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about Engineers Canada-sponsored insurance plans



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ENGEOACTIONS THE NEW BRUNSWICK SOURCE FOR ENGINEERING AND GEOSCIENCE NEWS



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CONTENTS

Message from the President 3
Message from the CEO
Editor's Message
Registration FAQs7
APEGNB Council 2020
APEGNB 2020 Awards
C.C. Kirby (Don Good, P.Eng.)
L.W. Bailey (Reginald Wilson, P.Geo.) 11
President's Award (Gary Hoadley, P.Eng.)
Women in Engineering (Maggie Stothart, P.Eng.)
Community Leadership (Tony Whalen, P.Eng.)
Voung Professional Achievement (Lindsay Wilcott, DEng.) 15

Feature Article: 1:1 Thought-Leadership Interview.......16

Project Updates:

Climate Change Adaptation (Chignecto Isthmus)	18
City of Saint John (Safe, Clean Drinking Water)	20
Moncton Operations Centre (Biomass Heating)	22
City of Fredericton (Victoria Circle Roundabout)	24
Serpentine Lake Mapping Project	26
City of Moncton (Centennial Beach Pool)	30
A New Venture for Earth Science at UNB	32
Fundy Engineering (10MW Utility Solar Farm)	34
CBCL (Moncton's Water Infrastructure Projects)	36
EXP (Route 15/Harrisville Boulevard Interchange)	38
UNB Earth Science: McAllister 2019 Field Trip	40
Stantec (Bringing Innovative Ideas to Life)	42
Canadian Nuclear Laboratories (Cyber Security Solutions)	44
RJ Bartlett Engineering Ltd.	46

Association of Professional Engineers and Geoscientists of New Brunswick Protecting public interests is the forefront of our thinking!

Message from the President Marlo Rose, P.Eng.



A s APEGNB's newly appointed President, I am honoured to be contributing to our Special Edition of *ENGEOActions* for National Engineering and Geoscience Month. It is also a year of celebration as we kick things off for our Centenary of self-regulation of engineering and 21 years for geoscience.

An anniversary is certainly a time to pause, reflect and pivot. Many of you may have noticed the messages we share have been changing, and you would be right. The language has been more focused on self-regulation and the role that we play in regulating the professions. In last month's regular edition of ENGEOActions, our 1:1 Thought-Leadership interview featured Robert Mysicka, an expert in the field of regulation and the author of Who Watches the Watchman? The Role of the Self-Regulator laid out how important the regulator function is. The fact is, if we don't properly regulate ourselves, government will ensure someone else does. Protecting public interests must always be at the forefront of our thinking. And while I have said it before, I believe it bears repeating, self-regulation is a privilege and not one that should be taken lightly.

Council has determined that we want to raise the bar when it comes to being recognized as the respected and relevant regulator who is a trusted source for the public and government via the standards – both ethical and experience-related – that we set for the members our professions. We often think about doctors, dentists, lawyers, etc. who are licensed to practise and what that means for the public, but we too have an obligation to protect public interests, including public safety. Membership in APEGNB means that you are a legally licensed professional in your province. Being licensed to practise your profession is a significant accomplishment. It also means that you are legally entitled to use the terms "engineer" or "geoscientists", "P.Eng." or "P.Geo." Being licensed also demonstrates the significant education and training, and an ongoing commitment to excellence, protecting public interests, and adhering to the ethical standards associated with being professionals.

Your Council has already embarked upon developing a new three-year strategic plan, which will be adopted by the new Council in the coming months. Once this has happened, we will be sharing more about what our goals are and how this relates to your profession.

Some important initiatives that we will continue to support include the sustainability of our professions and how diversity and inclusion can assist. Engineers Canada has embarked upon the 30 by 30 initiative, which seeks to have thirty percent of new licensed professionals be women. This is considered to be the tipping point for sustainable change. One way we are focused on this initiative is getting in front of more middle school girls to share all the possibilities and opportunities that come with embracing STEM. If you can provide in-class presentations, be a mentor or volunteer in other ways, we would love to hear from you!

Finally, as this is National Engineering and Geoscience Month (#NEGM), we hope you share your stories and expertise on social media and tag us. We also ask for you to share the stories you see on our social media and in ENGEOActions. The beauty of an online magazine is that you can easily share a link with colleagues, clients and/or family. It's time to tell our stories.

Until next time, we have much to celebrate this year!

Marlo Rose, P.Eng. APEGNB President, 2020

Message from the CEO Lia Daborn, CEO



"Elections remind us not only of the rights but the responsibilities of citizenship in a democracy" – Robert Kennedy

It is always an exciting time of year when the new Council is installed along with a new President for the year. At the annual meeting in February, we added three new faces to the provincial Council, joined by two members who served previously and have now returned to Council again. We are all looking forward to the fresh ideas and perspectives that will come with these new Councillors.

As reported at the Annual meeting, 24 percent of members eligible to vote, cast a ballot. That is only one in four. By comparison, last year's results showed a 33 percent participation rate. While these numbers are low, they are still higher than the number of votes would have been were the election held in person rather than electronically. APEGNB's approach to elections is much more accessible than that of many other organizations. The electronic voting system was used a second time in February for the ratification of By-law amendments presented at the Annual Meeting. As members are aware, the 2019 By-laws were adopted at the business meeting but had not been sent for ratification afterwards, requiring them to be brought forward again in 2020. Changes for 2019 and 2020 were circulated this year, and the system worked as it should. This process enables you to play a very important role in the organization and self-regulation.

Participating in the election, annual meeting and any other form of engagement allows you to have a say in how your profession (whether engineering or geoscience) is managed. That being said, despite the fact that you may vote to elect an individual from your region to sit on Council, their role at the council table is to act in the best interests of the Association and not necessarily yours (although ideally both of these coincide). APEGNB has been given a very specific mandate by government to ensure that the public interest may be served and protected. That means that it is the duty of those elected to regulate and govern the professions; to establish and maintain standards of knowledge and skill for the practice of the professions; and also to establish and maintain standards of professional ethics for the practice of the profession. "Public Interest" trumps all.

Council achieves this mandate by setting standards for qualification as a professional, establishing guidelines, and ensuring that all members are meeting their professional requirements on an annual basis. This includes paying license fees on time and demonstrating competence through annual continuing professional development.

Council's commitment to you is to be transparent for the decisions made so that you have a better understanding of the implications and the intended outcomes. That is why you will soon see published summaries of the most recent Council meeting. Make sure to read the monthly eblast *Regulatory Matters* and our eMagazine, *ENGEOActions*, so that you are up to date on our activities!

As Council works on its goal to enhance APEGNB's position as a respected and relevant regulator, we will be working to increase your level of engagement. One way to increase your engagement and to learn more about the regulatory process and what it means to your profession(s) is to volunteer. We are always looking for people to join committees, working groups and task forces. I would love to hear from you about volunteering.

Lia Daborn, CEO lia@apegnb.com

Editor's Message Heather MacLean, CCO



Protecting Public Interests of New Brunswickers since 1920 Welcome to the Special Edition of *ENGEOActions*. As many of you know, March is National Engineering and Geoscience Month, or as we say on social media, it is #NEGNB. Despite just issuing a full publication a few weeks ago, I thought it would be a fun challenge to pull together another full edition in just two weeks. Well, maybe fun is not the right word. Stressful is probably the right word, as it really takes a good month to put an edition together- and even that can be challenging - but I decided it was important to recognize this month with its own special feature.

In this issue, we wanted to focus on projects – the challenging and exciting projects that you are working on. As you will see we have quite a collection. The diversity of projects in this issue has something for everyone from the MIT to the practising engineer and geoscientists. And for those of you who haven't had a chance to read our first two publications of our new eMagazine, we reprinted the project updates from those editions, which I hope will prompt you to check out the other articles in those editions.

The 1:1 Thought-Leadership piece in this issue is a special one for me. Often times we focus on the seasoned professionals to learn from their experiences. This time however, we get to hear from high school student, Kristen Culberson about her program, "She Can Change the World." When I think about myself at that age, I am not so sure that I was as focused on the future as she is. As a future UNB engineering student, I marvel at her enthusiasm and dedication to STEM, girls, and the future. A must read!

The infamous "they" are often quoted as saying that we can't know where are going without knowing where we have been. So, while we don't have a specific article dedicated to our history, I thought I would highlight a little bit in mine. And with a little tongue in cheek, you might have heard that the Association is celebrating its Centenary this year. Many things have changed since the Association of Professional Engineers (APENB) was founded by Charles Conyers Kirby to regulate the engineering profession in New Brunswick in 1920. One significant

1920 APENB founded with

a membership of 117

2019 APEGNB

membership: 6,527

change was the addition of the geoscience profession in 1999, and the name change to the Association of Professional Engineers and Geoscientists, or APEGNB as we are more often referred to. The rest "they say" is history.

Change of course, comes in many

shapes and sizes and if there is one constant, it is change. We are now in the 4th industrial revolution with artificial intelligence (AI), automation or robotics and the Internet of Things (IoT) causing us to have a significant "rethink" of everything.

(continued on next page)

5

Then of course this digital world also plays a significant role in how we protect ourselves, our businesses, and our clients from cyber and privacy breaches. For those that attended the PD session at the Annual Meeting last week, I am sure that you came away with an entirely new perspective on what that means for you personally, as well as, professionally.

All of these themes impact how you execute and deliver your professional obligations. Throughout many of the articles in this edition, you will see trends emerge. Issues like climate change, changing requirements around building codes and more. These all emerge as change occurs. Over the coming issues, we will continue to explore how "change" is impacting you and your profession(s).

We also like to hear from you. What information do you want to have included? What features would you like to see? Let me know! I am always looking for content ideas.

Heather MacLean, Editor Chief Communications Officer & Privacy Officer heather@apegnb.com

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In French Only

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2020 C.C. KIRBY AWARD | PRIX C.C. KIRBY 2020

Don Good, P.Eng. | ing.

"APEGNB members are regularly involved in various types of infrastructure projects in our communities. Because we are a self-regulated profession it is essential that we ensure public safety is a cornerstone of our designs."

« Les membres de l'AIGNB participent souvent à différents types de projets d'infrastructure dans nos collectivités. Puisque notre profession est autoréglementée, il est impératif de faire de la sécurité publique une pierre angulaire de nos concepts. »



Nouveau-Brunswick



Registration FAQs Kate Sisk, Director of Admissions



5 Tips to Help You Obtain Your P.Eng. and/or P.Geo. Status

You've graduated. You've applied to APEGNB, and you are a Memberin-Training (MIT). So, now what do you do? Before you apply for professional status, here are a few things to keep in mind.

1 Take full advantage of the MIT program.

Submit experience and get feedback as you go. Ongoing feedback provides invaluable information that can save you both time and frustration in the future. This is especially true if you change jobs, change supervisors, or even change provinces.

Regardless of whether you submit experience to APEGNB, you should keep detailed logs for your own use.

The approval of experience is not automatic; it must be reviewed and approved by experienced practitioners. The most common reason experience is not approved is that it lacks detail, so having those logs to go back to can provide more context that is in your best interest.

Another benefit to submitting your work experience is that we maintain your information in your file. Therefore, should you lose your logbook and/or a reference cannot be located, this information can be drawn up for your benefit when applying for professional status. Without this record, it cannot be attested to.

Working for nearly four years and haven't submitted? Not to worry, we have a solution. We still require a detailed description of your work activities that can be attested by your supervising P.Eng./P.Geo. If you are in this situation, contact me directly for more information on what we need from you.

2 References

Each MIT needs a minimum of three P.Eng.'s or P.Geo.'s who can attest to at least 48 months of your work experience. If you need to have more than three professionals to attest to your experience, provide them. They will each be contacted.

Overseas work experience can be considered, so long as the person attesting to the experience is considered a P.Eng./P.Geo., or equivalent, for that jurisdiction. At least 12 months of your work experience must be acquired in conditions similar to a Canadian environment. In certain cases, some overseas experience may be applicable. If in doubt, ask.

You will need to provide your supervisors' up-to-date contact information. It is good practice to check in with your supervisors periodically to provide updates and to keep you top of mind so that when they receive a call or an email, they are prepared and don't struggle to recall you and your work.

7

In some cases, we have been unable to reach supervisors and/or they don't recall the MIT that worked with them previously. It is, therefore, good practice to have other professionals who you can call upon to act as references. For example, networking with professionals, even if they work for other companies can sometimes provide you with other resources that you can call upon.

3 Preparing for and Writing the National Professional Practice Exam

You are required to write and pass the exam which covers laws and ethics of working in the professions in Canada. The exam is offered five times a year in a variety of locations. The syllabus and what it covers can be found here.

There are also many study materials available, as well as a review session. You can learn more about this in our Winter edition of *ENGEOActions* article entitled, Continuing Professional Development by my colleague Stamatia Baker. materials available. This article provides detail on locations as well as deadlines. Be sure to read it for more detail.

4 Provide Information in Format Requested to Avoid Delays

In the event that we request additional information or require clarification, due to the fact that information needed for the Admissions Board is not sufficient and/or is not clear enough for the members to make a decision, please submit in the format requested.

5 Seek Input/Assistance from the Registration Staff

If you still have questions or you think you are in a unique situation, contact the Association. The Registration Staff, myself and Stamatia Baker have years of experience with all sorts of situations, and we can help you.

continued from Page 5)

APEGNB Historical Highlights

1951 Professional engineers unanimously approved to change their professional designation from Registered Professional Engineer of New Brunswick (R.P.E.N.B.) to P.Eng.

