

# PROJECT SUMMARY SHOWCASE



**FUNDY Engineering**

*Serving Our Clients' Needs First*

**OFFICES IN SAINT JOHN AND CLYDE RIVER**





**BIO-RESOURCES**



## Engenuity Feature

This Project was the feature article in the New Brunswick Association of Professional Engineers and Geoscientists Fall-Winter edition (No. 145) of Engenuity Magazine

### ENVIRONMENTAL RESEARCH, MONITORING, AND COMPLIANCE AND FISH HABITAT COMPENSATION

## Ghost Fishing by Derelict Lobster Traps in LFA 36

SAINT JOHN, NEW BRUNSWICK



### PROJECT DATES

- August 2008 – Side scan sonar survey
- August and September 2008 – Grapnel prototype design
- August and September 2008 and September 2009 – Derelict trap retrieval and assessment
- December 2009 – Research report completion
- December 2009 – Fish Habitat Compensation approval by DFO

### CLIENT REFERENCE

Mr. Fraser Forsythe, *P.Eng.*  
Health, Safety, Security, and  
Environment Manager  
Canaport™ LNG<sub>LP</sub>  
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### PROJECT OVERVIEW

Bay of Fundy lobster fishers feared that construction of the Canaport™ LNG<sub>LP</sub> facility would raise the incidence of fishing gear loss as a consequence of increased commercial vessel traffic in the Bay. This was a concern to local fishers because some lost / derelict lobster traps are known to ghost fish; a process whereby the gear lethally fishes for target and non-target species.

During construction and anchoring of the large pier bases for the Canaport™ LNG<sub>LP</sub> marine terminal, 2 445 m<sup>2</sup> of seafloor was impacted for which compensation was required as per Section 35(2) of the *Fisheries Act*. In cooperation with local fishers, the Fundy North Fishermen's Association, and the Department of Fisheries and Oceans, Canaport™ LNG<sub>LP</sub> launched a Derelict Lobster Trap Retrieval Project to protect and sustain the traditional lobster fishery. Fundy Engineering was contracted to undertake this innovative project.

Conservatively, it was estimated that each lobster trap has a fishing area of 78.5 m<sup>2</sup>. Through recovery of 540 derelict lobster traps, Canaport™ LNG<sub>LP</sub> provided a compensation ratio 4.5 times that necessary for their seafloor impacts during construction of the marine terminal. This cooperative Project was deemed a considerable success by all parties involved as it provided valuable data and helped in sustaining a local livelihood.

### CORE PROJECT TEAM

Tim Ryan, *M.Eng., P.Eng.*  
Peter McKelvey, *P.Eng.*  
Matthew Alexander, *Ph.D., P.Geo., EP*  
Chris Mayes, *P.Tech.*  
Joel Forsythe, *P.Eng.*  
Philippe Arseneau, *P.Tech.*

Project Manager  
Senior Associate  
Senior Environmental Scientist  
Environmental Technologist  
Environmental Support  
GIS Specialist

### SCOPE OF SERVICES PROVIDED

- Derelict lobster traps in the Project area were identified using side scan sonar
- A gridded search pattern across 49.25 km<sup>2</sup> of seafloor yielded 2 971 potential derelict lobster traps
- Average trap density was calculated at 60 traps · km<sup>-2</sup> of seafloor
- Specially designed grapnels were used by the local fishers to retrieve gear
- 540 derelict lobster traps were retrieved from the seafloor during the 40 days on the water during 2008 and 2009 (many crab were also retrieved)
- The traps recovered ranged in age from one year to 23 years; of the traps retrieved, 198 contained animals
- Field data suggested a ghost fishing incidence by derelict traps of 37 %
- The 198 ghost fishing traps yielded a bounty of 579 lobster with a combined total weight of 610 kg
- Based on the estimated 654 derelict lobster traps that were fishing in the area, the total annual loss of lobster to local fishers may be about 9 624 animals or ~ \$100 K in annual profit loss

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# Tunicate Control at Mussel Farms

SEVERAL LOCATIONS, PRINCE EDWARD ISLAND

## BIO-RESOURCES ENGINEERING



### PROJECT DATES

- Fall 2008 – Site visits to assess various technologies used manage fouling by tunicates on PEI mussel crops
- Winter 2008 / 2009 – Findings of the technical assessment reported to client and recommendations made for enhancements
- 2010 and 2011 – Evaluation of refined technologies



### CLIENT REFERENCE

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Atlantic Veterinary College  
University of Prince Edward Island  
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### PROJECT OVERVIEW

The mussel culture industry in Prince Edward Island was plagued by the invasion of tunicate species. The tunicate fouled mussel culture equipment, which increased handling costs and decreased yields. Several *ad hoc* technologies had been developed to counter the threat posed by tunicates. The Atlantic Innovation Fund Tunicate Project Team engaged Fundy Engineering to evaluate the concepts with a view towards improving their designs and ensuring their safe construction and operation.

The work involved meeting with several mussel growers on Prince Edward Island and going out on the water with them to view the various concepts used to control tunicates, including high pressure sprays, low pressure sprays, lime spray boxes, liming troughs, and manual liming. Members of our project team also visited several local machine shops to see how the various concepts were manufactured. Through an understanding of the structure, biology, and ecology of the organism and during our review of the various concepts, we provided the client with several recommendations for design improvements.

During later work, we conducted an objective evaluation of refined technologies, such as different nozzles and spray pressures, different sized lime spray boxes, thickened lime solutions, and underwater pre-sprays and provided results of the evaluation to the client.

### CORE PROJECT TEAM

Peter McKelvey, *P.Eng.*  
Hector Lamprea, *P.Eng., P.E., CEM*  
Chris MacPherson, *P.Eng., CESA*  
Michelle Gough, *P.Eng., CESA*

Senior Associate  
Mechanical Engineer  
Project Support  
Project Support

### SCOPE OF SERVICES PROVIDED

#### *Mussel Grower Interviews*

- Several individuals were interviewed in order to identify the pros and cons of the different tunicate control concepts

#### *Tunicate Control Equipment Assessment*

- Detailed observations, both on land and on the water were made for the various tunicate control equipment while in operation

#### *Safety Review of Process*

- During our review of the various technologies, we made comments on the overall safety of the equipment

#### *Improvement Recommendations*

- We provided recommendations on the most effective approach for equipment development to respond to the mussel industry's needs



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# Pilot-Scale Introduction of Wild-Trapped Wild Turkey

SOUTHCENTRAL, NEW BRUNSWICK

## ENVIRONMENTAL CONSTRAINTS MAPPING AND ENVIRONMENTAL IMPACT ASSESSMENT (EIA)



### PROJECT DATES

- Fall 2011- Environmental constraints mapping and landowner consultations
- Winter 2011 / 2012 – EIA preparation
- March 2012 – EIA registration and response to technical review committee questions
- Decision on the EIA is still pending



### CLIENT REFERENCE

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National Wild Turkey Federation  
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### PROJECT OVERVIEW

Enterprise Fundy, in partnership with the Rural Economic Development Alliance, proposed a four-year pilot-scale introduction of wild-trapped eastern wild turkey (*Meleagris gallopavo silvestris*) to southcentral New Brunswick. The formal introduction of wild turkeys was proposed to bolster the organic ecological expansion of the species and preclude the release of domestically-raised strains, which has been an issue in the past. It is hoped that the establishment of a wild turkey population would lead to a sport hunt in the Province, which would provide significant employment and new revenue opportunities.

Fundy Engineering worked with the proponents and stakeholders to identify several suitable large tracts of land in close proximity to the Maine border for releasing turkeys. Four release sites were selected based on climate suitability, land size, habitat suitability, food availability, and social acceptance. Through the EIA process, potential negative and positive environmental impacts were assessed. Through the implementation of mitigation measures, the proponents are confident that there will be no negative impacts as a result of the release.

Although the introduction of wild-trapped wild turkey to southcentral New Brunswick has not yet been approved, the population continues to increase as the birds naturally migrate northward.

### CORE PROJECT TEAM

Tim Ryan, *M.Eng., P.Eng.*

Matthew Alexander, *Ph.D., P.Geo., EP*

Peter McKelvey, *P.Eng.*

Stephen Little, *P.Tech., CESA*

Project Manager

Senior Environmental Scientist

Senior Associate

GIS Mapping

### SCOPE OF SERVICES PROVIDED

#### *Environmental Constraints Mapping*

- Considerable mapping using geographical information systems was undertaken to identify suitable large tracts of land in close proximity to the Maine border for undertaking the release
- This also involved consultations with landowners

#### *Environmental Impact Assessment*

- The introduction of a wild species to New Brunswick requires registration and review under the EIA process
- Preparation of the EIA was done working closely with members of the Wild Turkey Federation and New Brunswick First Nations Communities
- During review of the EIA, the technical review committee posed several questions to the proponent, which Fundy Engineering prepared a detailed response

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# Breviro Caviar Shortnose Sturgeon Hatchery

PENNFIELD, NEW BRUNSWICK

## ENVIRONMENTAL IMPACT ASSESSMENT (EIA)

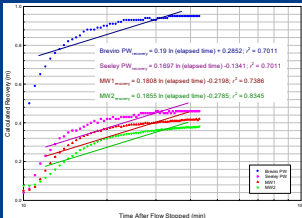
AND

## COMPREHENSIVE WATER SUPPLY SOURCE ASSESSMENT (CWSSA)



### PROJECT DATES

- Fall 2012 - CWSSA field work
- Winter 2012 / 2013 – EIA document submitted for regulatory review
- February 2013 – Final EIA approval



### CLIENT REFERENCE

Mr. Jonathan Barry  
Breviro Caviar Inc.  
181 Mealey Road  
Pennfield, NB E5H 1T3

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📞: 506.644.8596

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### PROJECT OVERVIEW

Breviro Caviar Inc. is the only licensed captive breeding producer of shortnose sturgeon (*Acipenser brevirostrum*) in the world. During the summer of 2011, Breviro noticed considerable quality changes and some decreases in quantity of their existing groundwater supply. Concentrations of copper attained levels lethal to *brevirostrum* and resulted in some mortality. To protect the remaining fish at the hatchery, Breviro increased their water withdrawal from a secondary water source, a small stream, until a new groundwater supply could be obtained.

In the winter of 2012 / 2013, Fundy Engineering completed hydraulic testing within a 20.32 cm diameter production well installed on the property of the nearby Crystal Springs hatchery. At the time of installation, that flowing artesian well yielded about  $275 \text{ L} \cdot \text{min}^{-1}$  of water. That overflow was sufficient to supply Breviro's hatchery needs.

A 92-hour constant-rate free-flow test was conducted on the production well while the production well at Crystal Springs was simultaneously and continuously pumped. Drawdown throughout the hydraulic testing was measured within several monitoring wells. Characteristics of the confined sand and gravel aquifer were determined to be  $710 \text{ m}^2 \cdot \text{day}^{-1}$ ,  $6 \times 10^{-5}$ ,  $1140 \text{ m}^2 \cdot \text{day}^{-1}$  and  $19800 \text{ m}^3 \cdot \text{day}^{-1}$  for transmissivity, storativity, long-term specific capacity, and sustainable yield, respectively. The results confirmed that water was available in sufficient quantity and suitable quality for Breviro's needs.

### CORE PROJECT TEAM

Matthew Alexander, *Ph.D., P.Geo., EP* Senior Environmental Scientist  
Stephen Little, *P.Tech., CESA* GIS Specialist

### SCOPE OF SERVICES PROVIDED

#### Baseline Data Collection

- Included the installation of a production well and performing a comprehensive water supply source assessment
- A 92-hour constant-rate free-flow test was completed
- The response of the aquifer to the free-flow extraction and the amount of groundwater available for extraction was determined using the data collected during the test
- Water quality of the groundwater at the site was determined and compared to the Canadian Drinking Water Quality Guidelines

#### Environmental Impact Assessment Registration Document Preparation

- An Environmental Impact Assessment document was prepared for regulatory

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# Aquaculture Technical Due Diligence

NORTH AMERICA, SOUTH AMERICA, CENTRAL AMERICA, AND EUROPE

## OPERATIONAL ASSESSMENTS



## PROJECT DATES

- Winter 2020/2021 - Development of workstreams and comprehensive asset checklists
- Spring 2021 – Asset visits and assessments
- July 2021 – Report issued to Client



## CLIENT REFERENCE

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PSP Investments  
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## PROJECT OVERVIEW

Fundy Engineering in partnership with SIMCorp conducted a due diligence exercise to support an investment decision by the Crown Corporation Public Sector Pension Investments Board. The exercise was completed for a cross-section of a global portfolio of integrated aquaculture and seafood businesses. The cross-section of assets assessed included two feed mills, one broodstock holding facility, five hatcheries, 37 on-grow sites, a shipyard, 18 vessels, and 15 seafood processing facilities.

The assets were evaluated against a dozen technical, operational, environmental, sustainability, and governance workstreams developed in collaboration with the Client. Given the various skill sets required to conduct the due-diligence, the global extents of the assets, and the complications for travel because of the COVID-19 global pandemic, approved specialty subconsultants were engaged.

Comprehensive due-diligence checklists were developed for each asset type and each applicable workstream. Use of those checklists ensured a consistent set of data were collected regardless of the sub-consultant that completed the work and geographical location. The report issued to the Client included snapshots for each asset assessed. It also identified instances of noteworthy performance, potential risks and areas for improvement for the assets.

## CORE PROJECT TEAM

Tim Ryan, *M.Eng., P.Eng.*  
Crystal Caines, *P.Tech., PMP*  
Matthew Alexander, *P.Geo., Ph.D., EP*  
Greg Derrah, *P.Tech., CESA*  
Lindsay Cail, *P.Tech.*

Project Coordinator  
Project Manager  
Senior Environmental Scientist  
Environmental Technologist  
GIS Specialist

## SCOPE OF SERVICES PROVIDED

### *Technical and Operational Workstreams*

- Upstream operations and hatcheries fish health
- Aquaculture farming infrastructure
- Farm numbers, health, and reproduction
- Quotas and fishing methods
- Vessel maintenance and technology
- Fish processing and logistics
- Marketing and sales

### *Environment, Sustainability, and Governance Workstreams*

- Aquaculture and wild catch certifications
- Product stewardship and food safety
- Environmental review
- Community relations and labour market
- Worker health and safety



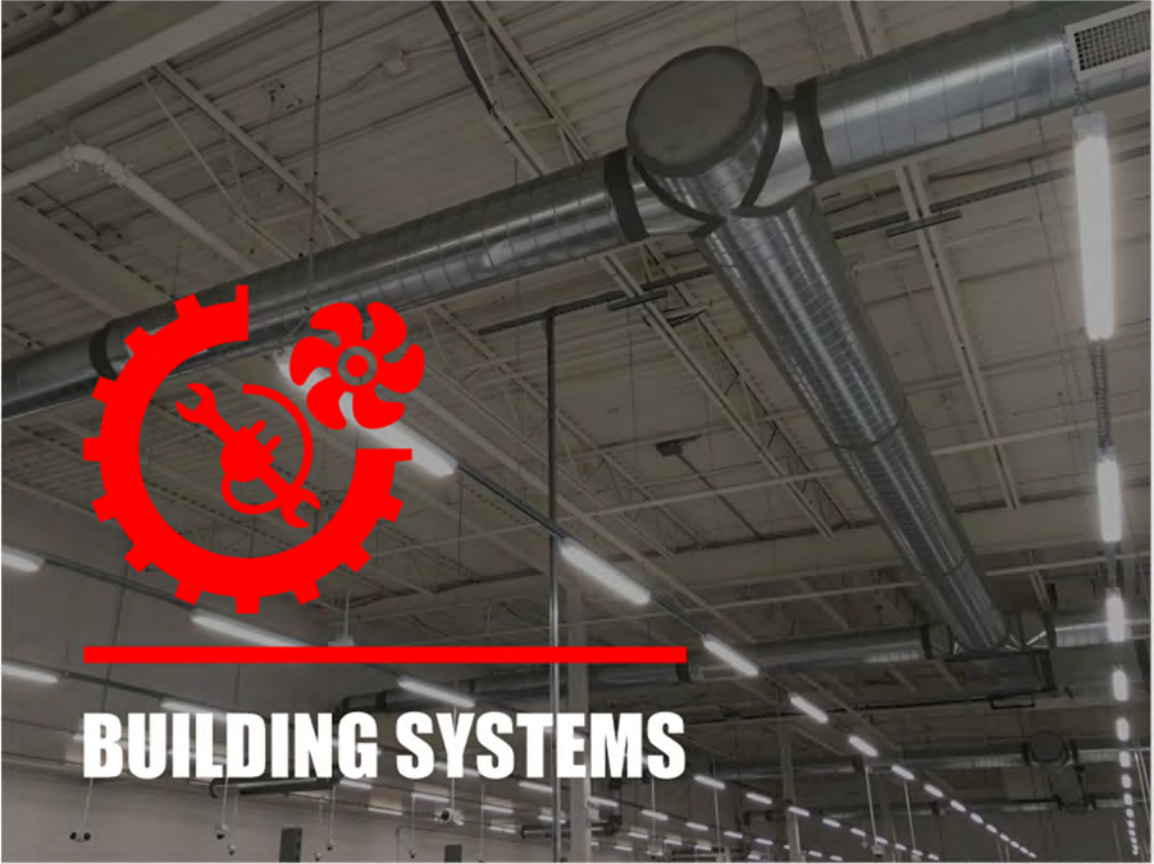
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# Harry Miller Middle School Renovations

ROTHESAY, NEW BRUNSWICK

MECHANICAL  
ENGINEERING DESIGN  
AND  
ELECTRICAL  
ENGINEERING DESIGN



## PROJECT DATES

- February 1999 – Project kick-off
- Winter and Spring 1999 – Project design
- Summer 1999 – Project construction
- Winter 2000 – Project close-out

## PROJECT OVERVIEW

Harry Miller Middle School is named in honour of Rothesay's first police chief. The school originally opened in 1951 as the Rothesay Regional High School for students in grades seven to twelve. When Kennebecasis Valley High opened in 1975, Rothesay Regional became Harry Miller Junior High, a second junior high school in Rothesay. In 1992, it became Harry Miller Middle School for grades six to eight. By 1999, the school was in dire need of upgrades after serving children throughout the community for almost 50 years.

Fundy Engineering was contracted by Anderson Architect Ltd. to undertake mechanical and electrical consulting and design services for major renovations at the school.

## SCOPE OF SERVICES PROVIDED

- Heating, ventilation, and air-conditioning design
- Hydronic heating design
- Dust collection system design
- Plumbing systems design
- Fire protection system specifications
- Control and instrumentation specifications
- Equipment testing, adjusting, and balancing program design
- Electrical design

## CLIENT REFERENCE

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Anderson Architect Ltd.  
565 Kennebecasis River Road  
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E5N 6C6

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## CORE PROJECT TEAM

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Ken Carson, *P.Eng.*  
Greg Hoyt, *CET, WRT*

Mechanical Engineer, Project Manager  
Electrical Engineer  
Mechanical Technologist

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# Digby Ferry Loading Ramp Failure

SAINT JOHN, NEW BRUNSWICK

## FORENSIC ENGINEERING



### PROJECT DATES

- February 2002 – Forensic investigation



### CLIENT REFERENCE

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### PROJECT OVERVIEW

Bay Ferries Limited operates a vehicle ferry across the Bay of Fundy from Saint John, New Brunswick to Digby, Nova Scotia. In February 2002, the vehicle loading ramp at the Saint John ferry terminal failed and fell into the Saint John Harbour. It took several weeks for ferry service to resume while repairs were undertaken.

Fundy Engineering's team visited the site several times to investigate the failure and identify a cause. We quickly determined that the failure was not related to operator error. During the course of the investigation, it was noted that several repairs had been undertaken on one of the loading ramps hydraulic rams. The welding repairs comprised the ends of the rams by building up their connection threads.

We determined that the primary mode of failure was the corrosion of the threads on the hydraulic rams. The strength and ductility of the metal was possibly inconsistent and after machining, it was highly likely that the material was more susceptible to corrosion. Although the threads had been repaired by means of welding, there were also concerns related to the metallurgical differences between the weld material and the hydraulic ram material, which would have weakened the weld.

### CORE PROJECT TEAM

Darryl Ford, *P.Eng., FEC*  
Peter McKelvey, *P.Eng.*

Senior Mechanical Engineer  
Senior Associate

### SCOPE OF SERVICES PROVIDED

#### *Forensic Investigation*

- Our engineering team completed a forensic investigation on the cause of the ramp failure and provided recommendations to the operator in order to reduce the chance of a reoccurrence



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## Award Winner

2006 Association of Consulting  
Engineering Companies (ACEC) – New  
Brunswick Showcase Award for

TECHNICAL EXCELLENCE

## BUILDING SYSTEMS DESIGN (MECHANICAL AND ELECTRICAL) AND PROJECT MANAGEMENT

### PROJECT DATES

- 2002 – Restoration of Phase One began
- 2002 through 2008 – Design and installation of mechanical and electrical systems during renovations
- 2005 – Phase One completed and opened for business
- 2008 – Phase Two completed and opened for business

### CLIENT REFERENCE

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# Heritage Building – CenterBeam Place

SAINT JOHN, NEW BRUNSWICK



### PROJECT OVERVIEW

A keystone block of prominent heritage buildings (circa 1878 to 1880) situated in the heart of Uptown Saint John was redeveloped to create modern office spaces that preserve and embrace the historic architecture. In 2002, a team of architects, designers, and engineers was chosen to breathe new life into the buildings located at the foot of King and Prince William Streets. CenterBeam Place, as it is now known, presented architectural and engineering challenges because the buildings were horizontally and vertically connected and the 4<sup>th</sup> and 5<sup>th</sup> floors of 60 Prince William Street were previously ravaged by fire.

It was a major undertaking to completely overhaul the outdated mechanical and electrical systems and bring them in-line with modern standards while maintaining the historic charm inherent in the buildings. Fundy Engineering successfully designed the natural gas-fired heating plants, the overall building management system, and the plumbing, air conditioning, and fire suppression systems.

The 13 500 m<sup>2</sup> redevelopment is now home to several commercial spaces including an IT firm, a handicrafts store, an upscale jeweler, and a coffee shop. In the end, the heritage architecture has been preserved for future generations to appreciate and enjoy.

### CORE PROJECT TEAM

Darryl Ford, *P.Eng., FEC*  
Hector Lamprea, *P.Eng., P.E., CEM*  
Brian Manley, *P.Eng.*  
Ian Flower, *P.Eng.*

Project Manager  
Energy Efficiency Engineer  
Mechanical Engineer  
Mechanical Engineer

### SCOPE OF SERVICES PROVIDED

#### Heating Systems Design

- A new boiler room was constructed for housing an entirely new high-efficiency natural gas-fired heating plant; all 2 600 m of water heating pipe was replaced

#### Ventilation Systems Design

- A ventilation system, designed to meet ASHRAE standards, exchanges outside air for stale air within the occupied spaces; the new system has reduced total energy costs by ~ 70 % and has considerably decreased greenhouse gas emissions

#### Air-Conditioning System Design

- The installed flexible air-conditioning system has generated about 30 % in energy savings compared to a conventional system, it cannot be seen or heard, and it performs effectively

#### Building Management System Design

- A key element in the mechanical engineering design is a building management system that completely and digitally integrates operation of the heating, ventilation, and air-conditioning systems

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# Irving Oil Marine Terminals NPRI Reporting

SAINT JOHN, NEW BRUNSWICK

## AIR EMISSIONS ASSESSMENT AND REPORTING



### PROJECT DATES

- Annual Reporting – 2003 through 2019



### PROJECT OVERVIEW

Under the Canadian Environmental Protection Act, 1999, owners or operators of facilities that meet or exceed published reporting thresholds are required to report to Environment Canada's National Pollution Release Inventory (NPRI). The NPRI is a publicly-accessible inventory of pollutant releases (*i.e.*, to air, water, and land), disposals, and transfers for recycling. Owning and operating Canada's largest oil refining facility, Irving Oil distributes refined products throughout Eastern Canada via several marine terminals. The release of Volatile Organic Compounds (VOCs) from several of those terminals meets or exceeds several of the NPRI air pollutant thresholds. Since 2003, Fundy Engineering has been contracted to estimate the VOCs emissions volumes at those marine terminals and to prepare a report for submission to the NPRI.

Using a variety of methodologies, we have estimated the volume of VOCs emissions for several marine terminals, including those in Belldune, Charlottetown, Gaspe, Halifax, Matane, and St. John's.



### SCOPE OF SERVICES PROVIDED

*Objectives of this work included:*

- Reviewing annual changes of the NPRI reporting criteria
- Identifying the facility's industrial source category
- Identifying the facilities Criteria Air Contaminants (CAC) emission sources
- Collecting supporting pollutant release information for the facility
- Determining the most appropriate CAC emissions methodologies to use, such as direct measurement, mass balance, emission factors, and engineering calculations
- Estimating CAC emissions
- Preparing a report for submission to the NPRI



### CLIENT REFERENCE

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### CORE PROJECT TEAM

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Hector Lamprea, *P.Eng., P.E., CEM*

Project Manager  
Mechanical Engineer

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# Dolan Road Irving Septic System

ROTHESAY, NEW BRUNSWICK

## MECHANICAL DESIGN



## PROJECT DATES

- Spring 2005 – System design and permitting
- Summer 2005 – System installation
- Fall 2005 – As-built drawings



## PROJECT OVERVIEW

Fundy Engineering designed a septic system to serve an existing 125 seat restaurant and convenience store. The system was installed to replace an outdated system at the Dolan Road Irving along the McKay Highway in Rothesay. The new system was designed to conform to the New Brunswick Department of Public Health's Standards and Guidelines for Septic Systems.

It was determined that the restaurant had an average daily discharge of 28 m<sup>3</sup>. To treat that volume of wastewater, one 50 m<sup>3</sup> concrete septic tank was installed. Ahead of the septic tank, a proceptor consisting of two 3.75 m<sup>3</sup> cells, was installed in order to separate grease from the wastewater flow.

Wastewater flows via gravity from the septic tank to a 9 m<sup>3</sup> pump chamber. Together, this provides a retention time of about two days. From the pump chamber, water is fed under pressure by pump, which ensures even dosing, to the infiltration field.

Due to the permeability of the existing soils, we designed a two-bed above ground infiltration field. One bed comprises 192 infiltrators while the other comprises 208 infiltrators. The infiltration beds provide an over-capacity of about 12 % to account for potential increased loadings.

## SCOPE OF SERVICES PROVIDED

### Design

- The system was designed to conform with the criteria outlined in the On-Site Sewage Disposal System Regulation [88-200] of the New Brunswick *Public Health Act*

### Permitting

- Completed the applications necessary for obtaining a permit from the New Brunswick Department of Public Health for installing and operating the system

### As-Built Drawings

- Drawings were prepared to provide information to the Client on how the system was constructed for future maintenance and repair



## CLIENT REFERENCE

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Irving Oil Limited  
PO Box 1421  
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## CORE PROJECT TEAM

Darryl Ford, *P.Eng., FEC*  
Peter McKelvey, *P.Eng.*  
Ian Flower, *P.Eng.*  
Greg Hoyt, *CET, WRT*

Project Manager  
Senior Associate  
Mechanical Engineer  
Drafting

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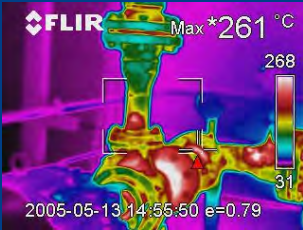
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# Fundy Linen Services Energy Audit

SAINT JOHN, NEW BRUNSWICK



## ENERGY AUDIT



## PROJECT DATES

- February 2005 – Initial site visit
- March 2005 – Desktop data review
- April and May 2005 – Detailed site visit and comprehensive energy modelling
- June 2005 – Final report issued



## CLIENT REFERENCE

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☎: 506.658.0798

## PROJECT OVERVIEW

Fundy Linen Services, now part of FacilicorpNB, provides laundry services for New Brunswick's hospitals and nursing homes. Their 4 300 m<sup>2</sup> laundry services building in Saint John is located in the Spruce Lake Industrial Park. The original facility, which opened in 1979, was designed to process 3 630 000 kg of linen annually.

The facility houses production equipment including tunnel washers, washer extractors, driers, irons, chemical processing, plant heating, and a steam generator. At the time of assessment, it was determined that the facility consumed approximately 38 816 GJ · yr<sup>-1</sup>. The majority of that energy, 83 %, was for processing linen. The heating, ventilation, and air-conditioning system used about 7 % of the total. Lighting and other building services consumed 1.3 % and 8.3 %, respectively.

Through the audit, we were able to identify detailed specifications for energy savings measures. We also provided Fundy Linen Services with enough information to make decisions on budget, investment, and prioritization of the energy savings investments.

Overall, we identified potential energy savings of 4 504 GJ · yr<sup>-1</sup> through various upgrades, such as new boilers. The energy savings, which translated to about \$200 000 · yr<sup>-1</sup>, would yield a payback period of 2.9 years if Fundy Linen Services moved forward with the recommendations. Through additional work, we assisted Fundy Linen Services with the recommended upgrades.

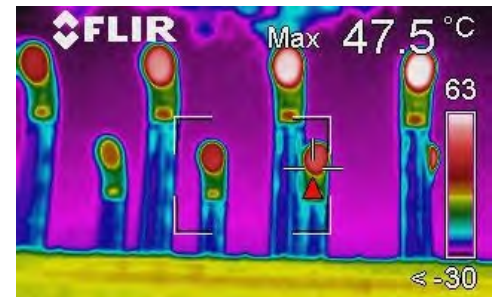
## CORE PROJECT TEAM

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Hector Lamprea, *P.Eng., P.E., CEM*  
Doug Boyer, *P.Eng.*  
Greg Hoyt, *CET, WRT*

Mechanical Engineer, Project Manager  
Energy Efficiency Engineer  
Electrical Engineer  
Mechanical Technologist

## SCOPE OF SERVICES PROVIDED

- Systems inspections
- Data collection and review
- Analysis of building utility data
- Building envelope assessment
- Analysis of building mechanical and electrical equipment
- Heating plant survey and system measurements
- Observation and review of operating practices
- Data analysis and energy modelling
- Estimating potential energy savings under various scenarios



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# Killam Properties Energy Audits

MULTIPLE MARITIME LOCATIONS



## ENERGY AUDITS



## PROJECT DATES

- May 2005 – Project kick-off and coordination
- Spring and Summer 2005 – Site visits
- Summer 2005 – Desktop data review
- Fall 2005 and Winter 2006 – Detailed energy modelling
- March 2006 – Final report binder issued to Client



## CLIENT REFERENCE

Mr. Pat Hardiman  
Killam Properties Inc.  
3700 Kempt Road, Suite 100  
Halifax, Nova Scotia  
B3K 4X8

☎: 902.453.9000  
☎: 902.455.4525

## PROJECT OVERVIEW

Killam Properties Inc. is one of Canada's largest residential landlords. They own, operate, and manage a \$2.3 billion portfolio of apartments and manufactured home communities. Fundy Engineering has worked on several projects with Killam Properties Inc. since they broke into the market in 2000.

In 2005, Fundy Engineering was contracted to conduct energy audits for 86 of Killam's buildings in multiple locations throughout the Maritimes. Combined, the buildings had a floor area of ~114 000 m<sup>2</sup>. To complete the audits, we formed an integrated engineering team. Detailed site visits were performed to assess building envelopes, which primarily involved thermal imaging, reviewing heating, ventilation, and air-conditioning equipment, and inspecting lighting systems. All of the collected data were used to complete power analyses for the various properties reviewed.

We identified numerous upgrades for Killam Properties Inc. to undertake to reduce overall energy consumption within a considerable portion of their apartment portfolio. Overall, \$2.5 million in upgrades were identified with a payback period of 6.2 years. Many of the projects we identified were implemented by Killam Properties Inc. in the months following completion of the project.

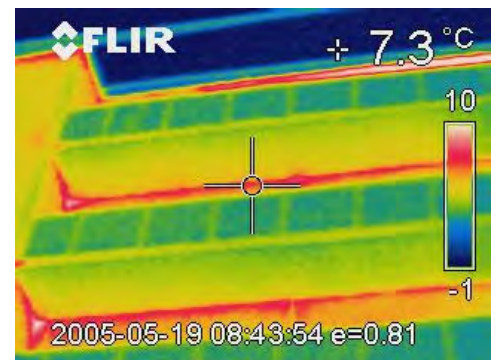
## CORE PROJECT TEAM

Darryl Ford, *P.Eng., FEC*  
Hector Lamprea, *P.Eng., P.E., CEM*  
Peter McKelvey, *P.Eng.*  
Doug Boyer, *P.Eng.*  
Greg Hoyt, *CET, WRT*  
Laura Dann, *P.Tech., CESA*

Mechanical Engineer, Project Manager  
Energy Efficiency Engineer  
Senior Associate  
Electrical Engineer  
Mechanical Technologist  
Technical Support

## SCOPE OF SERVICES PROVIDED

- Systems inspections
- Data collection and review
- Analysis of building utility data
- Building envelope assessments
- Analysis of building mechanical and electrical equipment
- Heating plant surveys and system measurements
- Data analysis and energy modelling
- Estimating potential energy savings under various scenarios



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# St. Stephen Elementary Renovations & Addition

ST. STEPHEN, NEW BRUNSWICK

**MECHANICAL  
ENGINEERING DESIGN  
AND  
ELECTRICAL  
ENGINEERING DESIGN**



## PROJECT DATES

- October 2005 – Contract award
- Winter 2006 to Summer 2007 – Project design
- Summer 2007 to Winter 2008 – Project construction
- Winter 2008 – Project close-out



## PROJECT OVERVIEW

The Province of New Brunswick recognized the need for a new gymnasium at the St. Stephen Elementary School. Concurrently, issues were identified with the outdated classrooms serving students of the community and those issues required rectifying. Fundy Engineering was contracted by Richard & Co Architecture Inc. to undertake mechanical and electrical consulting and design services for this major addition and renovation project at the school.

This major project involved constructing a completely new gymnasium at the school. It also comprised undertaking substantial upgrades and improvements to the mechanical and electrical infrastructure servicing many of the existing classrooms. Most of those systems dated to when the school was first constructed and no longer adequately serviced the building.

Fundy Engineering's involvement on this project included preparing conceptual design documents, design development, preparing design and specification documents, undertaking construction phase services and reviews, and assisting with project close-out.

## SCOPE OF SERVICES PROVIDED

- Heating, ventilation, and air-conditioning design
- Plumbing systems design
- Fire protection system specifications
- Electrical power distribution design
- Communications system design
- Building access control and security system design
- Control and instrumentation specifications
- Interior and exterior lighting design
- Respond to contractor enquiries during tendering and construction
- Perform construction reviews
- Review as-built drawings

## CLIENT REFERENCE

Mr. Michael Richard  
Richard & Co Architecture Inc.  
40 Water Street, 2<sup>nd</sup> Floor  
Saint John, New Brunswick  
E2L 2A5

☎: 506.633.1361  
☎: 506.633.1301



## CORE PROJECT TEAM

Darryl Ford, *P.Eng., FEC*  
Hector Lamprea, *P.Eng., P.E., CEM*  
Ken Carson, *P.Eng.*  
Greg Hoyt, *CET, WRT*

Mechanical Engineer, Project Manager  
Energy Efficiency Engineer  
Electrical Engineer  
Mechanical Technologist

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## Award Winner

2006 Association of Consulting  
Engineering Companies (ACEC) – New  
Brunswick Showcase Award for

TECHNICAL EXCELLENCE

# Fundy Linen Services

SAINT JOHN, NEW BRUNSWICK

BUILDING SYSTEMS  
DESIGN (MECHANICAL  
AND ELECTRICAL)  
AND  
PROJECT MANAGEMENT



## PROJECT DATES

- Spring 2006 – Design of facility upgrades
- Summer 2006 – Assistance with overseeing the construction and conversion to the new systems
- Fall 2006 – As-built review



## CLIENT REFERENCE

Mr. Shane Steeves  
Manager Commercial Installations  
Enbridge Gas New Brunswick  
Moncton, New Brunswick  
E2L 5E6

☎: 506.384.5058  
☎: 506.382.4655

## PROJECT OVERVIEW

Fundy Linen Services, now part of FacilicorpNB, provides laundry services for New Brunswick's hospitals and nursing homes. Their 4 300 m<sup>2</sup> laundry services building in Saint John is located in the Spruce Lake Industrial Park. The original facility, which opened in 1979, was designed to process 3 630 000 kg of linen annually.

The facility houses production equipment including tunnel washers, washer extractors, driers, irons, chemical processing, plant heating, and a steam generator. The original hot-oil heating plant system comprised three fuel-oil fired thermal heaters. Each of those heaters had an output rating of 6 000 000 BTU per hour. The boilers supplied heat to the building through a steam heat exchanger located in the main air handling units.

Fundy Engineering was contracted to modernize the heating plant system. We sized and selected the new heating plant, gas piping distribution system, hot-oil pumps, and economizer. The design documents produced specified the necessary work required to replace the fuel-oil fired thermal heaters with natural gas-fired units. Additionally, some of the smaller systems that were propane-fired were also converted to natural gas-fired units.

Conversion involved planning demolition of the existing equipment while maintaining the facility in an operational state.

## CORE PROJECT TEAM

Darryl Ford, *P.Eng., FEC*  
Hector Lamprea, *P.Eng., P.E., CEM*

Project Manager  
Energy Efficiency Engineer

## SCOPE OF SERVICES PROVIDED

### *Boiler Replacement Design*

- Three old fuel oil-fired boilers were replaced by two new natural gas-fired boilers that were sized and selected by Fundy Engineering

### *Boiler Room Design*

- Located all new boiler equipment (boilers, piping, and economizers) in a dedicated room at the facility

### *Natural Gas Piping Design*

- Construction drawings for the new natural gas piping distribution to the existing and new equipment was laid out and sized by Fundy Engineering

### *Demolition Drawings*

- Demolition drawings were created for the demolition of the existing propane pipe lines and for the existing boilers, chimney, and breaching

### *Economizer Support Design*

- Chimney was selected for the economizer

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# Saint John Energy Headquarters

SAINT JOHN, NEW BRUNSWICK

## BUILDING SYSTEMS DESIGN (MECHANICAL AND ELECTRICAL)



### PROJECT DATES

- December 2006 - Project start
- April 2007 – Project construction
- September 2008 – Project completion and occupancy



### CLIENT REFERENCE

Mr. David Bergmark  
Architect and Principal  
BGHJ Architects  
233 Queen Street  
Charlottetown, PE C1A 7N4

☎: 902.566.4449  
☎: 902.566.1235  
✉: architects@bghj.com

### PROJECT OVERVIEW

Working with Bergmark Guimond Hammarlund Jones Architects, our team designed the mechanical and electrical systems for Saint John Energy's new headquarters in west Saint John. The \$10.6 million facility consists of personnel offices, a public payment centre, equipment stores, maintenance shops, and an equipment garage.

