcolm H. MacLeod | CR29 | Oct. 24, 2021 |
| Dino Astri         | 1650 | Dec. 17, 2021 |
| Gordon H. Wood     | 856  | Dec. 11, 2021 |
| Eric L. Ansell     | 1543 | Dec. 24, 2021 |
| Eric Eichmanis     | 1251 | Jan. 30, 2022 |
| Charles P. Corbett | 753  | Feb. 23, 2022 |
| Michael Brooke     | 1274 | Feb. 28, 2022 |
| Colin D. Hadfield  | 941  | Mar. 4, 2022  |
| Djordje Petrovic   | 1970 | Mar. 25, 2022 |

### RETIREMENT/RESIGNATIONS

|                    |      |               |
|--------------------|------|---------------|
| Anna Tsvetanova    | 2118 | Dec. 1, 2021  |
| Richard Preiss     | 1539 | Dec. 31, 2021 |
| Peter Moreton      | 1317 | Dec. 31, 2021 |
| Jack Monteith      | 1053 | Dec. 31, 2021 |
| Duncan Ashworth    | 1509 | Dec. 31, 2021 |
| Doug Jemmett       | 1550 | Dec. 31, 2021 |
| Susan F. MacGregor | 1656 | Dec. 31, 2021 |
| P. Ardon Blackburn | 1104 | Dec. 31, 2021 |
| William Mascoc     | 1339 | Dec. 31, 2021 |
| Ray Visser         | 1396 | Dec. 31, 2021 |
| Lawrence Biason    | 1606 | Dec. 31, 2021 |
| Barry Clarke       | 1567 | Jan. 1, 2022  |

|                        |       |               |
|------------------------|-------|---------------|
| Reynaldo L. Isip       | 1897  | Jan. 1, 2022  |
| Adam Michael Stephen   | 1948  | Jan. 1, 2022  |
| David R. Watt          | CR152 | Jan. 1, 2022  |
| Ann-Marie Mailhot-Aron | CR99  | Jan. 1, 2022  |
| John Piraino           | CR171 | Jan. 1, 2022  |
| Scott McKay            | 1583  | Jan. 31, 2022 |
| Michael Haines         | 2001  | Mar. 22, 2022 |

### COFA REVISED

Was: Kevin P. Kujala Surveying Inc.  
Now: KPK Surveying Inc.  
Huntsville, ON, January 20, 2022

Was: Ivan B. Wallace Ontario Land Surveyor Ltd.  
Now: IBW Surveyors Ltd.  
February 28, 2022

### COFA RELINQUISHED

Biason Surveying Inc.  
Bolton, ON, December 31, 2021

Gibson Surveying Inc.  
London, ON, December 31, 2021

Ertl Surveyors  
Richmond Hill, ON, March 1, 2022

Hunt Surveys Inc.  
Richmond Hill, ON, March 1, 2022

## Surveyors in Transit

**Ralph Benedict** is now the CofA Holder for NA Geomatics Ltd.

**Raikes Geomatics Inc.** has moved its Bracebridge Office to 205 Manitoba St., Unit 2, Bracebridge, ON P1L 1S3.

**GeoVerra (ON) Ltd.** has moved its Thornhill and Oakville offices to 1875 Buckhorn Gate, Suite 101, Mississauga, ON L4W 5N9.