1980 Association hires first female Executive Director

1998 The Assocaiation elects its first female as President

1999 APENB expands and the Act becomes the Engineers and Geoscience Act of New Brunswick and the organization becomes APEGNB (abbreviated form)

2020 L.W. BAILEY AWARD | PRIX L.W. BAILEY 2020

Reginald Wilson, P.Geo. | géosc.

"Geoscientists play an important role in the nation's economy, and regulation of the geoscience profession protects the public welfare by providing a means to recognize and have confidence in qualified professionals".

« Les géoscientifiques jouent un rôle important dans l'économie de notre pays, et la réglementation de cette profession permet de protéger le bien-être du public en proposant des moyens de reconnaître les professionnels compétents et de faire confiance à ces derniers. »



APEGNB Council 2020



Marlo Rose, P.Eng. President



Maggie Stothart, P.Eng. Vice-President



Jean Boundreau, P.Eng. Director, Engineers Canada



Michael Parkhill, P.Geo. Director, Geoscientists Canada



Matt Alexander, P.Geo Geoscience Councillor



Tamey Lamey, P.Eng. Fredericton Councillor



Karine Savoie, P.Eng. Northwestern Councillor



Jeffrey Underhill, P.Eng. Saint John Councillor



Jérémie Aubé, P.Eng. Moncton Councillor



Stéphanie Doucet-Landry, P.Eng. Northeastern Councillor



Michelle Paul-Elias, P.Eng. At-Large Councillor



Maryse Doucet, P.Eng. At-Large Councillor



Lise Landry, LLB Public Representatives



Leslie Knox, CPA Public Representatives



Lia Daborn, CAE Chief Executive Officer

C.C. Kirby Award Don Good, P.Eng.



C.C. Kirby Award:

Given in recognition of outstanding service or contribution to both the engineering profession and the province of New Brunswick. Named in honour of Charles C. Kirby, a distinguished engineer who was the founder of the Association and co-founder and first President of the Canadian Council of Professional Engineers, the C.C. Kirby Award is the most prestigious award a professional engineer can receive from the Association. Selection of the Kirby Award must be approved by three past Presidents.

With more than 45 years' experience, Don Good, P.Eng. is considered one of Atlantic Canada's most recognized and respected Traffic Engineers. Throughout his career, he served as a Project Manager and/or Technical Lead on more than 500 transportation planning studies for clients across Atlantic Canada and Alberta, including 1) master planning studies for municipal transportation networks, 2) functional planning studies of transportation corridors, 3) traffic management plans for roadway construction, and 4) more the 200 traffic impact studies for the variety of residential, commercial, industrial, institutional, and retail developments. The vast majority of these projects have involved assessing existing transportation facilities, consulting with the public & key stakeholders, forecasting future travel demand, identifying & evaluating improvement concepts, and preparing implementation strategies.

Another major area where Don has considerable experience and expertise is the traffic impact and traffic engineering area. He has completed numerous traffic impact evaluations for various developments, as well as intersection traffic and pedestrian signal designs. He has also provided expert witness testimony in civil court cases and planning appeal board/expropriation hearings. Don is familiar with national and provincial guidelines as they relate to highway/street design, traffic control devices, pavement markings, and signing. Don started his career with ADI in 1972 and became Senior Engineer. He later moved to FGA Consultants Ltd. in 1983 in two roles, Senior Engineer and President. In 2001, he transitioned to EXP where he has since worked. He is currently the Senior Traffic Engineer and works part-time.

He has been deeply involved with APEGNB over the years and served as President in 1992 as well as serving as Admissions Chair in 1986, Brief and Government Liaison Co-Chair in 1990, Awards Committee Chair in 1993, Nominating Committee Chair in 1993, Office Accommodation Chair in 1993 and Professional Conduct Chair from 1995 – 2000.

In addition to his dedication and commitment to excellence in engineering, Don is equally as committed to his community. Over the years, Don has been actively involved in a number of important community initiatives such as:

- Currently on Organizing Committee for the DKB Golf Tournament (fundraiser for scholarships for the sons of Daryl Branscombe);
- Currently the Chair of the Building and Grounds Committee and Board Member of Pine Grove Nursing Home;
- Currently Vice-Chair of APEGNB's Complaints' Committee;
- Joined the Science East Board in 2006, was President in 2009/2010 and 2010/2011 and Past President in 2011/2012;
- He was awarded the APEGNB Citizenship Award in 2011 for his contributions to the quality of life in the Fredericton community;
- Fredericton Chamber of Commerce, numerous committees as well as President in 2003/2004; and
- Was awarded the Distinguished Citizen Award from the Fredericton Chamber of Commerce in 2010. Don was given recognition for his significant contributions to the capital city.

L.W. Bailey Award Reginald Wilson, P.Geo.



L.W. Bailey Award:

Given in recognition of outstanding service or contribution to both the geoscience profession and the province of New Brunswick. Named in honour of Loring W. Bailey, an energetic and productive geologist whose scientific work spanned the 19th and 20th centuries and who became one of the most popular professors in the history of Kings College (NB). The L.W. Bailey Award is the most prestigious award a professional geoscientist can receive from the Association.

Reginald (Reg) is native of Miramichi, New Brunswick and a 1973 BSc (Geology) graduate of the University of New Brunswick. After several years working in the private sector, engaged in planning and implementing mineral exploration projects, he joined the New Brunswick Geological Surveys Branch in 1986.

While with the New Brunswick government, he carried out regional bedrock mapping over a large area of northern New Brunswick. The resulting geological maps – including an updated Geological Map of Northern New Brunswick – and reports have provided valuable contributions to mineral exploration efforts, leading to discovery of the Sewell Brook basemetal deposit, as well as new insights and interpretations of the tectonic evolution of the northern Appalachians.

Among his reports are numerous papers authored or co-authored for publication in peerreviewed scientific journals. He has delivered about 50 oral presentations and led numerous field trips at professional geological conferences. Before retirement in 2017, he capped off his career with the production of a comprehensive memoir "The Middle Paleozoic Rocks of Northern and Western New Brunswick", which synthesized many years of field mapping and acquisition of diverse geoscience data from these areas.

Between 1992 and 1999, he worked to gain professional recognition for geoscientists in New Brunswick. As president of the Association of Professional Geologists of New Brunswick, he spearheaded negotiations with APENB and participated in drafting amendments to the Engineering Profession Act, leading to the inclusion of geoscientists under that Act in late 1999.

Reg has been very active with professional associations, including the Geological Association of Canada, the Atlantic Geoscience Society, and the Association of Professional Engineers and Geoscientists of New Brunswick and specifically he:

- Was the New Brunswick representative on a national committee that evolved into the Canadian Council of Professional Geoscientists from 1994-1997;
- Served on APEGNB's Legislation and Professional Conduct committees from 2000-2016;
- Received the Association's Service to the Profession Award in 2008 and has since been recognized as a Fellow of Geoscientists Canada and Honorary Fellow of Engineers Canada;
- Served on the Atlantic Geoscience Society (AGS) Council for approximately 10 years, and was President in 2003-04;
- Was a contributing author of The Last Billion Years: A Geological History of the Maritime Provinces of Canada – a book published by the AGS in 2001;
- Was a Councillor with the Geological Association of Canada (GAC) from 2004-2007 and chair of GAC's Communications and Awards committees;
- Was Editor-in-Chief of Geoscience Canada, GAC's flagship publication from 2008- 2012 and continued his involvement as a copyeditor for Geoscience Canada until 2016. In mid-2019 he agreed to serve as GAC's in-house editor of books published by the Association;
- Received the AGS Distinguished Service Award in 2008;
- Was presented with GAC's Distinguished Service Award in 2010; and
- Reg was presented with the W.J. Wright Award for distinguished contributions to the mineral industry of New Brunswick by the New Brunswick Branch of the Canadian Institute of Mining, Metallurgy and Petroleum in 2015, and in 2018 he was awarded the Gesner Medal, the AGS Distinguished Scientist Award.

President's Award Gary Hoadley, P.Eng.



Originally from Halifax, Gary graduated from the University of New Brunswick in 1974 and accepted employment in Amherst at Northern Electric. Since graduation, he has accumulated 45 years of experience in residential, commercial, institutional and industrial buildings in New Brunswick, Nova Scotia, Newfoundland and Prince Edward Island.

In 1975, Gary moved to W.H. Crandall & Associates in Moncton to expand the buildings department. In 1981, he helped form Enerplan Consultants, with offices in Moncton, Halifax and St. John's. The major focus of this firm was energy conservation studies, third party financed guaranteed energy savings projects and mechanical design for all types of buildings.

In 1993, Gary formed Hoadley Engineering in Moncton to provide mechanical design for multi-space residential, commercial, institutional and industrial buildings all over Atlantic Canada. Among many clients, the firm supplied mechanical designs for a major coffee shop chain, a major drug store chain and a major convenience store chain. It also provided all mechanical design work for a major Atlantic Canada University. A large portion of Hoadley Engineering work was providing design-build mechanical engineering for local developers and contractors.

President's Award:

Given to a professional engineer/geoscientist who, in the opinion of the Association, has enhanced the role of APEGNB and other professional associations and societies such as Engineers Canada and Geoscientists Canada. The Award recognizes outstanding service and dedication to the New Brunswick engineering/geoscience professions through New Brunswick/Canadian professional, consulting or technical associations and societies. Consideration is given to continued leadership in the profession and in the community, to outstanding achievements, and to recognition obtained.

In 2010, Gary joined Crandall Engineering, now a division of Englobe where he has been the Senior Mechanical Engineer since that time. Gary advises on most major mechanical designs and continues to provide direct supervision over the university and coffee shop chain work.

He has become a mentor to the young engineers at Crandall and provides a great deal of insight and experience. He thoroughly enjoys getting to know his mentees and giving them information and experiences that will help them thrive in their careers while also adhering to the codes of conduct and standards required to practise engineering. And when it comes to mentoring young engineers, he also had his son, Robert, as a natural mentee. Robert, also an engineer, is the President of Argyle Consultants in Fredericton.

Some of Gary's other volunteer work includes, but is not limited to:

- President, Consulting Engineers of New Brunswick;
- Chairman and Member of APEGNB Complaints Committee 2001-2018;
- President, Board of Directors, St. Patrick's Family Centre, Moncton 1990-1992;
- President, Albert Fishing Club 2003-2005;
- ASHRAE Representative on MEET Show Organizing Committee, Moncton – 1995-2019;
- Moncton Minor Hockey Coach 1994-2001;
- President, ASHRAE NB/PEI Chapter 1978-1980; and
- Board Member, Treitz Haus Restoration Committee (oldest house in Moncton).

Women in Engineering Award Maggie Stothart, P.Eng.



Maggie graduated from civil engineering from the University of New Brunswick in 2007. Since that time, she has worked in a variety of roles in the areas of consulting, government and private sector. Maggie obtained an accreditation from the CISC in 2014. She is currently one of 15 people in Canada with the "Steel Connections Designer in Conventional Construction" accreditation. Although eminently qualified in connection design, she has since left the industry to pursue her true passion of helping people and accepted a position working with the North Shore Mi'kmaq District Council.

She is a dedicated volunteer and role model which can be evidenced through the following:

- Mentoring newly graduated female engineers. They correspond through email and LinkedIn and she has encouraged and helped them get more involved with the Association. In addition, she has helped them as job seekers by reviewing their resumes and helping them network with local businesses;
- Working member of APEGNB 2020 Celebration committee in charge of STEM Initiative. This initiative will encourage students, province-wide, to pursue STEMrelated initiatives;
- Presented 'Working with Indigenous Communities' at Engineers Nova Scotia AGM (2018);

Women in Engineering:

Presented to an outstanding engineer who, in the opinion of the Association, through their engineering and career achievements, has demonstrated noteworthy support for women in engineering and has established a benchmark of engineering excellence. Consideration is given to leadership in engineering, business or industry, the education sector, provincially or nationally, and recognition as a role model for women entering or in the practice of engineering.

- Presented 'Working with Indigenous Communities' at APEGNB's AGM (2019);
- Attended Assembly of First Nation conferences to understand Housing and Infrastructure issues on a national level (2017-2019);
- Attended CCWESTT conference to gather information and ideas to be applied at APEGNB (2018);
- Panelist for Diversity & Inclusion Women in Engineering night (2017);
- Diversity & Inclusion Professional Development Chair (2019);
- Diversity & Inclusion Vice-Chair (2018 & 2019);
- Scored the Jocelyne Roy Vienneau Scholarship applicants (2016 to 2018);
- Diversity & Inclusion Committee Member 2017;
- Councillor for Northeast District 2016-2017 (2 year term);
- Co-wrote the successful proposal to hire Diversity & Inclusion staff member at APEGNB. It was noted at CCWESTT that APEGNB was falling behind in the Engineers Canada 30 by 30 goal;
- Participation in the Northeast Branch of APEGNB:
 - Northumberland County Rep (2012, 2013 2 Years);
 - Secretary (2014, 2015, 2016 3 Years);
 - Treasurer (2017, 2018, 2019 3 Years);
 - Distributed the APEGNB Northeast Branch Bursary forms and scored applicants (2013-2018);
- Local volunteer work:
 - ALS Society Miramichi Coordinator responsible for organizing 5 Walk Strong Events (Annual Fundraiser 2014 to 2018);
 - Big Brothers Big Sisters Big Sister 2013 to 2016;
 - Volunteered in NB pilot program from high school students entering engineering (2019);
 - APEGNB Pumpkin Fling Volunteer 2013 to 2019; and
 - Volunteer Judge ASD-N STEM Fair (2015-2016).