Mechanical work included design and inspection of the heating, ventilation, and air-conditioning, plumbing, and building management systems. Electrical design and inspection comprised power distribution, communications, lighting, emergency power supply, and fire and security systems.

Although the new facility was designed to meet Leadership in Energy and Environmental (LEED®) standards, it was not registered for LEED® certification due to budget constraints during construction.



### CORE PROJECT TEAM

Darryl Ford, P.Eng., FEC  
Doug Boyer, P.Eng.  
Ian Flower, P.Eng.

Project Manager  
Electrical Engineer  
Mechanical Engineer

### SCOPE OF SERVICES PROVIDED

#### Heating, Ventilation, and Air Conditioning

- Systems comprised multiple water source heat pumps for space heating and cooling
- A cooling tower was used to reject heat from the heat pump water loop during the summer and electric boilers were used to provide a source of heat

#### Plumbing

- Fundy Engineering designed a complete pumping system for the new building

#### Controls

- A complete building automation system was designed and installed to control the various mechanical systems

#### Electrical

- The lighting system installed in the building consists of energy efficient T5 and T8 fluorescent lighting fixtures and metal halide exterior lights and in the high bays
- The lighting control system for the building consists of local switches, occupancy sensors, daylight sensors, and an astronomical time clock for exterior lights
- A photovoltaic system was designed to convert energy from the window shades to electricity for powering hot water tanks

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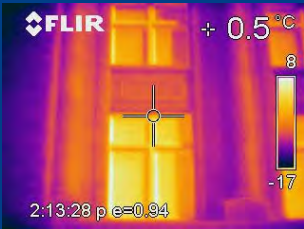
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# PO "A" & Annex Energy Audit

SAINT JOHN, NEW BRUNSWICK



## ENERGY AUDIT

### PROJECT DATES

- October 2006 – Desktop data collection
- November 2006 – Site visit to gather information
- February 2007 – Issued preliminary report for client review
- March 2007 – Issued final report



### CLIENT REFERENCE

Mr. Brian Maguire  
SNC Lavalin Profac  
189 Prince William Street  
Saint John, NB E2L 2B9

☎: 506.631.9833  
☎: 506.631.9822

### PROJECT OVERVIEW

Fundy Engineering provided an integrated building systems engineering team (i.e., mechanical and electrical) to conduct an energy audit at the 13 200 m<sup>2</sup> PO "A" & Annex building on Prince William Street in Saint John. The energy audit was done to identify energy savings opportunities, that when implemented, would result in a reduction of the total annual energy consumed by the building services.

The energy audit involved an historical energy review, a building envelope assessment using a thermal imaging camera, assessment of the existing heating, ventilation, and air-conditioning equipment, assessment of lighting, and a power analysis of all facility systems.

Through the energy audit, Fundy Engineering identified potential energy saving opportunities with respectable payback periods. We recommended the following:

- replacing the two existing electric boilers with natural gas-fired boilers;
- monitoring and controlling the volume of outside air introduced to the building;
- installing solar collectors; and
- upgrading lamps and ballasts.

The above measures were designed to reduce annual energy consumption and yielded a simple payback period to the client of 4.3 years.

### CORE PROJECT TEAM

Darryl Ford, *P.Eng., FEC*  
Hector Lamprea, *P.Eng., P.E., CEM*  
Doug Boyer, *P.Eng.*

Project Manager  
Energy Efficiency Engineer  
Electrical Engineer

### SCOPE OF SERVICES PROVIDED

- Data collection and review
- Analysis of building utility data
- Analysis of building mechanical equipment
- Heating plant survey and system measurements
- Observation and review of operating practices
- Data analysis
- Estimate of potential energy savings



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# Energy Feasibility Studies for Wastewater Facilities

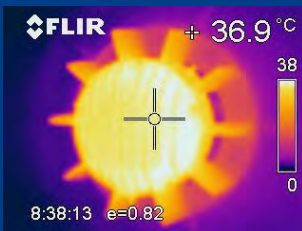
SAINT JOHN, NEW BRUNSWICK

## ENERGY FEASIBILITY STUDIES AND PROJECT MANAGEMENT



### PROJECT DATES

- Fall 2007 – Initial data review and site visits
- Winter 2007 / 2008 – Data collection and energy consumption analyses
- Spring 2008 – Draft energy feasibility reports issued
- Fall 2008 – Final report issued to Client for implementation



### CLIENT REFERENCE

Mr. Samir Yammine, *P.Eng.*  
Energy Manager  
City of Saint John  
Municipal Operations  
PO Box 1971  
Saint John, NB E2L 4L1

✉: samir.yammine@saintjohn.ca

### PROJECT OVERVIEW

The City of Saint John retained the services of Fundy Engineering to review energy consumption at 32 wastewater pumping facilities, 11 water pumping facilities, and five wastewater treatment plants at various locations across the City. The purpose of the reviews was to identify potential energy savings opportunities and to estimate the energy savings and payback periods for recommended system improvements.

The project comprised two phases. The first phase involved screening all of the facilities in order to prioritize them with respect to detailed analyses. The second phase involved conducting site visits of all facilities.

Fundy Engineering's recommended improvements included:

- reviewing and adjusting heating and ventilation system settings;
- replacing electricity as an energy source for heat;
- insulating and weather stripping areas to reduce air leakage and heat loss;
- eliminating pump inefficiencies resulting from pump age and wear and improper sizing; and
- reducing the volume of clean stormwater pumped due to inflow and infiltration issues.

### CORE PROJECT TEAM

Darryl Ford, *P.Eng.*, *FEC*  
Hector Lamprea, *P.Eng.*, *P.E.*, *CEM*

Senior Mechanical Engineer  
Energy Efficiency Engineer

### SCOPE OF SERVICES PROVIDED

- Data collection and review
- Analyses of building utility data
- Analyses of building mechanical equipment
- Heating plant survey and system measurements
- Observation and review of operating practices
- Data analyses
- Recommend energy savings opportunities
- Estimated potential energy savings
- Estimated payback periods

The study examined alternative energy sources that could be considered by the City, such as, ground or water source heat pumps, wind turbines, and photovoltaics.



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# CRA Office Building

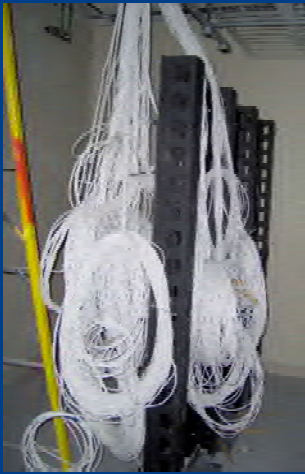
SAINT JOHN, NEW BRUNSWICK

## BUILDING SYSTEMS DESIGN (MECHANICAL AND ELECTRICAL)



### PROJECT DATES

- May 2007 - Project start
- June 2007 - Construction start
- Spring 2009 - Project commissioning and completion
- Summer 2009 - Humidification system design



### CLIENT REFERENCE

Mr. Rick Harley  
Bird Construction  
200 Millennium Drive, Suite 200  
Quispamsis, NB E2E 0C6

☎: 506.849.2473

☎: 506.847.0270

### PROJECT OVERVIEW

Fundy Engineering worked with Richard & Co Architecture Inc. on the new two-storey Canada Revenue Agency (CRA) call centre building in east Saint John. Fundy Engineering designed the mechanical and electrical building systems. The mechanical design work included heating, ventilation, air-conditioning, plumbing, and building management systems. The electrical design work included power distribution, communications, interior and exterior lighting, emergency power supply, fire alarms, access control, and security systems.



### CORE PROJECT TEAM

Darryl Ford, *P.Eng., FEC*  
Hector Lamprea, *P.Eng., P.E., CEM*  
Brian Manley, *P.Eng.*  
Ken Carson, *P.Eng.*

Project Manager  
Energy Efficiency Engineer  
Mechanical Engineer  
Senior Electrical Engineer

### SCOPE OF SERVICES PROVIDED

#### *Heating, Ventilation, and Air-Conditioning*

- Systems comprised two gas-fired packaged rooftop units; one per floor
- Humidifiers were installed in the supply air ductwork to provide space humidity control

#### *Plumbing*

- Fundy Engineering designed a complete pumping system for the new building

#### *Controls*

- A complete building automation system was designed and installed to control the various mechanical systems

#### *Electrical*

- The lighting system installed in the building consists of energy efficient T8 fluorescent and CFL lighting fixtures throughout the interior of the building and metal halide light fixtures for the exterior of the building
- The lighting control system for the building consists of local switches and a photocell for exterior lights

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# Saint John YM / YWCA Decommissioning

SAINT JOHN, NEW BRUNSWICK

HAZARDOUS MATERIALS  
SURVEY,  
PROJECT  
MANAGEMENT,  
AND  
AIR QUALITY  
MONITORING



## PROJECT DATES

- July 2007 – Hazardous material assessment completed prior to decommissioning building
- October 2007 – Building decommissioned and hazardous materials removed
- February 2008 – Building demolished and project substantially completed
- December 2008 – New Brunswick Department of the Environment (NBDENV) issued file closure

## CLIENT REFERENCE

Mr. Kevin Logan, *P.Eng.*  
New Brunswick Department of  
Supply and Services  
PO Box 5001  
Saint John, NB E2L 4Y9

☎: 506.658.2412  
☎: 506.658.3045

## PROJECT OVERVIEW

The New Brunswick Department of Supply and Services (DSS) retained Fundy Engineering to provide engineering-consulting services for the high-profile decommissioning and subsequent demolition of the YM / YWCA building located in Uptown Saint John. The site of the out-lived community pillar was transformed as a hub of revitalization through the construction of the Saint John Justice Complex.

Fundy Engineering was responsible for ensuring that the YM / YWCA building was decommissioned and demolished in a safe and environmentally responsible manner according to all applicable Acts and Regulations. Consistent with the age of the building, decommissioning assessments showed the presence of asbestos-containing insulation and plaster (friable and non-friable asbestos), PCB-containing light ballasts, and lead-based paints. Soil and groundwater investigations at the site of the underground storage tanks for petroleum hydrocarbons and Bunker C revealed contamination.

Hazardous materials crews were supervised and air quality monitoring was undertaken to ensure crew safety. All hazardous materials removed by the crews were quantified and disposed of safely. The building was demolished in early 2008 and contaminated soils were removed. The brownfield site received file closure from the NBDENV indicating the once contaminated site no longer presented a health and safety issue and that it could be redeveloped.

## CORE PROJECT TEAM

Tim Ryan, *M.Eng., P.Eng.*  
Richard Frenette, *P.Eng.*  
Stephen Little, *P.Tech., CESA*  
Joel Forsythe, *P.Eng.*

Project Manager  
Technical Specialist  
Environmental Technologist  
Environmental Support

## SCOPE OF SERVICES PROVIDED

- Prior to demolition, a hazardous materials survey was completed throughout the building to qualify and quantify asbestos (*i.e.*, piping insulation and plaster), lead-based paints, and PolyChlorinated Biphenyls (PCBs) (*i.e.*, light ballasts and electrical transformers) contaminants
- Demolition specifications were developed and contracts were administered on behalf of DSS
- Air quality monitoring was conducted during the removal of all hazardous materials to ensure worker safety
- Site supervision was provided for DSS and all materials removed during all phases of the decommissioning process were quantified and tracked
- As per the *Guideline for the Management of Contaminated Sites*, additional site work (*e.g.*, borehole / monitoring well investigations) was undertaken to support the unconditional closure documentation for the NBDENV

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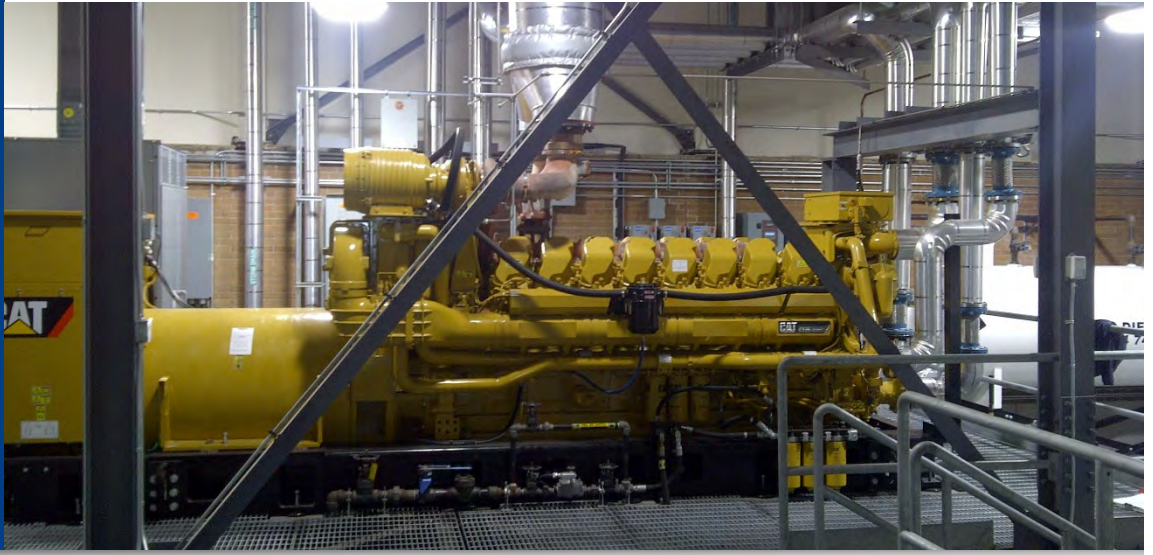




# Bell Aliant 3.0 MW Generator

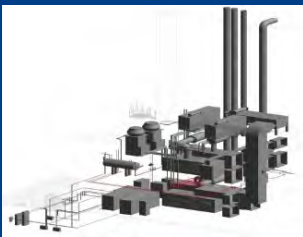
SAINT JOHN, NEW BRUNSWICK

PROJECT MANAGEMENT  
AND  
BUILDING SYSTEMS  
DESIGN (MECHANICAL  
AND ELECTRICAL)



## PROJECT DATES

- Winter 2009 / 2010 – System design, tender document preparation, and selection of contractors
- 2010 – Construction and installation of generator and associated infrastructure
- 2011 – System turned over to client for operational phase



## CLIENT REFERENCE

Mr. Jamie Cote  
Bell Aliant  
One Brunswick Square, 6<sup>th</sup> Floor  
PO Box 1430  
Saint John, NB E2L 4K2

✉: jamie.cote@bellaliant.ca

## PROJECT OVERVIEW

To accommodate ever-increasing server data load, Bell Aliant contracted Fundy Engineering to oversee a generator upgrade to 3.0 MW in their Uptown Saint John Tower. It was critical to consolidate Bell Aliant's data and technical support in one central location while fully utilizing existing infrastructure and services in order to reduce duplication and save on costs.

We provided engineering support, tender document control, and construction phase services associated with the design, planning, and construction of the new generator. This project presented several challenges to the team:

- restricted access and minimal site space for contractor construction activities;
- existing infrastructure and systems are sensitive to dust, water, and contractor intrusion;
- constraints of multi-storey city construction whereby services penetrated structures at several different levels; and
- maintaining compliance with applicable building codes and fire codes.

The generator is online and operating within design specifications.

## CORE PROJECT TEAM

Darryl Ford, *P.Eng., FEC*  
David Richards, *P.Eng., MBA*  
Hector Lamprea, *P.Eng., P.E., CEM*  
Richard Frenette, *P.Eng.*  
Greg Hoyt, *CET, WRT*

Senior Mechanical Engineer  
Project Manager  
Energy Efficiency Engineer  
Revit® Design  
Drafting

## SCOPE OF SERVICES PROVIDED

### *Project Management*

- Provided advice and guidance to Bell Aliant from project planning through to project completion
- Provided construction management including the tendering process and contract administration

### *Mechanical Design*

- Designed and sketched the new systems in Revit® for client review and construction

### *Electrical Design*

- Sized new services to accommodate the new systems



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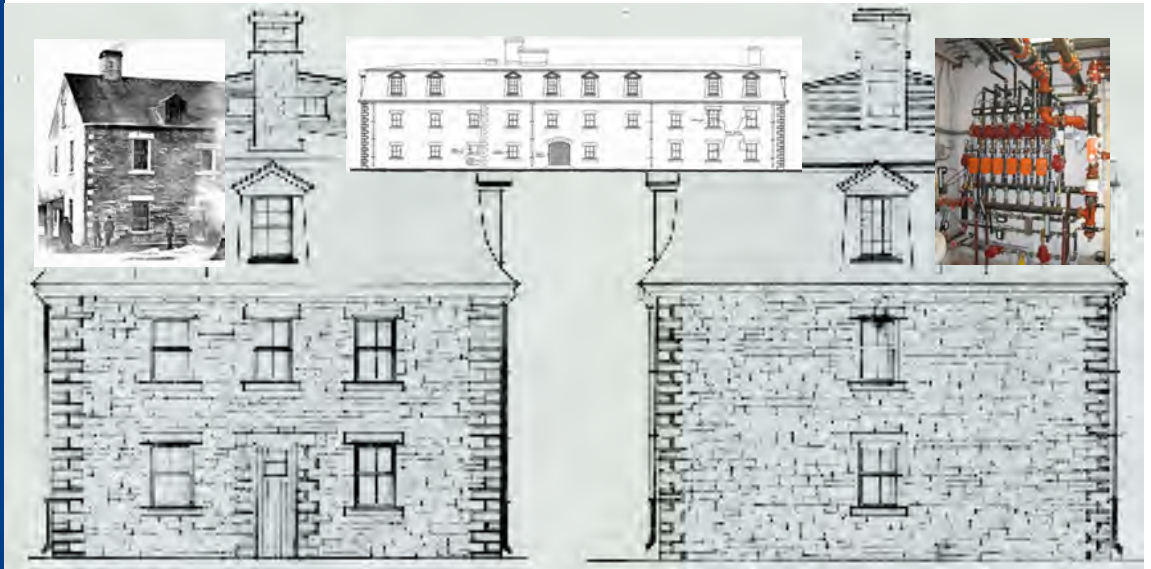
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# Ordnance Building

SAINT JOHN, NEW BRUNSWICK

## BUILDING SYSTEMS DESIGN (MECHANICAL AND ELECTRICAL)



### PROJECT DATES

- October 2009 – Building systems design initiated
- Winter 2010 – Detailed building systems design
- April 2010 – Base building tender issued
- Summer 2010 – Renovation and construction started
- July through November 2010 – Tenant electrical and mechanical fit-ups completed
- December 2010 – Tenants occupied renovated spaces
- 2011 – Energy analysis

### CLIENT REFERENCE

Mr. Chris Lawrence  
Commercial Properties Limited  
Suite 110 Brunswick House  
44 Chipman Hill  
PO Box 20114  
Saint John, NB E2L 5B2

☎: 506.647.3382  
☎: 506.635.6006  
✉: clawrence@cplre.ca

### PROJECT OVERVIEW

In 1842, Britain's Royal Engineers designed and built an ordnance building on the southern peninsula of Saint John to house the equipment for a battle-ready army. Over its more than 160 years of history, the building has seen many uses and is the only building that remains from when British soldiers were stationed in Saint John. In 1995 the Department of National Defence declared the building surplus. Understanding the historical significance of the colourful sandstone structure, Commercial Properties Limited purchased the neglected building in 2009. To recognize the historical importance, the new owners applied to Canada's Historic Sites and Monuments Board for designation as a national historic site.

The 1 300 m<sup>2</sup> three-storey building was refurbished to take on a new non-military role as a business centre. It was a major undertaking to completely overhaul the out-dated building systems and bring them up to modern standards. Fundy Engineering designed the high-efficiency natural gas-fired heating plants, in-floor heating systems, and the water-sourced variable refrigerant flow heat pump systems to allow for highly efficient heating and air-conditioning of the spaces. The building is now occupied by an engineering firm and a broadcasting company. An interesting showcase feature within the building is a display of military artifacts that were rescued from under the floorboards during rehabilitation of the building.

### CORE PROJECT TEAM

Darryl Ford, *P.Eng., FEC*  
Brian Manley, *P.Eng.*  
Spencer Mawhinney, *P.Eng.*  
Mitchell Muscroft, *P.Eng.*

Project Manager  
Mechanical Engineer  
Electrical Engineer  
Electrical Engineer

### SCOPE OF SERVICES PROVIDED

#### Heating Systems Design

- A new boiler room was constructed for housing an entirely new high-efficiency natural gas-fired heating plant

#### Ventilation Systems Design

- The new ventilation system was designed to meet ASHRAE standards; the new system reduces total energy costs and considerably decreases GHG emissions

#### Air-Conditioning System Design

- The installed flexible air-conditioning system generates energy savings compared to a conventional system

#### Building Management System Design

- A management system completely and digitally integrates operation of the heating, ventilation, and air-conditioning systems

#### Tenant Electrical Fit-Up

- The two tenants required specific systems for their operations; we modified the base building lighting, power, and data system layout and distribution to suit the tenants

#### Energy Analysis

- We completed an energy analysis of the building components



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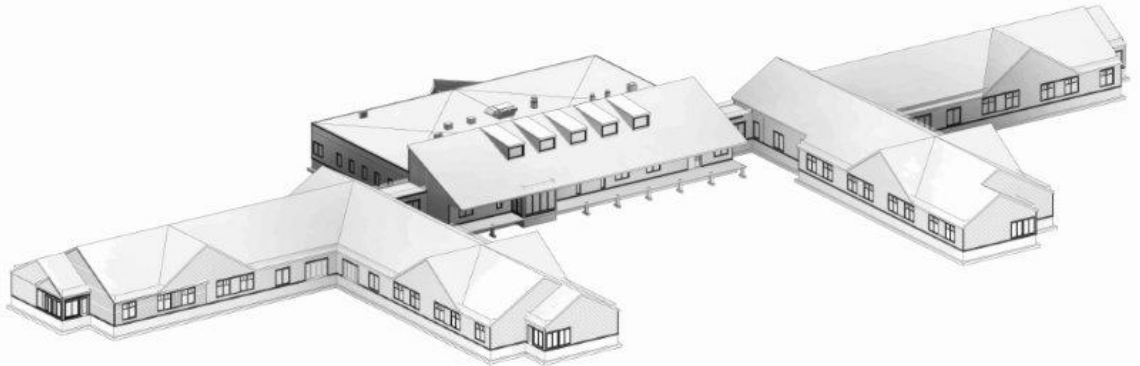
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# Maplewood Manor Long-Term Care Facility

ALBERTON, PRINCE EDWARD ISLAND

## BUILDING SYSTEMS DESIGN (MECHANICAL AND ELECTRICAL)



### PROJECT DATES

- Spring & Summer 2010 – Systems design
- Fall 2010 – Tendering process
- Fall 2010 – Construction began
- Fall 2010 to Spring 2012 – Monitoring of construction process
- Summer 2012 – Facility opened



### CLIENT REFERENCE

Mr. David Bergmark, *AAPEI, MRAIC*  
BGHJ Architects  
63 Fitzroy Street  
PO Box 1719  
Charlottetown, PE C1A 1R4

☎: 902.566.4449

☎: 902.566.1235

✉: architects@bghj.com

### PROJECT OVERVIEW

Maplewood Manor is a 48-bed long-term care facility that provides 24-hour nurse supervision and care management for individuals. The facility consists of a core utility/service area and two residential wings. The facility was constructed between 2010 and 2012 as part of the PEI government's long-term care facility replacement program.

Fundy Engineering designed the mechanical and electrical building systems for the facility located in Alberton, Prince Edward Island. The mechanical design work included hydronic in-floor heat, heating, ventilation, air-conditioning, domestic water, sanitary water, fire protection, and building management systems. The electrical design work included power distribution, data and communications, interior and exterior lighting, emergency power supply, fire alarm, access and security systems, and nurse call systems.



### CORE PROJECT TEAM

Darryl Ford, *P.Eng., FEC*  
Dave Richards, *P.Eng., MBA*  
Hector Lamprea, *P.Eng., P.E., CEM*  
Ryan Gosson, *P.Eng.*  
Mitchell Muscroft, *P.Eng.*  
Richard Frenette, *P.Eng.*  
Greg Hoyt, *CET, WRT*  
Jon Pitman, *CTech*

### SCOPE OF SERVICES PROVIDED

#### *Mechanical Design*

- Designed and sketched the new systems in Revit® for client review and construction

#### *Electrical Design*

- Sized new services to accommodate the new systems

#### *Field Review*

- Conducted routine inspections of the work being completed to ensure systems were being installed as per the specifications



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Toll Free: 1.877.635.1566

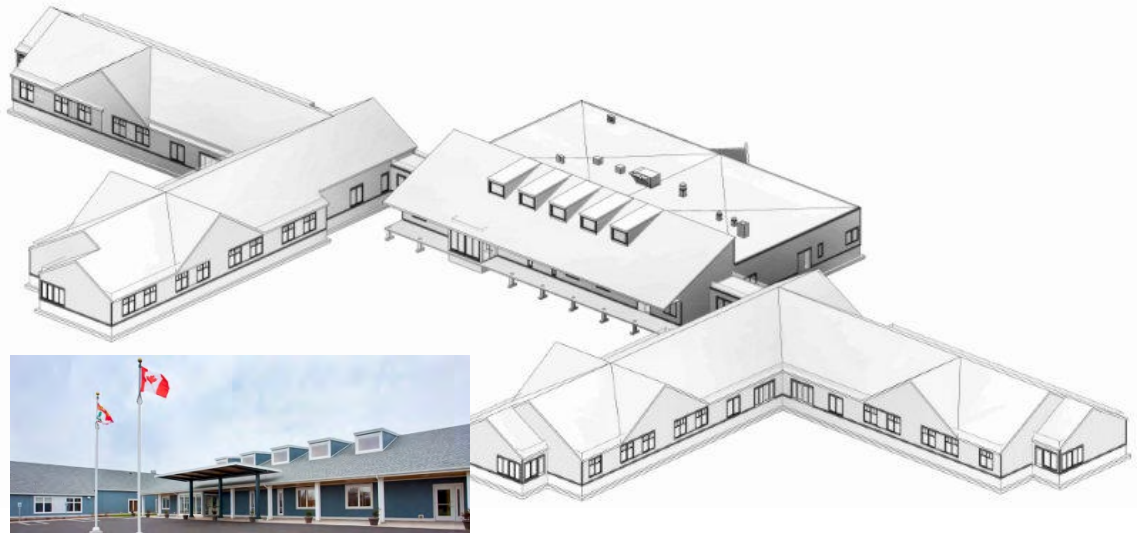
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# Colville Manor Long-Term Care Facility

SOURIS, PRINCE EDWARD ISLAND

## BUILDING SYSTEMS DESIGN (MECHANICAL AND ELECTRICAL)



### PROJECT DATES

- Spring and Summer 2010 – Systems design
- Fall 2010 – Tendering process
- Fall 2010 – Construction began
- Fall 2010 to Spring 2012 – Monitoring of construction process
- Summer 2012 – Facility opened



### CLIENT REFERENCE

Mr. David Bergmark, *AAPEI, MRAIC*  
BGHJ Architects  
63 Fitzroy Street  
PO Box 1719  
Charlottetown, PE C1A 1R4

☎: 902.566.4449  
☎: 902.566.1235  
✉: architects@bghj.com

### PROJECT OVERVIEW

Colville Manor and is a 52-bed long-term care facility that provides 24 hour nurse supervision and care management for individuals. The facility consists of a core utility / service area and two residential wings. The facility was constructed between 2010 and 2012 as part of the PEI government's long-term care facility replacement program.

Fundy Engineering designed the mechanical and electrical building systems for the facility located in Souris, Prince Edward Island. The mechanical design work included hydronic in-floor heat, heating, ventilation, air-conditioning, domestic water, sanitary water, fire protection, and building management systems. The electrical design work included power distribution, data and communications, interior and exterior lighting, emergency power supply, fire alarm, access and security systems, and nurse call systems.



### CORE PROJECT TEAM

Darryl Ford, *P.Eng., FEC*  
David Richards, *P.Eng., MBA*  
Hector Lamprea, *P.Eng., P.E., CEM*  
Ryan Gosson, *P.Eng.*  
Mitchell Muscroft, *P.Eng.*  
Richard Frenette, *P.Eng.*  
Greg Hoyt, *CET, WRT*  
Jon Pitman, *CTech*

Senior Mechanical Engineer  
Project Manager  
Mechanical Engineer  
Mechanical Engineer  
Electrical Engineer  
Revit® Design  
Drafting  
Drafting

### SCOPE OF SERVICES PROVIDED

#### *Mechanical Design*

- Designed and sketched the new systems in Revit® for client review and construction

#### *Electrical Design*

- Sized new services to accommodate the new systems

#### *Field Review*

- Conducted routine inspections of the work being completed to ensure systems were being installed as per the specifications



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# Prince Edward Home Long-Term Care Facility

CHARLOTTETOWN, PRINCE EDWARD ISLAND

## BUILDING SYSTEMS DESIGN (MECHANICAL AND ELECTRICAL)



### PROJECT DATES

- Spring and Summer 2010 – Systems design
- Fall 2010 – Tendering process
- Fall 2010 – Construction began
- Fall 2010 to Spring 2012 – Monitoring of construction process
- Summer 2012 – Facility opened



### CLIENT REFERENCE

Mr. David Bergmark, *AAPEI, MRAIC*  
BGHJ Architects  
63 Fitzroy Street  
PO Box 1719  
Charlottetown, PE C1A 1R4

☎: 902.566.4449

☎: 902.566.1235

✉: architects@bghj.com

### PROJECT OVERVIEW

Prince Edward Home and is a 120-bed combined long-term care facility that provides 24 hour nurse supervision and care management for individuals. The facility consists of a core utility / service area and three residential wings. The facility was constructed between 2010 and 2012 as part of the PEI government's long-term care facility replacement program.

Fundy Engineering designed the mechanical and electrical building systems for the facility located in Charlottetown, Prince Edward Island. The mechanical design work included hydronic in-floor heat, heating, ventilation, air-conditioning, domestic water, sanitary water, fire protection, and building management systems. The electrical design work included power distribution, data and communications, interior and exterior lighting, emergency power supply, fire alarm, access and security systems, and nurse call systems.

### CORE PROJECT TEAM

Darryl Ford, *P.Eng., FEC*  
David Richards, *P.Eng., MBA*  
Hector Lamprea, *P.Eng., P.E., CEM*  
Ryan Gosson, *P.Eng.*  
Mitchell Muscroft, *P.Eng.*  
Richard Frenette, *P.Eng.*  
Greg Hoyt, *CET, WRT*  
Jon Pitman, *CTech*

Senior Mechanical Engineer  
Project Manager  
Energy Efficiency Engineer  
Mechanical Engineer  
Electrical Engineer  
Revit® Design  
Drafting  
Drafting

### SCOPE OF SERVICES PROVIDED

#### *Mechanical Design*

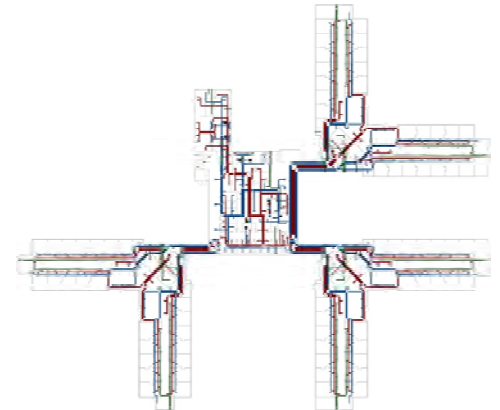
- Designed and sketched the new systems in Revit® for client review and construction

#### *Electrical Design*

- Sized new services to accommodate the new systems

#### *Field Review*

- Conducted routine inspections of the work being completed to ensure systems were being installed as per the specifications



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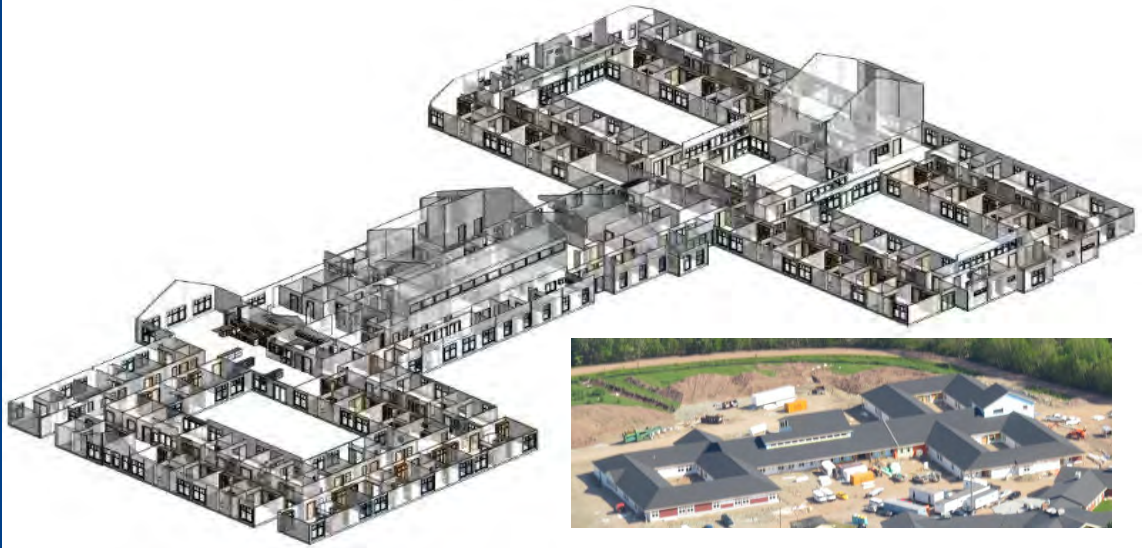
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# Mill Cove Nursing Home

MILL COVE, NEW BRUNSWICK

## BUILDING SYSTEMS DESIGN (MECHANICAL AND ELECTRICAL)



### PROJECT DATES

- June 2012 – Project start
- Summer 2012 through Fall 2012 – Systems design
- Winter 2012 / 2013 – Tendering process
- Spring 2013 – Construction began
- Spring 2013 to Fall 2015 – Monitoring of construction process



### CLIENT REFERENCE

Mr. Larry Jones, *AAPEI, FRAIC*  
BGHJ Architects  
63 Fitzroy Street  
PO Box 1719  
Charlottetown, PE C1A 1R4

☎: 902.566.4449  
☎: 902.566.1235  
✉: info@bghj.com

### PROJECT OVERVIEW

In 1982, the Mill Cove Nursing Home opened along the southwest shore of Grand Lake, New Brunswick. The facility provides 24 hour seven day a week nursing care for 70 residents comprising seniors and special needs adults. To maintain optimum levels of care, the provincial government announced funding for a new nursing home at the site.

Fundy Engineering was contracted by the architectural firm Bergmark Guimond Hammerlund and Jones to design the building systems for the new Mill Cove Nursing Home. That long-term care facility comprises 30 geriatric and 35 enhanced care beds.

We designed numerous systems for the nursing home including: the heating, ventilation and air conditioning systems that comprised hydronic forced-flow heating systems, hydronic in-floor heat systems, radiant ceiling panel systems, and refrigeration, the domestic water system, the sanitary water system, power distribution, data and communications, building management and controls, lighting, emergency power, access control and security systems, and the nurse call system.

### CORE PROJECT TEAM

Darryl Ford, *P.Eng., FEC*  
David Richards, *P.Eng., MBA*  
Hector Lamprea, *P.Eng., P.E., CEM.*  
Ryan Gosson, *P.Eng.*  
Mitchell Muscroft, *P.Eng.*  
Richard Frenette, *P.Eng.*  
Greg Hoyt, *CET, WRT*  
Jon Pitman, *CTech*  
Shelby Gallant, *P.Tech.*  
Jacob Beam, *P.Tech.*

Senior Mechanical Engineer  
Project Manager  
Energy Efficiency Engineer  
Mechanical Engineer  
Electrical Engineering  
Revit® Design  
Drafting  
Drafting  
Mechanical Support  
Electrical Support

### SCOPE OF SERVICES PROVIDED

#### *Mechanical Design*

- Designed and sketched the new systems in Revit® for client review and construction

#### *Electrical Design*

- Sized new services to accommodate the new systems

#### *Field Review*

- Conducted routine inspections of the work being completed to ensure systems were being installed as per the specifications



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## Award Winner

Efficiency NB Start Smart

Four Green Globes

Best Addition to the Valley for 2012

# KV Public Library – Expansion / Redevelopment

QUISPAMIS, NEW BRUNSWICK

## BUILDING SYSTEMS DESIGN (MECHANICAL AND ELECTRICAL)



### PROJECT DATES

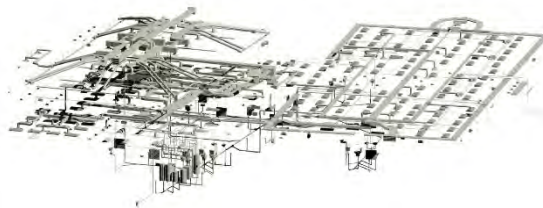
- 2011 – Project design
- 2012 and 2013 – Project construction
- 2014 – Project completion, commissioning, and opening



### PROJECT OVERVIEW

In 2010, the Kennebecasis Valley (KV) Public Library identified a need to expand their single slab-on-grade building. The expansion and redevelopment was required to provide modern technology, improved services, and programs to the growing population in Rothesay and Quispamsis.

Fundy Engineering, in concert with Richard & Co. Architecture Inc. and Estabrooks Engineering Inc., played a vital role in the design of the library expansion and redevelopment. We designed numerous systems for the new library including: the heating, ventilation and air conditioning systems that comprised hydronic in-floor heat systems, hydronic radiant ceiling panels, solar water heating, the domestic water system, the sanitary water system, the fire protection system, power distribution, data and communications, building management and controls, lighting, emergency power, and access control and security systems.