**Gabriel Laframboise** is now the Managing OLS at J.D. Barnes Limited in Whitby, ON.

**Eric Salzer** is now with Barich Grenkie Surveying Ltd. (a division of Geomaple Canada Inc.) in Stoney Creek, ON.

**Patrick Woolley** is no longer with MTE Ontario Surveyors Ltd.

**Pat Levac** is now the Managing OLS of MTE Ontario Land

**Surveyors Ltd.** in Burlington, ON, and **Trevor McNeil** is the Managing OLS in Stratford, ON.

**David Raithby** is now the Managing OLS of **McKechnie Surveying Ltd.**

**W.J. Johnston Surveying Ltd.** is now located at 584 Main Street West, Box 394, Winchester, ON K0C 2K0.

**Gord McGuire** is no longer with the **City of Hamilton.**

**Gavin Tyler** is now with **IBW Surveyors Ltd.** in Bowmanville, ON.

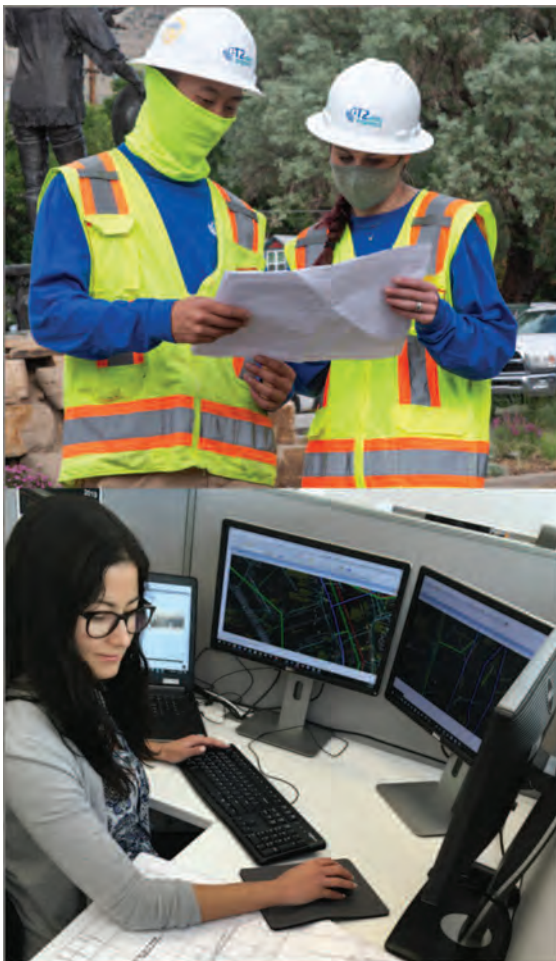
**Ertl-Hunt Surveyors**, which operates under **IBW Surveyors Ltd.**, is located at 1234 Reid Street, Unit 10 Richmond Hill, ON L4B 1C1. **Larry Ertl** is the Managing OLS.

**Doug Hunt** is now with **IBW Surveyors Ltd.**, in the Ertl-Hunt Surveyors branch office located in Richmond Hill.

**Waldemar Golinski, Satesh Lakhan, and Brad Warren** are now with **Krcmar Surveyors Ltd.** in Etobicoke, ON.

### THE AOLS IS PLEASED TO ANNOUNCE THAT THE FOLLOWING ONTARIO LAND SURVEYORS WERE SWORN IN:

|                           |      |                  |
|---------------------------|------|------------------|
| David Christopher Recchia | 2120 | January 26, 2022 |
| Ario Hadian               | 2121 | January 26, 2022 |
| Victoria Donko            | 2122 | January 26, 2022 |
| Daniel Matthew Berec      | 2123 | January 26, 2022 |
| William Coel Storey       | 2124 | January 26, 2022 |



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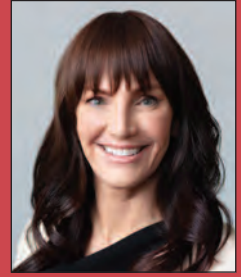
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# What the AOLS Can Learn from PEO's North Star Initiative to Protect Society's Wellbeing



By Marisa Sterling, P.Eng., FEC

*The following article is a summary of Marisa Sterling's keynote address to the AOLS membership at the 2022 Annual General Meeting.*

**T**hings change. It is our only constant—not just the new normal, but the old normal too.

Change is with us always in everything we do. It's not just masks and vaccines, or wars, or climate disaster, but smaller, less perceptible shifts. Daily disruptions that alter our lives in ways we might not even notice.

In recent years, for instance, we have been witnessing how the lines between the digital, the biological and the physical worlds are colliding and reinventing themselves. Artificial intelligence, computer vision, and nanotechnology have created machines that increasingly can “see,” learn, and act in ways that are transforming our world. A self-driving car, a smart device, a way to correct our DNA – all are impacting people's life, privacy, and health, and changing how we live.

I am the Assistant Dean and Director of the Office of Diversity, Inclusion and Professionalism at the University of Toronto's Faculty of Applied Science and Engineering. Last year I served as the first virtual president and chair of the Council of Professional Engineers Ontario. PEO shares with AOLS the role of stewarding Ontario legislation on behalf of government. We both regulate and govern licence holders so that the public interest may be served and protected. And we both think hard about change.

There are many trends that signal the time is now for regulators and STEM fields to reimagine how they can better protect the public. Even though we have been living through a crisis, these are also times for rapid, meaningful transformation. It is not enough just to respond to change; we should instigate it.

## Reimagining our Future

To reimagine public protection requires a transformation of some parts of a regulator while preserving what is helpful and working.

When we talk about systemic change, it's important to note that we, the regulators, are the system. When we discuss barriers to economic and cultural participation — for women and Indigenous or racialized people — it's vital to realize that we are one of those barriers.

Consider this.

I was only the eighth female president of PEO in its 99-year history. Less than 20% of new engineering licencees

identify as women. PEO is participating in Canada's 30 by 30 Task Force with other engineering regulators, higher education institutions, and employers to increase that number to 30% of new licencees identifying as women by the year 2030. But even this goal is insufficient, in my opinion, as women represent 50% of the population and therefore, for the engineering profession to represent the society it serves, we must achieve 50% women as licenced engineers.

Consider also our Council composition. Looking at the statistics this year, PEO's Council has about 12% of the board in the early to mid stages of their careers, with the balance holding senior roles and/or retired; and 28% of the board are women. I believe both these percentages need to increase to have a board with the diversity of perspectives and creative solutions needed to best serve the public.

Training, remuneration, and time commitments can all be barriers to participation in these vital roles. These barriers—and the need to remove them—exist not just inside regulatory bodies, but inside the profession itself.

Consider the requirement for Canadian experience for internationally trained engineering graduates. As you might be familiar, new Canadians seeking a licence to work in their profession can face a Catch-22 of needing to have Canadian work experience to get a licence and needing a licence to get the work experience. The Fairness Commissioner's work, along with the Ontario government's planned changes to legislation by 2023, will require courageous leadership on the part of regulators to think differently about the competencies for licence and providing multiple modalities for applicants to demonstrate them. For example, some regulators have replaced the requirement of 12 months of Canadian experience with a course to test for competency. There likely are other approaches as well.