Community Leadership Award Tony Whalen, P.Eng.



Community Leadership Award:

Given to a professional engineer/geoscientist who, in the opinion of the Association, has made a significant contribution to improving the quality of life in his/her community. The Award recognizes outstanding service and dedication to the province of New Brunswick through voluntary participation in community organizations, government- sponsored activities, or humanitarian work. Consideration is given to continued leadership in the profession and in the community, to outstanding achievements, and to recognition obtained.

Tony recognized his interest in volunteering and giving back while still in university. For four years, he served as the Sports Editor of the Engineering newspaper. He was elected President of the UNB Chemical Engineering Society for one year. While in that role, he represented Chemical Engineering undergrads at local and national organizations.

After graduation, Tony continued volunteering by focusing on several charities. For two years, he served as Team Captain for the United Way at the New Brunswick Department of Environment and Local Government. As Team Captain, he was responsible for all fundraising within the Department. In addition to the United Way, he was a canvasser for the Kidney Foundation of Canada, and a volunteer at fundraising events for the Fredericton Anti-Poverty Organization.

Intrigued by the film industry, he found time to volunteer in both the local and provincial film scene. Tony was involved with the Silver Wave Film Festival and took on the role of sponsor acquisition. He also taught courses designed for up-and-coming filmmakers. For more than four years, he organized a one-day film/tv summit for filmmakers in the province.

Committed to community, Tony sought to support his city through civic engagement. He served as City Councillor for eight years and Deputy Mayor for one year. Even while pursuing professional development, Tony found opportunities to show his support and volunteer. While attending several Atlantic Canada Water and Wastewater Association conferences, Tony volunteered to act as Moderator for the Top-Ops Competition. This competition is similar to the game show Jeopardy but designed for drinking water and wastewater operators.

He also processes documents as a Commissioner of Oaths from time-totime, serves a drink or two at Rustico/King West Brewing as a bartender, and serves as Chair of the New Brunswick Combat Sports Commission.

When he's not working, which isn't very often, he enjoys building pallet furniture, trying craft beer, woodworking, running, softball and bowling.

Quote from Past President

"To be an engineer or geoscientist does not simply mean you have the education and job. It means being a responsible person. It's about following the law and the rules and regulations that apply. It's knowing, understanding, and applying all of the sciences that make up our profession. The most important thing is to care for the people affected by our daily work and to have their best interest at heart.

The laws, rules and regulations, who understands them better than those who have learned them, applied them and sworn to uphold them? Who best understands the sciences that form our profession? It is for these reasons that we must see to our own regulations. There is no other way to serve the public as it should be.

It was an honor to serve as president of my association because I am committed to this amazing profession that gives me so much: great values, a sense of family and belonging, and the opportunity to mentor and be an example to engineers."

Iris Auclair-Bernard, P.Eng., FEC

Young Professional Achievement Award Lindsay Wilcott, P.Eng.



Lindsay graduated from Dalhousie University in 2013 with a B.Eng. – Environmental Engineering. After graduating she began working at CBCL Limited and has advanced to the position of Group Lead, Water Resources and Climate Change.

She has developed skills in all aspects of hydrologic and hydraulic analysis, including riverine flood plain mapping and flood mitigation; sanitary sewer and stormwater analysis and design; inflow and infiltration (I&I) reduction studies; and combined sewer overflow (CSO) reduction strategies. Lindsay also works with municipalities on climate change risk and vulnerability assessment as well as adaptation planning.

Over the past couple of years, Lindsay has presented in the following technical forums:

- 2019 Canadian Water and Wastewater Association (CWWA) National Conference in Banff, AB;
- 2019 ACWWA Annual Conference in Sydney, NS;
- 2019 Canadian Water Resources Association (CWRA) Online Course;
- 2019 Developed and hosted and education webinar for multiple municipalities through the AIM Network on climate change consideration;
- 2018 Atlantic Canada Asset Management Conference in Moncton, NB;

Young Professional Achievement Award:

Given to a young outstanding professional engineer/geoscientist who has carried out major engineering/geoscience achievements in or on behalf of New Brunswick. The Award recognizes exceptional technical achievements in his/her chosen fields. Consideration is given to the nominee's engineering/ geoscience excellence within the professions, business or industry, or education sector.

- 2018 Panelist and Presenter at a technical conference, jointly hosted by Natural Resources Canada & Environment and Climate Change Canada, on updates to new national flood plain mapping guideline series; and
- At CBCL, Lindsay was chosen to participate in the first Professional Development Program.

In addition to her work, she currently sits on the following Boards and Committees:

- Natural Resources Canada: National committee for the inclusion of climate change in flood plain mapping;
- Atlantic Canada Water and Wastewater Association (ACWWA): Lindsay is the current Communications Director. In the past she was the chair of the magazine committee. In 2015, she won the YP award for the Association;
- Canadian Water and Wastewater Association (CWWA): She sits on the national committee on climate change;
- Association of Consulting Engineers NB (ACEC-NB): Lindsay is the Chair of the Diversity and Inclusion in Consulting committee; and
- APEGNB: She has been a member of the Diversity and Inclusion Committee since 2016.

Quote from Past President

"Self-regulation of the Professions of Engineering and Geoscience is a public trust that has been delegated to APEGNB and its Members in exchange for the Professions' commitment to the people of New Brunswick to establish and maintain ethics, standards, and skills "in order that the public interest may be served and protected." It is as necessary and as relevant today as it was 100 years ago when APEGNB took on this responsibility."

Brent Smith, P.Eng., FEC

Thought-Leadership Interview Heather MacLean



Kristen Culberson She Can Change the World: Girls in STEM!

This sounds like a powerful claim to make and if anyone can do it, Kristen Culberson a grade 12 New Brunswick student can. Culberson will be attending the University of New Brunswick next year in engineering and I had a chance to talk to her to learn about her plans for the future.

MacLean: Right now, you are just starting your last semester in Grade 12, tell me about what your plans are once you graduate.

Culberson: I am pretty focused on what I have in mind for my future. I plan to attend UNB in mechanical engineering and then go on to biomedical engineering research with a focus on prosthetics. There are a couple of paths that I can take to get to my ultimate goal. If I decide that mechanical is not the right path for me, I can either change to electrical or chemical. Regardless, my end goal remains the same.

MacLean: I love hearing how focused you are. So many people in high school don't yet know their passion. Do you think that you could potentially work for UNB's biomedical institute?

Culberson: Absolutely! As one of the top five institutes in the world, it is definitely a goal of mine to work there.

MacLean: Again, you are very focused on what you want. What got you interested in engineering?

Culberson: I have always loved math and science, but in high school and specifically grade 11 when I started taking more applied sciences like chemistry and physics, I realized that I really liked doing the hands-on work. That lead me to engineering. I also love the areas of medicine, so when you combine medicine and engineering, the logical progression for me, is the path of biomedical engineering.

MacLean: As you know, there is a significant effort to get more girls interested in STEM. What has been your experience when you talk about what you want to do and your interests in STEM?

Culberson: I can't say that I have ever had anyone openly discourage me, but at the same time, I have surprised a lot of people when I tell them what I want to do. The most interesting response is when people ask me, if I am sure that this is actually what I want to do. The answer is always an empathic, yes!

MacLean: That actually raises a great question. What about role models? What role can they play?

Culberson: There is no question that I look for female role models and I don't see a lot of women, around me, in those roles. That is not to say that there aren't women in engineering, of course there are. I just don't see a lot in my local area. And naturally, seeing someone who can be an inspiration is important. I think seeing more women would lessen some





of the nervousness that girls in my position have when making the decision to pursue education and a career in this field.

MacLean: Well, you are certainly going to make your mark helping young girls and women that come after you. You will be a mentor and an inspiration with the work you are doing. Tell me about *She Can Change the World: Girls in Stem!*

Culberson: It's really about introducing STEM subjects to girls in grades 3-6 to show them that there is nothing to be afraid of, and that they are actually fun! Right now, I have five planned across the Upper Saint John River Valley in Woodstock, Perth-Andover, Hartland, Florenceville and Nackawic and they will all be completed by the end of February. In addition to having three hands-on exercises, I also have secured a female presenter for each location. I think it is important to have a female who is

training or working in engineering who can be a role model and provide inspiration.

MacLean: For someone who is doing this for the first time I am impressed with how organized you are. Not only have you made arrangements with public libraries to host your workshops, but you have also secured a sponsor, Brian McCain, who's support has resulted in you being able to offer these workshops at no cost. This is a phenomenal opportunity to increase participation. Tell me more about this.

Culberson: I am really pleased to have a working relationship with the public libraries. Not only does this mean that we have a great spot to use on the weekends for the workshops, but they also have significant experience with programming of this nature. I am also fortunate for the support of Mr. McCain. It was, and is, important to me to be able to open up this programming to all girls and this sponsorship means that

there are no financial barriers that could limit who gets to learn about STEM and women in STEM.

I would also add that this would not be possible without the Dr. Walter Chestnut Library accepting the donation on my behalf. They have been so helpful with everything and have been able to purchase supplies for me through their networks. This really is about collaboration, community and learning, a great mix.

MacLean: Well, I don't think I could have said it better myself. I believe that Culberson can achieve anything she sets her mind to. Not only does she understand the path she wishes to follow, but she also has the attitude and soft skills that will take her far! I think we will have another Thought-Leadership interview for the future with her.

If you have ideas for the 1:1 Thought-Leadership column, please reach out.

Heather MacLean, Editor Chief Communications Officer & Privacy Officer heather@apegnb.com

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Project Updates Climate Change Adaptation

Chignecto Isthmus Climate Change Adaptation Comprehensive Engineering and Feasibility Study Jacques Paynter, P.Eng., Wood

The New Brunswick Department of Transportation and Infrastructure (NBDTI) and the Nova Scotia Department of Transportation and Infrastructure Renewal (NSTIR) have commissioned Wood Environment & Infrastructure Solutions (Wood) and Stantec Consulting Ltd. (Stantec) to undertake a comprehensive engineering and feasibility study focused on developing viable options for the protection of the Chignecto Isthmus Trade Corridor and its infrastructure.

The Trade Corridor, an approximately 21-kilometre-wide and 35-kilometre-long lowlying land bridge between Nova Scotia and New Brunswick, is traversed by critical infrastructure including the TransCanada Highway, CN Rail, power transmission lines, agricultural dykes and water control structures, and telecommunication and other utilities. It is estimated that the value of commercial goods passing through the Trade Corridor is approximately \$50 million per day.

The Chignecto Isthmus has been extensively studied over the last decade indicating that flooding of this low-lying area, currently protected by a centuries-old dyke system, is inevitable unless key interventions are developed and engineered. This infrastructure is at risk of being compromised by climate change impacts, including sea level rise, flooding and increased storm frequency and intensity. The study is designed to develop at least three viable and resilient engineered solutions to protect and sustain the transportation corridor from flooding.

The year-long investigation comprises several important tasks:

- Review of existing documents and data.
- Preparation of a Project Management Plan.
- Assessment of the vulnerability of existing infrastructure.
- Consultation with stakeholders.
- Engagement with Rights Holders.
- Securing access permissions, permits and approvals.

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- Evaluation of sites of archaeological, historical, and significance.
- Development of engineering options.
- Comparative assessment and refinement of options by means of environmental reviews, benefit-cost analyses, and infrastructure resiliency risk reviews.

This project represents a strategic collaboration of two major engineering consulting firms Wood and Stantec. Leveraging the firms' professional engineering and geoscientist expertise from projects of similar size, scope and nature is critical to a project of this scope.

Wood, the Prime Consultant, will lead several components of the study including comparative environmental analyses, stakeholder engagement, regulatory compliance, costbenefit analysis, infrastructure resilience assessment, and archaeological and heritage programs.

Stantec, is leading a vulnerability assessment that will identify, at a high-level, key infrastructure elements such as design, safety, and operations of existing infrastructure within the transportation corridor. This assessment, together with proposed engineering solutions, will be used to shortlist options that provide the basis for more detailed engineering design in future project phases. Developed options will consider climate adaptability, economics, constructability, environment, land usage, and cultural heritage-to provide a safe, reliable transportation corridor for the future. Stantec will also provide input for the comparative environmental review and comparative infrastructure resiliency risk review.

During the study, the Wood/Stantec Team will collaborate and exchange information with affected landowners, stakeholders, Rights Holders and other interested parties in order to identify opportunities for participation and access key information, as well as integrate key considerations in the options analysis and constructability approach.

It is anticipated that final study findings will be available in early 2021.

For further information about the Chignecto Isthmus Climate Change Adaptation Comprehensive Engineering and Feasibility Study please contact Jacques Paynter at jacques.paynter@woodplc.com.

APEGNB CONGRATULATES Caroline Stephen The English recipient

of the 2019 JOCELYNE ROY-VIENNEAU SCHOLARSHIP!

ENGINEERS GEOSCIENTISTS New Brunswick

Quote from Past President

"After I was approached in 2014 to run for President, CEO Andrew McLeod mentioned that candidates can address a specific policy issue in their election statement, in addition to our regulatory duties. For example, my predecessor, Christine Plourde, P.Eng. did a lot of work to promote Women in Engineering.

I said, "What about Climate Change Mitigation?" That became part of my election statement and mandate.