### CORE PROJECT TEAM

Darryl Ford, *P.Eng., FEC*  
David Richards, *P.Eng., MBA*  
Hector Lamprea, *P.Eng., P.E., CEM*  
Richard Frenette, *P.Eng.*  
Mitchell Muscroft, *P.Eng.*

Project Manager  
Mechanical Engineer  
Energy Efficiency Engineer  
Electrical Engineer  
Electrical Engineer

### SCOPE OF SERVICES PROVIDED

#### *Mechanical Design*

- Energy efficient heating, ventilation, and air-conditioning equipment (*i.e.*, radiant heating, air-to-air energy recovery)
- High-efficiency modulating boilers
- Building automation systems
- Variable speed hydronic pumps
- Energy efficient hot water service systems that incorporate solar heating
- Energy efficient motors
- Variable speed energy recovery ventilators to provide exchange within the building controlled using carbon dioxide sensors in the return air ductwork
- Variable refrigerant flow heat pumps
- Domestic hot water is heated using solar hot water panels on the roof with the boiler providing supplemental heat

#### *Electrical Design*

- Energy efficient lighting fixtures, lamps, and ballasts and LED exterior lighting
- Photoelectric lighting controls

### CLIENT REFERENCE

Mr. Michael Richard, *AANB, MRAIC*  
Richard & Co. Architecture Inc.  
40 Water Street  
Saint John, NB E2L 2A5

☎: 506.633.1361  
☎: 506.633.1301  
✉: mrichard@richardarchitecture.com

**FUNDY Engineering**

[www.fundyeng.com](http://www.fundyeng.com)

Toll Free: 1.877.635.1566

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# Shaunslieve S|2 Apartment Complex

BEDFORD, NOVA SCOTIA

## LEED® PROJECT MANAGEMENT

AND

## LEED® COMMISSIONING



### PROJECT DATES

- October 2010 – LEED® Charette kick-off meeting with architect and engineering sub-consultants
- December 2010 – LEED® S|2 Project Registration (Project # 13934)
- September 2011 to January 2014 - Project construction and collection and compilation of LEED® related data
- March 2015 – Final commissioning report completed
- April 2015 – LEED® documentation submitted
- August 2016 - LEED® Certified

### CLIENT REFERENCE

Mr. Michael McLain  
VP, Developments  
Killam Properties Inc.  
3700 Kempt Road  
Halifax, NS B3K 4X8

☎: 902.453.4536  
☎: 902.454.9203  
✉: mmclean@killamproperties.com

### PROJECT OVERVIEW

Shaunslieve S|2 is a new 63 unit residential complex in Bedford, Nova Scotia. The Killam Properties complex was designed and built and operates as a Leadership in Energy and Environmental Design (LEED®) registered project administered under the Canadian Green Building Council. S|2 provides a healthier and cleaner environment for residents and yields measurable reductions in energy and water consumption.

A previously developed urban site with existing services and accessible pedestrian and public transit infrastructure was selected for S|2. Active transportation is promoted through conveniently located bike racks and a dedicated bike storage room. To reduce energy consumption, three natural gas-fired cascading condensing boilers are used for heating. Sensor systems thermally adjust each unit. A GREEN switch is located within each unit that allows residents to quickly and easily turn off all light and non-essential electronic devices. Activation of the switch also triggers the units' temperature to be turned down. To reduce water consumption, low-flow faucets, shower heads, and dual flush toilets were installed in all units and common areas.

The completed site was landscaped with native and adapted vegetation to eliminate any need for irrigation systems. A 15 000 L rainwater harvesting cistern was also installed to provide grey water within the units and water for an on-site car wash bay.

### CORE PROJECT TEAM

Tim Ryan, *M.Eng., P.Eng.*  
Hector Lamprea, *P.Eng., CEM*  
Richard Frenette, *P.Eng.*  
Shelby Gallant, *P.Tech.*

Project Manager  
LEED® Commissioning Agent  
LEED® Commissioning Agent  
LEED® Certification Management

### SCOPE OF SERVICES PROVIDED

#### LEED® Accredited Professional Services

- One of our LEED® Accredited Professionals oversaw the collection of the necessary data for managing the LEED® scorecard and for completing and submitting the LEED® Letter Templates for the Project

#### LEED® Commissioning Agent

- One of our LEED® Accredited Professionals oversaw the commissioning process in order to gain LEED® credits for the Project

#### LEED® Certification

- Our Project Team compiled all of the necessary documents for submission to the Canadian Green Building Council in order for S|2 to receive LEED® certification; the building obtained "Certified" in August 2016



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# Leon's Home Furnishings Superstore

SAINT JOHN, NEW BRUNSWICK

## ENERGY MODELLING



### PROJECT DATES

- Winter 2011 / 2012 – Pre-design modelling
- Spring 2012 – Proposed building modelling
- Summer 2012 – Reference building modelling and incentive application submission



### CLIENT REFERENCE

Mr. Gary Fowler  
Atlantic Building Contractors  
19 Teal Street  
Grand Bay-Westfield, NB E5K 3Y9

☎: 506.738.8884

### PROJECT OVERVIEW

In 2012, Leon's Home Furnishings opened a new 3 840 m<sup>2</sup> single level slab-on-grade prefabricated building in Saint John. Fundy Engineering was contracted prior to construction to complete energy modelling for the building in support of an application for funding through Efficiency New Brunswick's new commercial building incentive program. The modelling was done to assess the energy performance and indoor environmental quality at the pre-design, design, and verification phases of the project; it was done to assist the contractor in determining where their investments in energy conservation would have the most impact and the building can be operated at optimal performance.

The overall building was modelled as a big box retail store with nine thermal zones. One large zone was dedicated for the showroom, three zones were allocated for office space, one zone for the vestibule, one for the kitchen, and one for storage.

The mechanical systems for the furniture warehouse consist of six rooftop units for the large retail area and split heat pump systems for the adjacent office and service spaces. The building envelope consists of an insulated metal panel wall system with R-20 interior insulation and a filled cavity roof system with R-40 interior insulation. Lighting throughout the building consists primarily of high-efficiency LED track lighting in the retail space and various T8 fixtures in the office spaces. Using this type of lighting was the most beneficial energy savings measure for the Project. The Project was successful in incentive funding.

### CORE PROJECT TEAM

Darryl Ford, *P.Eng., FEC*  
Hector Lamprea, *P.Eng., P.E., CEM*  
Ryan Gosson, *P.Eng.*

Project Manager  
Energy Efficiency Manager  
Mechanical Engineer

### SCOPE OF SERVICES PROVIDED

- eQUEST Version 3.64 was used for all energy modelling
- Results were submitted to Efficiency New Brunswick in support of an incentive application

#### *Pre-Design Modelling*

- The base building for pre-design modelling was based on the Canadian Model National Energy Code, 1997

#### *Proposed Building Modelling*

- Various mechanical and electrical systems were modelled to assess the energy performance and to achieve optimal performance

#### *Reference Building Modelling*

- The reference building followed the rules set by the National Energy Code for Buildings



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# Diamond Jubilee Cruise Terminal

SAINT JOHN, NEW BRUNSWICK

## BUILDING SYSTEMS DESIGN (MECHANICAL AND ELECTRICAL)



### PROJECT DATES

- Summer 2011 – Conceptual design and system selection
- Winter 2011 / 2012 - System design
- Summer 2012 – Commissioning of systems



### CLIENT REFERENCE

Mr. Michael Start, *AANB*  
Strategic Director  
TOSS Solutions  
17 Canterbury Street, Suite 190  
Saint John, NB E2L 2C3

☎: 506.632.9678  
☎: 506.633.8873  
✉: start@tosssolutions.com

### PROJECT OVERVIEW

Port Saint John constructed the Diamond Jubilee Cruise Terminal to increase Saint John's competitive advantage in the cruise industry. The two-story 2 300 m<sup>2</sup> Terminal can accommodate the largest cruise ships currently in operation. It also features Canada Border Services screening facilities, conference rooms, a kitchen, and a waterfront rental venue complete with a rooftop patio.

Fundy Engineering designed state-of-the art mechanical and electrical systems. We designed the systems using Revit® software, which allowed for three-dimensional models to be produced during the design of the Terminal.

Overall, the Terminal meets Efficiency New Brunswick's Core Performance Guide requirements and it consumes 30 % to 50 % less energy than that of the Model National Energy Code for Buildings. It is an architecturally unique design that adds tremendous value to Saint John's core by helping revitalize the waterfront and increasing economic opportunities. It opened to much fanfare on 5 September 2012 with the arrival of the *Disney Magic*.

### CORE PROJECT TEAM

Darryl Ford, *P.Eng., FEC*  
David Richards, *P.Eng., MBA*  
Hector Lamprea, *P.Eng., P.E., CEM*  
Mitchell Muscroft, *P.Eng.*  
Ryan Gosson, *P.Eng.*  
Richard Frenette, *P.Eng.*  
Greg Hoyt, *CET, WRT*  
John Pitman, *CTech*

Senior Mechanical Engineer  
Project Manager  
Energy Efficiency Engineer  
Electrical Engineer  
Engineering Support  
Revit® Design  
Drafting  
Drafting

### SCOPE OF SERVICES PROVIDED

#### *Mechanical and Electrical Design*

- In-floor hydronic heating allows controlled heating of individual zones
- High-efficiency gas-fired hot water boilers for hydronic heating systems and domestic hot water
- Energy efficient variable refrigerant flows
- Energy recovery ventilators provide air exchange and dehumidification
- High-efficiency gas-fired radiant tube heaters provide efficient heating in storage areas of the Terminal
- Direct-mounted nozzle spot diffusers optimize air distribution in the large open area that contains many large windows
- Energy management control systems ensure maximum operational efficiency and building comfort



**FUNDY Engineering**

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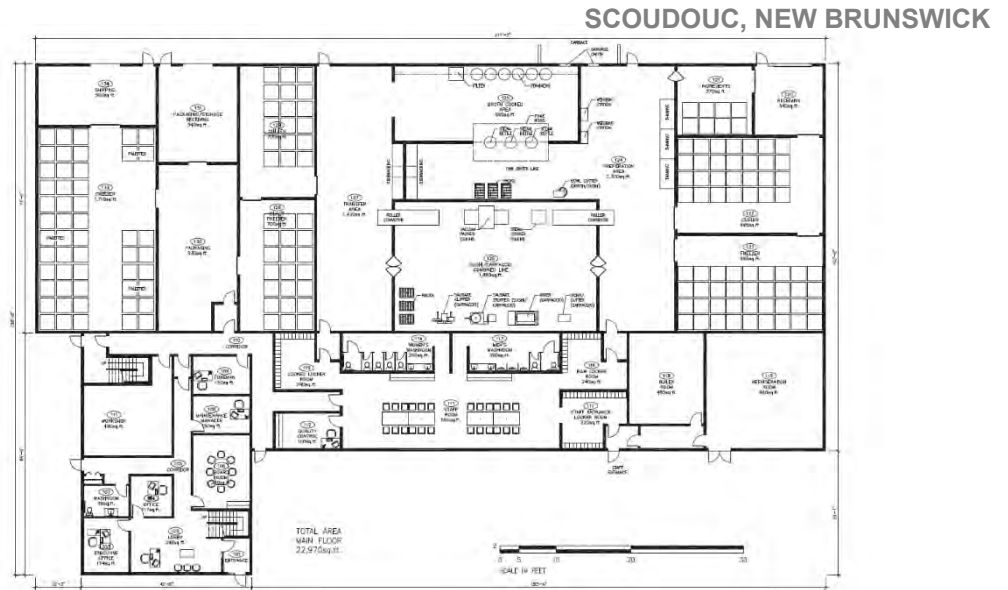
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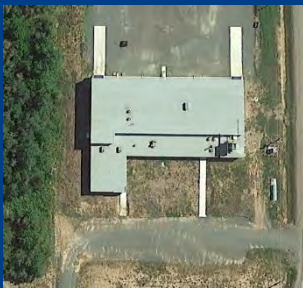
# Seafood Processing Plant – Conceptual Design

## COMPLETE FACILITY CONCEPTUAL DESIGN DEVELOPMENT AND PROJECT MANAGEMENT



### PROJECT DATES

- Fall 2012 – Contract award and initial floor plan conceptual design
- Winter 2012/2013 – Site plan development and estimating costs associated with design
- Summer 2013 – Final report and complete conceptual design issued



### CLIENT REFERENCE

Mr. Patrick Dodier  
Seafood 2000 Ltd.  
10 Water Street  
PO Box 40  
Georgetown, PE C0A 1L0

☎: 902.652.2316  
☎: 902.652.2023  
✉: patrick.sf2000@pwi.aibn.com

### PROJECT OVERVIEW

Fundy Engineering provided professional engineering and project management services to Seafood 2000 Ltd. during the preparation of a conceptual design for a seafood processing plant in the Scoudouc Industrial Park. The processing plant houses three product lines: lobster broth; sushi stick; and carpaccio.

The conceptual design incorporated initial and full production anticipated for the processing plant. Initial production for lobster broth and sushi stick were  $8\,000\text{ L} \cdot \text{day}^{-1}$  and  $1\,000\text{ kg} \cdot \text{day}^{-1}$  with a full production of  $24\,000\text{ L} \cdot \text{day}^{-1}$  and  $2\,000\text{ kg} \cdot \text{day}^{-1}$ , respectively. Carpaccio was not initially scheduled for production; however, consideration was given in the design in order to accommodate processing at some point in the future.

Floor plans for the facility were developed concurrently with the process lines in order to maximize efficiency and to determine overall space requirements. Several iterations were undertaken to arrive at the final design. Once the final design was determined, we provided the client with a “Class C” cost-estimate for constructing the facility, which has subsequently been built and is in operation.

### CORE PROJECT TEAM

Alex Moulard, *P.Eng., PMP*  
Darryl Ford, *P.Eng., P.E., FEC*  
Peter McKelvey, *P.Eng.*  
Doug Boyer, *P.Eng.*  
Richard Frenette, *P.Eng.*  
Jon Pitman, *CTech*

Project Manager  
Mechanical Engineer  
Senior Associate  
Electrical Engineer  
Revit® Design  
Drafting

### SCOPE OF SERVICES PROVIDED

#### *Conceptual Process Design*

- Evaluated the three product lines to assess production volumes and process flow

#### *Equipment Specifications*

- Provided specifications for various processing equipment within the facility

#### *Process Line Layout and Design*

- Identified proper product flow for lean efficiency and to minimize overall footprint

#### *Conceptual Plant Layout*

- Prepared a conceptual layout that incorporated full production for the three process lines

#### *Cost-Estimating*

- A “Class C” cost-estimate was provided for the overall conceptual design



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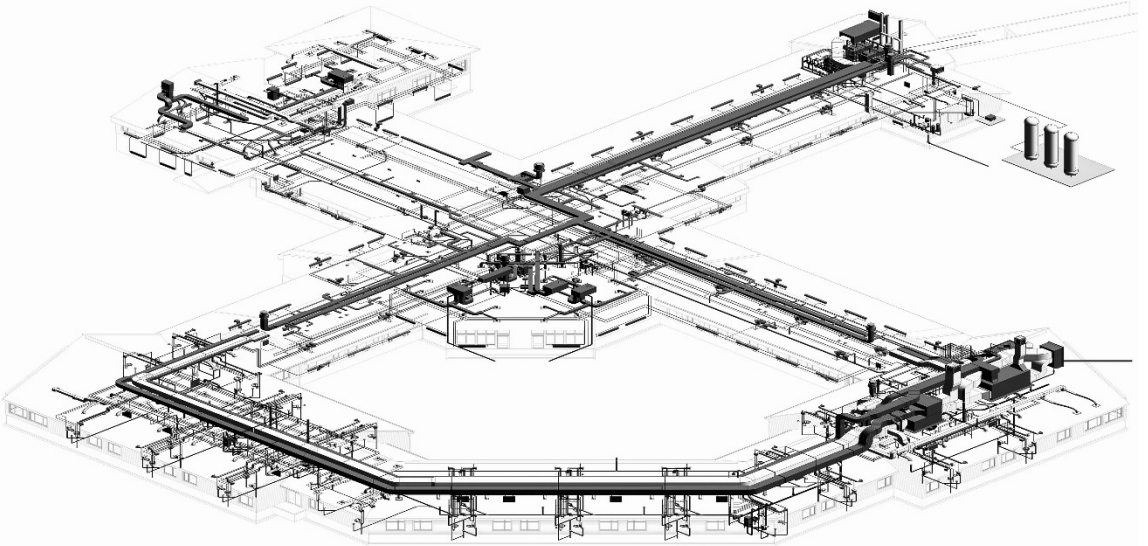
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# Kiwanis Nursing Home

SUSSEX, NEW BRUNSWICK

## BUILDING SYSTEMS DESIGN (MECHANICAL AND ELECTRICAL)



### PROJECT DATES

- May 2014 – Project start
- Summer 2014 into Fall 2014 – Systems design
- Winter 2014 / 2015 – Tendering process
- Spring 2015 – Construction began
- Spring 2015 to Winter 2016 – Monitoring of construction process



### CLIENT REFERENCE

Mr. Larry Jones, *AAPEI, FRAIC*  
BGHJ Architects  
63 Fitzroy Street  
PO Box 1719  
Charlottetown, PE C1A 1R4

☎: 902.566.4449  
☎: 902.566.1235  
✉: info@bghj.com

### PROJECT OVERVIEW

In 1979, the Kiwanis Nursing Home opened its doors in Sussex, New Brunswick. The non-profit facility operated to provide 24 hour seven day a week nursing care for 70 residents comprising seniors and special needs adults. To maintain optimum levels of care, the Province announced funding for an expansion.

Fundy Engineering was contracted by the architectural firm Bergmark Guimond Hammerlund and Jones to design the building systems for the expansion to the Kiwanis Nursing Home. That long-term care facility comprises 30 geriatric and 35 enhanced care beds.

We designed numerous systems for the nursing home including: the heating, ventilation and air-conditioning systems that comprised hydronic forced-flow heating systems, hydronic in-floor heat systems, radiant ceiling panel systems, and refrigeration, the domestic water system, the sanitary water system, power distribution, data and communications, building management and controls, lighting, emergency power, access control and security systems, and the nurse call system.

### CORE PROJECT TEAM

Darryl Ford, *P.Eng., FEC*  
David Richards, *P.Eng., MBA*  
Hector Lamprea, *P.Eng., P.E., CEM.*  
Ryan Gosson, *P.Eng.*  
Mitchell Muscroft, *P.Eng.*  
Richard Frenette, *P.Eng.*  
Greg Hoyt, *CET, WRT*  
Jon Pitman, *CTech*  
Shelby Gallant, *P.Tech.*  
Jacob Beam, *P.Tech.*

Senior Mechanical Engineer  
Mechanical Engineer, Project Manager  
Energy Efficiency Engineer  
Mechanical Engineer  
Electrical Engineering  
Revit® Design  
Drafting  
Drafting  
Mechanical Support  
Electrical Support

### SCOPE OF SERVICES PROVIDED

#### *Mechanical Design*

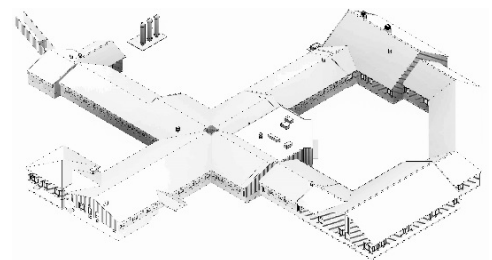
- Designed and sketched the new systems in Revit® for client review and construction

#### *Electrical Design*

- Sized new services to accommodate the new systems

#### *Field Review*

- Conducted routine inspections of the work being completed to ensure systems were being installed as per the specifications



**FUNDY Engineering**

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# Kingswood University Indoor Air Quality

SUSSEX, NEW BRUNSWICK

## INDOOR AIR QUALITY INVESTIGATION



### PROJECT DATES

- January 2015 – Project start
- May 2015 – Project completion



### PROJECT OVERVIEW

Kingswood University is situated along the banks of the Kennebecasis River in Sussex, New Brunswick. In 2012, staff at the University received several complaints regarding unsatisfactory indoor air quality. Fundy Engineering was retained to collect indoor air quality samples from 11 buildings on the University's campus to identify possible issues with air quality.

One representative outdoor air sample was collected for comparison to samples collected from each of the 11 buildings. Of the 23 air samples collected, several showed elevated counts of spores. The data suggested that the spore species identified as being present in high concentrations were likely a result of mould.

An overabundance of any microbial species has the potential to cause varying adverse health effects depending on the exposed individual's age, state of health, and duration of exposure. In order to limit the potential for adverse health effects to occur, Fundy Engineering provided the Client with remedial measures. Those measures primarily focused on the elimination of excessive moisture, which appeared to be the principal reason for the high concentration of spores.

### SCOPE OF SERVICES PROVIDED

#### Sampling Plan

- Using visual indicators and information collected from building occupants, identified areas on the campus where potential air quality issues existed and testing should be done to confirm / deny

#### Sampling Program

- Conducted air quality monitoring within 11 buildings on the campus using standardized methods and Zefon Air-O-Cell cassettes (*i.e.*, spore traps)
- Spore traps were submitted to an accredited laboratory for analysis
- Reported the results to the Client

#### Remedial Program

- Provided the Client with several recommendations for remediating mould

### CLIENT REFERENCE

Mr. Kirk Sabine  
VP for Campus Life  
Kingswood University  
26 Western Street  
Sussex, NB E4E 1E6

☎ : 506.432.4408  
☎ : 506.432.4425

### CORE PROJECT TEAM

Darryl Ford, *P.Eng., FEC*  
Greg Hoyt, *CET, WRT*  
Richard Frenette, *P.Eng.*

Senior Mechanical Engineer  
Air Quality Sampling  
Mechanical Engineer

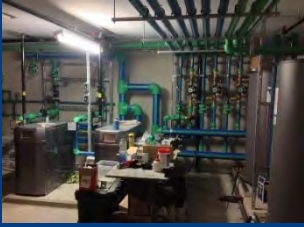
**FUNDY Engineering**

[www.fundyeng.com](http://www.fundyeng.com)

Toll Free: 1.877.635.1566

Saint John, NB • Clyde River, PE





# Father Eugene O'Leary Seniors Complex

SAINT JOHN, NEW BRUNSWICK



## BUILDING SYSTEMS DESIGN (MECHANICAL AND ELECTRICAL)

### PROJECT DATES

- Spring and Summer 2012 – Building systems design
- Fall 2012 – Ground breaking
- Fall 2012 to Fall 2013 – Construction
- Fall 2013 – Occupancy

### CLIENT REFERENCES

Mr. Jody Snider  
MC Ventilation  
1088 Bayside Drive  
Saint John, NB E2J 4Y1

☎: 506.634.8368  
☎: 506.631.0849  
✉: jsnider@mcvent.ca

Mr. George Freeze  
Freeze Plumbing & Heating  
589 Rothesay Avenue  
Saint John, NB E2H 2G9

☎: 506.696.7000

### PROJECT OVERVIEW

The Father O'Leary Seniors Complex is a three storey wood-framed apartment building. It is located on the north side of Loch Lomond Road in east Saint John. It is suitably situated to all major shopping areas and amenities in east Saint John.

The apartment building comprises 46 apartments; 23 one / two bedroom market rental units and 23 one bedroom units with rents based on income under a New Brunswick Department of Social Development program that is managed by NB Housing. The complex makes a positive quality statement in the area and provides tenants with comfort and security in a park-like setting.

Fundy Engineering provided professional mechanical and electrical engineering design services for the successful completion of this apartment complex in 2013-2014.



### CORE PROJECT TEAM

Darryl Ford, *P.Eng., FEC*  
David Richards, *P.Eng., MBA*  
Hector Lamprea, *P.Eng., P.E., CEM*  
Jon Pitman, *CTech*  
Shelby Gallant, *P.Tech.*

Project Manager  
Mechanical Engineer  
Energy Efficiency Engineer  
Drafting  
Mechanical Support

### SCOPE OF SERVICES PROVIDED

#### Mechanical Design

- Included heating, ventilation, and plumbing systems
- A high-efficiency gas-fired heating plant was designed to service in-floor radiant heating on the ground floor and hot-water baseboards on the second and third floors

#### Electrical Design

- Sizing of main electrical service entrance, distribution panels, power distribution, interior and exterior building lighting, telephone and data networks, fire alarm system, building access control, and security systems

#### Field Review

- Our Project Team conducted routine inspections during the entire construction process to ensure the systems were being installed as per the specifications identified during the detailed design



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# Barbour's Peanut Roaster

SUSSEX, NEW BRUNSWICK

PROJECT  
MANAGEMENT,  
ARCHITECTURAL  
SUPPORT,  
AND  
BUILDING SYSTEMS  
DESIGN (MECHANICAL  
AND ELECTRICAL)



## PROJECT DATES

- September 2013 – Project start
- December 2014 – Project completion



## PROJECT OVERVIEW

G.E. Barbour Inc., a multi-product food processing company contracted Fundy Engineering to assist with adding a new peanut roaster at their processing plant in Sussex, New Brunswick to meet demand. The installation of the new peanut roaster included the design of the peanut bin structure and the hopper support and managing the installation of the new roaster, erection of an existing hopper to the new peanut roaster, and the blancher conveyor to the bucket elevator.

Our project team used Revit® software to design the overall facility layout with the new peanut roaster. It was essential that the new roaster be installed with minimal interference with the existing operation processes at the manufacturing plant. Therefore, the use of Revit® proved to be invaluable because it allowed for three dimensional models to be produced in order to work out any potential conflicts with existing systems well before any construction took place.

The new peanut roaster is now a key component in the manufacture of Barbour's natural and organic peanut butters.

## CORE PROJECT TEAM

Crystal Caines, *P.Tech., PMP*  
Darryl Ford, *P.Eng., FEC*  
David Richards, *P.Eng., MBA*  
Mitchell Muscroft, *P.Eng.*  
Chris Legault, *P.Eng.*  
Greg Hoyt, *CET, WRT*  
Jon Pitman, *CTech*

Project Manager  
Senior Mechanical Engineer  
Mechanical Engineer  
Electrical Engineer  
Structural Engineer  
Drafting  
Drafting

## SCOPE OF SERVICES PROVIDED

### *Project Management*

- Provided advice and guidance to Barbour's from project planning through to project completion
- Provided construction management including the tendering process and contract administration

### *Architectural Support*

- Fundy Engineering sketched the existing floor layout and the new layout that incorporated the new peanut roaster

### *Mechanical Design*

- Designed and sketched the new peanut roaster including all plumbing, propane, and ventilation distribution systems

### *Electrical Design*

- Sized a new electrical panel to accommodate the new systems and production requirements

### *Structural Design*

- Designed all structural components including the concrete pad for siting the new peanut roaster and the associated stairs and catwalk

## CLIENT REFERENCE

Mrs. Sylvia MacVey  
G.E. Barbour Inc.  
165 Stewart Avenue  
Sussex, NB E4E 3H1

☎: 506.432.2300

☎: 506.432.2323

✉: inquiries@barbours.ca

**FUNDY Engineering**

[www.fundyeng.com](http://www.fundyeng.com)

Toll Free: 1.877.635.1566

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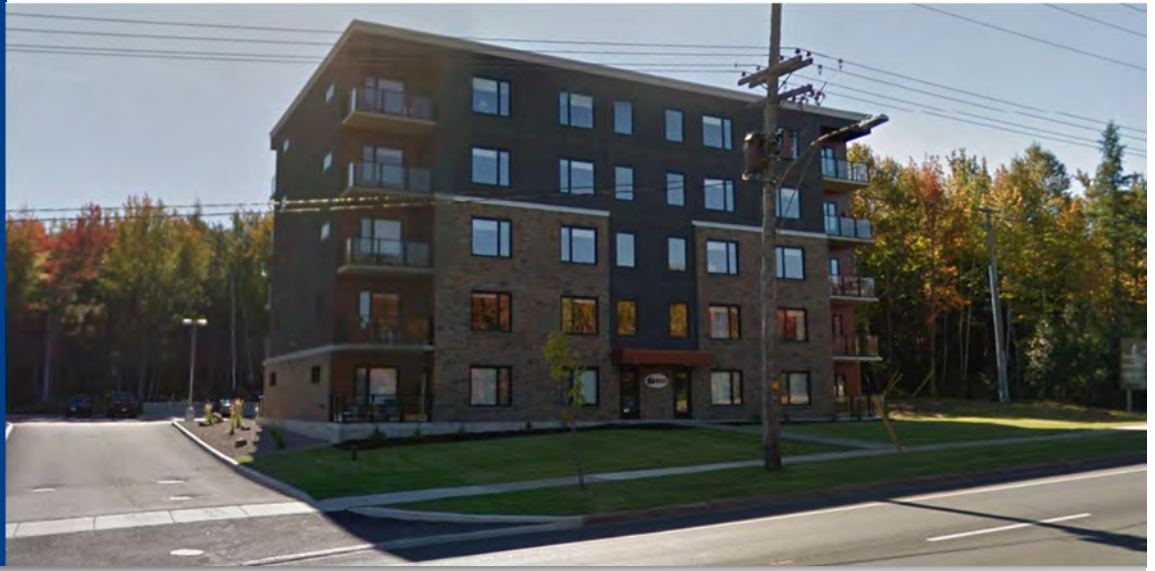




# St. George Apartments

MONCTON, NEW BRUNSWICK

## BUILDING SYSTEMS DESIGN (MECHANICAL AND ELECTRICAL)



### PROJECT DATES

- Summer and Fall 2013 – Systems design
- Winter 2014 to Spring 2015 – Construction



### PROJECT OVERVIEW

In 2013, Rice Contracting Ltd. was commissioned to construct a 20-unit apartment building on St. George Boulevard in Moncton, New Brunswick using a design-build construction approach. Fundy Engineering, in association with Roma Blair A Architect Limited, were engaged as the project's design team.

Fundy Engineering designed the mechanical and electrical systems for the apartment building and also provided architectural drafting support. The mechanical design consisted of sizing and selecting individual unit air-sourced heat pumps and heat ventilators to provide heating, ventilation, and air-conditioning to the building. We also designed the plumbing systems and the fire protection performance specification.

The building's electrical design consisted of power distribution, a meter stack for individual unit power metering, data and communications systems, interior and exterior building lighting, emergency lights and exit signs, fire sensors and detectors, power distribution, access control, and security systems.

### SCOPE OF SERVICES PROVIDED

#### Mechanical Design

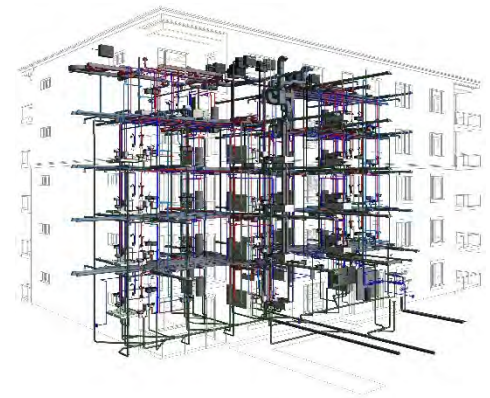
- Designed and sketched the new systems in Revit® for client review and construction

#### Electrical Design

- Sized new services to accommodate the new electrical systems

#### Field Review

- Our Project Team conducted routine inspections during the entire construction process to ensure the systems were being installed as per the specifications identified during the detailed design



### CLIENT REFERENCE

Mr. John Rice  
President  
Rice Contracting  
800 Salisbury Road  
Moncton, NB E1E 1C5

☎: 506.855.4044  
☎: 506.855.4034  
✉: john@ricecontracting.com

### CORE PROJECT TEAM

Darryl G. Ford, *P.Eng., FEC*  
David Richards, *P.Eng., MBA*  
Mitchell Muscroft, *P.Eng.*  
Richard Frenette, *P.Eng.*  
Jon Pitman, *CTech*

Senior Mechanical Engineer  
Project Manager  
Electrical Engineering  
Revit® Drafting  
Architectural Drafting

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# Hampton Inn and Suites

FREDERICTON, NEW BRUNSWICK

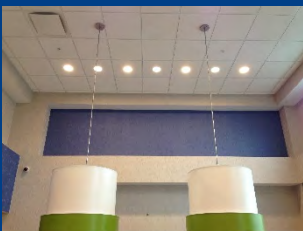


## MECHANICAL SYSTEMS DESIGN



## PROJECT DATES

- Spring and Summer 2014 – Systems design
- Fall 2014 through Fall 2015 – Construction
- December 2014 – Final inspection and opening



## CLIENT REFERENCE

Mr. Sean Jones  
K-Line Construction Ltd.  
8 Avery Street  
Hanwell, NB E3C 0E6

☎: 506.454.1302  
☎: 506.454.1303  
✉: info@k-lineconstruction.com

## PROJECT OVERVIEW

To help satisfy the growing demand for quality hotel rooms in Fredericton, New Brunswick, Hampton Inn and Suites opened a new 6 500 m<sup>2</sup>, 103 room hotel in December 2015. Fundy Engineering was contracted by the general contractor, K-Line Construction Ltd., to undertake mechanical design services for the hotel.

We calculated the building heating and cooling loads and sized the Heating, Ventilation, and Air-Conditioning (HVAC) equipment along with specifying the control system requirements. Plumbing system design included the sanitary, storm, and domestic water services.

One of the hotel's prominent features is the swimming pool complete with a waterslide. We designed the ventilation system for the pool area, which included calculating the dehumidification and ventilation loads, heating and cooling requirements of the pool water, and sizing the air distribution system.

Mechanical systems for the guest room and guest suites were completed using five typical room layouts: King; King Studio; King Accessible; Double Queen; and Double Queen Accessible. Mechanical systems for each of the room layouts included lavatories, water closets, bathtubs and showers, and PTAC systems. We also specified the plumbing fixtures for operational areas, such as kitchen preparation, laundry, mop sinks, etc.

## CORE PROJECT TEAM

Darryl Ford, *P.Eng., FEC*  
David Richards, *P.Eng., MBA*  
Ryan Gosson, *P.Eng.*  
Jon Pitman, *CTech*  
Greg Hoyt, *CET, WRT*  
Shelby Gallant, *P.Tech.*

Senior Mechanical Engineer  
Mechanical Engineer  
Project Manager  
Drafting  
Drafting  
Mechanical Support

## SCOPE OF SERVICES PROVIDED

### Mechanical Design

- Designed and sketched the new mechanical systems in AutoCAD for client review and construction documents

### Field Review

- Our Project Team conducted routine inspections during the entire construction process to ensure the mechanical systems were being installed as per the specifications identified in the detailed design drawings and specifications



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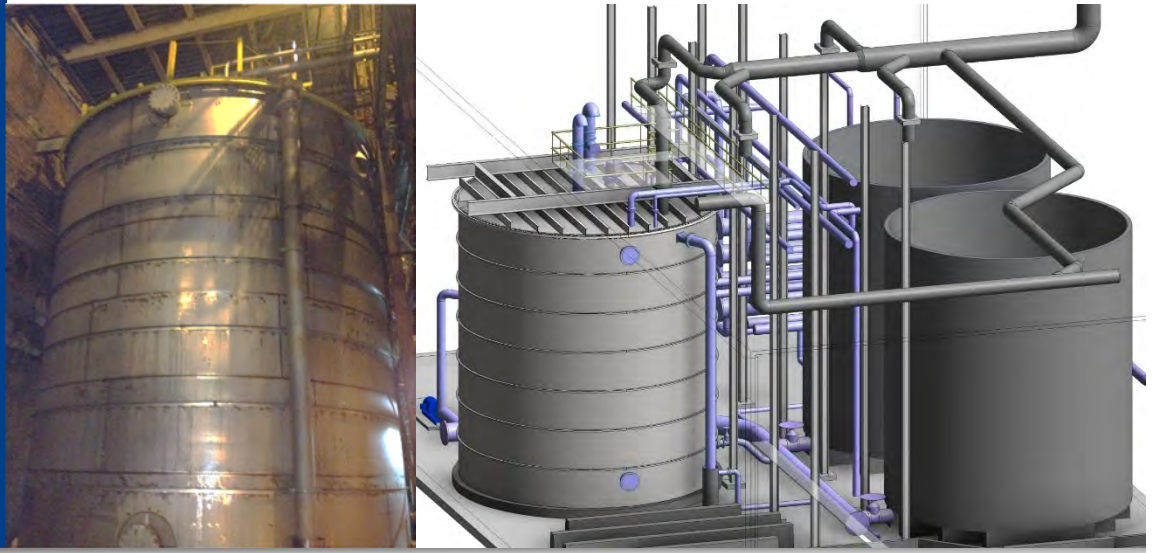
www.fundyeng.com

Toll Free: 1.877.635.1566  
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# AV Cell Heat Exchanger and SO<sub>2</sub> Quenching Tank Venting System

ATHOLVILLE, NEW BRUNSWICK

## BUILDING SYSTEMS DESIGN (MECHANICAL AND ELECTRICAL)



### PROJECT DATES

- Spring and Winter 2014 – Heat exchanger design
- Winter 2014 / 2015 – SO<sub>2</sub> relief venting system design



### PROJECT OVERVIEW

Fundy Engineering's Building Systems team has designed various systems for AV Cell Inc.'s specialty pulp mill in Atholville, New Brunswick. Two of the projects we completed were the design of a heat exchanger and the design of a sulphur dioxide (SO<sub>2</sub>) relief venting system.

The heat exchanger was designed for recovering boiler makeup water in order to reduce heating costs at the mill. We prepared instrumentation and control loop diagrams and specifications, sized pipes and materials, and calculated pressure losses within the system.

An SO<sub>2</sub> relief venting system was designed to safely release gases from a new 416 000 L quenching tank at the mill. For that work, our team produced piping and instrumentation drawings for the client, sized pipes, valves, connections, etc., and generated drawings in Revit® in order for the client to clearly envision the newly designed systems before they were constructed at the mill.

Through these jobs, Fundy Engineering was able to showcase our talent to AV Cell such that we now routinely do mechanical systems design at the mill.

### CORE PROJECT TEAM

Darryl Ford, *P.Eng., FEC*  
Hector Lamprea, *P.Eng., P.E., CEM*  
Richard Frenette, *P.Eng.*  
David Richards, *P.Eng., MBA*  
Greg Hoyt, *CET, WRT*  
Jon Pitman, *CTech*  
Shelby Gallant, *TGIT*

Senior Mechanical Engineer  
Project Manager  
Revit® Design  
Mechanical Engineer  
Drafting  
Drafting  
Mechanical Support

### SCOPE OF SERVICES PROVIDED

#### Heat Exchanger

- Provided mechanical systems design drawings and specifications for the heat recovery system for the recovery boiler makeup water

#### SO<sub>2</sub> Relief Venting System

- Provided mechanical systems design including sizing of ductwork and pipes, piping and instrumentation drawings, and various systems calculations

#### Electrical Design

- Designed cathodic protection for the new SO<sub>2</sub> quenching tank



### CLIENT REFERENCE

Mr. Paulino Barahona  
AV Cell Inc.  
175 Mill Road  
Atholville, NB E3N 4S7

☎: 506.789.4101  
✉: paulino.barahona@avg.adityabirla.com

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# Canaport™ LNG<sub>LP</sub> Marine Jetty

SAINT JOHN, NEW BRUNSWICK

## PROJECT MANAGEMENT

AND

## MARINE JETTY STRUCTURAL SURVEY



## PROJECT DATES

- Winter 2014 / 2015 – Marine jetty structural survey and client reporting



## CLIENT REFERENCE

Mr. Al Clarke, *P.Eng.*  
Electrical Maintenance  
Superintendent  
Canaport™ LNG<sub>LP</sub>  
2530 Red Head Road  
Saint John, NB E2L 3T5

☎: 506.638.1372

✉: al.clarke@canaportlng.com

## PROJECT OVERVIEW

Canaport™ LNG<sub>LP</sub> is Canada's first and only Liquefied Natural Gas (LNG) regasification terminal. The state-of-the-art facility has a deep water marine jetty for receiving Q-Max vessels, which are the largest LNG carriers in the world. The jetty comprises mooring dolphins, berthing dolphins, catwalks, and a main platform. The concrete decks of the jetty are supported on steel-framed metal jackets connected to piles installed in the seabed. The jetty provides a key connection between the Q-Max vessels and the on-shore regasification terminal infrastructure.