This all goes toward building a more inclusive culture.

Under my presidency, PEO appointed an Anti-racism and Anti-discrimination Exploratory Working Group to identify, study, and address any issues of systemic racism within PEO's work. The Working Group has produced a draft *Anti-Racism and Equity Code*. The draft code includes commitments for PEO to collect race-based data, improve

*cont'd on page 32*





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regulatory processes for fairness, include compliance to human-rights laws and equity principles in the professional obligations of engineers, embed anti-racism training in the organization, commit to engage with racialized members of the public, and commit to equitable hiring of racialized persons. I am proud of this initiative, which starts to demonstrate how an organization actively works to remove any incidences of racism within its historical and known systems.

Poll Question: What demographics of the population do you want to see AOLS reduce barriers for, in order to build a more inclusive profession? Results Women 8%, Indigenous 6%, Racialized 3%, and All of the Above 83%.

## He, She, They

When we talk about barriers, we're not talking about enormous concrete structures that require an industrial crane to remove. Sometimes they are small and simple, and the removal is effortless.

Think about a tiny four-letter pronoun, for instance. They.

In recent years, we notice in our language more common use of the gender-neutral pronoun "they." This can be a helpful practice to avoid accidentally offending someone in workplace conversations but sometimes it is used out of fear of getting someone's pronouns wrong because they have not been shared. And when we do use the pronouns "she" or "he" based on automatic assumptions of names that we have associated previously this way, this is the very definition of bias – the use of our past knowledge to make assumptions in a current situation. We can't assume that a person we meet named Ellen chooses to be referred to as "she," or a person named Elliot chooses to be referred to as "he." Or a person who appears feminine identifies as a woman or a person who appears masculine identifies as a man. They could be agender or nonbinary, for example. Everyone has the right to self-identify with whatever pronouns they feel comfortable with, or to avoid identifying altogether.

It begs the question of how a professional regulator like AOLS can play a role in making their licence holders, staff, and partner colleagues feel more welcomed and included by normalizing the volunteering and sharing of gender pronouns, and in providing a way for individuals to change their pronouns at any frequency, recognizing the fluidness of identity. If your regulator were to make space for you to share your pronouns during your licence renewal process this year, how would it make you feel, how comfortable would you feel about providing them, and how would it make you feel to be addressed in the next email from AOLS by the pronouns you choose?

Taking this line of questioning a bit further, what inclusivity leadership might AOLS take in the language of its legislation, both the *Surveyors Act* and Regulation 1026, to reflect gender identity? Currently there are eight mentions of "he or she" in the Act and five mentions of "he or she" in the regulation. As language plays a big part in inclusivity, the use of "he" and "she" are two extreme binaries that don't

leave room for other gender identities. As much as the current legislation, with its addition of "she," was likely the result of a positive evolution from a prior version that used all masculine language, today this can be hurtful for individuals such as transgender or gender queer communities who don't identify with he or she. How could AOLS evolve its legislation to be gender-neutral, and help lead this movement with government and other regulators?

We can look to other jurisdictions for answers to this question. In 2020, the Canadian government's department of justice recommended the drafting of gender-neutral language in legislation. And in 2021, the British Columbia government updated 70 different regulations across 15 ministries so that the language includes all gender identities. All references to "he" and "she" have been removed and replaced with "the member," "the director," and "the councillor," for example. This initiative, conducted through the annual regulatory process, named Better Regulations for British Columbians, was led by the Minister of Jobs, Economic Recovery and Innovation. The Minister is quoted as saying, "language matters. It allows people to feel recognized and affirmed ... the conversation has changed ... we believe outdated language that prevents people from being seen for who they are, should be removed, to help tackle gender bias."

Poll question: Would you like to see legislation that governs AOLS use gender-neutral language? Results 71% yes and 29% no.

## Turtle Island

That's not to say that transformative change can be easy. Far from it. I learned that lesson myself not too long ago, in a place called Turtle Island.

If you are currently in Canada, you are sitting or standing on Turtle Island. This is the land that you might more commonly refer to as North America. This land for thousands of years has been the traditional land of many Indigenous people from across Turtle Island and is today still the home to many Indigenous people.

In 2019, as PEO Vice President, I cosponsored a motion, that passed, for PEO to complete a policy development and draft policy on how to acknowledge Indigenous territorial land at PEO Council, chapter, committee, and staff meetings and events. The following year, PEO staff developed an Indigenous Land Acknowledgement Policy in consultation with Indigenous nations; however, when moved to adopt this policy, Council instead voted to postpone the decision.

I share this story in the spirit of a failure report, to illustrate how difficult change can be to bring about and how embedded colonial systems are in our ways of working and governing, and to learn how we can do better. In my opinion, the PEO Council's decision of postponement was likely driven by a few colonial ways of governing: first was a mistrust of unfamiliar non-traditional stakeholders, that in this case would be the Indigenous Nations; second was a discomfort with the truths of Indigenous history based on

what little has historically been taught in our public education and the stigmas reinforced in media and government; and third was a fear of blame and being called out for doing the wrong thing when it comes to sensitive topics.