With great support from Council, Staff, and the Membership, this led to APEGNB becoming an Early Adopter in the climate change mitigation effort through the installation of our 50-panel netmetering solar array on our building in 2015.

Many municipalities, departments and interested parties have consulted with us as they developed their own renewable energy projects. This accomplished the 2015 objectives for leadership and technical innovation, as a sub-set to our regulatory responsibilities."

Paul Campbell, P.Eng., FEC

Project Updates City of Saint John

Safe, Clean Drinking Water Project – Saint John, New Brunswick Brent McGovern, P.Eng., City of Saint John

Saint John is the oldest city in Canada. As such, it has a rich history and vibrant culture, but also some very old infrastructure. The economy of Saint John is vibrant and diverse; it is home to Canada's largest oil refinery, Canada's largest independent brewer, pulp and paper mills and the largest cargo port east of Montreal.

Historically the City supplied drinking water to its customers from two surface water sources. The water delivered to customers was coarse screened and chlorinated leaving the City unable to meet the Guidelines for Canadian Drinking Water Quality and placing the public health at risk.

To address this risk, City officials worked together with independent consultants to assess various options for a new water treatment plant, storage reservoirs and various dam and water transmission improvements. The City evaluated, in detail, the traditional Design-Bid-Build procurement model against the Public-Private Partnership (PPP) procurement models defined as Design-Build-Finance-Operate-Maintain (DBFOM - for the water treatment plant) and Design-Build-Finance (DBF for the dams and transmission improvements). The City opted to procure the project as a PPP based on, among other things, the City's business case analysis having concluded that the PPP procurement models would yield positive value for money.

Following its decision to proceed with the project, the City undertook a competitive procurement process and the project was awarded to Port City Water Partners (Brookfield Financial Corp, Acciona Agua, North America Construction, et al.)

A new water treatment plant however was only part of the solution. Pumping clean water through corroded 1850's vintage water transmission mains would not provide City residents with a reliable supply of safe, clean drinking water. Improving the City's water transmission main was also a necessity. Also, the City's potable water system served residential, commercial, and industrial water customers. All customers received treated water whether treatment was needed or not. As part of the project, the City separated the water system so as to provide large industrial users with raw untreated water, thereby reducing the size requirement of the new water treatment plant and creating cost efficiencies for all.

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ENGEOActions



An important construction component related to the rehabilitation of a dams and the installation of new intakes in Latimer Lake. However, this work could not begin prior to the completion of the newly constructed Loch Lomond Drinking Water **Treatment Facility which** was necessary to ensure proper water filtration and treatment during the construction work in the lakebed. As a result, the water treatment facility had to be fully calibrated and commissioned prior to substantial completion of the project.

The term of the project consisted of approximately 40

(continued)

The project, named the Safe, Clean Drinking Water Project is the largest municipal infrastructure project ever undertaken in the province of New Brunswick and represents one of the first projects in the water sector in Canada to use a PPP approach.

The project consisted of two key components:

- the DBFOM of a new 75 million litres per day water treatment plant and three new storage reservoirs with a capacity of 33 million litres; and
- the DBF of various water system improvements, primarily including rehabilitation of and improvements to the Robertson Lake and Latimer Lake dams, new intakes into Latimer Lake, new water transmission mains, well site development and pumping station upgrades and rehabilitation of existing 1850's cast iron water transmission mains. The transmission mains were rehabilitated using a sliplining technology (by installing a smaller diameter "carrier" pipe within a larger diameter "host" original cast iron pipe).

months of construction. The project totaled approximately 1.1 million person hours of work and for the duration of the project only one lost time accident occurred. The new Loch Lomond Drinking Water Treatment Facility has been delivering drinking water that exceeds the Guidelines for Canadian Drinking Water Quality since it entered service in August of 2018.

The total cost of the project's net present value is \$216.8 million dollars and the project has come in on budget. The successful delivery of Saint John's Safe Clean Drinking Water Project will serve as a guide for the procurement of future water treatment facilities across Canada.



Project Updates Moncton Operations Centre

Design, Build, Operation and Maintenance of Biomass Heating System

Joshua Bernatchez, P.Eng., City of Moncton

Fund (LCEF) is another incentive program provided by NB Power through federal funding. The City of Moncton will be applying for the LCEF (up to 40% of capital contractual cost) once the project is fully completed. The main objective of this project is to reduce the municipality's carbon footprint, while promoting the use of renewable fuel, consisting of wood



chips produced from biomass harvested and processed locally.

Part "A" of the Operations Centre Main Building, which includes the administrative area and water/sewer workshops, along with the warehouse space located in the Central Stores Building, is heated by a hydronic (liquid heat-transfer medium) heating system. The Central Stores warehouse facility is connected to the Operations Centre's heating system by means of underground pre-insulated pipes. This heating system once included an oilfired boiler and a recently installed natural gas-fired boiler. The aging oilfired boiler operated as the primary boiler in order to empty the large oil storage tank. The City recently installed a new natural gas-fired hot water heating boiler, in the Operations Centre Main Building mechanical room. The oil-fired boiler was removed and the

A study was commissioned in 2017 by Association francophone des municipalités du Nouveau-Brunswick (AFMNB) which included the evaluation of biomass fuel sources (wood chips and wood pellets) across twenty-one (21) municipal facilities in New Brunswick. A total of ten (10) locations were identified as good candidates for fuel switching to biomass, including the City of Moncton's Operations Centre. Wood chips were recommended for the Operations Centre due to the size of the boiler/energy demand, the estimated cost, and local biomass fuel availability.

The City applied for a grant through the Federation of Canadian Municipalities (FCM) to pilot this project, building on the fact that it currently produces wood chips in the Turtle Creek Watershed. The City was awarded a grant of \$280,914.00 from the FCM (or up to 50% of the cost) to pilot a wood chip boiler heating system complete with a new natural gas backup boiler. The Low Carbon Economy new natural gas boiler operated as the primary heating source for the hydronic heating system until the new biomass boiler was implemented. The natural gas boiler now serves as a back-up to the new biomass boiler.

The new biomass boiler plant is designed to provide approximately 80 percent of the heating requirements for the hydronic heating system. The oil-fired boiler was removed and replaced by a glycol-to-water heat exchanger. The heated glycol (provided by the biomass boiler plant) serves as primary heat and the recently installed natural gas-fired boiler is used to supplement the biomass heating plant in order to meet peak heating requirements. The existing propane-fired radiant tube heaters and unit heaters located in Part "B" of the main building (mechanical shop and trade shops) will remain for this phase of the project.

The technical proposal submitted by the sole proponent, Design Built Mechanical Inc. (DBM), was evaluated by staff from the Engineering and Environmental Services Department, Facilities Management, and Roy Consultants Inc., the consulting engineering firm retained by the City to assist with the biomass project.

The technical proposal submitted by DBM was found to be a responsive and compliant proposal; however, the bid prices submitted by the

Proponent exceeded the City's budgetary allocation. Therefore, the City initiated the negotiation process with DBM and underwent a value-engineering exercise to identify costreduction opportunities. Administration was able to negotiate pricing within budget.

- Capital Construction Cost: \$529,500
- Operation and Maintenance: \$8,900/ year to \$11,121/ year (10 year contract)
- Energy Supply: \$14.75/ GJ to \$18.34/ GJ (10 year contract)

The City of Moncton Energy Coordinator, Joshua Bernatchez P.Eng., project managed this new biomass heating system installation.

- The project team for this project consisted of the following:
- Mechanical and Electrical MCW Maricor Ltd.
- Structural Corbo Engineering Inc.
- Design Built Contractor Design Built Mechanical Inc.
- Wood Chip Supplier ACFOR Energy



Replacing the existing oil boiler at the Operations Centre with a wood chip biomass boiler will reduce greenhouse gas emissions by approximately 169 tonnes of CO₂ per year, and will help the City further reduce its corporate greenhouse gas emissions. This action was identified in the City's Corporate Energy and Greenhouse Gas Emissions Reduction Plan.

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Project Updates City of Fredericton

Reducing Idle Times and Greenhouse Gases: The Victoria Circle Roundabout Solution

Jon Lewis, P.Eng., City of Fredericton

The Victoria Circle Roundabout project was a major infrastructure renewal and transportation upgrade project on the western end of downtown Fredericton in 2019. The transportation upgrade included converting the five-leg signalized intersection at Smythe/ King/Brunswick to a modern-day roundabout design accommodating more than 25,000 vehicles per day. Adjacent to Fredericton's first and largest water treatment, the project also provided an opportunity for pipe renewal and to rationalize the underground infrastructure in the intersection that was at end of life.

The roundabout project was initially envisioned conceptually as part of the 2010 Capital City Traffic Study and was planned and budgeted in conjunction with the underground water and sewer infrastructure work for the 2019 construction year. There were several traffic,

pedestrian, infrastructure, and public realm considerations that were integral in the overall design and construction of the project as described below.

The former signalized intersection historically rated as one of the top five most dangerous intersections in the city. The conversion to a roundabout will greatly enhance the overall level of safety at this intersection for both vehicles and pedestrians. Within the first three months of operation, there has only been a single minor fender bender at the intersection; whereas in the past there was an average of five personal injuries resulting from collisions per year.

A unique aspect for this roundabout was to design for a combination of high traffic and pedestrian flows given proximity to the downtown core and the Westmorland Street Bridge. Instead of a typical two lanes inbound and two lanes outbound design at each approach, all exits were designed as single lane, and the entrance lane configurations varied. This design was incorporated to minimize crossing distances and reduce vehicle speeds at the crosswalks, improving safety for all pedestrians, particularly at roundabout exits where vehicle speeds are highest. In terms of intersection efficiency, both pedestrians and vehicles now experience much lower travel times throughout the day.

In order to accommodate single lane exits with varying entry lane configurations, innovative traffic striping was required to spiral traffic

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from the inside lanes to the outer edge of the roundabout at exits. With the timing of the lane striping being mid-November, the City utilized inlaid preformed thermoplastic pavement markings to help ensure that the markings would last through the winter and beyond. This is the first permanent use of inlaid pavement markings by Fredericton and they appear to be holding up well against winter plowing and salting operations.

The project is nearby the Bill Barrett Water Treatment Plant which began operation as a pump house in 1883 and has undergone multiple renovations since. The location of the water treatment plant made it practical to use Woodstock Road and Smythe Street as corridors for underground piping to supply the growing city with water. The renewal of the buried infrastructure enabled the combining of three aged (1930s &1950s era) water mains into one in some areas, while reducing the total length of water mains in the area by 50 percent. That is roughly 500 meters of underground piping that will not require long term maintenance while not impacting the current water service. In addition to the water mains, buried sanitary sewer and storm sewer mains were also renewed and upsized to mitigate future climate change impacts.

The construction project had to be strategically scheduled. The need for continued connection to the Westmorland Street Bridge and the ability to have continued vehicular access to many of the nearby businesses throughout the project meant that is was not possible to fully close the intersection for prolonged periods of time.

Given the mid-November finish for construction, the remaining landscaping will be completed in Spring 2020. As part of the final landscaping work, a piece of public art will be installed in the center of the roundabout enhancing the visual appeal of this infrastructure project. Upgrading the signalized intersection with a roundabout has created an aesthetically pleasing gateway to Fredericton's downtown core, with environmentally green benefits unique to roundabouts by reducing idle times and associated greenhouse gas emissions, as well as eliminating the future maintenance costs of traffic signals. The amount of underground infrastructure in this area has also now been rationalized and reduced further improving the City's infrastructure deficit.

APEGNB CONGratulates Cordell Paul

of Lower Woodstock as the recipient of the

2019 GRAYDON NICHOLAS SCHOLARSHIP!

ENGINEERS GEOSCIENTISTS New Brunswick

Quote from Past President

"In my opinion the engineering profession must remain selfregulated, but that does not mean that the status quo is acceptable. Recent scandals have received a lot of public attention and media coverage, may suggest that self-regulation of the engineering profession has failed to uphold its responsibility for protecting the public.

APEGNB has an ethical responsibility to hold paramount the safety, health, and welfare of the public and the protection of the environment. As a profession we have a Code of Ethics and an obligation to ensure that the work carried out by our license holders is done in compliance with codes, standards and regulations in the interest of public safety. Self-regulation empowers our profession to do this. The public has put their trust and confidence in our profession. If we cannot responsibly self-regulate the profession, then we run the risk of losing the trust and confidence of the people we are there to protect.

Darryl Ford, P.Eng., FEC

Project Updates Serpentine Lake

Serpentine Lake Mapping Project – Update (NTS 21 O/2)

Dustin Dahn and Moya MacDonald, New Brunswick Department of Energy and Resource Development

Note: this article previously appeared in Information Circular IC 2019-1 Geoscience Project Summaries and Other Activities 2019 and is reprinted with permission.

Introduction

The Serpentine Lake area (NTS map sheet 21 O/2), located in North Central New Brunswick, south of Mount Carleton Provincial Park, is underlain by Cambro-Ordovician sedimentary rocks (Miramichi Group), Middle Ordovician volcanic rocks of the Sheephouse Brook Group, and Early Devonian bimodal volcanic and sedimentary rocks of the Tobique Group. Numerous Middle Ordovician to Middle Devonian felsic and subordinate mafic plutonic

rocks intrude the area. These rocks host several mineral occurrences and the region is an area of active mineral exploration. This mapping project was initiated, in part, to support recent exploration in the western part of the map area. The area is easily accessed from Bathurst by major forestry roads south and west of Popple Depot or northeast of Plaster Rock via private roads on Acadian Timber land. Several major forestry roads provide good access to the entire map area. The objective of this mapping project, which began in 2018, is to update and refine the existing 1:50 000 scale geological map of the Serpentine Lake area.