To ensure the jetty is structurally safe, an above water and underwater inspection must be conducted every five years. Fundy Engineering undertook the first structural survey of the operational jetty. To facilitate the survey, our project management team subcontracted a crew of commercial divers, dive support personnel, and structural engineers.

The work presented several significant challenges including inclement weather delays and strong tidal currents, which limited the amount of time available daily to complete the work. Those challenges were managed with an acceptable level of impact on the project budget and schedule.

## CORE PROJECT TEAM

Tim Ryan, *M.Eng., P.Eng.*  
Alex Moulard, *P.Eng., PMP*  
Kent Grass  
James Holder, *M.Eng., P.Eng.*  
Chris Kenney, *BSc.*  
Monte Nickerson, *DCBC Certified*

Project Manager  
Project Coordinator  
Diver (All-Sea Atlantic)  
Structural Engineer  
Diver (All-Sea Atlantic)  
Diver (All-Sea Atlantic)

## SCOPE OF SERVICES PROVIDED

- Developed initial scope of work with the Client and adjusted, as required, throughout the project
- Assembled a project team that included individuals from four separate companies: Fundy Engineering; J.B. Holder Engineering Ltd.; All-Sea Atlantic; and DMK Marine
- Conducted thickness measurements of the jetty foundation piles using non-destructive testing methods
- Performed an underwater visual inspection of the jetty foundation piles
- Completed a visual inspection of the entire jetty structure above the water
- Provided the Client with a flexible billing structure, which resulted in a reduction in the overall budget
- Managed the project team, budget, and scope of work
- Provided recommendations to the client for conducting ongoing maintenance and management of the jetty infrastructure

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Saint John, NB • Clyde River, PE



# Scotiabank Heating System Feasibility Studies

MULTIPLE ATLANTIC CANADA LOCATIONS

## MECHANICAL FEASIBILITY STUDIES AND PROJECT MANAGEMENT



### PROJECT DATES

- January 2015 – Project start
- May 2015 – Project completion



### CLIENT REFERENCE

Ms. Rebecca Bedford  
Project Manager  
Scotiabank, Real Estate 54072  
61 Front Street, 4<sup>th</sup> Floor  
Toronto, ON M5J 1E5

☎: 416.866.5940  
☎: 416.866.4304

### PROJECT OVERVIEW

The Bank of Nova Scotia, Real Estate Department contracted Fundy Engineering to complete comprehensive heating feasibility studies for 30 of their locations across Atlantic Canada. Those locations comprised six New Brunswick sites, five Newfoundland sites, 14 Nova Scotia sites, and five sites on Prince Edward Island.

We provided the client with an accurate baseline assessment of the existing oil-fired heating systems within each of their buildings. Following our detailed site visits, we reviewed the data from each location to determine whether there was a cost-effective alternative to oil-fired heating.

For sites where options were available for upgrading, we generated a cost comparison analysis for alternate fuel sources with expected payback. Those data allowed the client to make informed decisions on the best approach with respect to upgrades, fuel conversion, and / or total replacement. If there was not a cost-effective alternative, we recommended system upgrades to mitigate potential environmental risk posed by the existing oil-fired heating system.

### CORE PROJECT TEAM

Darryl Ford, *P.Eng., FEC*  
David Richards, *P.Eng., MBA*  
Hector Lamprea, *P.Eng., PE, CEM*  
Ryan Gosson, *P.Eng.*  
Greg Hoyt, *CET, WRT*  
Shelby Gallant, *P.Tech.*

Senior Mechanical Engineer  
Project Manager  
Energy Efficiency Engineer  
Mechanical Engineer  
Project Support  
Project Support

### SCOPE OF SERVICES PROVIDED

#### *Feasibility Studies*

- Assessed the condition of the existing heating systems
- Generated cost-effective heating system replacement options
- Provided order of magnitude replacement costs for budgeting purposes
- Developed strategies to mitigate potential environmental risks posed by systems where replacement was not feasible
- Prioritized system upgrades for the locations assessed

#### *Project Management*

- Scheduled site visits to all locations and geographically grouped visits in order to reduce travel expenses for the client
- Ensured reports were timely



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# Alcool New Brunswick Liquor – East Point

SAINT JOHN, NEW BRUNSWICK

## BUILDING SYSTEMS DESIGN (MECHANICAL AND ELECTRICAL)



### PROJECT DATES

- April 2015 – Project start
- Spring 2015 through Fall 2015 – Systems design
- Winter 2015 / 2016 – Construction monitoring
- Spring 2016 – Store opening



### CLIENT REFERENCE

Mr. Tom Smith  
Project Manager  
East Point Inc.  
479 Rothesay Avenue  
Saint John, NB E2J 2C6

☎: 506.634.5717

☎: 506.634.2236

✉: tsmith@eastpointshopping.ca

### PROJECT OVERVIEW

On 4 March 2016, NB Liquor launched its new retail outlet design with the opening of its new 1 170 m<sup>2</sup> retail store at the East Point Shopping Centre in east Saint John. The design incorporates a growler bar, a wine tasting area, and a cocktail feature area.

Fundy Engineering worked in association with the architectural firm Turner Fleischer who has been bestowed multiple interior design awards. Our team prepared design briefs, detailed design drawings and specifications, cost-estimates, tender documents for construction, and worked on change order requests during construction.

We designed many of the building systems for the retail outlet. Those included: the heating, ventilation, and air conditioning systems, the domestic water system, the sanitary water system, power distribution, data and communications, snow melting, building management and controls, lighting, emergency power, access control, and security systems. Our team assisted the architect in the commissioning of the building systems and acceptance certification before handover to the owner.

### CORE PROJECT TEAM

Darryl Ford, *P.Eng., FEC*  
Mitchell Muscroft, *P.Eng.*  
Richard Frenette, *P.Eng.*  
Ryan Gosson, *P.Eng.*  
Jacob Beam, *P.Tech.*

Project Manager  
Electrical Engineer  
Revit® Design  
Mechanical Engineer  
Electrical Support

### SCOPE OF SERVICES PROVIDED

#### *Mechanical Systems Design*

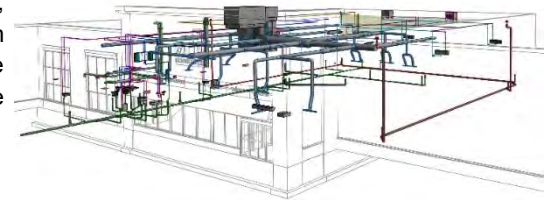
- Plumbing and natural gas distribution
- Heating, ventilation, and air-conditioning

#### *Electrical Systems Design*

- Service connection
- General power and distribution
- Lighting, emergency lighting, and controls
- Fire alarm, security, and intrusion alarm
- Data and communications

#### *Field Review*

- Conducted routine inspections of the work being completed and documented deficiencies in order to ensure systems were being installed as per the contract specifications



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# Hollis Street Scotiabank

HALIFAX, NOVA SCOTIA

COMPLETE  
ARCHITECTURAL,  
MECHANICAL,  
ELECTRICAL, AND  
STRUCTURAL  
ENGINEERING DESIGN,  
AND  
PROJECT MANAGEMENT



## PROJECT DATES

- Spring / Summer 2015 – Feasibility study
- Fall / Winter 2015 – Design
- Spring 2016 – Construction



## CLIENT REFERENCE

Ms. Rebecca Bedford  
Project Manager  
Scotiabank, Real Estate 54072  
61 Front Street, 4<sup>th</sup> Floor  
Toronto, ON M5J 1E5

☎: 416.866.5940  
☎: 416.866.4304

## PROJECT OVERVIEW

On 3 August 1931, the Bank of Nova Scotia opened one of its most authentically Canadian buildings at 1709 Hollis Street in Halifax. The building's historical significance was recognized on 25 January 1985 under the Nova Scotia *Heritage Property Act*. Since opening, the Renaissance-inspired six-storey sandstone building has undergone several renovations. Today, the building houses Scotiabank's Atlantic Regional Office and the Halifax Main Branch.

In 2015, we conducted a feasibility study to determine whether or not there was a cost-effective alternative to replace the existing oil-fired heating system. Through the feasibility study we were able to recommend several improvements for consideration by Scotiabank that went beyond just the heating system.

Following through with many of the recommendations, Fundy Engineering was contracted for complete architectural and mechanical, electrical, and structural engineering design and project management services for the replacement of existing rooves, rooftop Heating, Ventilation, and Air-Conditioning (HVAC) equipment, and conversion of the boilers from fuel oil to natural gas.

## CORE PROJECT TEAM

Darryl Ford, *P.Eng., FEC*  
David Richards, *P.Eng., MBA*  
Hector Lamprea, *P.Eng., PE, CEM*  
Mitchell Muscroft, *P.Eng.*  
Richard Frenette, *P.Eng.*  
Jacob Beam, *P.Tech.*

Senior Mechanical Engineer  
Project Manager  
Energy Efficiency Engineer  
Electrical Systems  
Revit® Design  
Electrical Support

## SCOPE OF SERVICES PROVIDED

### *Vault Roof Replacement*

- Removal of outdated HVAC equipment
- Ductwork modification
- Structural design for new ductwork
- Designed, tendered, and oversaw contract administration for new roof construction

### *Main Roof Replacement, Boiler Conversion, and Rooftop Unit Replacement*

- Developed plan for converting oil-fired boilers to natural gas-fired boilers
- Designed new HVAC ductwork
- Sized new rooftop air handling unit
- Designed, tendered, and oversaw contract administration for new roof construction, boiler conversion, and all associated infrastructure



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# Bell Aliant Tower T5 VHO Data Center

SAINT JOHN, NEW BRUNSWICK

COMPLETE  
ARCHITECTURAL,  
MECHANICAL,  
ELECTRICAL, AND  
STRUCTURAL  
ENGINEERING DESIGN



## PROJECT DATES

- Winter 2015 – Design
- Summer 2016 through Spring 2017 - Construction



## PROJECT OVERVIEW

Fundy Engineering was engaged as the prime consultant for the design of new mechanical systems for the space housing the VHO (Very High Output) Data Center at Bell Aliant's Tower in Uptown Saint John. The systems were designed in such a way that they could be built while maintaining full operation of the existing Data Center.

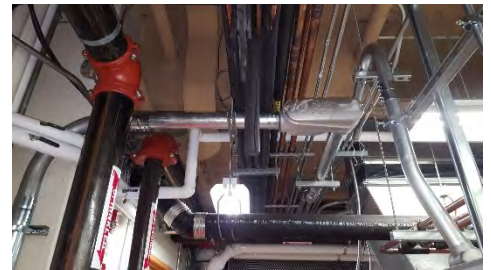
Complete design included the construction of a new mechanical room. Cooling requirements for the space were achieved using redundant Computer Room Air Conditioning (CRAC) units. To provide Bell Aliant with energy savings, the CRAC units incorporated a pumped refrigerant economizer system. Although this system still includes an indoor evaporator unit and an outdoor condenser unit, which are standard for most CRAC units, and the heat transfer fluid is still a refrigerant, a refrigerant pump package was included that is non-standard for a CRAC unit. The refrigerant pump package was placed next to the condenser. It operates at low temperatures to reduce or eliminate the need for the compressor to operate. Overall, this provides significant energy savings to realize the required cooling.

We engaged several sub-consultants to provide complete engineering design for this project.

## SCOPE OF SERVICES PROVIDED

### Complete Engineering Design

- Architectural design for new mechanical room
- Sizing and selection of computer room air-conditioning units
- Duct sizing and design
- Refrigeration design
- Direct digital controls system design to incorporate new equipment into the existing building automation system
- Plumbing design for the computer room air-conditioning humidifier and condensate drains
- Electrical power and lighting design
- Structural review of roof loading for new condensers



## CLIENT REFERENCE

Mr. Robert Sullivan  
SNC Lavalin O&M Solutions Inc.  
50 Innovation Drive  
Bedford, NS B4B 1A2

☎: 514.840.8136

☎: 514.840.8429

## CORE PROJECT TEAM

David Richards, *P.Eng., MBA*  
Richard Frenette, *P.Eng.*  
Smyth Design  
TEK Consultants  
CTS Engineering

Project Manager  
Revit® Design  
Architectural Sub-Consultant  
Electrical Sub-Consultant  
Structural Sub-Consultant

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# Hewanorra International Airport Fuel Depot Relocation

VIEUX FORT QUARTER, ST. LUCIA

COMPLETE  
ARCHITECTURAL,  
BUILDING SYSTEMS  
DESIGN (MECHANICAL  
AND ELECTRICAL),  
AND  
BID PACKAGE  
DEVELOPMENT



## PROJECT DATES

- Winter 2016 through Fall 2016 – Project design
- Winter 2017 – Construction tender document preparation and award construction
- Spring 2017 through Fall 2017 – Administer construction
- Winter 2018 – Facility complete and operational

## CLIENT REFERENCE

Mr. Greg Little  
Project Manager  
Phoenix Petroleum Ltd.  
400 Thompson Drive  
PO Box 3057 Station. "B"  
Fredericton, NB E3A 5G8

☎: 506.459.6260  
☎: 506.459.6263  
✉: info@phoenixpetro.ca

## PROJECT OVERVIEW

In 2010, the Saint Lucia Air and Sea Port Authority announced a \$140 million (USD) redevelopment program for the Hewanorra International Airport. The redevelopment program required SOL Caribbean Limited, the Caribbean's largest independent petroleum marketing company, to relocate its aviation fuel storage depot.

Fundy Engineering, under contract with Phoenix Petroleum Ltd., designed SOL's fuel depot for siting adjacent to an abandoned runway at the Hewanorra airport. The fuel depot included: petroleum storage tanks; secondary containment; a two-storey main office building; a canteen / kitchen; a workshop; a generator for emergency power; parking areas and roadways. We designed the facility and prepared many drawings for inclusion in the bid package. Some of the systems designed for the facility included: fuel storage and dispensing; fire suppression and safety; emergency power; heating, ventilation, and air-conditioning; plumbing; and electrical. The systems were designed using the Caribbean Uniform Building Code (CUBiC) for wind and seismic loads.

## CORE PROJECT TEAM

Tim Ryan, *M.Eng., P.Eng.*  
Darryl Ford, *P.Eng., FEC*  
Crystal Caines, *P.Tech., PMP*  
Alex Moulard, *P.Eng., PMP*  
Mitchell Muscroft, *P.Eng.*  
Ryan Gosson, *P.Eng.*  
Jon Pitman, *CTech*

Project Manager  
Senior Mechanical Engineer  
Project Coordinator  
Geotechnical Engineer  
Electrical Engineer  
Mechanical Engineer  
Architectural Design

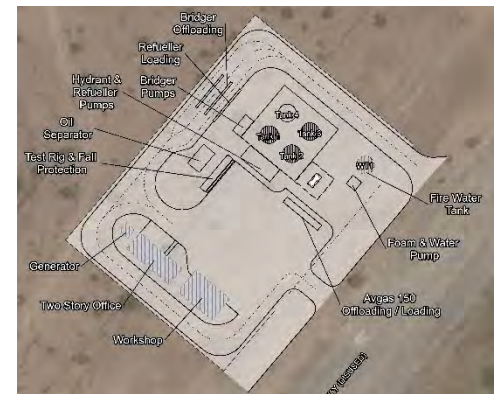
## SCOPE OF SERVICES PROVIDED

### Architectural

- Designed and sketched the new fuel depot and associated buildings in AutoCAD

### Mechanical Systems Design and Electrical Systems Design

- Designed and sketched the systems in AutoCAD for inclusion in the new buildings
- Developed the construction bid package for the proponent to use in selecting a contractor for the project



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Saint John, NB • Clyde River, PE



# Wolfe Lake Visitor Centre

FUNDY NATIONAL PARK, NEW BRUNSWICK

ELECTRICAL DESIGN,  
MECHANICAL DESIGN,  
GEOTECHNICAL  
INVESTIGATION,  
AND  
ENVIRONMENTAL  
PERMITTING



## PROJECT DATES

- Fall 2016 to Spring 2017 – Project design
- Winter 2016 – Geotechnical investigation
- Spring 2017 – Environmental permitting
- Summer and Fall 2017 – Construction reviews



## CLIENT REFERENCE

Mr. Matt Walsh, *P.Eng.*  
Project Manager  
Public Services &  
Procurement Canada  
189 Prince William Street  
Saint John, New Brunswick  
E2L 2B9

☎: 506.639.1741  
✉ Matthew.walsh@  
pwgsc.tpsgc.gc.ca

## PROJECT OVERVIEW

In 2012, the original Visitor Reception Centre located at Wolfe Lake in Fundy National Park was demolished because the building was dilapidated and deemed structurally unsound. Wolfe Lake is one of the two entrances to Fundy National Park. In anticipation of the completion of the Fundy Trail Parkway near the Wolfe Lake entrance, planning for a new Visitors Centre began in 2016. Fundy Engineering was contracted by Public Services and Procurement Canada to assist with the building design.

To accommodate the anticipated volume of visitors, a new wastewater treatment system was required, which was designed by Fundy Engineering. The wastewater generated is treated via an on-site sewage disposal system comprising an 18,000 L septic tank and raised infiltration bed consisting of 216 pressure-dosed chambers placed within engineered fills. Due to limited cleared space at the site, the infiltration bed had to be located within 30 m, but no closer than 15 m, to Wolfe Lake.

We also designed the electrical and mechanical systems for the new visitor centre. To ensure the systems were installed as per the specifications, members of our design team regularly visited the site during construction.

The new facility opened to the public in Fall 2018 and it is expected to serve thousands of visitors annually.

## CORE PROJECT TEAM

David Richards, *P.Eng., MBA*  
Ken Carson, *P.Eng.*  
Jacob Beam, *P.Tech.*  
Andy MacVey, *P.Eng.*  
Ryan Gosson, *P.Eng.*  
Matthew Alexander, *P.Geo., Ph.D., EP*

Mechanical Engineer, Project Manager  
Electrical Engineer  
Electrical Support  
Geotechnical Engineer  
Mechanical Engineer  
Senior Environmental Scientist

## SCOPE OF SERVICES PROVIDED

### *Electrical Design*

- Designed lighting, power distribution, communications, and heating systems

### *Mechanical Design*

- Designed the ventilation and plumbing systems for the facility
- Designed the new septic system to conform with the criteria outlined in the On-Site Sewage Disposal Regulation [88-200] of the New Brunswick *Public Health Act*
- Oversaw the construction and installation process

### *Geotechnical Investigation*

- Completed several test pits on the site to characterize the underlying soil conditions for the building and septic system

### *Environmental Permitting*

- Secured a watercourse and wetland alteration permit to allow the installation of the septic field within 30 m of Wolfe Lake

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# Housing Inspection Services

MULTIPLE ATLANTIC CANADA LOCATIONS, QUEBEC, AND SASKATCHEWAN

PROPERTY CONDITION  
ASSESSMENTS,  
PROGRESS ADVANCE  
VALIDATION  
INSPECTIONS,  
REHABILITATION  
INSPECTIONS,  
AND  
SPEC WRITING



## PROJECT DATES

- Winter 2016 to 2018 – inspections throughout Atlantic Canada, Quebec, and Saskatchewan



## PROJECT OVERVIEW

Fundy Engineering was contracted by OZHI LP First Nations Professional Services to provide housing inspection services to First Nations communities in support of Canada Mortgage and Housing Corporation's (CMHC's) programs. Those include progress reviews and physical condition reviews under the On-Reserve Non-Profit Housing Program and initial property reviews, work descriptions, and progress reviews for renovation programs.

Housing inspections were comprehensive in nature and, depending on the type of inspection required, included examining everything from the building's envelope, crawlspaces and / or basements, heating and ventilation systems, plumbing systems, electrical systems, kitchens, bathrooms, and bedrooms. All of the detailed information collected on-site was provided via reports, which were completed within constrained timeframes. In some instances, work scopes were completed for houses that required repairs and our reports were used to solicit bids and cost-estimates.

Many of the inspections required extensive travel as they involved work in remote First Nations communities including northern Quebec and Labrador. Over 1,200 inspections were completed in two years.

## SCOPE OF SERVICES PROVIDED

### Physical Condition Reviews

- Inspect housing for its state of repair and for life safety concerns

### Residential Rehabilitation Assistance Programme

- Inspect housing with performance problems or those that require modification to provide accessibility

### Progress Inspections

- Review housing under construction



## CLIENT REFERENCE

Mr. Karl Tuomisto  
OZHI LP First Nations Professional Services  
% FORM Architecture Engineering  
131 Court Street North  
Thunder Bay, ON P7A 4V1

☎: 807.345.5582

☎: 807.345.4093

✉: karl.t@formarchitecture.ca

## CORE PROJECT TEAM

Darryl Ford, *P.Eng., FEC*  
Crystal Caines, *P.Tech., PMP*  
Jon Pitman, *CTech*  
Katie Lord, *TGIT*  
Peter McKelvey, *P.Eng.*  
Justin Tinker, *MIT*  
Rob Haineault, *P.Eng.*  
Donnie Taweel, *CET*

Project Manager  
Project Coordinator  
Inspections (All Locations)  
Inspections (Atlantic Canada & QC)  
Inspections (Atlantic Canada & QC)  
Inspections (Atlantic Canada)  
Inspections (Nova Scotia)  
Inspections (PEI)

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# Harry Hachey Conference Centre

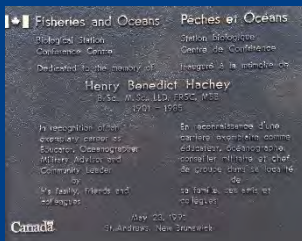
ST. ANDREWS, NEW BRUNSWICK

## BUILDING SYSTEMS DESIGN (MECHANICAL AND ELECTRICAL)



### PROJECT DATES

- November 2016 – Design contract awarded
- Winter 2017 – Design development
- Summer 2017 – Final drawings issued
- Fall 2017 and Winter 2018 – Field review



### PROJECT OVERVIEW

The Harry Hachey Conference Centre, named after educator Henry Benedict Hachey, was built in 1910 as two cottages. The cottages were later joined together and repurposed as a conference centre at the Department of Fisheries and Oceans' St. Andrews Biological Station campus. By 2017, the overall condition of the facility had deteriorated and the building systems were considerably outdated after serving the campus well for more than 100 years.

Public Works and Government Services Canada issued a tender for design services. The tender called for a major renovation to the facility, which included relocating the men's washroom, improving the function of rooms, upgrading the heating system, and bringing the facility's mechanical and electrical systems up to current building standards.

Fundy Engineering's Building Systems team was hired by Nine Yards Studio, a PEI architectural firm, to design the mechanical and electrical systems as part of the major renovation to the conference centre.

### SCOPE OF SERVICES PROVIDED

#### Mechanical Design

- Designed plumbing systems for domestic water and sanitary systems and design of the hydronic heating distribution system
- Sized and specified the boiler system for heating the facility and designed the heating, ventilation and air distribution system

#### Electrical Design

- Designed power distribution, interior and exterior lighting, telephone and data networks, fire alarm system, building access control, and security systems

#### Field Review

- Our Project Team carried out an initial assessment and conducted routine inspections during the renovation process to ensure the systems were being installed in compliance with the general design intent

### CLIENT REFERENCE

Ms. Silva Stojak  
Nine Yards Studio  
63 Fitzroy Street  
Charlottetown, PE C1A 1R4

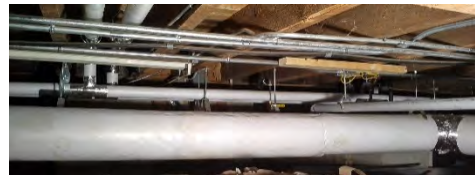
☎: 902.566.4449

✉: silva@9ystudio.com

### CORE PROJECT TEAM

Darryl Ford, *P.Eng., FEC*  
Hector Lamprea, *P.Eng., P.E., CEM*  
Ken Carson, *P.Eng.*  
Greg Hoyt, *CET, WRT*  
Jacob Beam, *P.Tech.*  
Shelby Gallant, *P.Tech.*

Project Manager  
Mechanical Engineer  
Senior Electrical Engineer  
Drafting  
Electrical Support  
Mechanical Support



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# Fundy Park Amphitheatre Replacement

FUNDY NATIONAL PARK, NEW BRUNSWICK

## BUILDING SYSTEMS DESIGN (ELECTRICAL)



### PROJECT DATES

- December 2017 – Site visit to review existing conditions
- 2018 – Design development
- Spring 2019 – Field review
- June 2019 – Anticipated opening of new amphitheatre



### PROJECT OVERVIEW

During the summer, Fundy National Park hosts a variety of outdoor acts at the Amphitheatre located on the shore of MacLaren Pond and near the Park's Headquarters. The wooden stage structure, comprised of an open faced dome band shell with an attached backroom, was built in 1951 shortly after Fundy National Park was established. It was renovated in 1978 and 1995. The wooden seating area, which is built into a natural slope, can accommodate up to 1 000 visitors.

Recently, considerable work has been occurring at the Park in an effort to increase tourism numbers and to enhance the visitor experience. Replacement of the amphitheatre with a signature structure is considered an important element of redeveloping the Headquarters area of the Park.

Fundy Engineering's Building Systems team was hired by Nine Yards Studio, a PEI architectural firm, to design the electrical systems for the new amphitheatre.



### SCOPE OF SERVICES PROVIDED

#### *Electrical Design*

- Designed electrical service entrance, power distribution, audio, audio-visual, and lighting systems to enhance the visitor experience

#### *Field Review*

- Our Project Team conducted routine inspections during the renovation process to ensure the systems were being installed in compliance with the general design intent



### CLIENT REFERENCE

Ms. Silva Stojak  
Nine Yards Studio  
63 Fitzroy Street  
Charlottetown, PE C1A 1R4

☎: 902.566.4449  
✉: silva@9ystudio.com

### CORE PROJECT TEAM

Darryl Ford, *P.Eng., FEC*  
Ken Carson, *P.Eng.*  
Seun Ijaola, *P.Eng., PMP*  
Jacob Beam, *P.Tech.*

Project Manager  
Senior Electrical Engineer  
Electrical Engineer  
Electrical Support

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# Bell Aliant Excite Center Consolidation

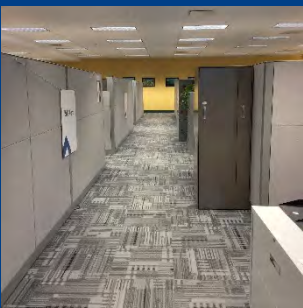
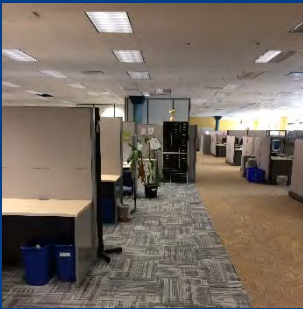
MILLIDGEVILLE, NEW BRUNSWICK

COMPLETE  
ARCHITECTURAL,  
MECHANICAL, AND  
ELECTRICAL  
ENGINEERING  
AND  
MOVE COORDINATION  
SERVICES



## PROJECT DATES

- Spring 2017 – Design
- Summer 2017 - Construction



## CLIENT REFERENCE

Mr. Robert Sullivan  
SNC Lavalin O&M Solutions Inc.  
50 Innovation Drive  
Bedford, NS B4B 1A2

☎: 514.840.8136

☎: 514.840.8429

## PROJECT OVERVIEW

Bell Aliant engaged Fundy Engineering to undertake engineering design and move coordination services for consolidating Excite employees at one location. Prior to this Project, Excite employees were spread between two offices; a Bell Aliant owned space in Millidgeville and a rented space in Uptown Saint John.

Through this Project, approximately 80 employees occupying the Uptown Saint John office were moved to join the approximately 70 employees working in the Millidgeville office. In order to accommodate the workforce doubling in Millidgeville, the space required renovations.

Fundy Engineering provided two services for this work. First, we provided architectural, mechanical, and electrical design service for the fit-up of the consolidated office space. Secondly, we provided move coordination services for Bell Aliant whereby we managed the movement of employees from their existing workstations at both locations to their new workstations at the consolidated office.

The Project occurred in several phases so that employees could continue working while the consolidation occurred.

## CORE PROJECT TEAM

David Richards, *P.Eng., MBA*  
Shari Seeley  
Ken Carson, *P.Eng.*  
Richard Frenette, *P.Eng.*  
Jacob Beam, *P.Tech.*

Project Manager  
Project Coordination  
Senior Electrical Engineer  
Revit® Design  
Electrical Support

## SCOPE OF SERVICES PROVIDED

### *Engineering Design*

- Completed architectural design for new workstation layout
- Designed new operators room
- Modified existing heating, ventilation, and air-conditioning equipment and fire protection systems
- Identified electrical and communications connections required for each workstation

### *Move Coordination*

- Worked with Bell Aliant managers and staff to finalize employee seating plan
- Coordinated with Project team to ensure phone lines were reconfigured for the new workstation layout and that special needs were incorporated into the overall design
- Served as a liaison between employees and Project team
- Provided on-site oversight during the Project to verify moving of workstations occurred smoothly
- Worked with Bell Aliant, consultant, and contractor to solve issues as they arose
- Logged all issues that arose before and after the move for discussion purposes

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PHASE I  
ENVIRONMENTAL SITE  
ASSESSMENT

MECHANICAL  
ENGINEERING,

ELECTRICAL  
ENGINEERING

AND

ENERGY AUDIT



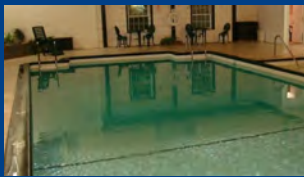
# Former Colonial Inn

SAINT JOHN, NEW BRUNSWICK



## PROJECT DATES

- July 2017 – Site visit for Phase I ESA data collection
- August & September 2017 – Preparation of Phase I ESA report
- October 2017 – Phase I ESA report issued to client
- February 2018 – Site visit for energy audit data collection
- March 2018 – Energy Audit report issued to client



## CLIENT REFERENCE

Mr. Paul Moffett, *MBA, CIRP, LIT*  
Project Manager  
Powell Associates Ltd.  
55 Drury Cove Road  
Saint John, NB  
E2H 2Z4

☎: 506.433.0096

✉: pmoffett@maritimetrustee.com

## PROJECT OVERVIEW

The former 96-room Colonial Inn on City Road in Saint John, which was originally built in the 1930s and underwent major renovations in the 1970s, was saved from the wrecking ball when Ontario developers purchased the property in late 2017. Fundy Engineering was contracted at the outset to assist with the developers' revitalization of the property.

During our review of the property, we did not identify any actual environmental concerns; however, several potential concerns were identified associated with the historical land-use, adjacent property land-use, underground storage tanks, and several hazardous materials.

The energy audit identified several opportunities for the owners to act upon in order to improve and / or enhance the energy performance of the hotel. Those opportunities included adding insulation and replacing windows. Once renovations began, it was clear that the facility's electrical and mechanical components required to be completely renewed in order to meet National Building Code requirements. As a result, we designed the required mechanical and electrical upgrades to meet those requirements.

After undergoing major renovations, the hotel opened in November 2018 under the Days Inn banner.

## CORE PROJECT TEAM

Greg Derrah, *P.Tech., CESA*  
Stephen Little, *P.Tech., CESA*  
Hector Lamprea, *P.Eng., P.E., CEM*  
Ryan Gosson, *P.Eng.*  
Greg Hoyt, *CET, WRT*  
Ken Carson, *P.Eng.*  
Azadeh Majdi, *EIT*  
Seun Ijaola, *EIT, PMP*

Environmental Technologist  
GIS Specialist  
Energy Efficiency Engineer  
Mechanical Engineer  
Drafting  
Electrical Engineer  
Electrical Engineering Support  
Electrical Engineering Support

## SCOPE OF SERVICES PROVIDED

### *Environmental Site Assessment*

- Completed a Phase I ESA to identify and delineate potential environmental issues at the site

### *Mechanical and Electrical Engineering*

- Designed ventilation systems for the lobby, pool area, ballroom, corridors, and kitchen
- Designed a new electrical entrance

### *Energy Audit*

- Analyzed utility data, modelled energy use, and estimated potential energy savings under various scenarios



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# Bell Aliant Alma St. Office Move Coordination

MONCTON, NEW BRUNSWICK

## MOVE COORDINATION SERVICES



## PROJECT DATES

- Fall 2017 – Moving and renovations



## PROJECT OVERVIEW

On 14 January 2017, a fire severely damaged Bell Aliant's building at 555 Mapleton Road in Moncton. Employees could not reoccupy the building because of the extensive damage.

Bell Aliant decided to relocate all of its employees affected by the fire to a satellite office in downtown Moncton at the base of its iconic 127 m tall directional radio services tower. To accommodate the additional employees at the Alma Street office, the entire office space was renovated and new workstations were installed.

Fundy Engineering was engaged to provide move coordination services. This involved emptying specific spaces within the building, renovating those space, and then reoccupying them once the work was completed. In order for the building to remain operational during the work, the renovations were separated into five phases whereby only one phase was renovated at a time. All told, 250 employees were affected by the work. The fire damaged building has since been put up for sale.



## SCOPE OF SERVICES PROVIDED

### Move Coordination Services

- Reviewed move specifications and provided feedback to the architectural consultant based on experience
- Worked with Bell Aliant managers and staff to finalize employee seating plan
- Coordinated with Bell Aliant, consultant, and contractor to ensure phone lines were reconfigured for the new workstation layout and that special needs were incorporated into the overall design
- Served as a liaison between employees and the consultant and contractor during the move process
- Provided on-site oversight during the moves to verify:
  - Employees had sufficient boxes to pack up their workstations
  - Boxes were properly labeled so the movers could move them to the correct new workstations
  - That workstations were operational (phones and LAN) prior to occupancy
- Worked with Bell Aliant, consultant, and contractor to solve issues as they arose

## CLIENT REFERENCE

Mr. Erik Lange  
exp Architects Inc.  
1133 Regent Street  
Fredericton, NB E3B 3Z2

☎: 506.452.9000

☎: 506.459.3954

## CORE PROJECT TEAM

David Richards, P.Eng., MBA  
Shari Seeley

Project Manager  
Project Coordination

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# The Wellington

SAINT JOHN, NEW BRUNSWICK

## BUILDING SYSTEMS DESIGN (MECHANICAL AND ELECTRICAL)



### PROJECT DATES

- Oct 2017 – Tender awarded
- Fall 2019 to Fall 2020 – Design development
- Spring 2021 – Construction started
- Fall 2021 – PHIUS verification



### PROJECT OVERVIEW

A block in Uptown Saint John that was once home to the Jellybean Houses that were erected in 1860 and survived the Great Fire of 1877 is being redeveloped. *The Wellington* is a six-storey, 48 unit mixed income apartment complex with commercial retail and professional office space on the main level. The contemporary building, which respects the area's heritage buildings and compliments the neighbourhood's urban fabric, is being sponsored by Saint John Non Profit Housing Inc.

*The Wellington* incorporated sustainable building practices within the planning, design, construction, and future operation. Those practices are designed to reduce energy consumption and as a result lower greenhouse gas emissions. Fundy Engineering was contracted by Acre Architects to undertake building systems design.

*The Wellington* was designed according to the Passive House Institute US Inc.'s (PHIUS) standards. Buildings that meet the PHIUS standard use 40 % to 60 % less energy than conventional buildings, they provide superior indoor air quality, resilience during power outages, and offer an extremely quiet and comfortable indoor living space.

### SCOPE OF SERVICES PROVIDED

#### *Mechanical Design*

- Calculating the domestic water, storm water, and sanitary fixture unit load requirements
- Calculating the size of the water entrance, storm piping, and sanitary piping
- Plumbing systems, including drainage, oil / water interceptor, drainage, waste, venting, and storm risers
- Common area and corridor heating and ventilation
- Heating, ventilation, and air-conditioning and plumbing for commercial spaces
- PHIUS design review compliance to ensure certification

#### *Electrical Design*

- Sizing the main electrical service entrance
- Single line electrical diagrams for power distribution
- Lighting, power, and life safety systems for common areas
- Emergency lighting, exit lighting, and fire alarm systems
- Electrical specifications and panel and lighting schedules

### CLIENT REFERENCE

Mr. Stephen Kopp, *AANB*  
Acre Architects Inc.  
87 Canterbury Street, Suite 301  
Saint John, NB E2L 2C7

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### CORE PROJECT TEAM

Ryan Gosson, *P.Eng.*  
Darryl Ford, *P.Eng., FEC*  
Hector Lamprea, *P.Eng., P.E., CEM*  
Seun Ijaola, *P.Eng., P.E., PMP*  
Jacob Beam, *P.Tech.*  
Jon Pitman, *CTech*  
Dexter Tan, *TGIT*  
Richard Frenette, *P.Eng.*

Mechanical Engineer, Project Manager  
Senior Mechanical Engineer  
Energy Efficiency Engineer  
Electrical Engineer  
Electrical Support  
Revit® Design  
Drafting  
Revit® Design

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# Cannabis NB Retail Dispensary

MONCTON, NEW BRUNSWICK



## MECHANICAL DESIGN AND ELECTRICAL DESIGN



### PROJECT DATES

- January 2018 – Project kick-off
- Winter and Spring 2018 – Mechanical and electrical systems design
- Summer 2018 – Construction reviews
- 17 October 2018 – Dispensary opened to public



### CLIENT REFERENCE

Ms. Allyson Clinch, *P.Eng.*  
VP Estimating & Pre-Construction  
Avant-Garde Construction  
378B Coverdale Road  
Riverview, New Brunswick  
E1B 3J7

☎: 506.856.5957  
✉ info@agcm.ca

### PROJECT OVERVIEW

On 17 October 2018, Cannabis NB opened several stand-alone retail outlets across New Brunswick. The majority of stand-alone retail outlets were new builds. Fundy Engineering was contracted by Avant-Garde Construction Management Inc. to design the mechanical and electrical systems for a 280 m<sup>2</sup> retail dispensary at 40 Wyse Street in Moncton.

Mechanical systems design for the building included: calculating the space heating and cooling loads; sizing and selecting heating, ventilation, and air-conditioning equipment; laying out the air handling distribution ductwork; sizing the plumbing and drainage systems; and sizing the natural gas service. Electrical systems design included: LED interior lighting calculations and layout; emergency and ingress/egress lighting; security and intrusion alarm systems; data and communications systems; and exterior lighting.

Members of our Project Team worked closely with Avant-Garde's construction team to ensure that all systems were installed as per the specifications. As part of the overall contract, our Project Team also designed the mechanical and electrical systems for a future tenant fit-up space in the unoccupied half of the overall 560 m<sup>2</sup> building.