### AOLS Land Acknowledgement Policy

I am thankful for AOLS's courageous leadership in passing a Land Acknowledgement Policy. I suggest that a next step on the journey toward reconciliation could be for AOLS to identify, study, and address any responsibilities derived from the Truth and Reconciliation Commission's *94 Calls to Action* that fall within the AOLS's mandate. This could include outreach to Indigenous schools and communities; signage for professional surveyor projects on Indigenous lands consistent with best practices of the relevant Indigenous nation; professional development programs in Indigenous cultural competency; professional practice guidance for the protection and preservation of sites of cultural significance to Indigenous nations; modifying consultation and engagement processes for example during the guideline development process that ensures equitable participation by Indigenous people; and inviting licence holders to self-identify by Indigenous identity to start to measure how the demographic diversity of members compares with the society that you serve.

Poll question: Would you like AOLS to explore further actions toward Truth and Reconciliation with

Indigenous peoples? Results: 69% yes and 31% no.

### The North Star

Operational and governance improvements can build a solid base from which regulators can forge ahead. My question then is, toward what? In the abbreviated words of Seneca, "No wind blows in favour of a ship without direction." Our direction is the public interest, it is our north star, and our challenge is to shape a new, longer-term vision that allows us, as regulators, to respond quickly and adapt to societal trends and challenges, to stay on course toward that north star.

So what are the societal trends today? The public is asking questions such as: how can we trust smart cities or consent to cellphone tracking and know that our data privacy and data access are being managed for the public good? We're wondering if facial recognition software has difficulty identifying people with darker skin, what other biases are embedded in the designs of the technology that we use. And we're concerned about how to stop climate change and inequality to create a more sustainable world.

Regulators need not just to keep up with the public's concerns, but to lead the way, to navigate how they will regulate their profession in a manner that is relevant to these issues. They need to reimagine who and what they need to regulate, to protect the public interest now—and 30 years from now.



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# Survey Review Department Forum



By Paul Wyman, O.L.S., Manager Survey Review Department

## The SRD in Review

### Financial

The Association of Ontario Land Surveyors – Survey Review Department (SRD) is totally funded by the sales of *Plan Submission Form Stickers*. The cost of a sticker was increased from \$16 to \$19 per sticker by vote in December 2020. The COVID-19 pandemic necessitated the use of ‘virtual’ office visits which are not as desirable but are less expensive. Combined with a 30% increase in 2021 sticker sales, these factors allowed the department to reverse earlier year losses and operate at a surplus for 2021. The accounting of the SRD is tracked separately within the general AOLS accounting so we will be able to apply this year’s surplus against future years and hopefully not require an increase in sticker fees for the foreseeable future.

For clarity, the SRD financial reporting is based on the AOLS fiscal year which runs from November 1, to October 31. We select the firms for the 5-year Comprehensive Review cycle and the plans for the Systematic Reviews using the calendar year in keeping with our legislation. Please note that the Comprehensive Reviews start with a field inspection in the spring, and we do not complete the Comprehensive Reviews until March/April of the following year.

The overall operational cost of the Department is, of course, determined by the work assigned to it by AOLS Council and the SRD Committee. The SRD Committee is currently looking at any need to expand the scope of SRD review work. This could increase costs but at the same time the AOLS has launched two initiatives that should result in slightly reduced costs for SRD operations.

### Plan Storage

In the fall of 2021, the AOLS initiated a change in the storage and selection of plans from the land registry offices (LRO). Currently, we receive plans from the LRO both digitally and in hard copy. Plans that are deposited/registered ‘digitally’ do not contain the physical Plan Submission Form Stickers. In lieu of the physical sticker a note is added to the plan that provides the sticker number. We are sent these plans electronically. We also continue to receive the hard copy plan containing the physical Plan Submission Form Sticker for plans entering the LRO as hard copies. These are stored in several file cabinets at the AOLS office. There are thousands of these physical plans received each year – 10 file cabinets!

Currently, we use both the electronic and physical plans as part of the process to select projects for review. The physical plan storage is a time consuming and space consuming process. In the summer of 2021, the AOLS contracted with ‘iLookabout’ who operate the Provincial Survey Records Index (PSRI). In the near future, the process will change.

- The physical Plan Submission Form Stickers will no longer be used. The same note used on the ‘digital’ plans will also be used on the plans entering the LRO as hard copies. The LRO is in the process of obtaining a regulation change to facilitate this process.
- The LRO will provide all plans to iLookabout digitally.
- iLookabout will index and create an ‘on-line’ metadata database for all plans that will facilitate SRD’s Review processes.
- SRD staff will be able to view and copy plans and metadata ‘on-line’ to select projects and materials for review.

This will reduce our labour costs and save badly needed space at the AOLS office. OLS Firms will still need to keep a ‘Log’ of all projects as the SRD reviews include the many survey projects that are not deposited/registered in the LRO. This new process only changes the way firms use the stickers and the way AOLS and the LRO interact. The Systematic and Comprehensive Review processes will remain unchanged.