Previous Work and Motivation

The Serpentine Lake map sheet last saw systematic geologic mapping with the completion of the 1" to ¼ mile scale mapping in the 1970s. Fyffe and Pronk (1985) completed bedrock and surficial mapping and geochemical analyses in the Long Lake area. Granitic rocks in this area were part of a study of New Brunswick plutonic rocks completed by Whalen in the late 1980s and early 1990s (Whalen 1987, Whalen 1993), the purpose of which was the documentation of geochemical signatures and variability within Appalachian granitic rocks of New Brunswick and adjacent Gaspé peninsula of Québec. Geological mapping at 1:20 000 scale in the 1990s covered portions of the Serpentine Lake map sheet



Figure. 2.1. Current geological map of the Serpentine Lake area (NTS 21 O/02) showing distribution of geological units, water bodies, and major forestry roads. Geological mapping during the 2018 field season was conducted in the area outlined in red, whereas geological mapping conducted during the 2019 field season is outlined in blue.

(continued on next page)

as an extension of mapping from adjacent map sheets. Specifically, in the western portion of map sheets 21 O/02 d and e, the area underlain by Early Devonian rocks was mapped by Wilson (1990a, b), whereas the Ordovician rocks of the Sheephouse Brook and Miramichi Group, in the northeast, map sheet NTS 21 O/02 h, were mapped by Gower (1996). Uranium mineralization and granite geochemistry at the Long Lake Uranium prospect (URN 64) was the studied by Shinkle (2011). A complete reference list of older publications is available by searching '210/02' in the Geoscience Publications database on the New Brunswick Department of Energy and Resource Development website. Since those mapping projects were published, a vast network of forestry roads has greatly improved access across the map area and has exposed new bedrock outcroppings. During the 2018 field season, geological mapping was completed in the northeastern quadrant of the map area.

Regional Bedrock Geology

This region of the province is geologically unique. Volcanic rocks assigned to the Sevogle River Formation of the Sheephouse Brook Group (Bathurst Supergroup) crop out in the northeastern portion of the map area, whereas sedimentary rocks of the Miramichi Group, which underlie the Bathurst Supergroup, crop out to the south and west. Rocks of the Miramichi Group are intruded by Ordovician and Devonian granitic plutons. Ordovician granitoids are moderately- to stronglyfoliated and are interpreted to be plutonic equivalents of felsic volcanic rocks of the Bathurst Supergroup (Whalen et al. 1998). Devonian granitoids are unfoliated and assigned to the North Pole Stream Granite (417.0 ± 1 Ma, Bevier 1988). In the western portion of the Serpentine Lake map area, bimodal volcanic rocks and clastic sedimentary rocks of the Wapske Formation (Tobique Group) unconformably overlie sedimentary rocks of the Miramichi Group. Felsic volcanic rocks of the Wapske Formation (420.2 ± 0.5 Ma, Wilson et al. 2017) may be extrusive equivalents of Devonian granitoids such as the North Pole Stream Granite.

Geological Mapping Observations

During the 2019 field season, mapping was completed in the southern and western portions of the map area (Fig. 2.1). A specific objective for this project was to refine the location of plutonic contacts and to better understand the nature of these contacts within the map area. In the northwestern quadrant, the contact between interbedded sandstone and mudstone of the Knights Brook Formation (Miramichi Group) and the Ordovician Sweat Hill Granite was observed. The Sweat Hill Granite is typically a strongly foliated, beige to pink granite containing centimeterscale phenocrysts of alkali-feldspar. Near the contact with the Knights Brook Formation, over several hundred meters, the intensity of the foliation within the Sweat Hill Granite decreases such that at the contact, it is a mediumgrained, equigranular, unfoliated granite. A possible explanation for these observations may be partitioning of strain into the rheologically weaker sedimentary rocks allowing the granites to remain undeformed adjacent to the contact.

A second objective of this project was to identify phases within the North Pole Stream Granite and better define the temporal and spatial relationships among these phases. Geological mapping throughout the area has confirmed that most of the pluton is relatively homogenous and consists of light pink, medium- to coarse-grained, equigranular, unfoliated granite composed of quartz, alkali-feldspar, plagioclase, and biotite (Fig. 2.2a). However, several subordinate phases have been identified





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including gabbro, granodiorite, aplite, and locally two-mica granite. These phases occur primarily in the western half of the pluton; however, limited outcropping and the ubiquity of glacial cover preclude accurate assessment of relationships among phases. The contact relationships between the main phase and an intermediate phase of the North Pole Stream Granite is gradational over a short distance, i.e. tens of centimeters (Fig. 2.2a). Feldspar phenocrysts have been observed to span the contact between phases. Locally, ovoid clasts or masses of the intermediate phase occur within the main phase. These textural relationships are interpreted to represent magmatic enclaves resulting from incomplete magma mixing. Similar textures are recognized between the gabbroic and main phases; however, the gabbroic masses are more angular and have sharper contacts (Fig. 2.2b). This may represent immiscibility between mafic and felsic magmas during mixing or that an early gabbro phase was intruded by the main phase of the North Pole Stream Granitic suite. A pink, aplitic phase occurs as dykes, which cross-cut the main phase, with sharp contacts (Fig. 2.2c) displaying chilled margins. Red to pink, twomica granite likely occurs as a late phase as well, although no contact relationships with this phase were observed. Further petrographic and geochemical studies of these phases will be necessary to better understand the timing and relationship between phases and whether they represent magma mingling and mixing (as magmatic enclaves) or as unique intrusions (as xenoliths).

Field observations in 2018, showed that fragments of sedimentary rocks of the Miramichi Group occur as xenoliths within the North Pole Stream Granite near its contact with the Knights Brook Formation. Field observations this field season identified additional sedimentary xenoliths near the western and southern margins of the pluton (Fig. 2.2d). In addition to xenoliths, an area near the southern extent of the North Pole Stream Granite shows a unique textural relationship between sedimentary and igneous rocks. In this area, sedimentary blocks appear to have gradational contacts with zones of partially melted material (leucosome; Fig. 2.2e) or partial melt, which appear to originate from sedimentary fragments (Fig. 2.2f). Some sedimentary blocks contain porphyroblasts of what appear to be cordierite, a common contact metamorphic mineral, suggesting relatively lowpressure and high temperature

conditions. These rocks are interpreted to represent low-pressure migmatites, where partial melting of sedimentary rocks produces a melt of granitic composition. Thin section and microanalytical work may prove useful in determining metamorphic and igneous conditions at this location. Further study is required to determine if melting of sedimentary rocks of the Miramichi Group represent the source for the bulk of North Pole Stream Granite (or other granites within New Brunswick's Central Plutonic Belt) or if these migmatites are a localized feature produced by a region of decompression melting. Several previously documented mineral occurrences occur within the study area. These mineral occurrences tend to be concentrated near the contact between the North Pole Stream Granite and Miramichi Group sedimentary rocks. Geological mapping during the 2019 field season identified several new sulphide mineral occurrences within the North Pole Stream Granite and near its contact with the Miramichi Group and the Serpentine River Granite. Based on outcrop and hand sample observations, these mineral occurrences consist of up to several percent pyrite over several meters to tens of meters at surface

Project Status

The Serpentine Lake Map area (NTS 21O/02) contains a variety of rock types ranging from Ordovician to Devonian. Fieldwork in 2019 has identified many new bedrock exposures leading to new insights and refinements in the current geological map. Future mapping will take place through the south-western corner of the map sheet, with the specific objectives of: 1) refining the location and nature of the various plutonic contacts; 2) investigating relationships between the Miramichi Group and the high grade metamorphic rocks south of Trousers Lake (i.e., Trousers Lake Metamorphic Suite); 3) documenting the contact relationships between Ordovician rocks and overlying volcanosedimentary rocks of the Tobique Group; and 4) establishing the genetic relationship, if any, between Tobique Group felsic volcanic rocks and the North Pole Stream Granite.

For References, please see original article as published, in English only, on the website.

Quote from Past President

"Counting my five years on Engineers Canada[®] Board, I served eleven years on the APEGNB Board. Prior service on the Moncton Branch, along with volunteering on Committees has made for an extended time for involvement with the Association.

Most everything we do must centre around the privilege of self-regulation. It is not just granting admissions or doing enforcement, there is a whole lot behind those items. Change in perceptions, standards, expectations occur all too fast and not just in the engineering/geoscience community. Staff, Council, committees must keep up-to-date and be proactive, not reactive. General membership needs to do the same and where not knowledgeable, need to let changes under control of the Association occur, based on the advice of Council, Committee and staff.

If we don't accept change, someone else will do it for us. To our peril."

Hollis Cole, P.Eng., FEC

2020 PRESIDENT'S AWARD | PRIX DES PRESIDENTS 2020

Gary Hoadley, P.Eng., FEC. | ing. FIC

"One of the goals of APEGNB Regulations is to insure that Engineers conduct themselves and their business dealings in such a manner that consumers of engineering services can be assured that they are being delt with fairly and ethically."

« Les règlements de l'AIGNB ont entre autres pour objectif de veiller à ce que les ingénieurs aient un comportement et une façon de faire des affaires qui mettent les consommateurs de services d'ingénierie en confiance quant à la nature équitable et éthique de leur relation d'affaires. »



2020 WOMEN IN ENGINEERING AWARD | PRIX DES FEMMES EN GÉNIE 2020



Maggie Stothart, P.Eng. | ing.

"Through volunteering for our association, I can attest to APEGNB's commitment to be a strong regulator governing the engineering and geoscientists professions all while ensuring public safety and continued prosperity for New Brunswick."

« En tant que bénévole pour l'association, je peux affirmer que l'AIGNB est déterminée à être un organisme de réglementation énergique qui gouverne les professions d'ingénieur et de géoscientifique tout en veillant à la sécurité publique et à une prospérité permanente au Nouveau-Brunswick. »



Quote from Past President

"It is through trust from the public that has been gained though the last 100 years that self-governance grants our association the autonomy, prestige and influence. It was an honour and privilege to serve in council and as President of our Association!"

Mark Bellefleur, P.Eng., FEC

Quote from Past President

"Self-regulation is a privilege. Who better to regulate our roles as professionals than our own peers. This privilege is being challenged across many other professions in Canada and around the world. It is imperative and crucial that APEGNB continues and moves forward in assuring the highest standards of practice for engineers and geoscientists in order to be a trusted resource while protecting the safety and well being of all New Brunswickers."

Serge T. Dupuis, P.Eng., FEC

Project Updates City of Moncton

New Centennial Beach Pool Project

Sherry Trenholm, FCSCE, P.Eng., FEC, City of Moncton

The existing Centennial Beach Pool was constructed in 1984, with a membrane lining system that was replaced in 1999 after a high water/flood event. The site of the existing pool was flooded several times by the Jonathan Creek overflow during heavy rain events and spring freshet. These events had a significant impact on the aesthetics of the area, the integrity of the buildings and facilities, and at times, have resulted in abnormally high maintenance and repair costs.

The existing facility had reached the end of its service life, and the City of Moncton determined that the existing pool and all affiliated facilities were to be replaced. The City intends to have the existing facilities repurposed once the new Centennial Beach outdoor public pool facility is operational. The new pool facility was constructed in an elevated location outside of any potential flood zones.

The new Centennial Beach outdoor public pool \$5.8 M construction commenced in 2018 and was substantially completed on budget by September 6, 2019, and is scheduled to open June 20, 2020. The project included new site services, two buildings and amenities. The project objective was to construct a high quality outdoor public aquatic facility that supported the needs of the population, while preserving the natural beauty and qualities of Centennial Park.



A grant of \$750,000 from the Federation of Canadian Municipalities' Municipalities for Climate Innovation Program (MCIP) was awarded for the construction of the new pool. MCIP provides funding, training and resources to help municipalities adapt to the impacts of climate change and reduce greenhouse



gas emissions. Since the existing Centennial pool was located within the Jonathan Creek flood plan which had been flooding the site more frequently with increased precipitation, the relocation of the pool to higher ground was a good fit with the objective of the MCIP program.

A grant of \$500,000 was also received from the Province of New Brunswick.

Through the award of a Request for Proposal, the City engaged the services of Crandall Engineering Ltd. to oversee and manage all related construction and engineering sub-consultant services required for the project. The City of Moncton Facilities Coordinator, Brenda Dore Kidney, CET, was the project manager.

Following is a partial list of the project team members.

- **Civil, Mechanical and Electrical** Crandall Engineering Ltd.
- Building Architect Design Workshop Ltd.
- Landscape Architect BDA Landscape Architects
- Structural
- Valron Engineers Inc.
- General Contractor
 Marco Maritimes Ltd.

An "Open House" was hosted by the City in October 2017 to present the conceptual design prepared by Crandall Engineering, address questions from residents, and solicit feedback from those in attendance. Upon completion of the "Open House", detailed Tender specifications and drawings which incorporated the programming and design options selected by the City were developed for the construction of modern, attractive and appropriate buildings and amenities.

The work completed under the scope of this construction project consisted of the following:

• Construction of facility siteworks;

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- Construction of a new, cast-in-place concrete pool and deck, and all related structural, mechanical pumping and filtration, piping, play structures, and appurtenances;
- Construction of a new beach house with all related mechanical and electrical servicing;
- Installation of new watermain, sanitary and storm sewer systems;
- Construction of new parking lots and facility entrance;
- Installation of landscape features including plantings, trees, fencing, trails, furniture, etc.;
- Reinstatement of St. George Blvd. and landscaped areas.