### CORE PROJECT TEAM

Ryan Gosson, *P.Eng.*  
David Richards, *P.Eng., MBA*  
Ken Carson, *P.Eng.*  
Richard Frenette, *P.Eng.*  
Azadeh Majidi, *EIT*  
Seun Ijaola, *EIT, PMP*

Mechanical Engineer, Project Manager  
Mechanical Engineer  
Electrical Engineer  
Revit® Design  
Electrical Engineering Support  
Electrical Engineering Support

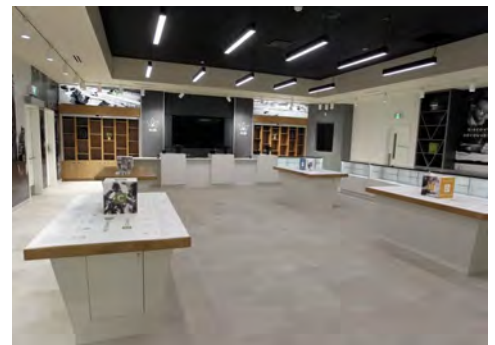
### SCOPE OF SERVICES PROVIDED

#### *Mechanical Design*

- Designed the heating, ventilation, and air-conditioning and plumbing systems for the building
- Performed site visits during construction to oversee installation of the mechanical systems

#### *Electrical Design*

- Designed lighting, power distribution, and communications systems
- Performed site visits during construction to oversee electrical installation



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# Sewer Systems Modernization

DORCHESTER PENITENTIARY, NEW BRUNSWICK

MECHANICAL  
FEASIBILITY STUDIES,  
MECHANICAL DESIGN,  
BID PACKAGE  
DEVELOPMENT,  
AND  
CONTRACT  
ADMINISTRATION



## PROJECT DATES

- January 2018 – Contract award
- February and March 2018 – Site visits and construction cost- and schedule-estimates
- April 2018 – Feasibility report submitted to Client



## CLIENT REFERENCE

Mr. Darcy Grant, *P.Eng.*  
Mechanical Engineer  
Public Services and Procurement  
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pwgsc-tpsgc.gc.ca

## PROJECT OVERVIEW

Fundy Engineering was part of a team tasked to conduct a comprehensive feasibility study of the sewer systems serving the Dorchester Penitentiary. This was done to identify deficiencies prior to any major disruption to plumbing services within the institution.

Sanitary services from each building within the complex drain via gravity through a system of sewer pipes. There are numerous laterals connected to the sewer pipes located within ~ 1.2 km of interconnecting service tunnels.

Fundy Engineering personnel conducted four site visits to investigate and analyze the existing sanitary sewer system. It was determined that the existing sanitary lines vary in size, age, material, and condition. The tunnel system also has many areas where obstructed access exists; the ability to physically enter and replace sewer piping in those areas will be difficult to undertake.

Three options and several recommendations were presented to the Client for replacing / upgrading the sewer piping in order to allow the system to operate for at least another 35 years. One of the main recommendations was to remove steam piping from the service tunnels because it is no longer used. Removal of the steam piping would improve access within the tunnel system.

## CORE PROJECT TEAM

Darryl Ford, *P.Eng., FEC*  
David Richards, *P.Eng., MBA*  
Greg Hoyt, *CET, WRT*  
Katie Lord, *TGIT*  
Shelby Gallant, *P.Tech*  
Jon Pitman, *CTech*

Senior Mechanical Engineer  
Mechanical Engineer, Project Manager  
Mechanical Support  
Mechanical Support  
Mechanical Support  
Mechanical Support

## SCOPE OF SERVICES PROVIDED

### *Pre-Design Services*

- Investigate and analyze existing sanitary sewer systems within the institution's interconnected service tunnels

### *Construction Cost- and Schedule-Estimate*

- Prepare a Class "C" construction cost-estimate for replacing the sanitary pipes
- Estimate the construction schedule for replacing the sanitary pipes



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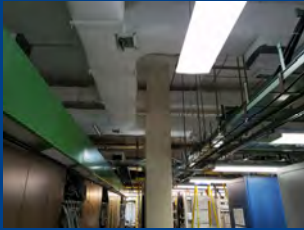




# Bell Central Office HVAC Upgrades

CORNER BROOK, NEWFOUNDLAND

## BUILDING SYSTEMS DESIGN (MECHANICAL AND ELECTRICAL)



### PROJECT DATES

- May and October 2018 – Site visits to review existing infrastructure
- Winter 2018 and 2019 – HVAC retrofit / upgrade design services
- April to October 2019 – Upgrades to HVAC systems



### CLIENT REFERENCE

Mr. Thomas Baltzer, *P.Eng.*  
Project Manager  
BGIS  
5788 North Street  
Halifax, NS B3K 1N7

☎: 902.209.1101

✉: Thomas.baltzer@bgis.com

### PROJECT OVERVIEW

Bell, Canada's largest communications company, has locations across Canada to support their operations. One of their central offices located in Corner Brook required improvements to the cooling system for the equipment space by replacing the existing end-of-life air-handling units with new units to support the Heating, Ventilation, and Air-Conditioning (HVAC) systems. The proponent also desired to have HVAC system redundancy and spare capacity for potential future requirements.

One of the project challenges was that the data centre had to remain operational during the HVAC retrofit. This was achieved by providing temporary equipment cooling and temporary air distribution systems to employee operation areas.

Our mechanical design included the installation of two air-cooled Computer Room Air-Conditioning (CRAC) units and an air-side economizer to provide free cooling to the equipment / data centre when outdoor ambient conditions permit. The design also included a remote monitoring and control system to operate the various system components. Our electrical team provided electrical design to support the new mechanical infrastructure.

As part of the overall construction process, we also led the commissioning process for the new systems. This ensured that the new automated control systems operated properly.

### CORE PROJECT TEAM

David Richards, *P.Eng., MBA*  
Hector Lamprea, *P.Eng., P.E., CEM*  
Jacob Beam, *P.Tech.*  
Jon Pitman, *CTech*  
Richard Frenette, *P.Eng.*

Mechanical Engineer, Project Manager  
Energy Efficiency Engineer  
Electrical Project Lead  
Drafting Services  
Revit® Design

### SCOPE OF SERVICES PROVIDED

#### *Architectural and Engineering Design*

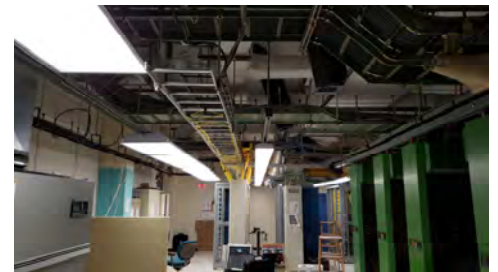
- Completed a survey of existing HVAC systems
- Analyzed the load distribution to design air distribution required
- Designed temporary HVAC systems for use during construction and designed the new HVAC distribution system
- Sized and specified new HVAC equipment and systems

#### *Tender Support and Contract Administration*

- Prepared tender documents and awarded contracts and change orders on behalf of the Client and conducted periodic inspections to ensure contract compliance

#### *Commissioning Services*

- Worked with the HVAC controls contractor to ensure the direct digital controls system operated as per the design requirements



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# Atlanding Sea Cucumber Facility

BLACKS HARBOUR, NEW BRUNSWICK

COMPLETE  
ARCHITECTURAL,  
MECHANICAL,  
ELECTRICAL,  
STRUCTURAL, AND  
GEOTECHNICAL DESIGN



## PROJECT DATES

- Spring 2018 – Project initiation
- Fall 2019 – Project completion



## CLIENT REFERENCE

Mr. Jamie Olsen  
Quality Manager  
252 Red Barn Road  
Blacks Harbour, NB E5H 1E1

☎: 506.755.0905  
✉ jamie@atlanding.ca

## PROJECT OVERVIEW

The sea cucumber (*Cucumaria frondosa*), which is considered a luxury seafood in east Asia, is a thin-walled marine animal that attaches itself to the bottom using tube feet. There is a limited fishery in southwestern New Brunswick with the primary focus being in *The Passages*, the area between Letete on the mainland and Deer Island. Individuals are harvested from the seafloor by commercial divers.

Atlanding is a primary processor of sea cucumbers in New Brunswick. They contracted Fundy Engineering to transform a former fish meal production facility in Blacks Harbour into a sea cucumber processing facility. The overall work also included design of a new effluent and boiler building.

Our team worked with Atlanding personnel throughout the project by sizing and selecting processing equipment, preparing design drawings and tender documents, and administering contract and construction documents throughout the building process. We also worked with Estabrooks Engineering who completed the structural engineering review and design.

Sea cucumbers are washed, cut, blanched, and frozen at the facility prior to export to the United States and overseas.

## CORE PROJECT TEAM

Darryl Ford, *P.Eng., FEC*  
David Richards, *P.Eng., MBA*  
Ryan Gosson, *P.Eng.*  
Seun Ijaola, *P.Eng., PMP*  
Richard Frenette, *P.Eng.*  
Jon Pitman, *CTech*  
Al Moulard, *P.Eng., PMP*  
Robert Hunt, *CTech*

Senior Mechanical Engineer  
Project Manager  
Mechanical Engineer  
Electrical Engineer  
Revit® Design  
Architectural Support  
Geotechnical Engineer  
Design and Drafting

## SCOPE OF SERVICES PROVIDED

### Architectural Support

- Obtained certified field measurements of the building structure and layout floorplans, including interior / exterior walls and key structural components including beams, trusses, joists, and load-bearing walls
- Generated architectural floor plans, layouts, and building sections

### Geotechnical Investigation and Materials Testing

- Installed several test pits to characterize the underlying soil conditions in the area of the new effluent and boiler building
- Completed various tests on *in-situ* soils during the geotechnical investigation and compaction and concrete testing during construction

### Electrical Design

- Designed an upgraded service entrance and power distribution

### Mechanical Design

- Sized and specified the boiler system for heating the overall facility and process water for washing and blanching
- Sized and specified processing equipment and piping

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# HDPE Pipe Flushing Thrust Restraints

SAINT JOHN, NEW BRUNSWICK

## MECHANICAL DESIGN



## PROJECT DATES

- March 2018 – Project kick-off
- April 2018 – Restraint system design
- May 2018 – Installation of pipe and restraint system
- June 2018 – Commissioning process



## CLIENT REFERENCE

Mr. Antonia Tenorio  
Project Manager  
Port City Water Partners  
380 Bayside Drive, Suite 101  
Saint John, NB  
E2J 4Y8

☎: 506.608.4928  
✉: antonio@acciona.ca

## PROJECT OVERVIEW

Port City Water Partners signed an agreement in 2013 with the City of Saint John as part of the Safe, Clean, Drinking Water Project to build and operate a water treatment facility in order to guarantee access to quality drinking water for Saint John homes and businesses. That facility is located in east Saint John along the banks of the Little River Reservoir.

Fundy Engineering was contracted by Port City Water Partners to design a pipe flushing restraint system for the facility's commissioning process. The temporary restraint system was required for a 600 mm diameter High-Density Polyethylene Pipe (HDPE) with a discharge rate of 40 million litres per day. The HDPE pipe was directed to the Little River Reservoir. The restraint system had to be capable of handling considerable changes in pressure as discharge was turned on and off during the commissioning process that occurred over several weeks in spring 2018.

To adequately maintain the pipe's position within the reservoir during the commissioning process, we designed a diffuser over a 12 m in-water length of the HDPE pipe to allow for even discharge. Several large concrete blocks (*i.e.*, each > 3 tonnes) were clamped to the HDPE pipe to restrain it during the thrusting events of the commissioning process.

The HDPE pipe successfully held its position during the commissioning process of the water treatment facility and was subsequently removed once all testing was completed.

## CORE PROJECT TEAM

David Richards, *P.Eng., MBA*  
Darryl Ford, *P.Eng., FEC*  
Hector Lamprea, *P.Eng., P.E., CEM*

Project Manager  
Senior Mechanical Engineer  
Engineering Support

## SCOPE OF SERVICES PROVIDED

### *Mechanical Design*

- Design of diffuser
- Design of restraint blocks
- Calculation of pressure thrusting and design of restraint blocks for pipe elbows on land
- Monitoring of the restraint system during the commissioning process



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# Fish Sea Cage Oxygen Injection System

MECHANICAL AND  
ELECTRICAL DESIGN

SEVERAL MARITIME LOCATIONS



## PROJECT DATES

- May 2018 – Project kick-off
- June 2018 – Site visits and background research on mechanical equipment
- June 2018 to October 2018 – Design of oxygenation systems for four sea cage sites



## CLIENT REFERENCE

Mr. Ted Weaire  
VP Marine Services  
Cooke Aquaculture  
35 Magaguadavic Drive  
St. George, NB  
E5C 3H8

☎: 506.755.1160

☎: 506.755.1166

## PROJECT OVERVIEW

Cooke Aquaculture, a global company headquartered in Saint John that farm-raises salmon, scallops, crab, oysters, and shrimp, hired Fundy Engineering to prepare engineering design drawings. The drawings were necessary for obtaining Canadian Registration Numbers for oxygen injection systems at four salmon sea cage sites in the Maritimes.

Oxygen injection systems are beneficial at salmon sea cage sites, to counteract spatial and temporal variations in dissolved oxygen levels that could result in fish mortality. Injecting oxygen within the water column not only benefits the welfare and development of salmon, but it can generally improve overall biomass yield.

The oxygen injection systems are self-contained within sea containers (Seacans). Cooke Aquaculture places the Seacans on barges at their sea farm sites where they are connected to floating hoses for distributing oxygen to individual sea cages.

We prepared the engineering drawings for the Seacans at each of the four sea sites. Those drawings showed the mechanical design details within each of the Seacans. Also included in the drawing packages were piping schematics for each of the sea cages at the four sea sites. Overall, we prepared drawings for four Seacans and 44 sea cages.

## CORE PROJECT TEAM

Darryl Ford, *P.Eng., FEC*  
David Richards, *P.Eng., MBA*  
Hector Lamprea, *P.Eng., P.E., CEM*  
Greg Hoyt, *CET, WRT*  
Jacob Beam, *P.Tech.*  
Jon Pitman, *CTech*

Senior Mechanical Engineer  
Mechanical Engineer, Project Manager  
Energy Efficiency Engineer  
Drafting  
Electrical Support  
Drafting

## SCOPE OF SERVICES PROVIDED

### *Mechanical Design Drawings*

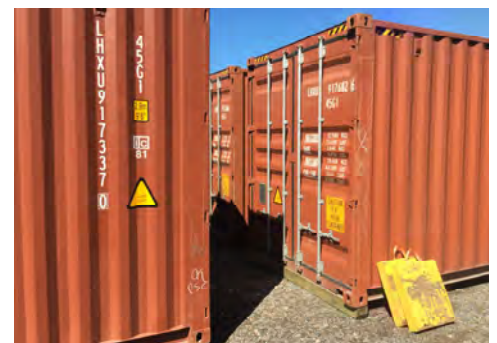
- 75% completion submission
- 99% completion submission
- 100% final drawing submission
- Piping and instrumentation details to indicating operating flows, pressures, and pipe sizes

### *Mechanical Design*

- Piping calculations

### *Electrical Design*

- Power distribution details



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# AV Cell Demineralization Plant Cation Tanks Internals Design

NACKAWIC, NEW BRUNSWICK

## BUILDING SYSTEMS DESIGN (MECHANICAL AND ELECTRICAL)



### PROJECT DATES

- Summer and Fall 2018 – Site visits for collecting detailed measurements
- Fall and Winter 2018 – Drawing development
- April 2019 – Construction drawings issued



### CLIENT REFERENCE

Mr. Paulino Barahona  
AV Cell Inc.  
175 Mill Road  
Atholville, NB E3N 4S7

☎: 506.789.4101

✉: paulino.barahona@avg.adityabirla.com

### PROJECT OVERVIEW

Fundy Engineering's Building Systems team has designed various systems for AV Group NB's specialty cellulose pulp mill in Nackawic, New Brunswick. One of the projects we completed was to model the demineralization plant's cation tanks and then generate fabrication drawings for all new internal piping components.

The demineralization plant, which includes four cation tanks, is part of the process system for supplying feed water to the boiler at the mill. The owner desired to change the demineralization process from SO<sub>2</sub> to HCL, which meant that all of the piping internals had to be replaced with materials compatible to the new process. Because the owner did not have current or accurate drawings of the tanks or the internals, we were tasked with reverse engineering the tanks and internal piping for supplying water and acids.

We spent several days at the mill taking detailed measurements of the tanks and internal piping. Using that data, we were able to develop three-dimensional models within Autodesk Plant 3D. The owner is now able to have replacement parts manufactured using the construction drawings that we developed. This is crucial as the mill moves forward with rebuilding and modernizing its systems.

### CORE PROJECT TEAM

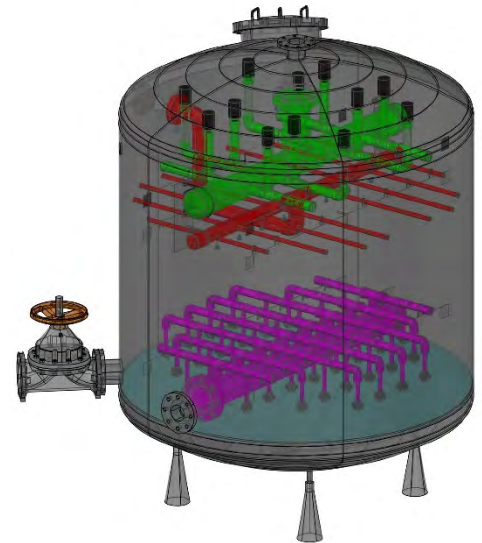
Hector Lamprea, *P.Eng., P.E., CEM*  
Greg Hoyt, *CET, WRT*

Project Manager  
Drafting

### SCOPE OF SERVICES PROVIDED

#### *Cation Tanks Internals Design*

- Developed construction drawings for the new internals that included all mechanical systems for the four cation tanks



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# Valley Ranch Suites

QUISPAMIS, NEW BRUNSWICK

## BUILDING SYSTEMS DESIGN (MECHANICAL AND ELECTRICAL)



### PROJECT DATES

- Winter 2018 / 2019 – Contract award
- Spring 2019 – Design completion
- Spring 2022 – Fire alarm commissioning and testing



### CLIENT REFERENCE

Mr. Andrew McKay  
A.E. McKay Builders  
380 Model Farm Road  
Quispamsis, NB E2G 1L8

✉: [andrew@aemckaybuilders.com](mailto:andrew@aemckaybuilders.com)

### PROJECT OVERVIEW

Valley Ranch Suites is a 42 unit wood-framed three-storey apartment complex. The building is located in the Kennebecasis Valley, which is the suburbs of Saint John.

Fundy Engineering was contracted by A.E. McKay Builders to undertake design the mechanical and electrical systems for the building. The mechanical design consisted of sizing and selecting heating and ventilation equipment for the common areas and parking garage. We also designed the plumbing systems.

The building's electrical design consisted of power distribution, data communications systems, interior and exterior building lighting, emergency lights and exit signs, fire sensors and detectors, power distribution, access control, and security systems.



Darryl Ford, *P.Eng., FEC*  
Ryan Gosson, *P.Eng.*  
Ken Carson, *P.Eng.*  
Jacob Beam, *P.Tech.*  
Jon Pitman, *CTech*

Senior Mechanical Engineer, Project Manager  
Mechanical Engineer, Project Coordinator  
Senior Electrical Engineer  
Electrical Support  
AutoCAD Design

### SCOPE OF SERVICES PROVIDED

#### *Mechanical Design*

- Sizing and selection of ventilation equipment for the corridors and common areas
- Sizing and selection of ventilation equipment for the parking garage
- Plumbing system design drawings for the parking garage, including drainage, oil interceptor, venting, and sanitary riser

#### *Electrical Design*

- Sizing the main electrical service entrance
- Single line electrical diagrams for power distribution
- Lighting, power, communications, and fire alarm for common areas and parking garage
- Fire alarm systems for compliance with applicable codes and requirements
- Witness fire alarm commissioning testing and review verification report for general design compliance

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# Calabria Estates

SAINT JOHN, NEW BRUNSWICK

## BUILDING SYSTEMS DESIGN (MECHANICAL AND ELECTRICAL)



### PROJECT DATES

- Winter 2019 / 2020 – Contract award and schematic design
- Spring and Summer 2020 – Design development
- Fall 2020 to Fall 2021 – Design completion and construction administration

### CLIENT REFERENCE

Mr. John Rocca  
Ellerdale Properties Ltd.  
1190 Fairville Boulevard  
Saint John, NB E2M 5T7

☎: 506.635.3064

✉: n6rocca@nb.aibn.com

### PROJECT OVERVIEW

Calabria Estates is a four-storey, 82 unit luxury condo-style apartment complex with a unique social hub. Units comprise one-, two-, and three-bedrooms. The development is about lifestyle and includes several indoor amenities, such as a concierge service, underground parking, storage lockers, community rooms, and fitness rooms. It also includes many outdoor amenities, including patios with BBQs, gardens, walking trails, a dog park, a putting green, and courts for a variety of sports.

Fundy Engineering was contracted by Ellerdale Properties Ltd. to complete all building systems design work. During schematic design, we met with the developer and design team to discuss the owner's project requirements. Design development involved the sizing and selection of mechanical and electrical equipment. We developed construction design drawings for review at 75 % and 99 % and incorporated the owner's requests after each review and then issued 100 % final drawings. During construction, we reviewed the contractor's shop drawings for conformance with the general design concept and contract requirements, we conducted periodic site visits to review progress, we issued supplementary instructions when the contractor required information, and we managed change orders.

### CORE PROJECT TEAM

Darryl Ford, *P.Eng., FEC*  
Ryan Gosson, *P.Eng.*  
Seun Ijaola, *P.Eng., P.E., PMP*  
Jacob Beam, *P.Tech.*  
Jon Pitman, *CTech*  
Dexter Tan, *TGIT*

Senior Mechanical Engineer, Project Manager  
Mechanical Engineer, Project Coordinator  
Electrical Engineer  
Electrical Support  
Revit® Design  
Drafting

### SCOPE OF SERVICES PROVIDED

#### *Mechanical Design*

- Calculating the domestic water, storm water, and sanitary fixture unit load requirements
- Calculating the size of the water entrance, storm piping, and sanitary piping
- Plumbing systems, including drainage, oil / water interceptor, drainage, waste, venting, and storm risers
- Common area and corridor heating and ventilation
- Heating, ventilation, and air-conditioning and plumbing for commercial spaces

#### *Electrical Design*

- Sizing the main electrical service entrance
- Single line electrical diagrams for power distribution
- Lighting, power, and life safety systems for common areas
- Emergency lighting, exit lighting, and fire alarm systems
- Single line fire alarm diagrams
- Exterior parking garage lighting
- Electrical specifications and panel and lighting schedules

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# Reversing Falls Mill 3D Site Renderings

SAINT JOHN, NEW BRUNSWICK

## BUILDING SYSTEMS DESIGN (MECHANICAL AND ELECTRICAL)



### PROJECT DATES

- Spring 2019 – Site rendering development
- Summer 2019 – Submission of developed 3D model



### PROJECT OVERVIEW

The point of land the Reversing Falls Mill sits atop has been the home to heavy industrial activities related to pulp and paper making since the mid- to late-1800s. Irving Pulp & Paper, Limited purchased the Mill in 1951 and since then has completed numerous upgrades to maintain it as a world-class bleached Kraft pulp producer. The Mill is confined to about 50 ha by surrounding residential, commercial, and industrial development, which means space for new development is at a premium.

Fundy Engineering's Building System team was contracted to develop a three-dimensional (3D) model of the existing Mill site. Development of the model incorporated 3D survey data for the site, which was imported to the architectural visualization software Enscape™.

The 3D model we developed can be used to prepare renderings of proposed developments at the Mill. The walkthrough ability of the model provides process engineers and operators at the Mill an opportunity to assess any issues that may arise, such as conflict with other Mill operations, before new development is undertaken. Use of this model will save time and money in the overall design of future projects at the Mill. For example, the model was recently used to illustrate five to ten year expansion plans at the site, primarily related to the new pulp dryer, warehouse, and offices.

### SCOPE OF SERVICES PROVIDED

#### Three-Dimensional Modelling

- Undertook 3D surveys of the existing infrastructure at the site
- Created a 3D model of the existing infrastructure
- Incorporated site expansion plans into the model in order to visualize proposed site layouts



### CLIENT REFERENCE

Mr. Fenwick Jeffrey, *P.Eng.*  
Project Engineer  
Irving Pulp & Paper, Limited  
408 Mill Street  
Saint John, NB E2M 3H1

☎: 506.635.3991  
✉ jeffrey.fenwick@irvingforest.com

### CORE PROJECT TEAM

Tim Ryan, *M.Eng., P.Eng.*  
Richard Frenette, *P.Eng.*

Project Manager  
Enscape™ Design

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# Bell Canada Arc Flash Studies

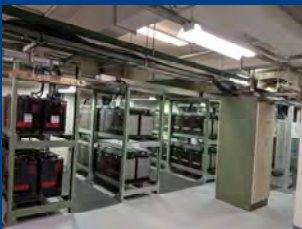
MULTIPLE ATLANTIC CANADA LOCATIONS

## ELECTRICAL ENGINEERING



### PROJECT DATES

- March 2019 – Project kick-off
- April to September 2019 – Site visits
- July to December 2019 – Reports issued to Client



### CLIENT REFERENCE

Mr. Connor Pratt, *P.Eng.*  
Project Manager  
BGIS O&M Solutions Inc.  
5788 North Street  
Halifax, NS B3K 1N7

✉: [connor.pratt@bgis.com](mailto:connor.pratt@bgis.com)



### PROJECT OVERVIEW

Bell, Canada's largest telecommunications company, operates facilities throughout Canada to provide mobile phone, television, high speed and wireless internet, and residential home phone services to clients. As part of their electrical safety program, Bell requires that electrical studies, such as a short circuit analysis, arc flash hazard assessment, and protective device coordination studies, be completed on the electrical distribution systems within their facilities.

Through this work, Fundy Engineering visited 11 facilities in New Brunswick, 14 in Nova Scotia, five in Newfoundland, and one in Prince Edward Island. Our team determined the short circuit current available at the facilities and assessed the adequacy of overcurrent protection at all nodes in the system. We determined the incident energy available and assessed the requirements for personal protective equipment when technicians work on live equipment. The time-current characteristics of the various over-current protection devices were compared to ensure they properly coordinate and we updated the single line diagrams for each facility's electrical distribution system.



### CORE PROJECT TEAM

David Richards, *P.Eng., MBA*  
Ken Carson, *P.Eng.*  
Jacob Beam, *P.Tech.*  
Seun Ijaola, *P.Eng.*  
Jon Pitman, *CTech*  
Dexter Tan, *TGIT*

Project Manager  
Senior Electrical Engineer  
Project Lead  
Electrical Engineer  
Drafting Services  
Drafting

### SCOPE OF SERVICES PROVIDED

#### Short Circuit Analysis

- Determined the maximum fault current at different buses in the electrical distribution systems
- Determined if the electrical equipment, when faulted, has enough capacity to withstand maximum fault current without sustaining damage

#### Arc Flash Hazard Assessment

- Completed to identify arc flash hazards, if additional protective measures are required and what personal protective equipment is required when working on live electrical equipment

#### Protective Device Coordination Studies

- Completed to determine the proper selection settings of the protective devices



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# Caribbean Indoor Air Quality Investigations

SEVERAL LOCATIONS IN CASTRIES, ST. LUCIA

## INDOOR AIR QUALITY INVESTIGATIONS



### PROJECT DATES

- August 2019 – Site visits
- September 2019 – Laboratory analyses
- December 2019 – Draft reports issued to Client
- April 2020 – Final reports issued to Client



### PROJECT OVERVIEW

Fundy Engineering, in collaboration with E6 Incorporated of St. Lucia, conducted indoor air quality assessments for four government buildings: Blue Coral Building; Caribbean Cinema Building; Finance Administrative Centre; and the Mango Building. The work was done to determine the status of the indoor air quality at the subject buildings in response to occupant complaints regarding unsatisfactory indoor air quality.

The team collected air samples for analysis of mould spores and particulate matter. Review of the buildings also included non-intrusive visual assessments and measurements of temperature, relative humidity, and carbon dioxide levels throughout the buildings.

Based on the sampling results, low, medium, and high impact recommendations were provided for each building to improve overall air quality and occupant health and safety.



### SCOPE OF SERVICES PROVIDED

#### Sampling Plan

- Using visual indicators and information collected from employees, we identified areas within the buildings where potential air quality issues existed

#### Sampling Program

- Air quality samples were taken from several indoor locations and one outdoor location at each building using an SKC Quicktake 15 equipped with Zefon Air-O-Cell cassettes
- Spore traps were submitted to an accredited laboratory for analysis

#### Remedial Program

- Several recommendations were provided to the Client for improving air quality



### CLIENT REFERENCE

Ms. Peggy Ann Soudatt  
Department of Public Safety  
2<sup>nd</sup> Floor Greaham Louisy  
Administrative Building  
Castries, St. Lucia

✉: psoudatt@gosl.gov.lc

### CORE PROJECT TEAM

Darryl Ford, *P.Eng., FEC*  
Crystal Caines, *P.Tech., PMP*  
Greg Hoyt, *CET, WRT*  
Jon Pitman, *CTech*

Project Manager  
Project Coordinator  
Air Quality Analyses  
Air Quality Sampling

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# Lobster Holding Facility Indoor Air Quality

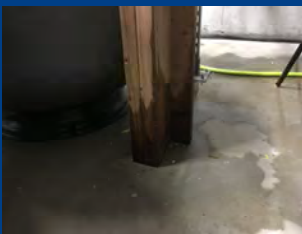
## INDOOR AIR QUALITY INVESTIGATION

BACK BAY, NEW BRUNSWICK



### PROJECT DATES

- July 2019 – Site visit and air quality sampling
- August 2019 – Report issued to Client



### PROJECT OVERVIEW

Bay Shore Lobster Ltd. operates a 225 000 kg live lobster holding and processing facility in Back Bay, New Brunswick. Live lobster are exported from the facility when demand requires, which ensures lobster are fresh at the time they reach the consumer. Fundy Engineering was contracted to undertake air quality sampling at the facility.

Visual observations were made of mould growing on wooden surfaces throughout the facility and is likely a result of the relative humidity normally being between 60 % and 70 %. Air samples were collected from seven locations within the facility and from one location outdoors. Results showed excessive concentrations of some microbial species (*i.e.*, *Cladosporium* and *Aspergillus / Penicillium*) within specific areas of the facility.

To ensure worker health and safety, several recommendations were provided to remediate the existing mould and to help inhibit microbial growth in the future.



### SCOPE OF SERVICES PROVIDED

#### Sampling Plan

- Using visual indicators and information collected from employees, we identified areas within the facility where potential air quality issues existed

#### Sampling Program

- Air quality samples were taken from seven indoor locations and one outdoor location using an SKC Quicktake 15 equipped with Zefon Air-O-Cell cassettes
- Spore traps were submitted to an accredited laboratory for analysis

#### Remedial Program

- Several recommendations were provided to the Client for remediating mould and inhibiting its future growth



### CLIENT REFERENCE

Mr. Harry Oxford  
Bay Shore Lobster Ltd.  
81 Back Bay Loop Road  
Back Bay, NB E5C 2V1

☎: 506.754.1000

✉: [harryo@bayshorelobster.com](mailto:harryo@bayshorelobster.com)

### CORE PROJECT TEAM

Darryl Ford, *P.Eng.*, *FEC*  
Greg Hoyt, *CET*, *WRT*  
Richard Frenette, *P.Eng.*

Project Manager  
Air Quality Sampling  
Mechanical Engineer

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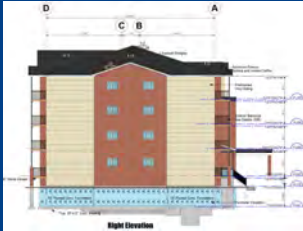




# 85 Fieldstone

FREDERICTON, NEW BRUNSWICK

## MECHANICAL DESIGN



## PROJECT DATES

- Summer 2019 – Contract awarded
- Winter 2019 / 2020 – Design development
- Summer 2020 to Fall 2021 - Construction
- Fall 2021 – First occupancy



## CLIENT REFERENCE

Mr. Craig McElroy  
Colpitts Development Ltd.  
830 Hanwell Road  
Fredericton, NB E3B 6A2

☎: 506.451.1776  
✉: reception@colpittsdev.ca

## PROJECT OVERVIEW

Fieldstone Court in Fredericton is a multi-unit residential neighbourhood. Colpitts Development Ltd. is the developer and has built several townhomes and apartment buildings within the neighbourhood. 85 Fieldstone is a four-storey 51-unit building comprising one-, two-, and three-bedroom apartments. The building offers tenants modern amenities, such as underground parking, a gym and social rooms, heat pumps for each unit, in-unit laundry services, floor and wall sound suppression, and upgraded finishes.

Fundy Engineering was contracted to undertake design work for the mechanical systems. That work involved sizing and the selecting heating, ventilation, and air-conditioning systems and the plumbing systems.

## SCOPE OF SERVICES PROVIDED

### Mechanical Design

- Sizing and selection of ventilation equipment for the corridors and common areas
- Sizing and selection of the ventilation equipment for the parking garage
- Plumbing system design drawings for the parking garage, including drainage, oil interceptor, venting, and sanitary riser diagrams
- Plumbing riser diagram for domestic water and sanitary building services
- Amalgamation of mechanical site services (i.e., domestic water and sanitary) as per municipal requirements



## CORE PROJECT TEAM

Darryl Ford, *P.Eng., FEC*  
Ryan Gosson, *P.Eng.*  
Jon Pitman, *CTech*

Senior Mechanical Engineer  
Mechanical Engineer  
Drafting

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# Misty Harbour Seafood Facility

SAINT JOHN, NEW BRUNSWICK

ARCHITECTURAL,  
MECHANICAL, AND  
ELECTRICAL DESIGN



## PROJECT DATES

- December 2019 – Project kick-off
- February 2020 – Design drawings issued for Client review
- February 2020 – Conceptual renderings issued for rezoning application



## CLIENT REFERENCE

Mr. Joseph Thompson  
Coastal Enterprises Ltd.  
PO Box 201 Lepreau  
Dipper Harbour, NB E5J 2T1

☎: 506.659.2781  
☎: 506.659.3113

## PROJECT OVERVIEW

Misty Harbour Seafoods is the main distribution plant of lobster, scallops, clams, haddock, halibut, cod, periwinkles, and a variety of other seafood for Coastal Enterprises. Fundy Engineering was engaged by Misty Harbour Seafoods to design a completely new seafood processing and retail complex for their west Saint John location.

We worked with the architectural firm Smith Design Inc. and electrical engineering firm TEK Consultants Limited to generate design drawings for the new facility. The new process area included a clam cook room, a lobster holding tank a lobster cook room, a lobster processing area, a packaging area, a package store room, an ice room, two large walk-in coolers, a blast freezer, a shipping and receiving area, washrooms, and a lunch room. The new retail area included two offices.



## CORE PROJECT TEAM

Darryl Ford, *P.Eng., FEC*  
Richard Frenette, *P.Eng.*  
Jon Pitman, *CTech*  
Robert Hunt, *CTech*  
Lindsay Cail

Senior Mechanical Engineer  
Revit® Design  
Architectural Support  
Design and Drafting  
GIS Specialist

## SCOPE OF SERVICES PROVIDED

### Architectural Support

- Generated architectural floor plans, layouts, and building sections

### Electrical Design

- Designed the service entrance and power distribution

### Mechanical Design

- Sized and specified various processing equipment and piping



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# Apartment Complex Project Monitoring

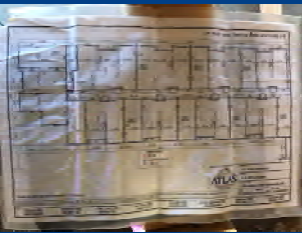
QUISPAMIS, NEW BRUNSWICK

## BUILDING SYSTEMS PROJECT MONITORING



## PROJECT DATES

- July 2020 – First Progress Draw
- October 2020 – Second Progress Draw
- December 2020 – Third Progress Draw
- 2021 – Six Progress Draws
- 2022 – Final Progress Draws



## CLIENT REFERENCE

Mr. Andrew McKay  
A.E. McKay Builders  
380 Model Farm Road  
Quispamsis, NB E2G 1L8

✉: [andrew@aemckaybuilders.com](mailto:andrew@aemckaybuilders.com)

## PROJECT OVERVIEW

Construction projects are exposed to a broad range of risks and uncertainties, such as time overages, poor equipment selection, poor site management, etc. To ensure infrastructure investments are protected, Canadian financial lending institutions sometimes require that monitoring be completed at various stages of a project during construction. Project Monitoring ensures that any material changes, actual or potential, are brought to the lender's attention as early as possible so there are no surprises at the conclusion of the project.

Fundy Engineering was contracted by A.E. McKay Builders for project monitoring of a 42 unit wood-framed three-storey apartment complex. Our project monitoring involved tabulating change orders and comparing the value against the overall budget, tracking the value of work completed and remaining to be completed, a comprehensive tracking of soft costs and hard costs, tracking the timeline, and estimating the costs to complete the project. As a result of our project monitoring, the contractor received the necessary progress payments to advance the project.



## CORE PROJECT TEAM

Darryl Ford, *P.Eng., FEC*  
David Richards, *P.Eng., MBA*  
Jon Pitman, *CTech*

Project Manager  
Project Monitor  
Project Monitoring Support

## SCOPE OF SERVICES PROVIDED

### *Project Monitoring Services*

- Periodic site inspections to verify the extent and value of the work completed during the progress stage
- Identification of any unbudgeted costs during progress stages and any changes to anchor the budget based on information provided by the borrower
- Identification of the budgeted costs that will be incurred to complete the project
- Recommend to the lender the amount of progress advance, including:
  - Total value of work completed during the progress stage, and
  - Costs that have been financed by the borrower to date



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SITE SELECTION,  
CONCEPTUAL DESIGN,  
MECHANICAL AND  
ELECTRICAL DESIGN,  
PERMITTING,  
AND  
CONSTRUCTION  
MANAGEMENT



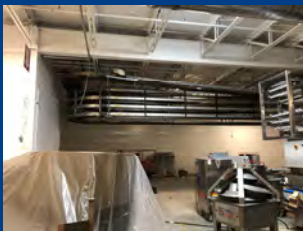
# Mrs. Dunster's Bakery

MONCTON, NEW BRUNSWICK



## PROJECT DATES

- Winter and Spring 2020 – Property condition assessments and site selection
- Summer 2020 – Bakery line conceptual design, permitting, and development of a contracting strategy
- Fall 2020 – Construction
- Mid-November 2020 - Bakery production began



## CLIENT REFERENCE

Mr. Blair Hyslop  
Co-CEO  
30 Leonard Drive  
Sussex, NB E4E 5T5

☎: 506.433.9333

✉ blair.hyslop@dunsters.ca

## PROJECT OVERVIEW

Mrs. Dunster's is a New Brunswick-based baker of homestyle donuts and other baked goods. In 2020, a new baking line was necessary to meet current and future demand for fresh-baked breads, rolls, pastries, and pizza shells for grocery stores and restaurants across the Maritimes and Maine and frozen baked goods for shops nation-wide.