### AOLS Database

The AOLS has also undertaken an upgrade to its internal database. It will now contain the SRD numeric review data that is now stored in individual reports. This will require a bit more training of staff and consultants to use and input data. Computer databases require rigour in ‘coding’ and ‘naming’ but the ability to easily query the system for analysis will not only reduce current costs but greatly increase the accessibility and value of this data. Over time, it will better direct our work. Additionally, it will help identify subject matter for the AOLS Continuing Education Program.

### 2021 Reviews

We completed 254 Systematic Reviews for 2021. The following are a few statistics from 2016 to 2021 based on

| Year | Plans Checked | Integration (%) | Method/Evidence (%) | Minor/Comment (%) |
|------|---------------|-----------------|---------------------|-------------------|
| 2021 | 254           | 27 (11%)        | 08 (3%)             | 61 (24%)          |
| 2020 | 205           | 26 (13%)        | 08 (4%)             | 45 (22%)          |
| 2019 | 297           | 41 (14%)        | 13 (4%)             | 61 (21%)          |
| 2018 | 254           | 50 (20%)        | 15 (6%)             | 52 (20%)          |
| 2017 | 245           | 59 (24%)        | 22 (9%)             | 118 (48%)         |
| 2016 | 248           | 99 (40%)        | 22 (9%)             | 111 (45%)         |

issues noted in the Systematic Reviews. The reviewers over the years have changed but the ‘yardstick’ used for the valuations has not, so I think a comparison is reasonably valid.

A cursory examination of the Systematic Review statistics indicates improvement in plan preparation over the years. As firms gain more experience with GPS and ‘survey integration’ in general, this aspect of work has improved. It is still worthwhile for OLSs and staff to dust off the texts and relearn the concepts of datums and projections, scale factors and coordinate systems to continue the improvement in survey integration.

For the 2021 year, the SRD undertook 72 Comprehensive Reviews, which is above average. We expect the workload for 2022 to be approximately 40 Comprehensive Reviews – a more average number. Firms have 4 to 10 survey projects reviewed. Each issue or infraction is assigned a score of 1 to 10 points (1 is minor, 10 is serious). Reviews with survey projects that score over 25 points may be referred to the Registrar. As noted previously, the new AOLS database will allow us to undertake improved analysis in future years, but we have been able to extract some data for 2021 from the 55 reviews (consisting of a total of 235 survey projects) that were completed at the time of this report.

| Issue                        | At Least One Minor Issue on a Survey Project | Average Assigned Score for each Issue |
|------------------------------|--|---------------------------------------|
| <b>Research</b>              |  |                                       |
| Documentary Evidence (LRO)   | 49%  | 3.7                                   |
| Survey Records (Field Notes) | 26%  | 3.1                                   |
| <b>Field Survey</b>          |  |                                       |
| Best Evidence                | 30%  | 3.3                                   |
| Field Procedure              | 91%  | 3.2                                   |
| Verification                 | 62%  | 2.6                                   |
| Quality Assurance            | 56%  | 2.5                                   |
| <b>Plan &amp; Report</b>     |  |                                       |
| Method of Survey             | 16%  | 3.5                                   |
| Report to Client             | 55%  | 3.4                                   |

**9 out of the 55 firms (16%) were referred to the Registrar, some with scores substantially over 25 points per survey project.**

Field survey issues are far too prevalent and survey firms need to focus on staff training to improve field note recording and field survey procedures. In particular, the quality of field work illustration (completeness and readability) and compliance with regulations/best practices in evidence locating/evaluation, measurement verification

(redundancy) and quality control (closures and post field survey analysis) are issues for many survey firms.

We will always expect to identify some areas for improvement, and it is not surprising to see some minor errors. Firms with average scores above 25 per project clearly need to improve

to avoid incorrect boundary decisions and potentially cause public harm. The subsequent referral to the Registrar may result in the Registrar requiring a follow-up review in a year’s time. The cost of these follow-up reviews is paid by the survey firm. This expense, combined with the staff time and effort required for the review, is not inconsequential.

## Closing

I do not have statistics available to me, but anecdotal evidence suggests that 2021 was a very busy and productive year for AOLS firms. This can put pressure on firms to ‘cut corners’, particularly for things like looking for monument identifiers or obtaining redundant measurements. These ‘rules’ are there because it has been proven, time and time again, that they protect both the public interest and survey professionals.

If survey staff do not occasionally reread and relearn the statutes, regulations, and best practices, etc., it will be reflected in the Comprehensive Review of the firm. Both the Systematic and Comprehensive Reviews are undertaken by our consultants who base their findings on the common law and court decisions, provincial statutes and regulations, and AOLS by-laws and best practices. Much of this information is available on the AOLS website. Additionally, there are many checklists prepared by the AOLS Professional Standards Committee which are also available on the AOLS website (section on Survey Practice under Best Practices), including a construction survey checklist.

Over time our memories tend to lose some of the details that we need to undertake our work. Firms should not just rely on the AOLS or other sources for training. Print copies of the regulations, best practices and checklists and get them into the hands of your staff. Perhaps use a rainy day for a review and discussion. Staff who are up-to-date and knowledgeable of the ‘rules’ are more efficient and provide good quality survey work without the need for repetition.