The pool house was designed to be a "net zero" facility meaning it will produce as much energy as it requires. The pool house is designed to host multiple solar panels on its rooftop. A large portion of the solar panels are photovoltaic and are expected to produce enough electricity for the building

and exterior lighting. Solar hot water panels will also installed to provide hot water to the pool house. This will allow the City to reduce greenhouse gas emissions resulting from the



operation of the new facility and reduce its operational costs. The new pool project is also constructed to be net zero runoff.

Minor Tree cutting was required to accommodate the new facilities. In order to avoid cutting additional trees for stormwater management (i.e. construction of a stormwater detention basin), an underground storage system was constructed under the parking area. A rain garden, built in partnership with the Petitcodiac Watershed Alliance, was also constructed on-site to help polish the stormwater before it is discharged to Jonathan Creek.



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University of New Brunswick A New Venture for Earth Science



Figure 1: Geological map of the Fredericton area, southern New Brunswick, showing example field stops to Silurian meta-sedimentary rocks, Carboniferous sedimentary and volcanic rocks, and Devonian plutonic rocks. Modified from Park and Whitehead 2003.

challenging task in a class of over 200 students to create settings that adequately address the scientific inquiry-based problem solving activities. Providing quality experiences in the field is also challenging with increasing safety concerns and decreasing budgets. Since 2015, UNB Earth science has applied a new creative idea to provide field experience to first-year students for the purpose of engaging with educators in the field and promote Earth Science literacy.

The Environmental Earth Science lecture (ESCI1012) and lab (ESCI1017) course is offered to first-year students in the fall term. Preliminary class surveys confirm that the overwhelming majority have had no previous experience with the Earth Sciences. The Earth Science department has designed a oneday field experience for up to 50 interested students, filling up one big yellow school bus. Two Earth Science professors, one Instructor and several enthusiastic graduate students volunteer their time to embark on a journey to several field stops in the Fredericton area. Our objective is to offer new students an opportunity to learn through direct experience in the natural world, and from their peers among a community of geoscientists. Figure 1 presents a geology map (modified from Park and Whitehead 2003) with example field stops for the fall 2019 class. Without any formal assessment, students can focus on learning in a stress-free environment. Our learning goals include: the introduction of

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The Earth Science and Geological Engineering programs at the University of New Brunswick have prioritized the fundamental need for field experience in the curriculum. An introduction to field skills to university students in their firstyear can create opportunities for first-hand experiences that encourage an appreciation for the outdoors, critical thinking, long-term retention, potential for transformative learning and a general positive attitude toward Earth Science and Earth Science Literacy¹.

Like many Canadian universities, science and engineering students experience their undergraduate science courses in large lecture hall and lab settings. Educators endeavour to provide rich content and engage students in active scientific investigation – it is a



concepts that promote a basic understanding of fundamentals of Earth's many systems, an introduction to basic field equipment, communication about Earth Science in a meaningful way, and learning how to make informed and responsible decisions regarding Earth and its resources.

Our morning begins with roadside geology to see fascinating Silurian and Carboniferous rocks in the context of regional geological history. Silurian rocks along Highway 2 include metasandstones to shales folded and deformed from





the Acadian orogenies (Fyffe 1995). Students hunt for graptolite fossils while learning about stratigraphy (Figure 2), and observe textural features left behind from the eventual closure of the ancient lapetus Ocean during the initial formation of Pangaea. Students later compare folded Silurian rocks to horizontal sandstones and conglomerates of the Carboniferous Period (Figure 3). When the supercontinent Pangaea² was assembled, the Fredericton area was a lush environment thriving with active fluvial systems and forests of Calamites trees. Further along the highway, students hammer away at granitic rocks from the Pokiok Pluton (Figure 3), an extension of the Central New Brunswick Batholith emplaced throughout the Devonian Period³. Many students are learning for the first time about the basic processes behind the formation of the three rock groups in the context of the finishing stage of the Acadian orogenies.

Later, students are exposed to the world of economic geology at the St. George Mine, and discuss the benefits and challenges of mining and resource development for a growing population. From exploration, extraction, processing and reclamation - the mining cycle offers many employment opportunities and plays an important role in the Canadian economy. Our final stop takes the group to Carlisle Quarry, where a Carboniferous volcanic eruption emplaced several basalt flows. Students explore these rocks in the context of geological history, as well as the economic use for industrial materials and the geological engineering principles in constructing an active quarry.

From the formation to the breakup of Pangaea with applications to the modern community, students are exposed to the dramatic geological history of the Fredericton area in one interactive day in the

field. As educators, we can witness enhanced cognitive development in real-time as students engage with their peers and graduate students in active field study. Field experience provides new dimensions to education through "teachable moments" that seldom occur in the large classroom setting. We also recognize that an appreciation for Earth Science literacy is applicable to all disciplines with long-term impacts for students and for the Earth Science profession that will transcend into society.



- 1. Mogk and Goodwin 2012
- 2. Park and Whitehead 2003
- 3. O'Brien 1977

Project Updates Fundy Engineering

Project Violet – 10MW Utility Solar Farm, Brunswick Mills, NB

Tim A. Ryan, P.Eng., Fundy Engineering

C2 Solar Ltd. is a New Brunswick based renewable energy start-up that was formed in 2016 to develop utility scale solar projects in the province of New Brunswick. The strategy of C2 Solar is to reduce overall project risk by securing the necessary project permits to allow the project to proceed. C2 Solar sees emerging opportunities with utility solar as a result of dropping costs for solar panels and associated components, improvements to storage technologies, and a desire to move toward a less carbon intensive form of power generation. Utility scale solar is still in its infancy in Canada, with a total of less than 3000 MW installed with 97 percent of that located in Ontario, and no installations east of Ontario.

The initial 10MW project proposed by C2 Solar, Project Violet, has the potential to supply

approximately 2000 homes and reduce greenhouse gases by over 3t per vear.

Fundy Engineering is the trusted partner to C2 Solar and responsible for providing all professional services in order to make the project happen, including:

- Feasibility Engineering and Conceptual design;
- Site Selection; and.
- **Environmental Impact Assessment.**

Feasibility Engineering and Conceptual Design

Based on preliminary design estimates, a 26.8 ha solar field will be required to yield 10 MW. The solar field will comprise 31 200 panels at 320 W each. The arrays of solar panel modules will be spaced a minimum of 5.7 m apart in order to eliminate overshadowing during all times of the year.

The photo-voltaic (PV) modules are connected to form an array and the arrays will be mounted on aluminum racking tables anchored into the ground. The front of each table will be approximately 2 m above grade while the rear would be about 4.5 m above grade, in order to avoid snow accumulation.

The PV module arrays will be electrically connected to an inverter which will convert the DC electric output from the PV modules into AC electric

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output. The AC power output from the inverter units will feed to an on-site transformer which will step up the voltage to 69 kV for input to NB Power's transmission grid.

Prior to construction, an optimization exercise will be undertaken to determine the best available solar panel technology, as panel outputs continue to improve, less panels and land will be required for the final 10 MW nameplate design.

Site Selection

An optimum site is one where the yields are at or above New Brunswick's annual average solar radiation, as well as:

- Minimal or no sensitive environmental features present, such as;
 - wetlands and watercourses;
 - species at risk;
 - protected wellfields and watersheds; and
 - and parks and managed areas.
- In close proximity to electrical transmission grid with available capacity;
- located away from residential and developed areas;
- is a minimum of 40 hectares and includes expansion opportunities;
- easily accessible and perimeter can be secured without difficulty; and
- local economy can be strengthened.

With the help of Fundy Engineering, a site in northern New Brunswick, south of Bathurst and at the intersection of Route's 430 and 360 was selected. This location makes Pabineau First Nation a close neighbour, and C2 Solar is intent on working with the Pabineau First Nation and the Mi'gmawe'l Tplu'Taqnn Inc. to respect Aboriginal Treaty Rights.

Environmental Impact Assessment

Our New Brunswick Regulations require that a power generator greater than 3 MW must complete an Environmental Impact Assessment (EIA) and receive approval prior to the project proceeding. To that end, C2 Solar registered a 170 page plus appendices EIA document, prepared by Fundy Engineering on 16 July 2019 with the New Brunswick Department of Environment and Local Government (NBDELG). The NBDELG EIA is a comprehensive assessment of the project's environmental impact, based on the baseline environmental condition of the site, the impacts associated with the project and proposed mitigation. EIA approval is pending for 2020.

Closing

C2 Solar is close to achieving its initial goal of securing the project permits to enable a 10 MW solar farm to be built.

Quote from Past President

"Self-regulation is a privilege not to be taken lightly. It was an honour to have the opportunity to be President of our Association and play a small part in maintaining our position as a strong selfregulated profession here in New Brunswick. We should also take pride in the significant influence we've had on the profession at the national level for 100 years."

Jeff Underhill, P.Eng., FEC

Project Updates CBCL

CBCL and Greater Moncton's Water Infrastructure Projects Presented by CBCL

In 2010, CBCL Limited opened an office in Moncton that has grown and expanded to include engineering consulting in municipal, structural, mechanical, electrical and environmental disciplines. CBCL Moncton has recently been involved in design and construction of the TransAqua Waste Wataer Treatment Facility (WWTF) and Moncton Waste Treatment Plant (WTP).

TransAqua Wastewater Treatment Facility Upgrades

The Greater Moncton wastewater collection and treatment system was constructed over the past 30 years to collect and treat wastewater generated in the municipalities of Moncton, Riverview, and Dieppe. It includes a number of trunk collector sewers and tunnels, eight pumping stations, the TransAqua Wastewater Treatment Facility, and a biosolids treatment (composting) facility. In 2014, CBCL Limited began planning for the implementation of secondary (biological) treatment to meet new regulatory requirements. Following detailed design, construction on the site started in August of 2017.



The project is being constructed in phases that include upgrades to existing preliminary treatment, new primary clarifiers, a new bioreactor and blower building, conversion of the existing primary clarifiers to secondary clarifiers plus one new secondary clarifier, new ultraviolet disinfection system, and upgrades to the solids handling processes.

The main project element is the secondary treatment process that will consist of two (2) four-stage step-feed bioreactors configured for biological nutrient removal (BNR). This advanced treatment process will go above and beyond the current regulatory limits.

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Since construction started in 2017 over 100,000 m3 of soil has been moved and 15,000 m3 of reinforced concrete has been incorporated into the project. Construction activity is occurring on four of the five major project phases. Most days there are 50-60 people on the site working for one of six major trade contractors. TransAqua, owner and operator of the site, is acting as the construction manager supported by CBCL Limited. When completed in 2021, the TransAqua Wastewater Treatment Facility will be the largest secondary plant in Atlantic Canada and one of the largest BNR facilities in North America.

Moncton Water Treatment Plant

In 2017 the drinking water source for the municipalities of Moncton, Riverview and Dieppe experienced a significant blue green algae bloom. The Moncton Water Treatment Plant, which provides treated drinking water to the three municipalities, draws raw water from the Turtle Creek and Tower Road reservoirs. The blue-green algae event, which occurred primarily in the Tower Road reservoir, resulted in a vulnerability assessment of the City's WTP with respect to algae and related algal toxins to understand the ability of the WTP to remove these constituents. This assessment, completed by CBCL, has subsequently led to a significant and ongoing Harmful Algal Bloom (HAB) upgrade plan for the WTP.

Phase 1 of the HAB strategy, designed by CBCL, is now under construction and includes an expansion of the WTP structure and retrofit of the existing four clarification basins to an ACTIFLO®-based process. The clarification retrofit will enable the facility to remove significant levels of algal matter that may occur in the future, while also performing efficiently under typical conditions. The retrofitted facility will have a nominal treatment capacity of 75,000 m3/day. The overall treatment process at the end of Phase 1 will include coagulation, flocculation,



clarification, filtration, and disinfection to assure the continued production of high quality drinking water. The Phase 1 upgrade project is valued at approximately \$6,000,000 and will be complete in the summer of 2020.

Phase 2 of the HAB strategy includes the development and addition of ancillary unit treatment processes to enhance the ability of the facility to achieve higher levels of algal matter and algal toxin removal. The development of Phase 2 technologies will be based on pilot testing of options that may include ozonation, activated carbon, and advanced oxidation; all of which are based around the core upgrades being completed during Phase 1. The timeline for Phase 2 is expected to extend into 2022.



Project Updates EXP

Route 15/Harrisville Boulevard Interchange Improvements

Serge Levesque, P.Eng. and Brian Dorcas, P.Eng., EXP

With an Average Annual Daily Traffic Volume (AADT) of approximately 30,000 vehicles per day, the Harrisville Boulevard / Route 15 interchange serves as the primary access point to the City of Dieppe, Greater Moncton Roméo-LeBlanc International Airport, and Dieppe Industrial Park. In recent years, the interchange had operated with significant congestion and safety-related issues, prompting the client, the New Brunswick Department of Transportation and Infrastructure (NBDTI), to search for a potential solution.

After numerous concepts had been ruled out - including a diverging diamond interchange, button-hook ramps, and conventional dual lane roundabouts - EXP developed a concept for a "Dogbone Interchange" in conjunction with a new exit ramp from Route 15 onto Rue Industrial. This unique configuration was unanimously selected as the preferred option by City of Moncton, City of Dieppe, and NBDTI.