Our team was hired to work with members of Mrs. Dunster's team to identify a site for a new 3 400 m<sup>2</sup> \$4.5 million bakery line and then develop a conceptual design. After reviewing several sites, a warehouse in Moncton on St. George Boulevard was selected. We then prepared a conceptual design that included the baking line, retail store, community room, offices, lunch room, locker rooms, and washrooms for a facility that would employ 50 to 60. Size of the spaces and corridors were increased to account for social distancing required during the global pandemic.

Iron Maple, a general contractor based in Sussex, was selected to build the new baking line. Our team was on site during the construction to ensure that systems were being installed as per the design specifications.

This bakery was the first of its size to be developed in Atlantic Canada in more than 20 years. The last one of its size to be constructed was the Mrs. Dunster's bakery in Sussex.

## CORE PROJECT TEAM

Tim Ryan, *M.Eng., P.Eng.*  
Crystal Caines, *P.Tech., PMP*  
Ryan Gosson, *P.Eng.*  
Seun Ijaola, *P.Eng., PMP*  
Richard Frenette, *P.Eng.*  
Greg Hoyt, *CET, WRT*  
Jacob Beam, *P.Tech.*  
Jon Pitman, *CTech*

Project Manager  
Project Coordinator  
Mechanical Engineer  
Electrical Engineer  
Revit® Design  
Mechanical Technologist  
Electrical Lead  
Architectural Support

## SCOPE OF SERVICES PROVIDED

### Site Evaluation

- Visited several sites and evaluated them based on several criteria to determine the ideal location for siting the new bakery line
- Conceptual Design and Mechanical and Electrical Design*

- Worked with the Client and suppliers to develop a conceptual design for the new baking line
- Designed, sized, and specified various mechanical and electrical systems for the new baking line

### Permitting

- Prepared permits for demolition, civil works, and mechanical works for the new bakery and met with personnel with the City of Moncton regarding the permits

### Construction Management

- Identified the best strategy, use of a general contractor, for constructing the new baking line
- Conducted routine inspections to ensure that systems were being installed in compliance with the general design intent

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**BUILDING SYSTEMS  
DESIGN  
(MECHANICAL AND  
ELECTRICAL)**



# The Suites of The Atlantic

SAINT JOHN, NEW BRUNSWICK



## PROJECT DATES

- Spring 2020 – Contract award and schematic design
- Summer 2020 – Design development
- Fall 2020 to Fall 2021 – Design completion and construction administration



## CLIENT REFERENCE

Mr. Mike Cavanagh  
Cavanagh Homes  
11 Waterview Drive  
Saint John, NB E2K 5K2

☎: 506.636.1322

## PROJECT OVERVIEW

The Suites of The Atlantic is a five-storey, 29 unit apartment complex. These oceanside one- and two-bedroom elegant urban lofts are just steps away from Harbour Passage and restaurants and boutiques of Uptown Saint John. The majority of these elegant units are corner suites that offer spectacular views of Saint John Harbour. The complex provides residents with many modern amenities, including fine finishes, private terraces, underground parking, enhanced security features, in-suite laundry facilities, a fitness centre, and on-site storage lockers.

Fundy Engineering was contracted by Cavanagh Homes to undertake all building systems design work. During schematic design, we met with the developer and design team to discuss the owner's project requirements. Design development involved the sizing and selection of mechanical and electrical equipment. We developed construction design drawings for review at 75 % and 99 % and incorporated the owner's requests after each review and then issued 100 % final drawings. During construction, we reviewed the contractor's shop drawings for conformance with the general design concept and contract requirements, we conducted periodic site visits to review progress, we issued supplementary instructions when the contractor required information, and we managed change orders.

## CORE PROJECT TEAM

Darryl Ford, *P.Eng., FEC*  
Ryan Gosson, *P.Eng.*  
Seun Ijaola, *P.Eng., P.E., PMP*  
Jacob Beam, *P.Tech.*  
Jon Pitman, *CTech*  
Dexter Tan, *TGIT*

Senior Mechanical Engineer, Project Manager  
Mechanical Engineer, Project Coordinator  
Electrical Engineer  
Electrical Support  
Revit® Design  
Drafting

## SCOPE OF SERVICES PROVIDED

### *Mechanical Design*

- Calculating the domestic water, storm water, and sanitary fixture unit load requirements
- Calculating the size of the water entrance, storm piping, and sanitary piping
- Plumbing systems, including drainage, oil / water interceptor, drainage, waste, venting, and storm risers
- Common area and corridor heating and ventilation
- Heating, ventilation, and air-conditioning and plumbing for commercial spaces

### *Electrical Design*

- Sizing the main electrical service entrance
- Single line electrical diagrams for power distribution
- Lighting, power, and life safety systems for common areas
- Emergency lighting, exit lighting, and fire alarm systems
- Single line fire alarm diagrams
- Exterior parking garage lighting
- Electrical specifications and panel and lighting schedules

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# Cornerstone Apartments and Wellness Centre

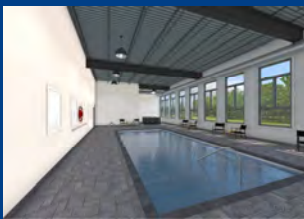
FREDERICTON, NEW BRUNSWICK

## MECHANICAL DESIGN



## PROJECT DATES

- March 2020 – First contract awarded
- Summer 2020 – Design development phase started
- Summer 2020 to Fall 2021 - Construction
- Spring 2022 – First occupancy



## CLIENT REFERENCE

Mr. Craig McElroy  
Colpitts Development Ltd.  
830 Hanwell Road  
Fredericton, NB E3B 6A2

☎: 506.451.1776

✉: reception@colpittsdev.ca

## PROJECT OVERVIEW

The Cornerstone Apartments is a five building community with a central Wellness Center. The apartment buildings are four-storeys with 45 suites with a mixture of one-, two-, and three-bedroom units. The buildings offer tenants modern amenities, such as underground parking and storage lockers, in-unit laundry services, private balconies or sunrooms, stainless steel appliances, and upgraded finishes. The Wellness Center includes a pool, hot tub, gym, yoga and social rooms, and a rooftop patio.

Fundy Engineering was contracted to undertake design work for the mechanical systems throughout the development. That work involved sizing and the selecting heating, ventilation, and air-conditioning systems and the plumbing systems.



## SCOPE OF SERVICES PROVIDED

### Mechanical Design

- Sizing and selection of ventilation equipment for the corridors and common areas
- Sizing and selection of the ventilation equipment for the parking garage
- Plumbing system design drawings for the parking garage, including drainage, oil interceptor, venting, and sanitary riser diagrams
- Plumbing riser diagram for domestic water and sanitary building services
- Amalgamation of mechanical site services (i.e., domestic water and sanitary) as per municipal requirements



## CORE PROJECT TEAM

Darryl Ford, *P.Eng., FEC*  
Ryan Gosson, *P.Eng.*  
Jon Pitman, *CTech*  
Dexter Tan, *TGIT*

Senior Mechanical Engineer  
Mechanical Engineer  
Drafting  
Drafting

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# New Compact Twin Roll Pulp Press

ATHOLVILLE, NEW BRUNSWICK

BUILDING SYSTEMS  
DESIGN (MECHANICAL  
AND ELECTRICAL)



## PROJECT DATES

- November 2021 – Contract awarded
- Winter 2021 / 2022 – Site visits to collect detailed measurements
- Spring and Summer 2022 – Drawing development
- Fall 2022 – Construction drawings issued

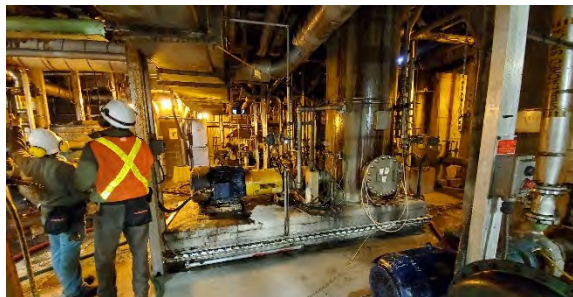


## PROJECT OVERVIEW

Fundy Engineering's Building Systems team has designed various systems for AV Group NB's specialty cellulose pulp mill in Atholville, New Brunswick. One of the projects we completed was to prepare design documents for the construction and installation of a new compact twin roll press at the mill.

The compact twin roll press is part of the pulp forming and washing process at the mill. Pulp is fed into the press and then the pulp is dehydrated as it passes between two large rollers.

We spent several days at the mill taking detailed measurements of the existing equipment, including undertaking a 3D scan, to understand how to integrate the new piece of equipment into the existing operation. Using that data, we were able to develop three-dimensional models within Plant 3D.



## CORE PROJECT TEAM

Hector Lamprea, *P.Eng., P.E., CEM*  
Cecilia Atunbi, *P.Eng.*  
David Richards, *P.Eng., MBA*  
John McKelvey, *P.Eng., NBLS*  
Greg Hoyt, *CET*  
Bhupinder Singh

Project Manager  
Electrical Engineer  
Mechanical Engineer  
Survey Engineer  
Drafting  
Revit® Design

## SCOPE OF SERVICES PROVIDED

### *Building Systems Design*

- Conducted field reviews to establish existing conditions
- Undertook a 3D scan of the existing press
- Established a comprehensive list of required connections, bypasses, and site services
- Created a construction schedule for construction sequencing
- Identified process pipe routing for connection to the new compact twin roll press
- Calculated pipe sizing for the new compact twin roll press connections
- Prepared drawings for the required mechanical and electrical modifications
- Coordinated with the owner's project team for construction of the new equipment
- Updated the plant process P&ID documents and as-built drawings

## CLIENT REFERENCE

Mr. Paulino Barahona  
AV Cell Inc.  
175 Mill Road  
Atholville, NB E3N 4S7

☎: 506.789.4101  
✉: paulino.barahona@avg.adityabirla.com

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# Telegraph Square

SAINT JOHN, NEW BRUNSWICK

## BUILDING SYSTEMS DESIGN (MECHANICAL AND ELECTRICAL)



### PROJECT DATES

- Spring 2020 – Contract award and schematic design
- Summer 2020 – Design development
- Fall 2020 to Fall 2021 – Design completion and construction administration



### CLIENT REFERENCE

Mr. Stephen Brittain  
Iron Gate Developments Inc.  
29 Canterbury Street  
Saint John, NB E2L 2C6

☎: 506.647.3228

✉: stephen@

villageviewsuites.com

### PROJECT OVERVIEW

A parking garage in the heart of Uptown Saint John at the site of the former Telegraph building was redeveloped as Telegraph Square by Iron Gate Developments Inc. The development is a six-storey, 34 suite urban style mid-rise apartment complex with street-level retail and commercial space. The complex provides residents with many modern amenities, including fine finishes, underground parking, enhanced security features, in-suite laundry facilities, and a fitness centre.

Fundy Engineering was contracted by Iron Gate Developments Inc. to undertake all building systems design work. During schematic design, we met with the developer and design team to discuss the owner's project requirements. Design development involved the sizing and selection of mechanical and electrical equipment. We developed construction design drawings for review at 75 % and 99 % and incorporated the owner's requests after each review and then issued 100 % final drawings. During construction, we reviewed the contractor's shop drawings for conformance with the general design concept and contract requirements, we conducted periodic site visits to review progress, we issued supplementary instructions when the contractor required information, and we managed change orders.

### CORE PROJECT TEAM

Ryan Gosson, *P.Eng.*  
Darryl Ford, *P.Eng., FEC*  
Seun Ijaola, *P.Eng., P.E., PMP*  
Jacob Beam, *P.Tech.*  
Jon Pitman, *CTech*  
Dexter Tan, *TGIT*  
Bhupinder Singh

Mechanical Engineer, Project Manager  
Senior Mechanical Engineer  
Electrical Engineer  
Electrical Support  
Revit® Design  
Drafting  
Revit® Design

### SCOPE OF SERVICES PROVIDED

#### *Mechanical Design*

- Calculating the domestic water, storm water, and sanitary fixture unit load requirements
- Calculating the size of the water entrance, storm piping, and sanitary piping
- Plumbing systems, including drainage, oil / water interceptor, drainage, waste, venting, and storm risers
- Common area and corridor heating and ventilation
- Heating, ventilation, and air-conditioning and plumbing for commercial spaces

#### *Electrical Design*

- Sizing the main electrical service entrance
- Single line electrical diagrams for power distribution
- Lighting, power, and life safety systems for common areas
- Emergency lighting, exit lighting, and fire alarm systems
- Single line fire alarm diagrams
- Exterior parking garage lighting
- Electrical specifications and panel and lighting schedules

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# Apartment Building Integrated Systems Testing

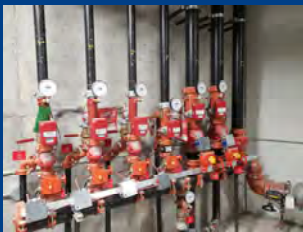
SAINT JOHN, NEW BRUNSWICK

## FIRE PROTECTION AND LIFE SAFETY SYSTEMS TESTING



### PROJECT DATES

- August 2020 – On-site integrated life safety systems testing
- September 2020 – Submission testing analysis results



### PROJECT OVERVIEW

Fundy Engineering was contracted by Village View Suites to conduct integrated systems testing and coordination at one of their multi-unit residential properties at 49 Noel Avenue in Saint John. This testing was done during commissioning to ensure the proper operation and inter-relationship between the systems and that they comply with the provisions of the National Building Code. Our testing procedures were completed as per the CAN/ULC-S1001-11-REV4: *Standard for Integrated Systems Testing of Fire Protection and Life Safety Systems*.

During the commissioning process, we tested the fire alarm system, the fire alarm signal receiving center, the sprinkler system, the standpipe system, and the elevator. A series of tests under normal mode and fire mode were completed to assess pass or fail. All systems passed and the integrated systems testing indicated that the fire protection and life safety systems were operating as intended.



### SCOPE OF SERVICES PROVIDED

#### *Fire Alarm Signal Receiving Center*

- Alarm condition, supervisory condition, trouble condition, and connection integrity condition

#### *Sprinkler System*

- Water-flow condition and valve supervision condition

#### *Standpipe System*

- Water flow condition and valve supervision condition

#### *Elevator*

- Primary recall, alternate recall, and top of shaft recall



### CLIENT REFERENCE

Mr. Stephen Brittain  
Village View Suites  
41 Noel Avenue, Box "B"  
Saint John, NB E2K 4M1

☎: 506.647.3228

### CORE PROJECT TEAM

Darryl Ford, *P.Eng., FEC*  
Jacob Beam, *P.Tech.*  
Seun Ijaola, *P.Eng., PMP*

Project Manager  
Project Lead  
Electrical Engineer

**FUNDY** Engineering

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# Kennebecasis Land & Leisure

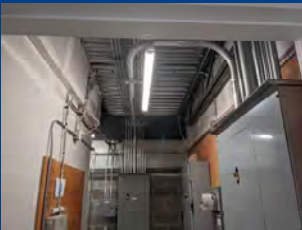
QUISPAMIS, NEW BRUNSWICK

GEOTECHNICAL  
INVESTIGATION,  
MATERIALS TESTING,  
AND  
BUILDING SYSTEMS  
DESIGN



## PROJECT DATES

- Summer and Fall 2021 – Building systems design
- Winter 2020/2021 and Spring 2021 – Geotechnical inspections and materials testing
- Summer 2021 – Construction reviews and completion



## CLIENT REFERENCE

Mr. Durck deWinter  
Iron Maple Construction  
119 B Cogle Road  
Sussex Corner, NB E4E 2S5

☎: 506.808.1826

✉: durck.dewinter@ironmaple.ca

## PROJECT OVERVIEW

Kennebecasis Land & Leisure is a one-stop shop for homeowners to purchase or rent all equipment they need to maintain their property. The facility is also a service centre for purchased and rented equipment. The operation was moved to a modern, newly constructed building on a greenfield site in 2021 after spending many years in a small warehouse type building in the heart of Rothesay. This site is located adjacent to major transportation routes and there is ample room for equipment storage and expansion.

This project was a design build. Fundy Engineering was hired by the contractor, Iron Maple Construction, to undertake all building systems design work and geotechnical aspects of the project. During construction, our Project Team worked closely with the contractor to ensure that all systems designed for the building were installed as per the specifications. This involved regular site inspections.

## CORE PROJECT TEAM

Darryl Ford, *P.Eng., FEC*  
Alex Moulard, *P.Eng., PMP*  
Ryan Gosson, *P.Eng.*  
Richard Frenette, *P.Eng.*  
Jacob Beam, *P.Tech.*  
Dexter Tan, *TGIT*  
Seun Ijaola, *P.Eng., P.E., PMP*  
Myles Munn, *P.Tech.*

Building Systems Project Manager  
Geotechnical Project Manager  
Mechanical Engineer, Project Coordinator  
Revit® Design  
Electrical Support  
Drafting  
Electrical Engineer  
Civil Works Technologist

## SCOPE OF SERVICES PROVIDED

### *Building Systems Design*

- Heating, ventilation, and air-conditioning design
- Plumbing systems design
- Fire protection systems specifications
- Electrical power distribution design
- Interior and exterior lighting design
- Building access control and security system design
- Communications system design
- Construction reviews
- Responding to contractor enquires during construction

### *Geotechnical Investigation*

- Test pits to assess subsurface soil, bedrock, and groundwater conditions
- Sieve analysis of *insitu* soils
- Foundation earthwork

### *Materials Testing*

- Compaction testing
- Proctor testing
- Concrete slump, air, and compressive strength testing

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**BUILDING SYSTEMS  
DESIGN  
(MECHANICAL AND  
ELECTRICAL)  
AND  
ENERGY MODELLING**



# The Oak within The Village at Twin Oaks

MONCTON, NEW BRUNSWICK



## PROJECT DATES

- September 2020 – Tender awarded
- March 2021 – 50 % review
- Summer 2021 – Energy performance modelling
- January 2022 – Design issued for tender
- Spring 2023 – Anticipated occupancy



## CLIENT REFERENCE

Mr. Erik de Jong  
Thrive Properties  
(Formerly Cordova Realty Ltd.)  
128 Highfield Street  
Moncton, NB E1C 5N7

☎: 506.469.4460

✉: erik.dejong@thriveproperties.ca

## PROJECT OVERVIEW

The Village at Twin Oaks is a community surrounded by green space, nature trails, and schools in the north end of Moncton designed with active living as its central theme. The Oak is the first apartment complex within the Village. It is a six-storey 101 unit building comprising one- and two-bedroom suites. The ultramodern building includes underground heated parking, secure keyless entry, tall ceilings, energy efficient construction, superior sound suppression, heat pumps and air-conditioning, in-suite laundry, large balconies, a car wash station, a dog wash station, a fitness room, and upgraded finishes.

Fundy Engineering was contracted to undertake all building systems design work. During schematic design, we met with the design team to discuss the owner's project requirements. Design development involved the sizing and selection of mechanical and electrical equipment. We developed construction design drawings for review at 50 %, 75 %, and 99 % and incorporated the owner's requests after each review and then issued 100 % final drawings. We also completed energy performance analyses to ensure the design would be energy efficient and be at least 25 % more efficient than a base building designed to the 2015 National Energy Code of Canada for Buildings.

## CORE PROJECT TEAM

Ryan Gosson, *P.Eng.*  
Darryl Ford, *P.Eng., FEC*  
Ken Carson, *P.Eng.*  
Hector Lamprea, *P.Eng., P.E., CEM*  
Richard Frenette, *P.Eng.*  
Jacob Beam, *P.Tech.*  
Jon Pitman, *CTech*  
Dexter Tan, *TGIT*  
Bhupinder Singh

Mechanical Engineer, Project Manager  
Senior Mechanical Engineer  
Senior Electrical Engineer  
Energy Efficiency Manager  
Revit® Design  
Electrical Support  
Revit® Design  
Drafting  
Revit® Design

## SCOPE OF SERVICES PROVIDED

### *Mechanical Design*

- Calculating the domestic water, storm water, and sanitary fixture unit load requirements
- Calculating the size of the water entrance, storm piping, and sanitary piping
- Plumbing systems, including drainage, oil / water interceptor, drainage, waste, venting, and storm risers
- Common area and corridor heating and ventilation
- Heating, ventilation, and air-conditioning and plumbing for all spaces

### *Electrical Design and Energy Modelling*

- Sizing the main electrical service entrance
- Single line electrical diagrams for power distribution
- Lighting, power, and life safety systems for common areas
- Emergency lighting, exit lighting, and fire alarm systems
- Single line fire alarm diagrams
- Exterior parking garage lighting
- Electrical specifications and panel and lighting schedules
- Energy performance analyses

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**BUILDING SYSTEMS  
DESIGN  
(MECHANICAL AND  
ELECTRICAL)**

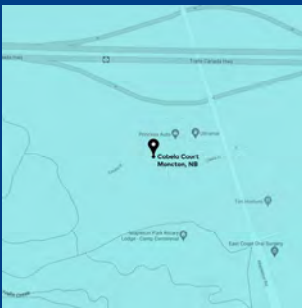
# Park Place I

MONCTON, NEW BRUNSWICK



## PROJECT DATES

- November 2020 – Contract awarded
- 2021 – Design development
- February 2022 – Design issued for tender
- Fall 2023 – Anticipated occupancy



## CLIENT REFERENCE

Mr. Erik de Jong  
Thrive Properties  
(Formerly Cordova Realty Ltd.)  
128 Highfield Street  
Moncton, NB E1C 5N7

☎: 506.469.4460

✉: erik.dejong@thriveproperties.ca

## PROJECT OVERVIEW

Park Place is located adjacent to Mapleton Park, a 120 hectare urban nature park with an extensive all seasons trail network. Phase I of the development comprises a six-storey 99 unit building housing one- and two-bedroom suites. The ultramodern building includes underground heated parking, secure keyless entry, tall ceilings, energy efficient construction, superior sound suppression, individual suite heat pumps and air-conditioning, in-suite laundry, large balconies, a car wash station, a dog wash station, a fitness room, and upgraded finishes.

Fundy Engineering was contracted to undertake all building systems design work. During schematic design, we met with the design team to discuss the owner's project requirements. Design development involved the sizing and selection of mechanical and electrical equipment. We prepared construction design drawings for review at 50 %, 75 %, and 99 % and incorporated the owner's requests after each review and then issued 100 % final drawings.



## CORE PROJECT TEAM

Ryan Gosson, *P.Eng.*  
Darryl Ford, *P.Eng., FEC*  
Ken Carson, *P.Eng.*  
Jacob Beam, *P.Tech.*  
Dexter Tan, *TGIT*  
Bhupinder Singh

Mechanical Engineer, Project Manager  
Senior Mechanical Engineer  
Senior Electrical Engineer  
Electrical Support  
Drafting  
Revit® Design

## SCOPE OF SERVICES PROVIDED

### *Mechanical Design*

- Calculating the domestic water, storm water, and sanitary fixture unit load requirements
- Calculating the size of the water entrance, storm piping, and sanitary piping
- Plumbing systems, including drainage, oil / water interceptor, drainage, waste, venting, and storm risers
- Common area and corridor heating and ventilation
- Heating, ventilation, and air-conditioning and plumbing for all spaces

### *Electrical Design*

- Sizing the main electrical service entrance
- Single line electrical diagrams for power distribution
- Lighting, power, and life safety systems for common areas
- Emergency lighting, exit lighting, and fire alarm systems
- Single line fire alarm diagrams
- Exterior parking garage lighting
- Electrical specifications and panel and lighting schedules

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**BUILDING SYSTEMS  
DESIGN (MECHANICAL  
AND ELECTRICAL)**



# Bell Tyne Valley CO Standby Generator

TYNE VALLEY, PRINCE EDWARD ISLAND



## PROJECT DATES

- November 2020 – Contract awarded and site review
- Winter 2020 / 2021 – Electrical design
- Summer 2022 – Generator installation and commissioning
- November 2022 – Project completion



## PROJECT OVERVIEW

Bell, Canada's largest communications company, has locations across Canada to support their operations. One of their remote sites is located at 7480 Barlow Road in Tyne Valley, Prince Edward Island. That site is connected to the utility. On-site batteries provide backup power for a short period of time in the event of a power outage. Bell is upgrading many of their remote sites with standby generators to provide an uninterrupted power supply during power outages.

Fundy Engineering was contracted by BGIS O&M Solutions Inc. to coordinate the installation of a 50 kW pad-mounted standby generator at the Barlow Road site. The work also included design of associated electrical upgrades.



## SCOPE OF SERVICES PROVIDED

### *Engineering Design*

- Completed a survey of existing onsite electrical systems
- Sized and specified new electrical equipment and systems for the generator installation and automatic switching
- Developed design drawings for client and prepared drawings for construction

### *Tender Support and Contract Administration*

- Prepared tender documents and awarded contracts and change orders on behalf of the Client and conducted periodic inspections to ensure contract compliance

### *Commissioning Services*

- Worked with the generator installer to ensure the switching systems operated as per the design requirements
- Conducted an acoustic audit of the site to ensure operational generator sound levels would not disturb nearby receptors
- Prepared as-built drawings for the work completed

## CLIENT REFERENCE

Mr. Ryan O'Neil, *P.Tech*  
Project Manager  
BGIS O&M Solutions Inc.  
PO Box 3521  
Markham, ON L3R 0N4

☎: 506.349.8902

✉: ryan.oneil@bgis.com

## CORE PROJECT TEAM

David Richards, *P.Eng., MBA*  
Cecilia Atunbi, *P.Eng.*  
Jacob Beam, *P.Tech.*  
Jon Pitman, *CTech*

Project Manager  
Electrical Engineer  
Electrical Project Lead  
Drafting Services

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**BUILDING SYSTEMS  
DESIGN  
(MECHANICAL AND  
ELECTRICAL)  
AND  
ENERGY MODELLING**

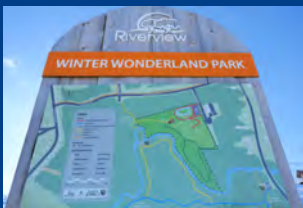
# Dobson Crossing Phase I

RIVERVIEW, NEW BRUNSWICK



## PROJECT DATES

- Fall 2020 – Contract awarded
- January 2021 – 50 % review
- March 2021 – 75 % review
- Spring 2021 – Energy performance modelling
- April 2021 – Design issued for construction
- Fall 2022 – Anticipated occupancy



## CLIENT REFERENCE

Mr. Erik de Jong  
Thrive Properties  
(Formerly Cordova Realty Ltd.)  
128 Highfield Street  
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✉: erik.dejong@thriveproperties.ca

## PROJECT OVERVIEW

Dobson Crossing is a community where adventure awaits. There is a direct connection to the Dobson Trail that extends to Fundy National Park and the adjacent Gunningsville Trail connects to Riverfront Park where the famous tidal bore can be viewed. Winter Wonderland Park, which offers outdoor skating, sliding hills, and sleight rides is also next door. The first apartment complex within the community is a four-storey 66 unit building comprising one- and two-bedroom suites. The modern building includes underground heated parking, on-site storage, energy efficient construction, superior sound suppression, heat pumps and air-conditioning, in-suite laundry, large balconies, a car wash station, a dog wash station, a common room, and upgraded finishes.

Fundy Engineering was contracted to undertake all building systems design work. For this project, we also completed energy performance analyses to ensure the design would be energy efficient and be at least 25 % more efficient than a base building designed to the 2015 National Energy Code of Canada for Buildings. A unique feature of this building is the rooftop solar farm comprising 220 solar panels to offset electricity purchased from the grid and to be more energy efficient.

## CORE PROJECT TEAM

Ryan Gosson, *P.Eng.*  
Darryl Ford, *P.Eng., FEC*  
Ken Carson, *P.Eng.*  
Hector Lamprea, *P.Eng., P.E., CEM*  
Richard Frenette, *P.Eng.*  
Jacob Beam, *P.Tech.*  
Jon Pitman, *CTech*  
Dexter Tan, *TGIT*  
Bhupinder Singh

Mechanical Engineer, Project Manager  
Senior Mechanical Engineer  
Senior Electrical Engineer  
Energy Efficiency Manager  
Revit® Design  
Electrical Support  
Revit® Design  
Drafting  
Revit® Design

## SCOPE OF SERVICES PROVIDED

### *Mechanical Design*

- Calculating the domestic water, storm water, and sanitary fixture unit load requirements
- Calculating the size of the water entrance, storm piping, and sanitary piping
- Plumbing systems, including drainage, oil / water interceptor, drainage, waste, venting, and storm risers
- Common area and corridor heating and ventilation
- Heating, ventilation, and air-conditioning and plumbing for all spaces

### *Electrical Design and Energy Modelling*

- Sizing the main electrical service entrance
- Single line electrical diagrams for power distribution
- Lighting, power, and life safety systems for common areas
- Emergency lighting, exit lighting, and fire alarm systems
- Single line fire alarm diagrams
- Exterior parking garage lighting
- Electrical specifications and panel and lighting schedules
- Energy performance analyses

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# Ben & Florentine Restaurant Fit Up

HALIFAX, NOVA SCOTIA

## BUILDING SYSTEMS DESIGN (MECHANICAL AND ELECTRICAL)



### PROJECT DATES

- Summer 2021 – Contract awarded
- Winter 2021 / 2022 – Building systems design
- Summer 2022 – Site inspections
- January 2023 – Restaurant opened for business



### CLIENT REFERENCE

Ms. Stephanie Caron  
MTY Group  
8210 Rte Transcanadienne  
Suite 200  
Saint-Laurent, QC H4S 1M5

☎: 514.336.8885  
✉: info@mtygroup.com

### PROJECT OVERVIEW

Ben & Florentine is a Canadian breakfast and lunch restaurant chain that belongs to the MTY Group. Each of the 60+ restaurants across Canada is individually owned as a franchise.

After expanding from Quebec into Ontario and Manitoba, the chain set its sights on Atlantic Canada with their first store in the Bayers Lake shopping district of Halifax.

Fundy Engineering was contracted by MTY Group to complete building systems design services for the restaurant fit up.



### CORE PROJECT TEAM

Darryl Ford, *P.Eng., FEC*  
Cecilia Atunbi, *P.Eng.*  
David Richards, *P.Eng., MBA*  
Ryan Gosson, *P.Eng.*  
Greg Hoyt, *CET*  
John Pitman, *CTech*

Project Manager  
Electrical Engineer  
Mechanical Engineer  
Mechanical Engineer  
Drafting  
Revit® Design

### SCOPE OF SERVICES PROVIDED

#### *Mechanical Design*

- Heating, ventilation, and air-conditioning system, including the ductwork
- Commercial kitchen ventilation system, including wet chemical fire suppression system to meet NFPA-96
- Plumbing systems including sanitary, domestic water, and venting
- Natural gas distribution

#### *Electrical Design*

- Sized new services to accommodate the new electrical systems
- Designed the lighting systems to meet the tenants' prototype requirements
- Designed the power distribution systems, communications systems, and life safety systems for the fit up

#### *Field Reviews*

- Conducted an initial site visit to review the existing mechanical and electrical systems
- Conducted a field review of the fit up work to ensure that the systems were installed as per the specifications

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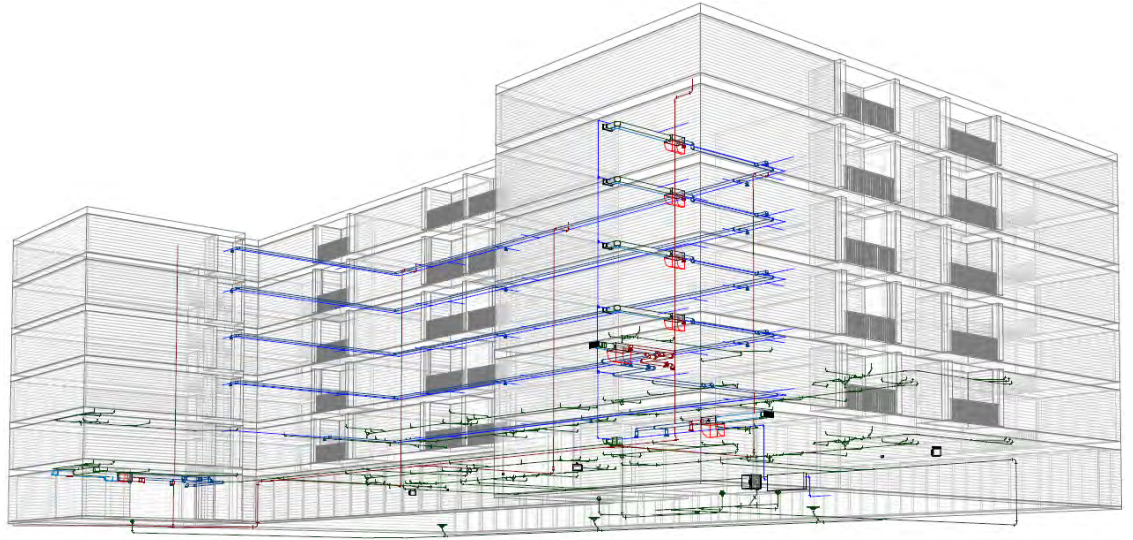




# 620 Forest Hills Apartment Complex

FREDERICTON, NEW BRUNSWICK

## MECHANICAL DESIGN



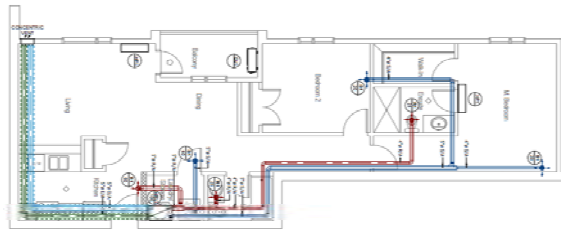
## PROJECT DATES

- October 2021 – Contract award
- Fall / Winter 2021 – Design development
- Winter 2021 – Design completion

## PROJECT OVERVIEW

Modern apartment complexes are being built across Fredericton as high-density infill developments. 620 Forest Hills comprises a five-storey 56 two-bedroom complex built on a pocket of previously underutilized lots. The building is centrally located and provides residents with many modern amenities, including fine finishes, private balconies, underground parking, on-site storage lockers, enhanced security features, in-suite laundry facilities, and a gym.

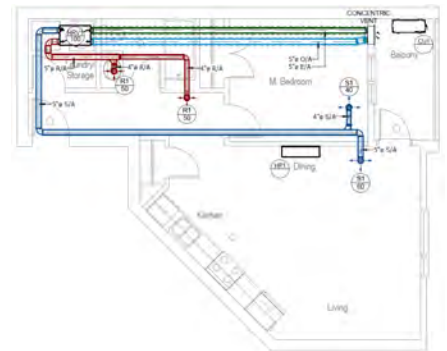
Fundy Engineering was contracted by BellaState Construction Inc. to undertake all building systems design work. During schematic design, we met with the developer and design team to discuss the owner's project requirements. Design development involved the sizing and selection of mechanical and electrical equipment. During construction, we reviewed the contractor's shop drawings for conformance with the general design concept and contract requirements, we conducted periodic site visits to review progress, we issued supplementary instructions when the contractor required information, and we managed change orders.



## SCOPE OF SERVICES PROVIDED

### *Mechanical Design*

- Calculating the domestic water, storm water, and sanitary fixture unit load requirements
- Calculating the size of the water entrance, storm piping, and sanitary piping
- Plumbing systems, including drainage, oil / water interceptor, waste, venting, and storm risers
- Sizing and selection of ventilation for corridors and common areas
- Sizing and selection of ventilation equipment and controls for parking garage
- Ventilation and plumbing for elevator machine room
- Heating, ventilation, and air-conditioning and plumbing sizing and layouts for typical apartment suites



## CLIENT REFERENCE

Mr. Patrick Sohy  
BellaState Construction Inc.  
557 Saint Mary's Street  
Fredericton, NB E3A 8H4

☎: 506.454.0166  
✉: info@bellastate.ca

## CORE PROJECT TEAM

Darryl Ford, *P.Eng., FEC*  
Ryan Gosson, *P.Eng.*  
Bhupinder Singh

Senior Mechanical Engineer  
Project Manager  
Revit® Design

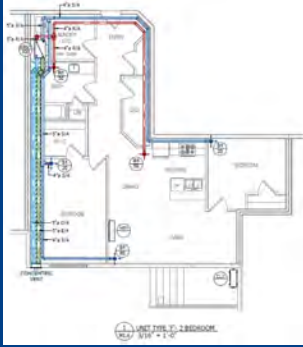
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**BUILDING SYSTEMS  
DESIGN  
(MECHANICAL AND  
ELECTRICAL)**



# The Skyline

SAINT JOHN, NEW BRUNSWICK



## PROJECT DATES

- Nov 2021 – Tender awarded
- Winter 2021 / 2022 – Design development
- Spring 2022 – Anticipated construction start



## PROJECT OVERVIEW

The Skyline is a 35 unit, six-storey apartment complex with six one-bedroom and 29 two-bedroom units. The complex is being built on an historic urban vacant lot adjacent to the City centre and close to all amenities, including parks, dining, arts, markets, and transit stops to go further afield. The modern building includes some underground vehicle and bicycle parking, a fitness room, in-unit laundry, decks, and upgraded finishes.

Fundy Engineering was contracted to undertake all building systems design work. During schematic design, we met with the developer and design team to discuss the owner's project requirements. Design development involved the sizing and selection of mechanical and electrical equipment.

The mechanical design consisted of sizing and selecting heating and ventilation equipment for the common areas and parking garage. We also designed the plumbing systems. The building's electrical design consisted of power distribution, data communications systems, interior and exterior building lighting, emergency lights and exit signs, fire sensors and detectors, power distribution, access control, and security systems.

## SCOPE OF SERVICES PROVIDED

### *Mechanical Design*

- Calculating the domestic water, storm water, and sanitary fixture unit load requirements
- Calculating the size of the water entrance, storm piping, and sanitary piping
- Plumbing systems, including drainage, oil / water interceptor, drainage, waste, venting, and storm risers
- Common area and corridor heating and ventilation
- Heating, ventilation, and air-conditioning and plumbing for commercial spaces

### *Electrical Design*

- Sizing the main electrical service entrance
- Single line electrical diagrams for power distribution
- Lighting, power, and life safety systems for common areas
- Emergency lighting, exit lighting, and fire alarm systems
- Single line fire alarm diagrams
- Exterior parking garage lighting
- Electrical specifications and panel and lighting schedules

## CLIENT REFERENCE

Mr. Greg Collins  
Collins Tours & Consulting Ltd.  
303 Westmorland Road  
Saint John, NB E2J 2G2

☎: 506.634.8080

✉: greg@collinstours.ca

## CORE PROJECT TEAM

Ryan Gosson, *P.Eng.*  
Darryl Ford, *P.Eng., FEC*  
Seun Ijaola, *P.Eng., P.E., PMP*  
Jacob Beam, *P.Tech.*  
Jon Pitman, *CTech*  
Dexter Tan, *TGIT*  
Bhupinder Singh

Mechanical Engineer, Project Manager  
Senior Mechanical Engineer  
Electrical Engineer  
Electrical Support  
Revit® Design  
Drafting  
Revit® Design

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**ENVIRONMENTAL**

# Irving Oil Marine Terminals NPRI Reporting

SAINT JOHN, NEW BRUNSWICK

## AIR EMISSIONS ASSESSMENT AND REPORTING



### PROJECT DATES

- Annual Reporting – 2003 through 2019



### PROJECT OVERVIEW

Under the Canadian Environmental Protection Act, 1999, owners or operators of facilities that meet or exceed published reporting thresholds are required to report to Environment Canada's National Pollution Release Inventory (NPRI). The NPRI is a publicly-accessible inventory of pollutant releases (*i.e.*, to air, water, and land), disposals, and transfers for recycling. Owning and operating Canada's largest oil refining facility, Irving Oil distributes refined products throughout Eastern Canada via several marine terminals. The release of Volatile Organic Compounds (VOCs) from several of those terminals meets or exceeds several of the NPRI air pollutant thresholds. Since 2003, Fundy Engineering has been contracted to estimate the VOCs emissions volumes at those marine terminals and to prepare a report for submission to the NPRI.