We are just beginning 2022 and it appears to be another busy year for cadastral surveys. With luck, the COVID-19 pandemic will continue to abate here in Ontario and firms can get back to business as usual. Enjoy, stay safe and practice professional excellence through lifelong learning.



# Registrar's Review



By Kevin Wahba, B.Eng., LL.B., O.L.S., Barrister & Solicitor

**A**s I enter my fourth year in the role of Registrar of The Association of Ontario Land Surveyors (AOLS), I would like to reflect on the several changes that have taken place within the Association, with a particular focus on the year 2021.

When I reflect on the most significant changes within the Association, in Ontario, and the world as a whole, it should come as no surprise that the most significant catalyst of those changes was and continues to be the Pandemic. Although in recent weeks, mandates are being lifted, and restrictions appear to be softening, there is also a concern that at any time, we may see a rise in the number of infections published by the government, which may lead to another lockdown or other kinds of restrictions. With that in the back of one's mind, it feels appropriate to make sure that plans are set in place to ensure the continued efficiency of our organization.


In November of 2020, the Association delivered its first set of entirely remote, online professional examinations. This method of delivery of examinations continues to the date of writing this article and it looks as if that online delivery will continue to be implemented for the foreseeable future. Additionally, many traditional in person meetings, including our last two AGM's, have been attended in an online format. These meetings, unlike exams, may find a way back to in person attendance in the very near future, but of course, contingencies will continue to be in place in the event they are required.

In addition to the changes prompted by the Pandemic, several of our Committees went through policy and procedural changes. The Complaints Committee recently made significant updates to its practice manual and it has been posted to the AOLS website. The Academic and Experience Requirements Committee (AERC) also made several policy changes including, allowing appeals to the Oral Professional Exam, the creation and delivery of a Plan Check Professional Exam, changes to the Certificate of Completion reporting requirements, and a more detailed assessment of a candidate's good character. These along with several other policy revisions were incorporated into a revised Policy Manual which was published on the AOLS website.

The Fees Mediation Committee also developed a practice manual, which is posted on the AOLS website. The Discipline Committee and the Registration Committee are currently working towards developing new practice manuals for their respective committees. The Association itself developed a new website, enhanced its telephone system to provide more information to assist members of the public who call into the office to find a survey company, and created several internal policies. The AOLS has also started

to gather additional statistics to better implement a risk-based approach to regulation.

Another significant endeavour currently under development is the new public register, which will be posted online. This will permit easier viewing of the AOLS' public register and allow for a more fluid system of statistical tracking and more seamless updates to the Register.

During my time as Registrar, I have come to realize that in the last few years there has been a much greater expectation of our members from their clients and the general public. That same increase in expectation can also be observed by regulators. In Ontario, the *Fair Access to Regulated Professions and Compulsory Trades Act* (FARPACTA), has continued to require higher standards from regulators in the province. On a positive note, the AOLS has been described by FARPACTA as "falling into the lowest risk category" based on their assessment of our association. I continue to look forward to seeing new advancements in technology and legal developments that will further our profession. 

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## Summary of Mediation and Mediation Agreement

Between the Association of Ontario Land Surveyors and Omari Mwinyi, O.L.S.

In a decision dated September 3, 2021, the Complaints Committee of the Association of Ontario Land Surveyors, pursuant to Section 22.(4.3)(a) of the *Surveyors Act*, referred Omari Mwinyi, O.L.S. to Council.

The Council of the Association of Ontario Land Surveyors, under the authority of the *Surveyors Act*, R.S.O. 1990, Chapter S.29 Section 25.1 decided that the matter should be referred to mediation and passed a motion dated October 19, 2021 to appoint Kent Campbell, O.L.S. as the mediator.

The main issue, as described in the Final Decision of the Complaints Committee, was that Mr. Mwinyi's lack of communication may have caused the Complainant undo stress and financial burden. Additionally, the Committee noted that the "Plan" prepared by Mr. Mwinyi showed planted monumentation where none existed, and the "Plan" should have been labelled a "Plan of Survey" and not just a "Topographic Survey" as it clearly was a cadastral survey.

Due to the COVID-19 pandemic, mediation meetings were held virtually rather than in the offices of the Association of Ontario Land Surveyors. The Mediator met separately with Omari Mwinyi, O.L.S., the Deputy Registrar, Maureen V. Mountjoy, O.L.S. representing the Association of Ontario Land Surveyors (AOLS), and Peter Meerveld, the Lieutenant Governor Appointee to the AOLS Council.

All parties in the mediation agreed that this issue could be settled if Mr. Mwinyi (the member) agreed to the following:

1. Monitoring of the member's practice for a minimum of six months; during this period Mr. Mwinyi will review all signed plans back to January 2018 to ensure that monuments were planted and plant any that were not at his own expense
2. The member sign an undertaking that he:
  - will ensure all surveys showing legal boundaries follow the regulations and have an SRD sticker;
  - will ensure all monuments are planted before the plan is signed. Any monuments not planted on previous surveys since January 2018 will be planted at the member's expense;
  - The member will not article any students in the future.
3. A summary of the results of the mediation be published in the Ontario Professional Surveyor magazine and be posted to the AOLS website;
4. The member shall be responsible for the costs of the mediation and monitoring;
5. Any future infractions of a similar nature will be considered by Council for referral to the Discipline Committee.