The scope of improvements generally included:

- 1) widening of the existing underpass structure to accommodate four lanes of traffic plus a new pedestrian connection;
- 2) upgrading the ramp terminals to teardrop-shape roundabout junctions forming a 'dogbone' configuration;
- 3) introducing a double left turn from the Route 15 Westbound Exit Ramp to Dieppe Boulevard which resulted in New Brunswick's first application of spiralling roundabout geometry; and
- 4) constructing a new Eastbound Exit Ramp from Route 15 to the Dieppe Industrial Park.

The new interchange has yielded many social, economic, and environmental benefits including improved access to major destinations, reduced vehicular congestion, improved road user safety, reduced carbon footprint, and enhanced Active Transportation facilities.

EXP provided a range of professional services to NBDTI for this project including planning, a construction Traffic Management Plan, traffic engineering, and bridge and roadway design. The improved interchange was opened to traffic in 2018, and congestion issues have been resolved. NBDTI and EXP are proud of this innovative project - the first interchange of its kind in the province.

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Excellence + Innovation

The project involved several unique features and challenges including:

- A comprehensive traffic management plan was required to minimize disruptions during construction.
- Given the uniqueness of this configuration, a simulation model was created and presented at a public open house to aid in the public's understanding of the project. Detour drawings were also created to help the general public identify alternate routes in advance of construction.
- The Route 15 underpass structure was required to be widened on both sides, presenting challenges in construction phasing and traffic management.
- Given the poor condition of the existing bridge deck, a combination of partial and full depth deck rehabilitation was undertaken.
- Given the fixed roadway elevation below the bridge, shallower beams were used on the widened sections to ensure that minimum clearances could be maintained.
- The requirement to accommodate Long Combination Vehicles (LCVs) for all turning movements through the interchange presented unique challenges for roadway geometry.
- The interchange was required to be signed and marked to accommodate 13 different destinations, resulting in major challenges

related to proper signing and pavement markings.

- In order to accommodate traffic volumes, a dual left turn was introduced on the WB Exit Ramp from Route 15, which required spiraling geometry to be introduced within the roundabout the first application in a roundabout in New Brunswick.
- In order to accommodate the new pedestrian facility, a retaining wall was built to allow for widening over an existing CN Rail structure.
- Design had to accommodate several existing utility constraints.

Social + Economic Benefits

The project resulted in many positive social and economic benefits including:

- Reduced travel time through the interchange resulted in major savings in fuel consumption and reduced greenhouse gas emissions.
- The new exit ramp from Route 15 EB to Rue Industrial provides more direct access to Dieppe Industrial Park.
- The new interchange provides improved access to Greater Moncton International Airport, which generates approximately 665,000 passengers per year, along with 100 all-cargo flights weekly.
- Road user safety of the interchange was improved, most notably by eliminating queuing of vehicles along the WB exit ramp onto the high speed main lanes of Route 15. Also, roundabouts generally result in improved safety performance compared to equivalent signalized intersections.
- The reduced footprint of the preferred alternative for the interchange improvements minimized property implications.
- The selected configuration resulted in reduced capital cost relatives to other interchange alternatives which required more than four lanes of traffic across Route 15.
- The introduction of a pedestrian connection across Route 15 promotes healthy living by improving connectivity of the local Active Transportation network.



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University of New Brunswick McAllister 2019 Field Trip



UNB Earth Sciences: Silver Standard – McAllister 2019 Field Trip to Spain and Portugal

by Alexandra Gray, Gisèle Rudderham, Matthew Clark, and Jennifer Day

This past May, six undergraduate and six graduate Earth Sciences and Geological Engineering students from the University of New Brunswick attended the biennial Silver Standard – McAllister Field trip. The students, along with two faculty supervisors, Dr. David Lentz and Dr. Jennifer Day, travelled to the Iberian Pyrite Belt and other geologically significant areas in Spain and Portugal. The trip focused on observing the geology of the region, genesis of volcanogenic massive sulphide (primarily zinc and copper) ore deposits, mining processes involved with extracting various mineral resources, environmental remediation associated with mine closure, and rock mechanics aspects of surface and underground excavation construction. During the trip, the group visited historic and active mine sites, significant deposits and outcrops, and sites of impressive geological engineering feats. All of this was immersed in the fabulous cultures of Spain and Portugal. Prior to the trip, each student was assigned a presentation topic of one of the sites to be visited. Each student researched their topic and prepared a brief presentation for the group in the field.

Beginning the Silver Standard – McAllister Field trip in Madrid, the group travelled south through Spain and west into southern Portugal. During the first leg of the trip through Spain, we visited and travelled through the Spanish cities of Toledo, Córdoba, Seville, and Aracena, where we

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visited many significant cultural and historic landmarks. In between these cities, we visited several notable geological sites, including the historical Almadén mercury mine (a UNESCO World Heritage Site), Gibraltar, Minas de Cala iron skarn deposit, and the active Rio Tinto open pit mine (*Figure 1*) before heading into southern Portugal.

In Portugal, we stayed in the major cities of Albufeira, Lisbon, and Porto. While traveling through Portugal, we visited the active Neves-Corvo zinc-copper underground mine. Here, eight students were selected to go underground to see the ongoing operation and mining of the massive sulphides and stockwork systems. This was a fantastic experience for the students, and the first-time underground for some, who visited two active mining fronts, a drill rig, and a drill core facility. The students also visited inactive open pits including Tharsis and Sao Domingos, and toured the Minas do Lousal. These historic mine sites are accessible to the public and have educational exhibits about the mining cycle (including exploration, extraction, and environmental reclamation) and the importance of mineral resources to modern lifestyles and technologies. As the trip progressed northwards in Portugal, we left the Iberian Pyrite Belt for the active Panasqueira tungsten underground mine. Eight students went underground to see the unique, subhorizontal vein-hosted wolframite deposit (Figure 2). This tour included visiting several active mining fronts, a drill rig drilling blasting holes, observing different types of ground support, and the mining cart system in operation. Between our two underground site visits, all of the students had the opportunity to go underground at least once, which for all was a particularly exciting experience after spending years learning about mines in the classroom! Our final site visit in Portugal was a tunnel engineering tour with Jorge Quelhas in a completed section of the Porto Metro to discuss the engineering design and construction of the subway tunnels and stations in the city.

Upon returning to Spain across the northern border of Portugal, we first visited the rock mechanics research group led by Dr. Leandro Alejano at the Universida de Vigo to see advanced geomechanical rock laboratory testing equipment and to go on a field visit to the precariously perched Equilibrium Stone (*Figure 3*). From Vigo, we continued our journey to visit the towns of Santiago de Compostela, Salamanca, and San Lorenzo de El Escorial, on our route back to Madrid. A



highlight of our geological site visits in the northwestern region of Spain is Las Médulas, which is an ancient Roman paleo placer gold mine and another UNESCO World Heritage site. Our final site visits before Madrid included the longest preserved ancient Roman aqueduct in Segovia, and one of the best preserved historic walled cities in Europe, Ávila. Both of these sites are fantastic examples of engineering using rock materials that have stood the test of time through hundreds of years.

Overall, the trip was a resounding success! Students in the group came from different academic backgrounds, mainly economic geology and rock mechanics, and it was clear that all were eager to learn and share their knowledge with one another. The exposures that this trip gave to all the students were broad, ranging from historic Roman mines to active modern mines and from the famous Iberian Pyrite Belt to other geologically impressive regions. This field trip will certainly leave a lasting impact on all of the students and what they have learned will be invaluable as they move forward in their academic and industrial careers.

Acknowledgements: The technical success of this trip would not have been possible without our site hosts and staff in Spain and Portugal from the active mines Neves Corvo and Panasqueira, Spanish Geological Survey, Portugese Geological Survey, Metro do Porto, Universida de Vigo, Almaden Mining Museum, and Lousal Mining Museum. We are also very grateful for the generous donations that made this trip financially possible, from APEGNB, Galway Metals, Klohn Crippen Berger, Wolfden Resources Corporation, BGC Engineering Inc., and the Silver Standard – McAllister Mineral Deposits Study Fund. Gracias y Obrigado!

Quote from Past President

"If the purpose of regulation is to protect the public by setting standards and guaranteeing the competency of practicing engineers, then surveillance requires in-depth expertise—best provided by the profession, not by [government] bureaucrats."

Patricia Dineen, P.Eng., FEC

Project Updates Stantec

Bringing Innovative Ideas to Life

Peter Crowe, PEng, Senior Principal, Region Leader (Atlantic Canada), Stantec

Nothing great ever happens by accident. Or in isolation. Great things happen when smart people with equal parts talent and determination come together to create what couldn't be done alone. At Stantec, we don't just know this—we live it.

As one of the largest professional consulting firms in Atlantic Canada, our seven office locations are home to 700 staff, including 265 in New Brunswick. We are a community partner in enhancing experience through design and sustainable solutions. Together, we contribute to New Brunswick by designing infrastructure, shaping our province's landscape, respecting our local environment, and giving back in our local communities.

We care because we live here. From large-scale developments to challenging neighborhood projects, we've had the opportunity to serve the communities we're personally invested in throughout New Brunswick for over 55 years.

Most recently, our inventive and collaborative approach to problem solving has helped us bring some innovative ideas to life.

Fundy Isle Submarine Cables Replacement Design

The Transmission Fundy Isles Submarine Cables form part of 69 kV Line from Deer Island to Campobello (3.4 km) and from Campobello to Grand Manan (16.4km) in New Brunswick.

The undersea cables, installed in 1978, were approaching the end of their 40-year life. To continue providing power to the Islands, NB Power required replacement cables to be installed while existing cables remained in service – to be decommissioned at later date.

Stantec partnered with Teshmont Consultants and Marenco Engineering to provide a cost-



effective solution that would be environmentally sound, and delivered within a quick timeframe. Presenting a single cable with a 3-core design allowed for the project to limit impact on local fisheries, marine wildlife, migratory birds, and species at risk in the area. Partnering with multiple groups allowed for the leveraging of diverse skills for this challenging project.

Route 105 Two Nations Crossing Roundabout

The intersection of Route 105 and Two Nations Crossing in Fredericton presented traffic safety problems, with serious collisions occurring, and the layout of roadways contributing to significant traffic congestion during peak periods on the City's northside.

Design changes were required to improve safety to motorists and pedestrians and to improve traffic flow. Stantec came up with a solution that would alleviate these problems while anticipating the communities' traffic needs for decades to come.

Our design not only increased traffic safety, it assisted the City's transit authority and enhanced emergency response times by providing better traffic flow to the area. A future connection for pedestrian traffic from the nearby retail area to the residential area to the west of the roundabout was also considered in the design.

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jurisdictional approvals and licenses within 20 months of commencing the environmental permitting phase of the project.

Our team received the 2018 ACEC-NB Pinnacle Award as the top ranked entry for our work on this project.

Tesla Canadian Supercharger Network Deployment

In their aim to make electric vehicles more consumer-ready, Tesla began building a network of 480-volt, fast-charging supercharger stations that would allow for quick vehicle charging. With a network of high-powered superchargers located across the US, Europe, and Asia, they were ready to further expand into Canada.

Tesla retained our integrated team of engineers to provide design, engineering, and utility coordination services for this fast-paced project, which includes several superstation site installations across New Brunswick. The supercharger is a proprietary direct current (DC) technology that provides up to 120-kilowatts of power per car.

Our scope for each site includes complete electrical, structural, civil, and landscape engineering as well as coordination with the electrical utilities.

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PEI-NB Interconnection Upgrade Environmental Impact Assessment (EIA)

An improvement and modernization to the electrical power transmission system between Prince Edward Island and New Brunswick was required due to an increasing power demand and the existing cables nearing the end of service life. To install, and operate, two new high voltage submarine cables between the provinces an environmental impact assessment was required.

Stantec worked with Maritime Electric and PEI Energy Corporation to collect the necessary data and prepare permit applications and an environmental assessment to meet multijurisdictional regulatory requirements.

In consultation with First Nations and provincial archaeological departments, we provided a permitting strategy, a solid and defensible environmental assessment, as well as technical support for the project which received multi-

Quote from Past President

"My APEGNB President's term was a major accomplishment leading an organization predominately controlled by men, running executive and council meetings, travelling throughout Canada, attending numerous public speaking engagements and hiring the first full-time communications director.

A strong working relationship with government is key to communicating the special skills, knowledge and experience that the engineering profession possess along with the importance of APEGNB being self-regulated to protect, promote and maintain the health and safety of the public. Pursuing an engineering career has been a life changing experience, labour of love and has provided me unlimited personal, professional and volunteer opportunities.

Congratulations to APEGNB on their 100th anniversary and their endless commitment and support to students and their members."

Sherry Trenholm, P.Eng., FEC

Project Updates Canadian Nuclear Laboratories

Innovating Cyber Security Solutions for Industrial Facilities

Dave Trask, PEng and Marienna MacDonald, PEng, Canadian Nuclear Laboratories

In the past, industrial facilities were designed with safety and physical security in mind, but with the explosion of the digital age, cyber security has become a growing and urgent concern. In addition to an increase in targeted cyberattacks on industrial control systems such as TRISIS, CRASHOVERRIDE, and STUXNET, collateral attacks on industrial systems are also increasing in likelihood such as the ransomware attack named WannaCry that indiscriminately targeted unpatched Windows

Operating Systems. With the evergrowing threat landscape, industry must continue to strengthen their defenses with a focus on achieving resilience to the inevitable attack, to ensure that the safe and reliable operation of their industrial systems are not impacted by cyber events.