Using a variety of methodologies, we have estimated the volume of VOCs emissions for several marine terminals, including those in Belldune, Charlottetown, Gaspe, Halifax, Matane, and St. John's.



### SCOPE OF SERVICES PROVIDED

*Objectives of this work included:*

- Reviewing annual changes of the NPRI reporting criteria
- Identifying the facility's industrial source category
- Identifying the facilities Criteria Air Contaminants (CAC) emission sources
- Collecting supporting pollutant release information for the facility
- Determining the most appropriate CAC emissions methodologies to use, such as direct measurement, mass balance, emission factors, and engineering calculations
- Estimating CAC emissions
- Preparing a report for submission to the NPRI



### CLIENT REFERENCE

Ms. Laura Nicolson  
Irving Oil Commercial, G.P.  
PO Box 5810  
Saint John, NB E2L 0B4

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### CORE PROJECT TEAM

Darryl Ford, *P.Eng., FEC*  
Hector Lamprea, *P.Eng., P.E., CEM*

Project Manager  
Mechanical Engineer

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# Jean Canfield Building Remedial Action Plan

CHARLOTTETOWN, PRINCE EDWARD ISLAND

## SITE CHARACTERIZATION, REMEDIAL ACTION PLAN, RISK ASSESSMENT, AND SPECIFIC RISK MANAGEMENT PLAN



### PROJECT DATES

- 2004 – Site characterization and remediation
- 2005 – Specific risk management plan
- 2008 – Building opening



### CLIENT REFERENCE

Mr. David Bergmark, *AAPEI, MRAIC*  
BGHJ Architects  
63 Fitzroy Street  
PO Box 1719  
Charlottetown, PE C1A 1R4

☎: 902.566.4449  
☎: 902.566.1235  
✉: architects@bghj.com

### PROJECT OVERVIEW

The Jean Canfield office building is Public Works and Government Services Canada's most environmentally friendly building. The building was constructed on a formerly heavily contaminated block of 11 properties in downtown Charlottetown.

Fundy Engineering was contracted to provide site professional services to characterize the extent of contamination of the block. Historical land uses included scrap metal storage, automotive repair, welding, fuel distribution, commercial, and residential. Soil and water samples taken from test pits, boreholes, and groundwater monitoring wells on the site showed subsurface soils to be heavily impacted by metals and petroleum hydrocarbons.

To maximize remedial work efficiencies, Fundy Engineering utilized an on-site laboratory for quick analysis. Soils to be remediated were managed by strategically stockpiling them based on the level of contamination: metals exceeding Canadian Council of Ministers of the Environment (CCME) criteria; metals exceeding CCME criteria and Site-Specific Target Levels (SSTL); metals exceeding landfill disposal criteria; and petroleum hydrocarbons exceeding SSTLs. To reduce overall remediation costs, the impacted soils were either disposed of at a licensed management facility or managed on-site.

Environmental risks to the building occupants were eliminated following the removal of the highly impacted soils and using institutional controls in the design of the building and for the facility's long-term monitoring.

### CORE PROJECT TEAM

Tim Ryan, *M.Eng., P.Eng.*  
Gordon Mouland, *M.Eng., P.Eng.*  
Greg Derrah, *P.Tech, CESA*

Project Manager  
Senior Geotechnical Engineer  
Environmental Technologist

### SCOPE OF SERVICES PROVIDED

#### *Site Characterization*

- Test-pits, boreholes, and groundwater monitoring wells were used to characterize subsurface soils and groundwater and to fully delineate on- and off-site impacts

#### *Remedial Action Plan*

- Coordinated sampling to maximize remedial work efficiencies
- Designed a site-specific risk management plan to handle impacted soils stored on-site within an engineered cell
- Supervised the remedial work
- Provided necessary site documentation to the Department of Environment



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# Ultra Low Sulphur Diesel Pipeline

SAINT JOHN, NEW BRUNSWICK

## ENVIRONMENTAL PERMITTING AND PROJECT MANAGEMENT



### PROJECT DATES

- December 2004 – ULSD application submitted to the PUB
- January 2005 – Response submitted to PCC
- February 2005 – Supplemental information submitted to PCC
- April 2005 – PUB hearings
- July 2005 – Final application submitted to the PUB
- August 2005 – Permit to Construct (2005-01) issued by PUB
- Fall 2005 – ULSD pipeline construction

### CLIENT REFERENCE

Mrs. Louise Stewart, *P.Eng.*  
Refinery Environment Manager  
Irving Oil Limited  
PO Box 1260  
Saint John, NB E2L 4H6

### PROJECT OVERVIEW

Fundy Engineering assisted with regulatory permitting to the Public Utilities Board (PUB) for a dedicated 1.85 km long 610 mm diameter pipeline to transport Ultra Low Sulphur Diesel (ULSD) from the Irving Refinery to the Courtney Bay refined products terminal. ULSD contains 97 % less sulphur than the industry standard diesel product.

Although a relatively short pipeline, its route was complicated by several crossings, including:

- Bayside Drive;
- a Canadian National Railway line;
- Little River;
- Irving Paper's waterline;
- a City of Saint John waterline;
- Maritimes & Northeast gas line;
- several NB Power transmission lines; and
- several SJ Energy distribution lines.

Modifications were required to the original application submitted to the PUB based on regulatory reviews. After approval was granted from the PUB, the ULSD pipeline was built. The ULSD pipeline was installed on a newly constructed pipeline support system. That new support system was constructed atop 111 concrete spread footing foundations.

As a result of this project, ULSD is transported by ship from the East Saint John Product Terminal to domestic and foreign markets.

### CORE PROJECT TEAM

Tim Ryan, *M.Eng., P.Eng.*  
Matthew Alexander, *Ph.D., P.Geo., EP*  
Crystal Caines, *P.Tech., PMP*

Project Manager  
Senior Environmental Scientist  
Environmental Technologist

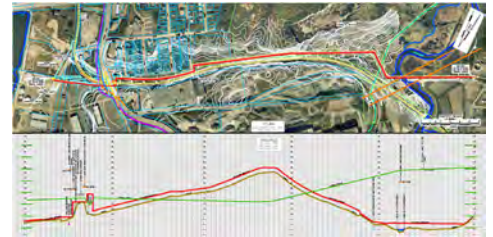
### SCOPE OF SERVICES PROVIDED

#### Permitting

- Several permits were required for various components of the pipeline to move forward, which were secured by Fundy Engineering
- We developed briefing presentations for the PUB and the Pipeline Coordinating Committee (PCC)
- We prepared responses to requests for information from the PUB and PCC and we submitted supplementary information, when necessary

#### Project Management

- We tracked inquiries made by several interveners throughout the public hearing
- We liaised with property and easement owners to obtain necessary agreements to construct and operate the ULSD pipeline



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# Renforth Wharf Reconstruction

ROTHESAY, NEW BRUNSWICK

GEOTECHNICAL  
INVESTIGATION,  
WHARF DESIGN,  
ENVIRONMENTAL  
PERMITTING,  
AND  
SOIL REINFORCED WALL  
(SRW) DESIGN



## PROJECT DATES

- Fall 2004 – Geotechnical investigation
- Summer / Fall 2006 – Marine retaining wall construction supervision
- Fall / Winter 2007 – Design
- Spring / Summer 2007 – Wharf construction supervision
- Spring 2006 and 2007 – Environmental permitting
- Summer 2014 – SRW design and construction supervision

## CLIENT REFERENCE

Mr. John Jarvie  
Town Manager  
Town of Rothesay  
70 Hampton Road  
Rothesay, NB E2E 5L5

☎: 506.848.6600  
☎: 506.848.6677  
✉: johnjarvie@rothesay.ca

## PROJECT OVERVIEW

Fundy Engineering determined that wave action and ice impact and abrasion during the spring freshet on the Kennebecasis River led to the failure of deck sections on Renforth Wharf. The original wharf was constructed using a treated wood deck over timbers that were used to build a ballasted crib work.

We completed a borehole investigation to assess the soil conditions below the existing and proposed wharf. Using the information collected in the field, we developed designs for the reconstruction. We designed the wharf as a sheet pile structure in order to provide a solid and long-lasting structure. A Redi-Rock® retaining wall was designed to protect against shoreline erosion and to support the shoreline boardwalk. We also designed a new boat launch ramp and an SRW that was built as approaches to the community wharf.

Our engineers designed and were on-site to oversee the reconstruction of the community wharf. The reconstructed wharf is a hub of community activity ranging from the dragon boat races in the summer to the 100+ ice shack fishing village in the winter.



## CORE PROJECT TEAM

Gordon Mouland, *M.Eng., P.Eng., P.E.*  
Andy MacVey, *P.Eng.*  
Alex Mouland, *P.Eng., PMP*  
Robert Hunt, *C.Tech*

Senior Geotechnical Engineer  
Geotechnical Engineer  
Geotechnical Engineer  
Design and Drafting

## SCOPE OF SERVICES PROVIDED

### *Geotechnical Investigation*

- Completed a field investigation to determine the nature of deck failures
- Provided recommendations on the type of required remedial action

### *Geotechnical Design*

- Undertook a borehole investigation to assess soil conditions
- Designed a shoreline retaining wall and a new wharf

### *Environmental Permitting*

- Watercourse alteration permits were required through the Department of the Environment

### *Soil Reinforced Wall*

- Designed an SRW deck skirting for around the light house at the associated park



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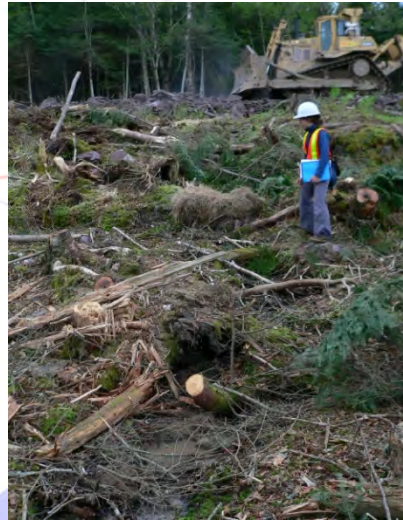
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# Bayside Drive Extension and Hewitt Road

SAINT JOHN, NEW BRUNSWICK

ENVIRONMENTAL  
CONSTRAINTS  
MAPPING,  
ENVIRONMENTAL  
IMPACT ASSESSMENT  
(EIA),  
PUBLIC AND  
STAKEHOLDER  
CONSULTATIONS,  
AND  
ENVIRONMENTAL  
PERMITTING,  
PROTECTION,  
MONITORING, AND  
COMPLIANCE



## PROJECT DATES

- Spring through Fall 2005 – Baseline data collection, environmental constraints mapping, and EIA document preparation
- November 2005 – EIA registration and public and stakeholder consultations
- March 2006 – EIA approval
- Winter 2006 through Fall 2007 – Environmental permitting, monitoring, and compliance
- Spring 2006 through Fall 2007 – Roadway construction
- Fall 2007 – Official opening

## CLIENT REFERENCE

Mr. Warren Long, *P.Eng.*  
President  
Milkish Oaks Inc.  
77 Joe Long Road  
Summerville, NB E5S 1H8

☎: 506.674.9435  
☎: 506.333.6281  
✉: wrlong@milkishoaks.ca

## PROJECT OVERVIEW

Fundy Engineering completed all environmental permitting, monitoring, and compliance for Saint John's largest road construction project in 20 years, the Red Head Secondary Access Road (*i.e.*, Bayside Drive Extension and Hewitt Road). Canaport™ LNG<sub>LP</sub> constructed the 8.8 km \$10 million roadway and donated it to the City of Saint John.

Residents of Red Head raised concern about heavy construction vehicles increasing roadway degradation along the rural Red Head Road during construction of the Canaport™ LNG<sub>LP</sub> facility at Mispec Point. The primary purpose of the new road was to re-route construction traffic and provide a secondary road for residents of Red Head who had been lobbying the City for another route in the event of a local emergency.

Fundy Engineering undertook environmental constraints mapping to assist roadway engineers with routing of the road. Because the final route could not avoid impact to wetlands  $\geq 2$  ha in size, the project required review and approval through an EIA. We took the project through the EIA process, obtained all environmental permits (municipal, provincial, and federal) necessary to build and operate the road, and we routinely monitored for long-term impacts, which continued until 2012.

## CORE PROJECT TEAM

Tim Ryan, *M.Eng., P.Eng.*  
Matthew Alexander, *Ph.D., P.Geo., EP*  
Crystal Caines, *P.Tech., PMP*  
Chris Mayes, *P.Tech.*

Project Manager  
Senior Environmental Scientist  
Environmental Compliance  
Environmental Compliance

## SCOPE OF SERVICES PROVIDED

### *Baseline Environmental Data Collection*

- Field and desk-top studies were completed to determine the environmental conditions prior to construction and operation

### *Sustainable Site Selection Optimization*

- Using extensive field survey data, we used ArcGIS to iteratively determine a location where the road would result in the most sustainable site footprint

### *Environmental Impact Assessment*

- The presence of wetlands along the route and potential impact to those features required that the Project receive approval through an EIA

### *Environmental Permitting*

- Several permits were required for various components of the road to move forward, which were secured by Fundy Engineering

### *Environmental Monitoring and Compliance*

- Routine monitoring of groundwater, surface water, fish and fish habitat, terrestrial flora and fauna, *etc.* was done to ensure the road has minimal environmental impact

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# Canaport™ LNG<sub>LP</sub> Marine Terminal and Multi-Purpose Pier Project

MISPEC POINT, NEW BRUNSWICK

ENVIRONMENTAL  
COMPLIANCE AUDITING  
/ ENVIRONMENTAL  
MANAGEMENT  
SYSTEMS,  
ECOLOGICAL  
SCREENING,  
PUBLIC  
CONSULTATIONS,  
AND  
STAKEHOLDER  
CONSULTATIONS



## PROJECT DATES

- 2004 – Wetland watercourse delineations and baseline data collection began
- August 2005 – Construction began
- 2005 to Present – Ongoing site monitoring / environmental compliance
- June 2009 – Tank 1 completed and Terminal commissioned: First LNG shipment arrived (following the issue of the Approval to Operate by NBDENV)
- January 2010 – Tank 2 completed
- August 2010 – Tank 3 completed

## CLIENT REFERENCE

Mr. Fraser Forsythe, *P.Eng.*  
Health, Safety, Security, and  
Environment Manager  
Canaport™ LNG<sub>LP</sub>  
2530 Red Head Road  
Saint John, NB E2L 3T5

☎: 506.638.1305  
☎: 506.638.1335  
✉: [fforsythe@canaportlng.com](mailto:fforsythe@canaportlng.com)

## PROJECT OVERVIEW

Fundy Engineering was retained by Canaport™ LNG<sub>LP</sub> to provide environmental compliance and project management for all environmental permits, building permits, and approvals to construct for the \$750 million (USD) Liquefied Natural Gas (LNG) Project in Saint John, New Brunswick.

Construction of the facility began in August 2005, with the first of three LNG tanks completed in June 2009. The second and third tank were completed in 2010.

Fundy Engineering developed and obtained Regulatory approval of the Environmental Protection Plan used by the project designers, field staff, and all contract personnel. Our firm maintained and reported to the Regulator site monitoring of groundwater quality, noise, vibration, traffic control, and site runoff during construction.

Fundy Engineering supports ongoing public consultation through active membership of the Canaport Community Environmental Liaison Committee and are responsible for recording and distributing the minutes of those quarterly meetings. The project site work began in 2002, and the terminal was completed in 2010 within approved project budgets and schedules and has operated successfully since.

## CORE PROJECT TEAM

Tim Ryan, <i>M.Eng., P.Eng.</i>	Project Manager
Gordon Moulard, <i>M.Eng., P.Eng., P.E.</i>	Senior Geotechnical Engineer
Crystal Caines, <i>P.Tech., PMP</i>	Environmental Technologist
Matthew Alexander, <i>Ph.D., P.Geo., EP</i>	Senior Environmental Scientist
Joel Forsythe, <i>P.Eng.</i>	Technical Support

## SCOPE OF SERVICES PROVIDED

- Wetland delineation; baseline data collection
- Ensured that the 24 commitments made in the approved Environmental Impact Assessment were met
- Worked closely with the Regulator's Environmental Compliance Officer to ensure that the environment was the number one priority during the construction of the Terminal
- Environmental compliance / site monitoring included the collection, analyzing and reporting of the following items: traffic, sound levels, blasting, groundwater levels, groundwater quantity and quality, surface water quality, etc.
- Aided in the development of the Terminal's Emergency Management Plan, which was subsequently approved by the municipal, provincial, and federal regulators
- Restored, enhanced, and constructed wetlands off-site in order to compensate for wetland loss during construction

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# Dutch Point Wetland Restoration

HAMPTON, NEW BRUNSWICK

ENVIRONMENTAL  
CONSTRAINTS  
MAPPING,  
WETLAND RESTORATION  
DESIGN,  
ENVIRONMENTAL  
PERMITTING,  
PROTECTION,  
MONITORING, AND  
COMPLIANCE,  
AND  
PROJECT MANAGEMENT



## PROJECT DATES

- 2007 – Site evaluation and baseline data collection
- September to December 2009 – Lagoon dewatering, sediment stabilization, grading, and berm re-shaping
- 2010 – Berm re-shaping and native plant seeding and re-vegetation
- 2011 and 2013 – Post-restoration environmental monitoring

## CLIENT REFERENCE

Mr. Fraser Forsythe, *P.Eng.*  
Health, Safety, Security, and  
Environment Manager  
Canaport™ LNG<sub>LP</sub>  
2530 Red Head Road  
Saint John, NB E2L 3T5

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✉: [fforsythe@canaportlng.com](mailto:fforsythe@canaportlng.com)

## PROJECT OVERVIEW

In the 1970s, a backwater area of the Kennebecasis River adjacent to Dutch Point in Hampton, NB was developed into a municipal wastewater treatment lagoon. In 2005, the lagoon was decommissioned when a new treatment plant was brought on-line. Fundy Engineering worked with the Town of Hampton and Canaport™ LNG<sub>LP</sub> to reclaim the lagoon and transform it into a functional floodplain wetland that is accessible for local residents and visitors to view birds and wildlife at Randall Park.

The wetland restoration work comprised three phases:

- Phase I: lagoon dewatering and sediment stabilization;
- Phase II: site preparation, grading, berm re-shaping, and geotextile installation; and
- Phase III: native plant seeding and re-vegetation.

Restoration efforts were completed in 2010 and yielded 8.98 ha of restored wetland habitat. Not only was the restoration effort effective at restoring the habitat lost from the wastewater treatment lagoon development, but it also restored much of the fragmented habitat within the original bog of the Kennebecasis River.

## CORE PROJECT TEAM

Tim Ryan, *M.Eng., P.Eng.*  
Matthew Alexander, *P.Geo., Ph.D., EP*  
Crystal Caines, *P.Tech., PMP*  
Stephen Little, *P.Tech., CESA*

Project Manager  
Senior Environmental Scientist  
Environmental Technologist  
GIS Specialist

## SCOPE OF SERVICES PROVIDED

### *Baseline Environmental Data Collection*

- Field and desk-top studies were completed to determine the environmental conditions prior to restoration

### *Environmental Permitting*

- Several permits were required for various components of the restoration work

### *Optimized Wetland Restoration Planning*

- Using the extensive field survey data from the baseline data collection work, we used ArcGIS to iteratively determine a wetland restoration plan best suited for the site

### *Project Management*

- This multi-year project involved the management of several work scopes and various contractors for different stages

### *Project Tendering and Site Supervision*

- Fundy Engineering administered the tendering process and undertook the on-site restoration supervision to ensure project success

### *Long-Term Environmental Monitoring and Compliance*

- Post-restoration sampling (*i.e.*, water and sediment quality) and monitoring was undertaken to evaluate restoration success

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# Matthews Cove Wetland Restoration

QUISPAMISIS, NEW BRUNSWICK

ENVIRONMENTAL  
CONSTRAINTS  
MAPPING,  
WETLAND RESTORATION  
DESIGN,  
ENVIRONMENTAL  
PERMITTING,  
PROTECTION,  
MONITORING, AND  
COMPLIANCE,  
AND  
PROJECT MANAGEMENT



## PROJECT DATES

- Fall 2007 – Site evaluation and baseline data collection
- Spring 2008 to Spring 2010 – Permitting and wetland design
- Summer and Fall 2010 – Lagoon dewatering and sediment stabilization
- Spring and Summer 2011 - Grading, berm re-shaping, and hydroseeding
- October 2011 – Restoration complete
- 2012 and 2014 – Post-restoration environmental monitoring

## CLIENT REFERENCE

Mr. Fraser Forsythe, *P.Eng.*  
Health, Safety, Security, and  
Environment Manager  
Canaport™ LNG<sub>LP</sub>  
2530 Red Head Road  
Saint John, NB E2L 3T5

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✉: [fforsythe@canaportlng.com](mailto:fforsythe@canaportlng.com)

## PROJECT OVERVIEW

In the 1970s, a wastewater treatment lagoon was constructed at Matthews Cove to serve the village of Gondola Point. To accommodate the lagoon, Saunders Brook, which flowed into Matthews Cove, was diverted to Matthews Brook. The 2.3 ha clay bermed lagoon was fed by a wastewater discharge pipe located in the former Saunders Brook channel. In 1998, Gondola Point amalgamated with Quispamsis.

Around 2003, the flow of wastewater to the lagoon was halted when a lift station came online and diverted the sewage to a centralized municipal wastewater treatment plant. The lagoon sat full and collecting surface water runoff for several years.

Fundy Engineering worked with the Town of Quispamsis and Canaport™ LNG<sub>LP</sub> to reclaim the lagoon and transform it into a functional shallow open-water wetland that would be accessible for local residents and visitors.

Restoration work, which yielded 7.86 ha of wetland habitat, was completed over several years and also involved restoring Saunders Brook to its former natural channel. Since the work was completed, native plant species have re-established themselves and grow within the wetland and provide the basis for a functioning ecosystem.

## CORE PROJECT TEAM

Tim Ryan, *M.Eng., P.Eng.*  
Matthew Alexander, *P.Geo., Ph.D., EP*  
Crystal Caines, *P.Tech., PMP*  
Stephen Little, *P.Tech., CESA*

Project Manager  
Senior Environmental Scientist  
Environmental Technologist  
GIS Specialist

## SCOPE OF SERVICES PROVIDED

### *Baseline Environmental Data Collection*

- Field and desk-top studies were completed to determine the environmental conditions prior to restoration

### *Environmental Permitting*

- Several permits were required for various components of the restoration work to move forward

### *Optimized Wetland Restoration Planning*

- Using the extensive field survey data from the baseline data collection work, we used ArcGIS to iteratively determine a wetland restoration plan best suited for the site

### *Project Management*

- This multi-year project involved the management of several work scopes and various contractors for different stages

### *Project Tendering and Site Supervision*

- Fundy Engineering administered the tendering process and undertook the on-site restoration supervision

### *Long-Term Environmental Monitoring and Compliance*

- Post-restoration sampling (*i.e.*, water and sediment quality) and monitoring was undertaken to evaluate restoration success



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# Integrated Solid Materials Recovery Facility Feasibility Study

MIRAMICHI, NEW BRUNSWICK

ENVIRONMENTAL  
ENGINEERING,  
SPREADSHEET  
MODELLING,  
AND  
FEASIBILITY STUDY



## PROJECT DATES

- September 2006 – Project initiation and stakeholder meetings
- October and November 2006 – Spreadsheet model development
- December 2006 – Report preparation, multiple presentations made to the NSWC, and feasibility analysis
- January 2007 – Project completion



## CLIENT REFERENCE

Ms. Marie Leblanc  
Northumberland Solid Waste  
Commission  
505 Old King George Highway  
Miramichi, NB E1V 1J8

☎: 506.778.6646  
☎: 506.778.6642

## PROJECT OVERVIEW

In the mid-1990s, the Northumberland Solid Waste Commission (NSWC) opted not to construct a solid waste transfer station in the County. Alternatively, the waste generated in the County was directly hauled to the Red Pine Landfill in Allardville, Gloucester County about 70 km from the center of the generation for waste in Northumberland County.

The rising and uncertain fuel costs associated with waste disposal, increasing awareness of methods to reduce greenhouse gas emissions, and a shifting focus by the NSWC from waste disposal to waste reduction and diversion were the primary factors that warranted the consideration of an integrated Solid Materials Recovery Facility (SMRF) in the County. As such, the NSWC contracted Fundy Engineering to conduct a feasibility study and facility site location recommendations for an integrated SMRF.

The spreadsheet model SMRFFAM™, comprising 23 modules related to specific SMRF components, was developed to allow the NSWC to make intelligent strategic decisions regarding system component options and their associated risks for constructing and operating a SMRF in Northumberland County. SMRFFAM™ was run for two scenarios: a fully integrated SMRF owned and operated by the NSWC; and a partially integrated SMRF that did not include composting. Results were used by the NSWC to assist with their decision making process regarding a SMRF. Fundy Engineering also prepared a conceptual design for a SMRF complete with equipment requirements.

## CORE PROJECT TEAM

Matthew Alexander, *P.Geo., Ph.D., EP* Senior Environmental Scientist  
Tim Ryan, *M.Eng., P.Eng.* Project Manager  
Crystal Caines, *P.Tech., PMP* Environmental Technologist

## SCOPE OF SERVICES PROVIDED

### *Environmental Engineering*

- Generated a waste stream profile for the region (composition characterization and quantification)
- Reviewed several waste collection options for Northumberland County
- Assessed several sites and identified the best site for locating a SMRF within Northumberland County

### *Spreadsheet Modelling*

- Developed a detailed and easy-to-use Excel® spreadsheet model
  - SMRFFAM™ comprises 23 modules

### *Feasibility Study*

- The SMRFFAM™ model was run for two scenarios as part of the feasibility analysis and results were reported to the NSWC



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# Canadian Tire Associate Store

OROMOCTO, NEW BRUNSWICK

SITE  
DECOMMISSIONING  
SERVICES,

PHASE I, II, AND III  
ENVIRONMENTAL SITE  
ASSESSMENT (ESA),

AND

ON-SITE  
CONTAMINATION  
REMEDIATION



## PROJECT DATES

- November 2006 – Initial subsurface soil investigations
- November to December 2006 – All underground infrastructure decommissioned
- October through November 2009 – Intrusive groundwater and subsurface soil investigations
- May through June 2010 – Further detailed groundwater and soil investigations

## CLIENT REFERENCE

Ms. Dawn Burt  
Canadian Tire Real Estate Limited  
2180 Yonge Street, 15th Floor  
South, Station K  
Toronto, ON M4P 2V8

☎: 416.544.6438

☎: 416.480.3990

✉: dawn.burt@cantire.com

## PROJECT OVERVIEW

Fundy Engineering provided Canadian Tire Real Estate Limited (CTREL) with site decommissioning, environmental site assessment, and on-site contamination management services. A former Canadian Tire Associate Store in Oromocto, New Brunswick, which had an automobile service facility, required decommissioning before CTREL could divest of the property. During the decommissioning process, Fundy Engineering supervised the removal of all underground storage tanks and heavy equipment above and below ground that could have the potential to contaminate the environment.

In October 2009, Fundy Engineering undertook a Phase I/II ESA to assess the subsurface soil and groundwater conditions on the property by drilling boreholes and installing monitoring wells. A total of 27 soil samples and four groundwater samples were collected and submitted for laboratory analysis to fully delineate potential hydrocarbon impacts. One sample showed volatile organic compound TriChloroEthylene (TCE) at concentrations above the Canadian Drinking Water Quality Guidelines. As a result, a Phase III ESA was conducted to further delineate TCE impacts, which indicated that TCE contamination was not migrating off-site.

## CORE PROJECT TEAM

Tim Ryan, *M.Eng., P.Eng.*  
Christy Cunningham, *P.Geo.*  
Greg Derrah, *P.Tech., CESA*  
Stephen Little, *P.Tech., CESA*

Project Manager  
Environmental Scientist  
Environmental Technologist  
Environmental Technologist

## SCOPE OF SERVICES PROVIDED

- Supervised and documented the decommissioning of all underground infrastructure, which included storage tanks, vehicle hoists, and oil-water separators
- Conducted a Phase I/II ESA, which identified subsurface concerns related to TCE
- Conducted a Phase III ESA to further delineate TCE impacts on the CTREL property
- Conducted groundwater and subsurface soil investigations (*i.e.*, installation of boreholes and monitoring wells) and fully delineated TCE impacts on- and off-site
- Provided the necessary documentation (*i.e.*, remediation file 6515-5-1005) to the New Brunswick Department of the Environment (NBENV) for file closure

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# Canaport™ LNG<sub>LP</sub> Emergency Access Road

SAINT JOHN, NEW BRUNSWICK

ENVIRONMENTAL  
CONSTRAINTS  
MAPPING,  
ENVIRONMENTAL  
IMPACT ASSESSMENT  
(EIA),  
PUBLIC AND  
STAKEHOLDER  
CONSULTATIONS,  
AND  
ENVIRONMENTAL  
PERMITTING,  
PROTECTION,  
MONITORING, AND  
COMPLIANCE



## PROJECT DATES

- Summer 2005 to Fall 2006 – Baseline data collection, environmental constraints mapping, and EIA document preparation
- April 2007 – EIA registration and public and stakeholder consultations
- August 2007 – EIA approval
- Summer 2007 to June 2009 – Environmental permitting, monitoring, and compliance
- Winter 2007 to Summer 2009 – Phased roadway construction
- June 2009 – Official opening

## CLIENT REFERENCE

Mr. Fraser Forsythe, *P.Eng.*  
Health, Safety, Security, and  
Environment Manager  
Canaport™ LNG<sub>LP</sub>  
2530 Red Head Road  
Saint John, NB E2L 3T5

☎: 506.638.1305  
☎: 506.638.1335  
✉: [fforsythe@canaportlng.com](mailto:fforsythe@canaportlng.com)

## PROJECT OVERVIEW

Fundy Engineering was retained to undertake an EIA for a 525 m long emergency access road to provide a secondary means of access to / from the Canaport™ LNG<sub>LP</sub> Terminal at Mispec Point. The secure and private two lane undivided roadway crosses one stream and one wetland. It required EIA review because there was no practical way to avoid impacting a wetland  $\geq 2$  ha.

The EIA involved assessing the existing physio-chemical (e.g., air quality, watercourses, and wetlands), biological (e.g., flora and fauna), and socio-economic (e.g., health and safety) environment so that potential impacts could be identified. Under the EIA, 350 specific possible impacts were assessed and it was found that the roadway would have little to no impact on the environment. Where it did impact the environment, mitigation measures were established to limit that potential impact through the development of an Environmental Protection Plan that was implemented by the contractor.

The EIA process included public involvement to ensure that those individuals and groups potentially affected by the roadway were able to express any and all concerns.

## CORE PROJECT TEAM

Tim Ryan, <i>M.Eng., P.Eng.</i>	Project Manager
Gordon Mouland, <i>M.Eng., P.Eng., P.E.</i>	Senior Technical Specialist
Matthew Alexander, <i>P.Geo., Ph.D., EP</i>	Senior Environmental Scientist
Crystal Caines, <i>P.Tech., PMP</i>	Environmental Technologist

## SCOPE OF SERVICES PROVIDED

### *Baseline Environmental Data Collection*

- Field and desk-top studies were completed to determine the environmental conditions

### *Sustainable Site Selection Optimization*

- Extensive field survey data were used with ArcGIS to iteratively determine a location with the least environmental impact

### *Environmental Impact Assessment*

- The presence of a wetland  $\geq 2$  ha at the site and potential impact required that the Project receive approval through an EIA

### *Environmental Permitting*

- Several permits were required for construction of the road

### *Environmental Monitoring and Compliance*

- Routine monitoring of groundwater, surface water, fish and fish habitat, terrestrial flora and fauna, etc. was done to ensure minimal environmental impact

### *Public Involvement*

- Direct stakeholder communications, written communications with affected residents, public notices, and presentations to the Canaport™ Community Environmental Liaison Committee were undertaken

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# Carters Point Sturgeon Farm

KINGSTON, NEW BRUNSWICK

## ENVIRONMENTAL IMPACT ASSESSMENT (EIA)

AND

## COMPREHENSIVE WATER SUPPLY SOURCE ASSESSMENT (CWSSA)



### PROJECT DATES

- March 2007 - CWSSA field work
- April 2007 – EIA document submitted for regulatory review
- May 2007 – Partial EIA approval
- March 2011 – Additional CWSSA field work and EIA amendments
- July 2014 – Final EIA approval



### CLIENT REFERENCE

Dr. Cornel Ceapa  
Acadian Sturgeon & Caviar Inc.  
214 King Street  
Saint John, NB E2L 1H3

☎: 506.642.1816

📞: 506.639.0605

✉: cceapa@acadian-sturgeon.com

### PROJECT OVERVIEW

Acadian Sturgeon & Caviar Inc. on the Kingston Peninsula was required to complete an EIA and associated CWSSA in order to expand their operations from strictly a spawning-hatchery to include several grow-out facilities. Water for the facility was to be derived from the Saint John River (primary supply) and groundwater wells (supplemental supply). Although only about 5 % of the overall required water was to be derived from groundwater, the extraction rate of about  $550 \text{ m}^3 \cdot \text{day}^{-1}$  was equivalent to the daily consumption of about 1 200 individuals.

In the winter of 2007, Fundy Engineering completed hydraulic testing within the two on-site production wells. A six hour independent step-drawdown test was completed on each well to determine its approximate yield. Following that testing, those two wells and the one supplying the existing hatchery were pumped continuously and simultaneously for 76-hours to determine their cumulative impact on the aquifer. Results indicated that the three wells, all installed within fractured bedrock, could yield sufficient quantities of water to supply the expanded facility.

Because of regulatory uncertainty with the results from 2007, hydraulic testing was completed again in the winter of 2011. During that testing the wells were pumped continuously and simultaneously for 120-hours. The results confirmed that water was available in sufficient quantity and quality to supply the needs of the grow-out facilities.

### CORE PROJECT TEAM

Matthew Alexander, *Ph.D., P.Geo., EP* Senior Environmental Scientist  
Stephen Little, *P.Tech., CESA* GIS Specialist

### SCOPE OF SERVICES PROVIDED

#### *Baseline Data Collection*

- Included the installation of production wells and performing a CWSSA at the site of the proposed grow-out facilities
- A 76-hour constant-rate pump test was initially carried out at the site
- A subsequent 120-hour constant-rate pump test was conducted
- The response of the aquifer to the pumping and amount of groundwater available for extraction was determined using the data collected during the tests
- Water quality at the site was determined and compared to the Canadian Drinking Water Quality Guidelines

#### *EIA Registration Document Preparation*

- Consistent with the provincial EIA guidelines, a comprehensive document assessing the impact of the project on the environment and vice versa

#### *Regulator and Public Review Process*

- The EIA was reviewed through a regulatory and public assessment whereby all questions and comments from the Technical Review Committee were answered

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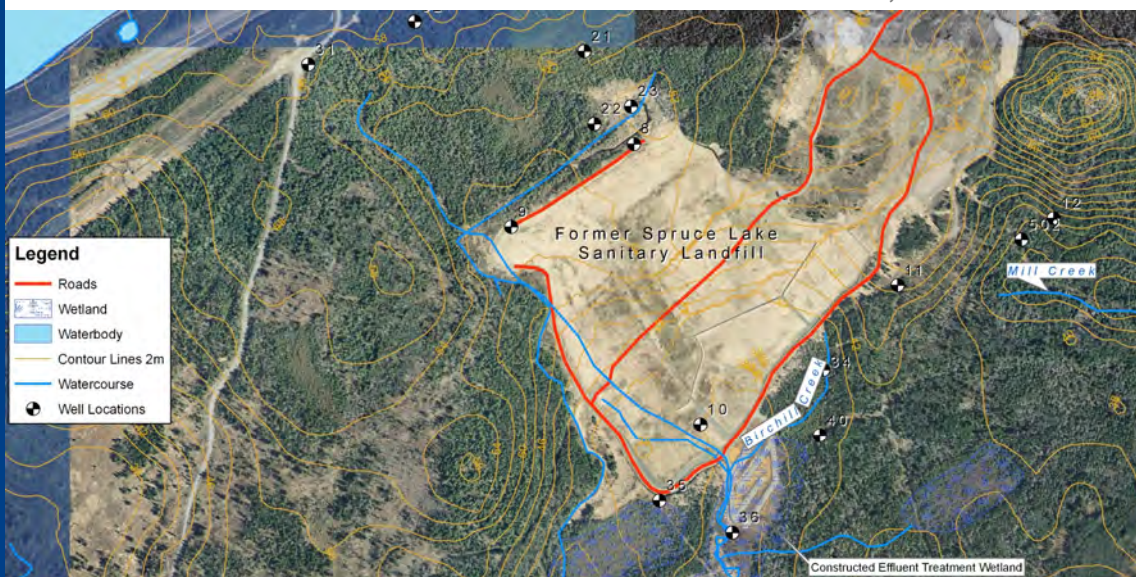


# Former Spruce Lake Sanitary Landfill

SAINT JOHN, NEW BRUNSWICK



## WATER QUALITY MONITORING



## PROJECT DATES

- 2007 to 2009 – Groundwater and surface water monitoring



## CLIENT REFERENCE

Mr. Tim O'Reilly, *P.Eng.*  
City of Saint John  
175 Rothesay Avenue  
Saint John, NB E2L 2B4

☎ 506.658.4455  
✉ tim.oreilly@saintjohn.ca

## PROJECT OVERVIEW

Fundy Engineering was retained by the City of Saint John to conduct triannual water quality monitoring at the former Spruce Lake Sanitary Landfill (SLSL) located in Lorneville, New Brunswick. The former SLSL operated from 1978 to 1997 when the Crane Mountain Landfill opened. The 30 ha unlined landfill site accepted all forms of waste atop unprepared soil. The former SLSL was decommissioned by capping it with a clay cover, installing strong drainage control measures, installing a perimeter leachate collection system, and constructing an engineered wetland to treat effluent.

Part of the long-term facility closure plan is the monitoring of groundwater and surface water in and around the former SLSL. The monitoring is undertaken to assess the potential for contaminated leachate originating from toxic substances within the former SLSL migrating off-site and potentially contaminating nearby aquifers and / or watercourses.