Should Council conclude that there has been any failure on Mr. Mwinyi's part to comply with any of the terms of this Agreement, Council will in writing direct the Registrar to notify him that this matter will be referred back to Council.

The agreement was signed by all parties and accepted by Council on January 25, 2022.

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## EDUCATIONAL FOUNDATION NEWS

### Congratulations to our Fall Award Winners!

**York University – Lassonde School of Engineering – Erin Corrado and Jared Yen** tied for the highest grade in LE/ESSE 4660 Cadastral Surveys and Land Registration Systems and therefore each received the *David W. Lambden Award*, which is sponsored by the SCRG.

**Confederation College – Adam Lavoie** received the award for the student in the 2<sup>nd</sup> year of the Civil Engineering Technician Program who demonstrated a high proficiency in Introductory Surveying and Advanced Surveying (Field School) and has an interest in pursuing a career in Geomatics.

### Report from the 2022 Annual Meeting of Members

The Annual Meeting of Members was held virtually on February 24, 2022. This was **Jim Hill's** last day as the President of the Foundation. He took on this role in February

2022, and for a few years prior to that, he served as a Director on the Board. We thank Jim for his dedication and generous support for the Foundation. He will remain on the Board as Past President. To recognize Jim's 20 years of service as the President, he was presented with a special AOLS Citation at the AGM. Trevor McNeil is the new President.

There has been no update on the status of the application for Supplementary Letters Patent which was submitted last March. We have asked the Foundation's lawyer to investigate.

**The 16<sup>th</sup> Annual Graduate Student Geomatics Poster Session**, which was held virtually during the Annual General Meeting, featured 11 posters from Ryerson and York Universities. There was a tie for 2<sup>nd</sup> place and a tie for 4<sup>th</sup> place. Thank you to our judges: **Boney Cherian, Brian Coad** and **Reuben Mc Rae**. The 7 winning posters can be found on page 22.



# BOOK REVIEWS

## Dark and Magical Places The Neuroscience of Navigation

By Christopher Kemp



Published by W.W.  
Norton & Company  
ISBN 978-1-324-00538-4

Inside our heads we carry around an infinite and endlessly unfolding map of the world. Navigation is one of the most ancient neural abilities we have—older than language. In *Dark and Magical Places*, Christopher Kemp embarks on a journey to discover the remarkable extent of what our minds can do.

Fueled by his own spatial shortcomings, Kemp describes the brain regions that orient us in space and the specialized neurons that do it. Place cells. Grid cells. He examines how the brain plans routes, recognizes landmarks, and makes sure we leave a room through a door instead of trying to leave through a painting. From the secrets of supernavigators like the indigenous hunters of the Bolivian rainforest to the confusing environments inhabited by people with place

blindness, Kemp charts the myriad ways in which we find our way and explains the cutting-edge neuroscience behind them.

How did Neanderthals navigate? Why do even seasoned hikers stray from the trail? What spatial skills do we inherit from our parents? How can smartphones and our reliance on GPS devices impact our brains? In engaging, engrossing language, Kemp unravels the mysteries of navigating and links the brain's complex functions to the effects that diseases like Alzheimer's, types of amnesia, and traumatic brain injuries have on our perception of the world around us.

*Information taken from the publisher.*

## A Brief History of Timekeeping The Science of Marking Time, from Stonehenge to Atomic Clocks

By Chad Orzel

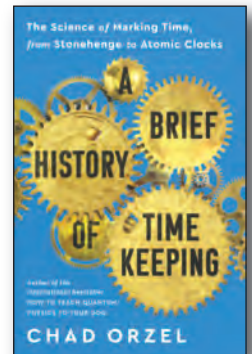
Our modern lives are ruled by clocks and watches, smartphone apps and calendar programs. While our gadgets may be new, however, the drive to measure and master time is anything but—and in *A Brief History of Timekeeping*, Chad Orzel traces the path from Stonehenge to your smartphone.

Orzel, a physicist and the bestselling author of *Breakfast with Einstein* and *How to Teach Quantum Physics to Your Dog* continues his tradition of demystifying thorny scientific concepts by using the clocks and calendars central to our everyday activities as a jumping-off point to explore the science underlying the ways we keep track of our time. Ancient solstice markers (which still work perfectly 5,000 years later) depend on the basic astrophysics of our solar system; mechanical clocks owe their development to

Newtonian physics; and the ultra-precise atomic timekeeping that enables GPS hinges on the predictable oddities of quantum mechanics.

Along the way, Orzel visits the delicate negotiations involved in Gregorian calendar reform, the intricate and entirely unique system employed by the Maya, and how the problem of synchronizing clocks at different locations ultimately required us to abandon the idea of time as an absolute and universal quantity. Sharp and engaging, *A Brief History of Timekeeping* is a story not just about the science of sundials, sandglasses, and mechanical clocks, but also the politics of calendars and time zones, the philosophy of measurement, and the nature of space and time itself.