While there is a large commercial industry catering to the cyber security of information technology (IT) systems such as those handling personal information, financial data or intellectual property, the cyber security of operational technology systems (OT) – the industrial equipment operating our nuclear power plants, refineries

and pulp mills - draws far less attention. A large industrial facility typically has thousands of digital devices distributed among a wide array of important systems (e.g., plant process control, HVAC, fire suppression, physical security, electrical power), all requiring consideration for cyber security vulnerabilities. Unlike IT systems, OT systems are often bound by strict regulatory requirements and rigorous change controls that introduce complexities, risks and costs that are substantially higher for any modernization or modification effort, and therefore requires specialists in OT systems with cyber security expertise. For example, the practice of software patching is an effective means of deploying security upgrades to IT systems and patches are deployed on a regular basis. However, OT systems are typically operating 24/7 and require rigorous, time consuming and costly processes to ensure that any software patches that are introduced are safe and don't have undesired impacts on plant processes. When IT practices are applied to OT system, undesirable things can happen! NASA experienced this firsthand when it deployed a patch intended for an IT system to a computer that was connected to a large scale oven that contained spacecraft hardware. When the computer was rebooted the control software stopped running, resulting in the oven temperature rising, a fire, and the destruction of the spacecraft hardware. The fire went undetected for 3.5 hours because the patch also impaired the alarm function.

There are many other differences between IT and OT systems as illustrated in the figure below:



Cyber Security Myths and Realities

There are also several myths regarding industrial systems and why they may be immune to a cyberattack:

- "System is not connected to the internet": The Shodan Intelligence Extraction project that began collecting data in 2012 by scanning the internet looking for attached industrial devices, has identified over 600,000 SCADA or control systems devices or related software products. There are many examples of "work arounds" or temporary changes where network connections are made for good reasons but may be left in place or improperly secured.
- 2. A system that is "air-gapped" is protected: This is true only if the system has no connectivity capability (i.e., no ports, no wireless

capability), no drives that support external storage (e.g., CD drive), and no means to support software or configuration updates. If any of these attributes is true, then there is opportunity to compromise the system without having a connection to the internet. The infamous Stuxnet attack was spread via a USB flash drive, effectively defeating the protection an air-gap offers by exploiting security holes related to the handling of removable media by humans. Eventually every digital device will require some interaction for maintenance or configuration and if the tools or media used to interact with device are compromised then the device itself can be compromised.

3. "Security by obscurity" – Attackers are specifically attacking Industrial Control Systems (ICS) systems, including older technology. For example, recent attacks have occurred against the Ukraine Power Grid, causing a widespread power outage during winter for up to six hours and required at least two months for the control centres to fully recover. No system is immune to an attacker's interest, nor are attacks perpetrated on a tight, predictable timeline. "System is protected by a firewall" – Unfortunately, a firewall can only block unwanted network traffic but offers no protection against malware that is communicated via legitimate services.

Solution Path

It becomes quickly apparent that cyber security is not achieved by technology alone. An effective cyber program has a wide mandate that needs to consider cyber security in supply chain, installation, operation, maintenance and decommissioning activities. The program requires an understanding and analysis of cyber risk and substantial investment to manage the risk, thus involving executive support, strong policy development and engagement across organizational boundaries. Participation is required not just from information technology (IT) and process control departments, but also from physical security, information security, engineering change control, supply chain, human resources, the training department, and so on.

Canadian Nuclear Laboratories (CNL), formerly Atomic Energy of Canada Ltd. (AECL), is among the many organizations in New Brunswick focused on developing cyber security solutions for the nation. CNL is Canada's premier nuclear science and technology laboratory, dedicated to developing peaceful and innovative applications from nuclear technology. It is headquartered in Chalk River, Ontario on a 9,000 acre site that is home to 17 nuclear facilities and over 3,000 employees.

CNL has long had a presence in Fredericton, where the team has a strong background in developing and deploying plant display systems for mission critical applications. Now, CNL is focused on helping industry partners achieve the necessary cyber security posture for their ICSs, supported by CNL's new state-of-the-art facility that provides the physical equipment and network infrastructure for modelling real plant processes.

APEGNB Foundation for Education - 2020 Scholarship/ Prize Recipients

UNIVERSITY OF NEW BRUNSWICK

APEGNB Entrance Scholarship Joshua J.L. Ellis \$5000

APEGNB/TD Entrance Scholarship Zoe M. Devries \$5000

D.O. Turnbull Memorial Scholarship Anna K. Miller \$3000

> Grandy, Gibson, Holmes Memorial Scholarship **Kiera Dolan** \$3000

APEGNB Prize - Saint John Karyn A. Codjoe \$2000

APEGNB Prize - Fredericton Ethan C. O'Connell \$2000

ADVANCED STUDIES

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Advanced Studies Scholarship, Masters Gabriel Goguen, IS \$5000

Ottis I. Logue Graduate Scholarship, Masters **Réjean Belliveau, IS** \$5000 Advanced Studies Scholarship, Masters **Troy Dobson, MIT/GIT** \$5000

UNIVERSITÉ DE MONCTON

APEGNB Entrance Scholarship Adrien Arseneau \$5000

APEGNB Entrance Scholarship Christian Richard \$5000

Graham MacDonald Memorial Scholarship François-Guillaume Landry \$3000 APEGNB Prize Josée Doucet \$2000

Project Updates RJ Bartlett Engineering Ltd.

Innovative Ideas for Proven Solutions

By Luc Doucette, PTech

Architectural innovation has been a defining feature of societies, changing to suit the needs and desires of the builders and occupants as they evolve. From energy-efficient designs to interconnected spaces, designers and builders have been looking for creative ideas to renew buildings and contribute to defining communities.

Up until the 1995 editions of building and fire codes in Canada, the approach for implementing innovative design solutions was by developing equivalencies. The National Research Council of Canada recognized the need for the building and fire codes to better facilitate innovation, and thus, at the turn of the century, the committee responsible for developing national building regulations, the Canadian Committee on Building and Fire Codes, began working on a review of the codes. This included the identification of objective and functional statements that would enable code users to more readily develop and assess alternative methods to meet the intent of the acceptable solution requirements of the National Building and Fire Codes of Canada (NBCC/NFCC). The 2005 versions of the NBCC/ NFCC were the first editions that included alternative solutions. These performancebased solutions could be applied to new innovative designs, as well as upgrades to existing buildings where conforming with today's standards can be cost-prohibitive and/ or impractical.

RJ Bartlett Engineering Ltd has been a strong proponent for the development of alternative solutions for new building designs and renovations. Our team, which includes three formally educated Fire Protection Engineers, employs various methods including fire and egress computer models, and traditional mathematical approaches, to evaluate possible fire scenarios and relatively effectiveness of fire protection measures.

Our employee-owned firm has been providing fire protection engineering solutions since 1987. Our goal on any project is to ensure that the overall design meets both the fire protection and life safety objectives of the Codes and Standards, as well as the requirements of the client, from both an economic and design standpoint.

Two of the recent projects we have been able to deliver over the past year are highlighted here:

Avenir Centre, Moncton, NB

The Avenir Centre is a new 8,800 seat multi-use arena facility in Moncton, NB that was completed in 2018.

RJ Bartlett Engineering Ltd was retained by Bird Construction Company to develop a performance-based alternative solution to satisfy the requirements of the NBCC. Specifically, with regards to the provision of a smoke management system designed to maintain tenable conditions in egress routes and egress systems that can facilitate occupant evacuation before untenable conditions are reached.

As project fire protection engineer, our firm employed computer fire and evacuation modeling to establish design criteria for the smoke management system, confirm that sprinklers were not required at the high ceiling elevation above the performance surface, and validate the egress system design.

We worked with a multi-discipline team of consultants and the Authorities Having Jurisdiction to refine the designs to meet the criteria established by the modeling. The employment of advanced



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fire protection engineering fire/evacuation modeling, and use of advanced fire detection systems demonstrates an engineering achievement in the development of a comprehensive approach for life safety in a state-of-the-art arena facility not attempted before in New Brunswick.

The project design team was led by Populous and Stantec's architecture groups. The engineering team consisted of BMR Structural Engineering, RSEI Consultants Ltd, Smith & Andersen, and Maritech Commissioning Works Ltd.

Province House National Historic Site, Charlottetown, PE

Also known as the birthplace of confederation, Province House National Historic Site located in downtown Charlottetown, PE, is a legislative building that was constructed in 1847. Due to its unique characteristics and significant historic features, specific construction requirements of the NBCC related to the interconnection of floors and egress systems could not be prescriptively satisfied during its restoration, a project that began in 2014.

Computer-based fire and egress simulation software was utilized in the development of a performance-based alternative solution that consisted of several enhanced fire and life safety components which compensate for these prescriptive discrepancies, and ultimately demonstrated an ability to minimize risks related to life safety and fire spread.

As a more specific example, it was estimated that under peak loading



conditions, occupants were able to evacuate the building prior to reaching the temperature, visibility, and carbon monoxide thresholds (i.e. tenability limits) along egress paths. Through an iterative exercise, volumetric capacity and configuration of a dedicated smoke exhaust system was optimized and also leveraged contemporary technology in the form of an air aspirating smoke detection system which promotes a more rapid response to fire conditions.

We recognize that it is important to maintain the rich history and culture of buildings like Province House. RJ Bartlett Engineering Ltd takes pride in developing creative, performance-based approaches to ensure the life safety of the occupants in these iconic building is upheld.

In close collaboration with the project design team, we were able to provide a balanced solution to the Client, Parks Canada, with due consideration for contemporary code intent and the preservation of the building's integral historic fabric. Province House benefitted from a strong design team. The conservation project was structured in multiple phases led by Robertson Martin Architects and DFS Inc. Architecture & Design. The Engineering team was comprised of John G. Cooke and Associates Ltd, Ojdrovic Engineering Inc., Jokinen Engineering Services, MCW Consultants, and CBCL Limited.



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Quotes from Past Presidents

"Self-regulation is a privilege that has been delegated to APEGNB and its Members to ensure that the public interest is protected. This means our Association must be accountable, open and transparent in our regulation of our profession in New Brunswick. Otherwise some other body, such as the provincial government, will do it for us. Over three hundred volunteers annually assist through Council, committees and boards in (a) assessing the qualification for registration, (b) providing guidance to members in the form of code of ethics, rules of professional conduct and standards of practice, (c) maintaining a public register and (d) investigating complaints about Members and discipling members as required.

Self-regulation is important to us as engineers and geoscientists and should be taken seriously by all Members."

Don Good, P.Eng., FEC

"Years ago, Canadian legislatures passed statutes recognizing engineering knowledge as specialized, only to be applied in the public domain by appropriately educated persons, they to be henceforth designated as "professional engineers" and self-governed by Professional Associations. The said associations were charged with setting and enforcing safe standards of performance, all in the name of protecting the public good. Practitioners became duty-bound in their work to know and recognize the unknowns as well as the current established knowledge base, and to act accordingly.

It has been a privilege and my pleasure to have been involved in various roles and over 50-plus years in our Association's development and maintenance of standards for both the education of engineers and the expected norms of their project performance."

W.G. Paterson, P.Eng., FEC

"Self-regulation is not to be taken lightly or for granted. Our ability to self-regulate shows the maturity and knowledge our professions have and how they are regarded publicly and privately. It is an honour to have the right to self-regulate."

Tanya Horgan, P.Eng., P.Geo., FEC, FGC

"During the 1990's many geologists in Canada were lobbying for a system of regulation and registration for its members in order to address public safety and ethical accountability. The collapse of Bre-X mining shares in 1997 resulted in a large stock scandal exposing the vulnerability of investors to unregulated reporting of mining and mineral exploration. This was a catalyst for governments to move towards professional registration of geologists.

As a proponent of self-regulation and as a former President and Member, I am of the opinion that public and the professions are best served, when professional associations regulate the conduct and standards of their members. Such organizations have the knowledge and experience to evaluate the professional conduct of others and the added inducement that their own reputations are tarnished by any misdeeds that reflect poorly on the professions."

Bruce Broster, P.Geo., FGC

"We should always remember that it is a privilege, not a right, to be a self-regulating profession."

John Wheatley, P.Eng. FEC

"Who better to understand and protect the public where engineering and geoscience issues arise than those who best understand the technologies involved. Our self-regulated Engineering & Geoscience Professions Act provides the protective strength our public deserves.

Our Membership can enhance our obligations to the public by staying involved and volunteering our valuable time and energies to APENGB to weather future challenges."

Mike MacDonald, P.Eng., FEC

"Society has bestowed upon APEGNB the right to self-governance and self-regulation with the expectation that engineers, and geoscientists meet and maintain certain standards. Therefore, APEGNB must ensure that people who represent themselves as engineers or geoscientists, are fully qualified and licensed practitioners."

Wolfgang Faig, P.Eng., FEC

"I believe self-regulation is important for professional engineers and geoscientists due to the broad reaching work we do, and we are responsible to protect the public interest with respect to legal, ethical, environmental and safety concerns in everything we do. It is essential that we each take ownership of our responsibility to work within the limits of our own knowledge and capabilities, and to engage the knowledge and capabilities of other professionals where appropriate to ensure our work meets these expectations. Being regulated by your peers adds an additional layer of accountability to each other, resulting in a culture of professionalism and excellence to which we all aspire."

Christine Plourde, P.Eng., FEC

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