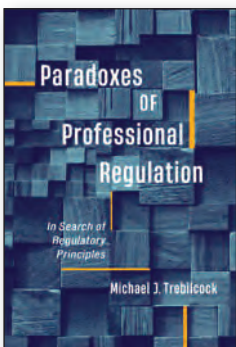
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Published by BenBella  
Books, Inc.  
ISBN: 978-1-953295-60-6

## Paradoxes of Professional Regulation In Search of Regulatory Principles

By Michael J. Trebilcock



Published by University of  
Toronto Press  
ISBN 978-1-4875-4304-4

Occupational licensure, including regulation of the professions, dates back to the medieval period. While the guilds that performed this regulatory function have long since vanished, professional regulation continues to this day. For instance, in the United States, 22 per cent of American workers must hold licenses simply to do their jobs. While long-established professions have more settled regulatory paradigms, the case studies in *Paradoxes of Professional Regulation* explore other professions, taking note of incompetent services and the serious risks they pose to the physical, mental, or emotional health, financial well-being, or legal status of uninformed consumers.

Michael J. Trebilcock examines five case studies of the

regulation of diverse professions, including alternative medicine, mental health care provision, financial planning, immigration consulting, and legal services. Noting the widely divergent approaches to the regulation of the same professions across different jurisdictions – paradoxes of professional regulation – the book is an attempt to develop a set of regulatory principles for the future. In its comparative approach, *Paradoxes of Professional Regulation* gets at the heart of the tensions influencing the regulatory landscape, and works toward practical lessons for bringing greater coherence to the way in which professions are regulated.

*Information taken from the publisher.*

# The Last Word

**Dr. Ugur Sahin - Chief Executive and Scientist of BioNTech**

By Saeid Sedaghat, C.L.S., O.L.S., O.L.I.P., P.Eng., P.M.P.

I am Saeid Sedaghat, I expect that you all know me from my first role that I played in a short movie clip, "I am an Ontario Land Surveyor" directed by Chris Fox, OLS. If you have not seen it, I strongly recommend that you watch it on the AOLS website.

When Brian Maloney first asked me to be the Sergeant-at-Arms this year, I wasn't sure I was going to do it. For some reason, in the back of my mind, I thought the "Sergeant-at-Arms" should be a person with at least 30 years of survey experience to be qualified.

Therefore, as a surveyor, before accepting the project, I started by doing some research, certainly not in the LRO or PSRI but on the AOLS website and in all the *Ontario Professional Surveyor* magazines since 2007, which is almost 7 years before I immigrated to Canada. My research proved that I was wrong. That is why research is very important for us. You never stop learning! Now here I am. The next challenge was choosing the proper character.

I thought about a few characters. The COVID-19 pandemic has brought unprecedented turmoil across the globe. Mankind has suffered so much loss. Respecting the current world conditions that have impacted our daily jobs and to honour and thank

all doctors, nurses, immunologists, and healthcare workers, then and now, those who have dedicated their lives to protect public health, I chose Dr. Ugur Sahin. He was born in Iskenderun, Turkey in 1965, and arrived in Germany as a 4-year-old, where his father worked in a car factory. He studied medicine at the University of Cologne and worked several years at the Saarland University Medical Center.

Dr. Sahin's wife, Dr. Ozlem Tureci, is the daughter of a Turkish physician who emigrated to Germany from Istanbul. She studied medicine at the Saarland University Faculty of Medicine and became a pioneer in cancer immunotherapy in Germany. The pharmaceutical company BioNTech, which Dr. Ugur Sahin and Dr. Ozlem Tureci founded in 2008, managed to develop an experimental vaccine together with its American partner Pfizer which was found to be more than 90% effective in preventing COVID-19.

"Public Protection" is the common point that we share. We as land surveyors, are the professionals who protect public interest in terms of boundary location while the immunologists protect public health by doing research and developing vaccines to defend public health from dangerous viruses.

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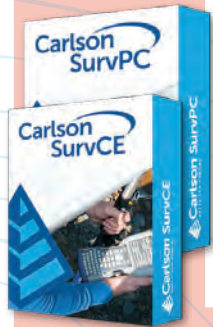
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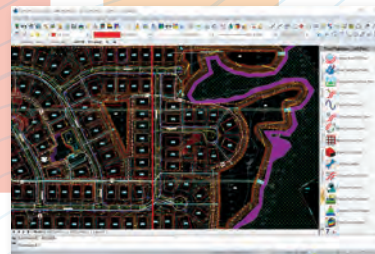
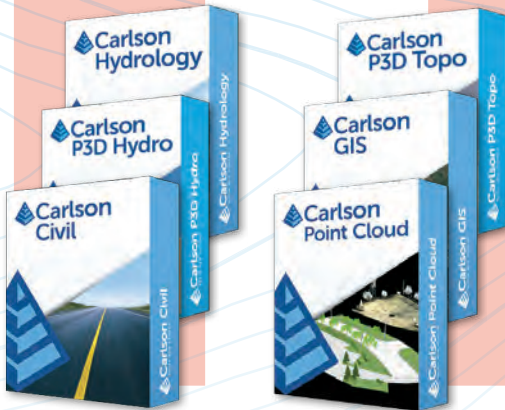
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