Fundy Engineering held the contract for the triannual water quality sampling between 2007 and 2009. Water samples were collected from surface water features, groundwater monitoring wells, and nearby domestic wells. The collected water samples were submitted to an accredited laboratory for the analysis of several indicator parameters. Results obtained from the laboratory were compared to the thresholds identified in the facility's closure plan.

## CORE PROJECT TEAM

Tim Ryan, *M.Eng., P.Eng.*  
Greg Derrah, *P.Tech, CESA*  
Matthew Alexander, *Ph.D., P.Geo., EP*

Project Manager  
Environmental Technologist  
Senior Environmental Scientist

## SCOPE OF SERVICES PROVIDED

### Groundwater Monitoring

- Included analysis of arsenic, lead, zinc, phosphates, total organic nitrogen, pH, ammonia, *Escherichia coli* (*E. coli*), total coliforms, mercury, chromium, cadmium, copper, chloride, nickel, iron, manganese, polychlorinated biphenyls (PCBs), total suspended solids (TSS), five-day biochemical oxygen demand (BOD<sub>5</sub>), Dissolved Oxygen (DO), Total Dissolved Solids (TDS), conductivity, and Chemical Oxygen Demand (COD) with monitoring wells and domestic wells

### Surface Water Monitoring

- Included analysis of arsenic, lead, zinc, phosphates, total organic nitrogen, ammonia, *E. coli*, total coliforms, mercury; PCBs, TSS, BOD<sub>5</sub>, cadmium, copper, chromium, and nickel

### Reporting

- Assessing results against closure plan guidelines
- Providing recommendations to the Client on sampling protocols and remedial measures

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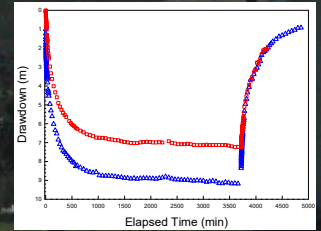
# Pleasant View Estates

HAMPTON, NEW BRUNSWICK

## ENVIRONMENTAL IMPACT ASSESSMENT (EIA)

AND

## COMPREHENSIVE WATER SUPPLY SOURCE ASSESSMENT (CWSSA)



### PROJECT DATES

- 2004 - Phase I subdivision construction
- September 2007 - CWSSA field work for Phase II of the subdivision
- December 2007 – EIA document advertised to the public and TRC responses prepared
- January 2008 - Phase II of the subdivision received approval to proceed from the New Brunswick Department of the Environment (NBDENV)

### CLIENT REFERENCE

Mr. Bill Bonney  
Bonney Construction  
381 Bonney Road  
Nauwigewauk, NB E5N 7A5

☎: 506.832.4512  
☎: 506.832.3155  
✉: info@bonneyconstruction.ca

### PROJECT OVERVIEW

Demand for quality built homes within Phase I of Pleasant View Estates in the Town of Hampton necessitated Bonney Construction to move forward with Phase II in late 2007. The 82 single-family residential units, in the form of garden homes and townhouses, on the 8.2 ha parcel of land required a CWSSA be completed. The estimated daily extraction of groundwater  $> 50 \text{ m}^3 \cdot \text{day}^{-1}$  triggered an EIA under the New Brunswick Clean *Environment Act*.

Short's Well Drilling installed three wells for Phase II based on guidance from Fundy Engineering's hydrogeologist. During a 72-hour constant-rate pump test within one of the wells, we determined that the well tested was able to supply  $140 \text{ L} \cdot \text{min}^{-1}$ . That quantity of water was more than enough to supply Phase II. Water quality was considered excellent, save for uranium levels that slightly exceed the drinking water quality guidelines, but were easily remediated using on-site water treatment.

Fundy Engineering successfully shepherded the project through the EIA process in a timely manner. The EIA was registered on 10 December 2007. The level of detail in the document allowed the Regulator to turn the document around within 45 days, which is less than the minimum 60 day recommended review period. The EIA was approved on 24 January 2008.

### CORE PROJECT TEAM

Tim Ryan, *M.Eng., P.Eng.*  
Matthew Alexander, *Ph.D., P.Geo., EP*  
Philippe Arseneau, *P.Tech.*  
Stephen Little, *P.Tech., CESA*  
Richard Casey, *P.Tech., CESA*

Project Manager  
Senior Environmental Scientist  
GIS Specialist  
Environmental Technologist  
Environmental Technologist

### SCOPE OF SERVICES PROVIDED

#### *Baseline Data Collection*

- Included the installation of monitoring wells, and performing a CWSSA at the site of the proposed development
- A 72-hour constant-rate pump test was carried out at the site and the response of the aquifer to the pumping and amount of groundwater available for extraction was determined using the data collected
- Water quality at the site was determined and compared to the Canadian Drinking Water Quality Guidelines

#### *EIA Registration Document Preparation*

- Consistent with the provincial EIA guidelines, a comprehensive document assessing the impact of the project on the environment and vice versa was completed

#### *Regulator and Public Review Process*

- The EIA was reviewed through a regulatory and public assessment whereby all questions and comments from the Technical Review Committee were answered

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Saint John, NB • Clyde River, PE

# Saint John YM / YWCA Decommissioning

SAINT JOHN, NEW BRUNSWICK

HAZARDOUS MATERIALS  
SURVEY,  
PROJECT  
MANAGEMENT,  
AND  
AIR QUALITY  
MONITORING



## PROJECT DATES

- July 2007 – Hazardous material assessment completed prior to decommissioning building
- October 2007 – Building decommissioned and hazardous materials removed
- February 2008 – Building demolished and project substantially completed
- December 2008 – New Brunswick Department of the Environment (NBDENV) issued file closure

## CLIENT REFERENCE

Mr. Kevin Logan, *P.Eng.*  
New Brunswick Department of  
Supply and Services  
PO Box 5001  
Saint John, NB E2L 4Y9

☎: 506.658.2412  
☎: 506.658.3045

## PROJECT OVERVIEW

The New Brunswick Department of Supply and Services (DSS) retained Fundy Engineering to provide engineering-consulting services for the high-profile decommissioning and subsequent demolition of the YM / YWCA building located in Uptown Saint John. The site of the out-lived community pillar was transformed as a hub of revitalization through the construction of the Saint John Justice Complex.

Fundy Engineering was responsible for ensuring that the YM / YWCA building was decommissioned and demolished in a safe and environmentally responsible manner according to all applicable Acts and Regulations. Consistent with the age of the building, decommissioning assessments showed the presence of asbestos-containing insulation and plaster (friable and non-friable asbestos), PCB-containing light ballasts, and lead-based paints. Soil and groundwater investigations at the site of the underground storage tanks for petroleum hydrocarbons and Bunker C revealed contamination.

Hazardous materials crews were supervised and air quality monitoring was undertaken to ensure crew safety. All hazardous materials removed by the crews were quantified and disposed of safely. The building was demolished in early 2008 and contaminated soils were removed. The brownfield site received file closure from the NBDENV indicating the once contaminated site no longer presented a health and safety issue and that it could be redeveloped.

## CORE PROJECT TEAM

Tim Ryan, *M.Eng., P.Eng.*  
Richard Frenette, *P.Eng.*  
Stephen Little, *P.Tech., CESA*  
Joel Forsythe, *P.Eng.*

Project Manager  
Technical Specialist  
Environmental Technologist  
Environmental Support

## SCOPE OF SERVICES PROVIDED

- Prior to demolition, a hazardous materials survey was completed throughout the building to qualify and quantify asbestos (*i.e.*, piping insulation and plaster), lead-based paints, and PolyChlorinated Biphenyls (PCBs) (*i.e.*, light ballasts and electrical transformers) contaminants
- Demolition specifications were developed and contracts were administered on behalf of DSS
- Air quality monitoring was conducted during the removal of all hazardous materials to ensure worker safety
- Site supervision was provided for DSS and all materials removed during all phases of the decommissioning process were quantified and tracked
- As per the *Guideline for the Management of Contaminated Sites*, additional site work (*e.g.*, borehole / monitoring well investigations) was undertaken to support the unconditional closure documentation for the NBDENV

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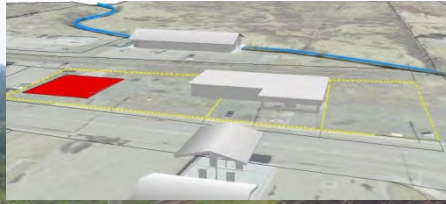
# Former McKnight Motors Property

SAINT JOHN, NEW BRUNSWICK

## PHASE I, II, AND III ENVIRONMENTAL SITE ASSESSMENT (ESA)

AND

## ON-SITE CONTAMINATION REMEDIATION



### PROJECT DATES

- January to March 2008 – Detailed intrusive groundwater and subsurface soil investigations
- August 2008 – Remedial activity and cell construction for safely containing contaminants on-site
- December 2009 – NBDENV File Closure obtained
- January 2009 – Site preparation for new land-use



### CLIENT REFERENCE

Mr. Gerald O'Leary  
O'Leary Pontiac  
1135 Hanwell Road  
Fredericton, NB E1C 1A5

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✉: skimo@nb.sympatico.ca

### PROJECT OVERVIEW

Historically, the former McKnight Motors property, located on Rothesay Avenue in Saint John, was used as a gasoline service station and an automobile service / salvage yard. The site was also used for manufacturing roofing and building materials. As a result, the subsurface soil was highly contaminated with heavy metals, petroleum hydrocarbons, and polyaromatic hydrocarbons.

Testing by Fundy Engineering indicated that the metals contained in the soil were non-leachable, which meant there would be no environmental concerns if the material was left on-site; however, a barrier would be required to eliminate dermal contact with the soil.

All contaminated soil that was above regulatory criteria was placed within an on-site geomembrane lined pit. The membrane was wrapped completely around the material and welded shut to provide an appropriate barrier and eliminate vapours. Sand and backfill material were placed over the lined pit. The site has since been redeveloped with a commercial building.

### CORE PROJECT TEAM

Tim Ryan, *M.Eng., P.Eng.*  
Greg Derrah, *P.Tech., CESA*  
Richard Casey, *P.Tech., CESA*  
Stephen Little, *P.Tech., CESA*

Project Manager  
Environmental Technologist  
Environmental Technologist  
GIS Specialist

### SCOPE OF SERVICES PROVIDED

- Conducted a Phase I ESA
- Conducted a Phase II ESA by digging 24 test pits across the property
- Conducted groundwater and subsurface soil investigations (*i.e.*, boreholes / monitoring wells) and fully delineated impacts on- and off-site
- Prepared a Remedial Action Plan to deal with the on-site contamination
- Supervised the construction of a containment cell for contaminated soil
- Supervised the removal and the on-site stockpiling of contaminants
- Completed risk management of the remaining impacted soils
- Provided the necessary conditional closure documentation (*i.e.*, entire site to be covered upon site development) to the New Brunswick Department of the Environment and Local Government (NBDELG)

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## Engenuity Feature

This Project was the feature article in the New Brunswick Association of Professional Engineers and Geoscientists Fall-Winter edition (No. 145) of Engenuity Magazine

### ENVIRONMENTAL RESEARCH, MONITORING, AND COMPLIANCE AND FISH HABITAT COMPENSATION

## Ghost Fishing by Derelict Lobster Traps in LFA 36

SAINT JOHN, NEW BRUNSWICK



### PROJECT DATES

- August 2008 – Side scan sonar survey
- August and September 2008 – Grapnel prototype design
- August and September 2008 and September 2009 – Derelict trap retrieval and assessment
- December 2009 – Research report completion
- December 2009 – Fish Habitat Compensation approval by DFO

### CLIENT REFERENCE

Mr. Fraser Forsythe, *P.Eng.*  
Health, Safety, Security, and  
Environment Manager  
Canaport™ LNG<sub>LP</sub>  
2530 Red Head Road  
Saint John, NB E2L 3T5

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✉: [fforsythe@canaportlng.com](mailto:fforsythe@canaportlng.com)

### PROJECT OVERVIEW

Bay of Fundy lobster fishers feared that construction of the Canaport™ LNG<sub>LP</sub> facility would raise the incidence of fishing gear loss as a consequence of increased commercial vessel traffic in the Bay. This was a concern to local fishers because some lost / derelict lobster traps are known to ghost fish; a process whereby the gear lethally fishes for target and non-target species.

During construction and anchoring of the large pier bases for the Canaport™ LNG<sub>LP</sub> marine terminal, 2 445 m<sup>2</sup> of seafloor was impacted for which compensation was required as per Section 35(2) of the *Fisheries Act*. In cooperation with local fishers, the Fundy North Fishermen's Association, and the Department of Fisheries and Oceans, Canaport™ LNG<sub>LP</sub> launched a Derelict Lobster Trap Retrieval Project to protect and sustain the traditional lobster fishery. Fundy Engineering was contracted to undertake this innovative project.

Conservatively, it was estimated that each lobster trap has a fishing area of 78.5 m<sup>2</sup>. Through recovery of 540 derelict lobster traps, Canaport™ LNG<sub>LP</sub> provided a compensation ratio 4.5 times that necessary for their seafloor impacts during construction of the marine terminal. This cooperative Project was deemed a considerable success by all parties involved as it provided valuable data and helped in sustaining a local livelihood.

### CORE PROJECT TEAM

Tim Ryan, *M.Eng., P.Eng.*  
Peter McKelvey, *P.Eng.*  
Matthew Alexander, *Ph.D., P.Geo., EP*  
Chris Mayes, *P.Tech.*  
Joel Forsythe, *P.Eng.*  
Philippe Arseneau, *P.Tech.*

Project Manager  
Senior Associate  
Senior Environmental Scientist  
Environmental Technologist  
Environmental Support  
GIS Specialist

### SCOPE OF SERVICES PROVIDED

- Derelict lobster traps in the Project area were identified using side scan sonar
- A gridded search pattern across 49.25 km<sup>2</sup> of seafloor yielded 2 971 potential derelict lobster traps
- Average trap density was calculated at 60 traps · km<sup>-2</sup> of seafloor
- Specially designed grapnels were used by the local fishers to retrieve gear
- 540 derelict lobster traps were retrieved from the seafloor during the 40 days on the water during 2008 and 2009 (many crab were also retrieved)
- The traps recovered ranged in age from one year to 23 years; of the traps retrieved, 198 contained animals
- Field data suggested a ghost fishing incidence by derelict traps of 37 %
- The 198 ghost fishing traps yielded a bounty of 579 lobster with a combined total weight of 610 kg
- Based on the estimated 654 derelict lobster traps that were fishing in the area, the total annual loss of lobster to local fishers may be about 9 624 animals or ~ \$100 K in annual profit loss

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# Long Wharf Development Program

SAINT JOHN, NEW BRUNSWICK

PROJECT  
MANAGEMENT,  
ENVIRONMENTAL DUE  
DILIGENCE AND  
PERMITTING,  
AND  
GEOTECHNICAL DUE  
DILIGENCE AND  
ENGINEERING



## PROJECT DATES

- Spring 2008 – Preliminary environmental and geotechnical due diligence
- Summer and Fall 2008 – Detailed environmental and geotechnical due diligence assessments
- Spring 2009 – Environmental permitting under the *Canadian Environmental Assessment Act* & building registered for LEED®
- Summer and Fall 2009 – Pile driving inspection and environmental monitoring
- Winter 2009 through Winter 2010 – Project management support

## CLIENT REFERENCE

Mr. Warren Long, *P.Eng.*  
President  
Milkish Oaks Inc.  
77 Joe Long Road  
Summersville, NB E5S 1H8

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☎: 506.333.6281  
✉: wrlong@milkishoaks.ca

## PROJECT OVERVIEW

Irving Oil Limited started developing a highly-visible architecturally unique 15 300 m<sup>2</sup> four-storey world headquarters office building on Long Wharf in September 2009. The building, which was cancelled in early 2010, would have provided Class A office space for up to 1 000 employees. Irving Oil Limited had a vision to “*deliver a world class, sustainable corporate headquarters office building that compliments a developed site, enhancing the Saint John uptown core and promotes significant public use.*”

A powerhouse design team was assembled to achieve the design goals and included the world-renowned architectural firm Robert A.M. Stern LLP of New York and leading edge sustainability consultants of the Rocky Mountain Institute in Boulder, Colorado. Fundy Engineering was contracted to provide Irving Oil Limited with local top-quality talent in the fields of geotechnical and environmental engineering and project management. We provided environmental due diligence, permitting, monitoring, and compliance support, environmental sustainability assistance, geotechnical due diligence and support, and Leadership in Energy and Environmental Design (LEED®). One of our Project Managers was seconded to Irving Oil Limited full-time to fulfill a role as Project Management Office Manager and Sustainability Team Coordinator.

## CORE PROJECT TEAM

Gordon Mouland, *M.Eng., P.Eng., P.E.* Geotechnical Engineer  
Matthew Alexander, *Ph.D., P.Geo., EP* Senior Environmental Scientist  
Alex Mouland, *P.Eng., PMP* Project Manager  
Darryl Ford, *P.Eng., FEC* LEED® Commissioning Agent

## SCOPE OF SERVICES PROVIDED

### *Environmental Due Diligence:*

- The site was intensively investigated for potential impacts dating back to the 1800s when the Long Wharf site was first developed; studies included archaeology and Phase II Environmental Assessments

### *Geotechnical Due Diligence:*

- Historical and current data were assessed to determine subsurface conditions for supporting development

### *Environmental Permitting:*

- Development at the site required that the project be assessed under the *Canadian Environmental Assessment Act* and several permits under different regulatory agencies were required

### *Project Management:*

- One of our Project Managers provided full-time support to the Project Management Office as a Coordination Manager and headed the Sustainability Team

### *LEED® Commissioning Agent:*

- One of our Professionals was overseeing the commissioning process

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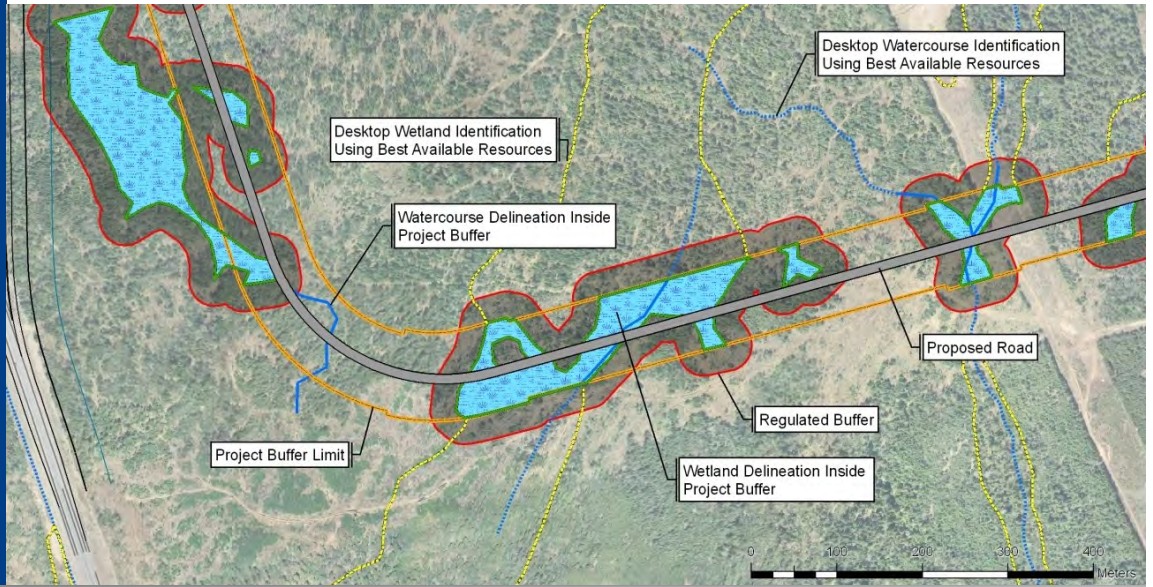




# Colonel Nase Boulevard

GRAND BAY-WESTFIELD, NEW BRUNSWICK

WETLAND  
DELINEATIONS,  
RARE PLANT SURVEYS,  
AND  
ENVIRONMENTAL  
IMPACT ASSESSMENT  
(EIA)



## PROJECT DATES

- Summer & Fall 2008 – EIA baseline data collection
- 2 December 2008 – EIA registered with the New Brunswick Department of the Environment (NBDENV)
- 25 September 2009 – EIA Certificate of Determination issued allowing the project to proceed
- Spring 2010 through 2011 – Roadway construction

## CLIENT REFERENCE

Mr. David Taylor  
Development Officer  
Town of Grand Bay-Westfield  
609 River Valley Drive  
Grand Bay-Westfield, NB E5K 1B3

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☎: 506.738.6424

✉: dtaylor@towngbw.ca

## PROJECT OVERVIEW

Due to community growth, the Town of Grand Bay-Westfield recognized the need to construct a direct route from the main provincial arterial (*i.e.*, NB Route 7) to the Town's core. Presented with two options by the Town's civil engineering design consultant, Fundy Engineering determined the route that had the least impact to sensitive watercourses and wetlands; however, because Colonel Nase Boulevard would impact wetlands  $\geq 2$  ha in size, the project required review under the EIA regulation of the New Brunswick *Clean Environment Act*.

All baseline assessments required for preparing the EIA registration document, which assessed 350 specific potential impacts, were completed by Fundy Engineering. Based on the baseline data, four stream crossings, two with fish-passage structures, were incorporated in the design of the 2 150 m long, 30 m wide Right-Of-Way (ROW). The crossing of wetlands in 11 locations was done with the least impact possible while not compromising roadway safety.

Because watercourse and wetland impact could not be avoided, the Town presented projects to offset any and all potential loss of wetland value and function and the potential loss of fish habitat. In addition, Fundy Engineering developed comprehensive environmental protection plans for construction.

## CORE PROJECT TEAM

Tim Ryan, *M.Eng., P.Eng.*  
Peter McKelvey, *P.Eng.*  
Matthew Alexander, *Ph.D., P.Geo., EP*  
Derrick Mitchell, *B.Sc.F.*  
Philippe Arseneau, *P.Tech.*  
Laura Dann, *P.Tech., CESA*

Project Manager  
Senior Associate  
Senior Environmental Scientist  
Wetland Delineator  
GIS Specialist  
Environmental Support

## SCOPE OF SERVICES PROVIDED

### Baseline Data Collection

- Detailed flora and fauna surveys (*e.g.*, plants, animals, birds, fish, *etc.*), watercourse and wetland identification and delineation exercises were completed along two potential ROWs to assess the existing environment prior to roadway development

### Environmental Impact Assessment Registration Document Preparation

- Consistent with the provincial EIA guidelines, a comprehensive document assessing the impact of the project on the environment and vice versa

### Regulator and Public Review Process

- As an open and transparent process, the EIA was reviewed through a regulatory and public process whereby all questions and comments were provided with appropriate responses

### Environmental Protection Plan

- A project-specific environmental protection plan was developed to limit the amount of potential impact on the environment during construction and operation

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# Tunicate Control at Mussel Farms

SEVERAL LOCATIONS, PRINCE EDWARD ISLAND

## BIO-RESOURCES ENGINEERING



### PROJECT DATES

- Fall 2008 – Site visits to assess various technologies used manage fouling by tunicates on PEI mussel crops
- Winter 2008 / 2009 – Findings of the technical assessment reported to client and recommendations made for enhancements
- 2010 and 2011 – Evaluation of refined technologies



### CLIENT REFERENCE

Dr. Jeff Davidson  
Department of Health Management  
Atlantic Veterinary College  
University of Prince Edward Island  
550 University Avenue  
Charlottetown, PE C1A 4P3

☎: 902.566.0666

✉: davidson@upeil.ca

### PROJECT OVERVIEW

The mussel culture industry in Prince Edward Island was plagued by the invasion of tunicate species. The tunicate fouled mussel culture equipment, which increased handling costs and decreased yields. Several *ad hoc* technologies had been developed to counter the threat posed by tunicates. The Atlantic Innovation Fund Tunicate Project Team engaged Fundy Engineering to evaluate the concepts with a view towards improving their designs and ensuring their safe construction and operation.

The work involved meeting with several mussel growers on Prince Edward Island and going out on the water with them to view the various concepts used to control tunicates, including high pressure sprays, low pressure sprays, lime spray boxes, liming troughs, and manual liming. Members of our project team also visited several local machine shops to see how the various concepts were manufactured. Through an understanding of the structure, biology, and ecology of the organism and during our review of the various concepts, we provided the client with several recommendations for design improvements.

During later work, we conducted an objective evaluation of refined technologies, such as different nozzles and spray pressures, different sized lime spray boxes, thickened lime solutions, and underwater pre-sprays and provided results of the evaluation to the client.

### CORE PROJECT TEAM

Peter McKelvey, *P.Eng.*  
Hector Lamprea, *P.Eng., P.E., CEM*  
Chris MacPherson, *P.Eng., CESA*  
Michelle Gough, *P.Eng., CESA*

Senior Associate  
Mechanical Engineer  
Project Support  
Project Support

### SCOPE OF SERVICES PROVIDED

#### *Mussel Grower Interviews*

- Several individuals were interviewed in order to identify the pros and cons of the different tunicate control concepts

#### *Tunicate Control Equipment Assessment*

- Detailed observations, both on land and on the water were made for the various tunicate control equipment while in operation

#### *Safety Review of Process*

- During our review of the various technologies, we made comments on the overall safety of the equipment

#### *Improvement Recommendations*

- We provided recommendations on the most effective approach for equipment development to respond to the mussel industry's needs



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# RCMP Detachment Water Quality Protection

L-DIVISION FACILITIES, PRINCE EDWARD ISLAND

## POTABLE WATER QUALITY ANALYSIS

AND

## AQUIFER VULNERABILITY ASSESSMENT



### PROJECT DATES

- December 2008 – Contract awarded
- January 2009 – Fieldwork completed and water samples collected
- February 2009 – Water quality results analyzed and vulnerability assessments completed
- March 2009 – Final report issued to client

### CLIENT REFERENCE

Ms. Debbie Bungay  
Senior Procurement Officer  
RCMP – Atlantic Region  
3139 Oxford Street  
Halifax, NS B3J 3E1

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### PROJECT OVERVIEW

The L-Division of the RCMP is obligated to provide potable water to its employees. To ensure the potability and safety of their water supplies, the RCMP hired Fundy Engineering to complete potable water quality analyses and groundwater vulnerability assessments for their facilities located in Prince Edward Island. Potable water quality analyses were undertaken at all 15 of the L-Division facilities and groundwater vulnerability assessments were undertaken at eight sites where water is sourced on-site (*i.e.*, individual potable groundwater wells).

Potable water quality was assessed by collecting water samples at the various facilities. Samples were submitted to certified laboratories for analysis of microbiology, general chemistry, and trace metals. All laboratory results were compared to the Canadian Drinking Water Quality Guidelines (CDWQGs) to determine if the water was of a potable quality. Where on-site treatment existed, samples were collected pre- and post-treatment to assess treatment effectiveness.

Groundwater vulnerability was assessed by completing a desk-top study and a field visit program. Potential groundwater contamination sources were identified for each of the sites. Additionally, we identified any threats that we believed could affect the groundwater system(s). Based on the data gathered, we completed a threat ranking for the potential contamination sources. Recommended actions were provided for identified moderate and high-level threats to protect the water supply.

### CORE PROJECT TEAM

Tim Ryan, *M.Eng., P.Eng.*  
Matthew Alexander, *Ph.D., P.Geo., EP*  
Philippe Arseneau, *P.Tech.*  
Michelle Gough, *P.Eng., CESA*  
Lenny Qian, *P.Eng., MBA, PMP*

Project Manager  
Senior Environmental Scientist  
GIS Specialist  
Environmental Support  
Environmental Support

### SCOPE OF SERVICES PROVIDED

#### Potable Water Quality

- Water samples were collected from the water supply system at a facilities for a microbiological, general chemistry, and trace metals analysis to determine the potability of the water (*i.e.*, if the water met the CDWQGs); historical water quality data were reviewed to identify any previous issues

#### Water Treatment Assessment

- On-site water treatment systems were documented and assessments were made regarding the degree and acceptability of treatment (*i.e.*, if the systems treated the water to standards acceptable under the CDWQGs)

#### Aquifer Vulnerability

- Potential hazards to groundwater, including contaminants of concern and their sources, were identified and ranked according to their degree of risk; an overall assessment was made regarding the susceptibility of groundwater to contamination

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# Poley Mountain Ski Lodge

WATERFORD, NEW BRUNSWICK

## GEOTECHNICAL INVESTIGATION

AND

## PHASE I ENVIRONMENTAL SITE ASSESSMENT (ESA)



### PROJECT DATES

- April 2015 – Geotechnical investigation for assessing subsurface soil conditions
- June 2015 – Site visits for conducting Phase I ESA
- July 2015 – Reporting



### PROJECT OVERVIEW

Poley Mountain's 1 580 m<sup>2</sup> ski lodge was completely destroyed by fire on 9 December 2014. After operating out of six portable trailers during the 2015 season and undertaking considerable work, a new 2 700 m<sup>2</sup> lodge opened in time for the 2016 season.

Fundy Engineering completed a geotechnical investigation for the foundation of the new ski lodge. Based on the findings, it was recommended that the site be prepared for drainage around and within the excavation to minimize the degradation of the bearing soils. Furthermore, placement of engineered fills was recommended for the excavation in order to adequately support the foundation of the new ski lodge.

A Phase I ESA was completed at the site to assess the risk of potential environmental issues on the property due in part to the fire. A thorough review of the site conditions was completed and available records of historical property use were examined to ensure compliance with applicable environmental regulations prior to building the new lodge. As a result of the work completed, no significant environmental issues were identified for further investigation and / or remedial action.

### CORE PROJECT TEAM

Andy MacVey, *P.Eng.*  
Rob Haineault, *P.Eng.*  
Robert Hunt, *CTech*  
Tim Ryan, *M.Eng., P.Eng.*  
Greg Derrah, *P.Tech., CESA*  
Stephen Little, *P.Tech., CESA*

Geotechnical Engineer  
Geotechnical Engineer  
Design and Drafting  
Environmental Engineer  
Environmental Technologist  
GIS Specialist

### SCOPE OF SERVICES PROVIDED

#### *Geotechnical Investigation*

- Conducted to determine the characteristics of the underlying soils in the area of the new foundation

#### *Phase I ESA*

- Performed a detailed site review to assess potential environmental issues following the fire



### CLIENT REFERENCE

Mr. Bill Anderson  
Manager  
Poley Mountain Resorts Ltd.  
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Award Winner

2009 Association of Consulting Engineering Companies (ACEC) – New Brunswick Award for

BENEFIT TO SOCIETY

Strategies for Environmentally Sustainable Site Selection

WETLAND DELINEATIONS, ENVIRONMENTAL IMPACT ASSESSMENT (EIA), AND ENVIRONMENTAL, PERMITTING, MONITORING, AND COMPLIANCE

qplex™ Wellness and Conference Complex

QUISPAMIS, NEW BRUNSWICK



PROJECT DATES

- Summer and Fall 2007 – Baseline data collection and EIA document preparation
• February 2008 – EIA registration
• Spring and Summer 2009 – Environmental permitting
• September 2009 – EIA approval
• Fall 2009 through Spring 2011 – Environmental monitoring and compliance
• 2011 through 2016 – Long-term environmental monitoring

CLIENT REFERENCE

Ms. Susan Deuille
Chief Administrative Officer
Town of Quispamsis
12 Landing Court
Quispamsis, NB E2E 4Z4

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Fax: 506.849.5799
Email: sdeuille@quispamsis.ca

PROJECT OVERVIEW

The Town of Quispamsis constructed the qplex™, a progressive and green multi-purpose wellness and conference centre, to provide recreational and cultural activities and programs to residents within the Kennebecasis Valley. The \$21 million facility, designed by Murdock & Boyd Architects, showcases innovative green strategies for sustainable development. The qplex™ team achieved a gold rating through the Canadian Green Building Council's Leadership in Energy and Environmental® (LEED®) certification program.

Fundy Engineering played a defining role when selecting an optimum location for the facility, which yielded a low-impact environmental footprint. We also secured the necessary environmental permits required for development. We were tasked with environmental monitoring throughout construction to ensure the environment was protected and that permit compliance was achieved.

An important overall component of the Project, following construction, was the long-term monitoring of the environment for potential impacts. A detailed monitoring program continued for five years after the Project was commissioned to ensure that no environmental impacts were realized.

CORE PROJECT TEAM

Tim Ryan, M.Eng., P.Eng.
Matthew Alexander, Ph.D., P.Geo., EP
Kristy Hogsden, M.Sc., P.Biol.
Chris Mayes, P.Tech.
Philippe Arseneau, P.Tech.

Project Manager
Senior Environmental Scientist
Environmental Scientist
Environmental Compliance
GIS Specialist

SCOPE OF SERVICES PROVIDED

Baseline Environmental Data Collection

- Field and desk-top studies were completed to determine the environmental conditions prior to construction and operation of the qplex™

Sustainable Site Selection Optimization

- Using extensive field survey data, we used ArcGIS to iteratively determine a location where the qplex™ would result in the most sustainable site footprint

Environmental Impact Assessment

- The presence of wetlands at the site and potential impact to those features required that the qplex™ receive approval through an EIA

Environmental Permitting

- Several permits were required for various components of the qplex™ to move forward, which were secured by Fundy Engineering

Environmental Monitoring and Compliance

- Routine monitoring of groundwater, surface water, flora and fauna, etc. was done to ensure the qplex™ had minimal environmental impact

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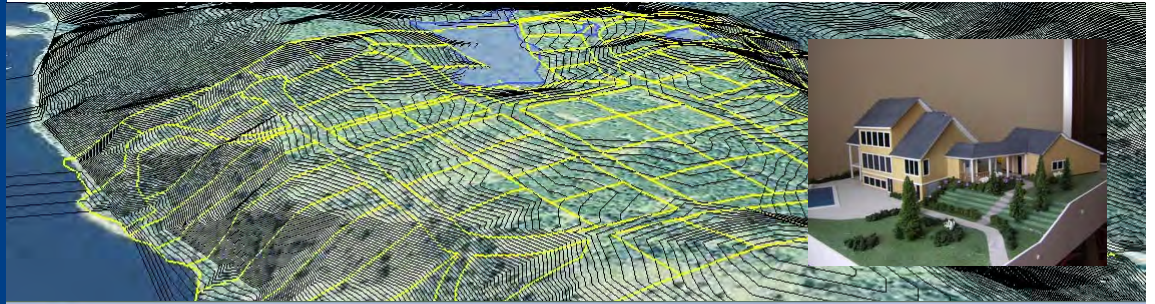




# Kingston Cliffs

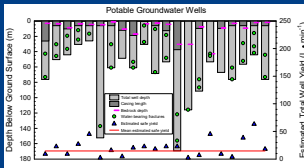
CLIFTON ROYAL, NEW BRUNSWICK

WETLAND  
DELINEATIONS,  
  
COMPREHENSIVE  
WATER SUPPLY SOURCE  
ASSESSMENT (CWSSA),  
  
AND  
  
EXPERT KNOWLEDGE



## PROJECT DATES

- Spring 2009 – Standard wetland delineation completed for the subdivision lands
- Winter 2010 - CWSSA field work completed
- Winter 2011 – Expert knowledge provided during hearings before the New Brunswick Planning Assessment and Appeals Board



## CLIENT REFERENCE

Mr. David Peacock  
Evergreen Homesites Inc.  
PO Box 4723  
Rothsay, NB E2E 5X4

☎: 506.763.3400

✉: info@evergreenhomesites.com

## PROJECT OVERVIEW

Evergreen Homesites Inc. (EHI) is developing an eco-friendly riverfront community on the Kingston Peninsula. Located 26 km northeast of Saint John, Kingston Cliffs provides rural living in close proximity to an urban setting. EHI offers customers seeking rural living at its best with wooded, waterview, and waterfront homesites. The development considers existing watercourses and wetlands as key environmental features for protection.

A six-hour constant-rate pumping test was conducted within one of three wells for completing a CWSSA. Based on the data collected, it was determined that the well tested at a pumping rate of  $34.1 \text{ L} \cdot \text{min}^{-1}$  had a capacity of  $74 \text{ m}^3 \cdot \text{day}^{-1}$ , which is sufficient for the development of single-family residences. The few water quality parameter exceedances that existed are easily remedied using on-site water treatment.

Adhering to EHI's green community vision, Fundy Engineering provided options for water conservation to limit the amount of water used in order to preserve it for future generations.

Because housing on the Peninsula is low-density, a community group objected to EHI's proposal. Fundy Engineering appeared before the NB Planning Assessment and Appeals Board regarding the work completed.

## CORE PROJECT TEAM

Christy Cunningham, *P.Geo.*  
Matthew Alexander, *P.Geo., Ph.D., EP*  
Derrick Mitchell, *B.Sc.F.*  
Philippe Arseneau, *P.Tech.*  
Richard Casey, *P.Tech., CESA*

Project Manager  
Senior Environmental Scientist  
Wetland Delineator  
GIS Specialist  
Environmental Technologist

## SCOPE OF SERVICES PROVIDED

### Wetland Delineations

- The entire 35.3 ha land parcel proposed for development was walked for delineating watercourses and wetlands
- Four regenerating forested wetlands were mapped out on the property.

### Pumping Test

- Critical to inferring if water quality and quantity were suitable for residential development, a constant-rate pumping test was completed as part of the CWSSA
- The response of the aquifer to the pumping and amount of groundwater available for extraction was determined using the data collected during the test
- Water quality was determined and compared to the Canadian Drinking Water Quality Guidelines

### Expert Knowledge

- EHI required Fundy Engineering to provide expert knowledge during proceedings before the New Brunswick Planning and Assessment Appeals Board
- Based on the information presented, the Appeals Board dismissed the appeal by the community group

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# Summerside Wind Farm

SUMMERSIDE, PRINCE EDWARD ISLAND

WETLAND  
DELINEATIONS,  
FLORA AND FAUNA  
SURVEYS,  
ENVIRONMENTAL  
MANAGEMENT PLANS,  
AND  
ENVIRONMENTAL,  
PERMITTING,  
MONITORING, AND  
COMPLIANCE



## PROJECT DATES

- Summer 2009 – Baseline data collection
- Summer 2009 through Winter 2009 – Environmental permitting, monitoring, and compliance
- Winter 2009 – Development of comprehensive environmental protection plan specific to the wind farm
- Winter 2010 – Conflict mitigation and resolution protocols were developed for wind farm operation
- 2010 through 2012 – Post-construction environmental monitoring

## CLIENT REFERENCE

Mr. Greg Gaudet, *P.Eng.*  
Director of Municipal Service  
City of Summerside  
94 Ottawa Street  
Summerside, PE C1N 1W3

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✉: ggaudet@summerside.pe.ca

## PROJECT OVERVIEW

Fundy Engineering was retained by the City of Summerside to provide professional environmental engineering services for the construction and operation of four 80 m tall Vesta V90 turbines. The wind farm is located at the northern municipal boundary of the City of Summerside adjacent to Malpeque Bay, which is a staging area for migratory birds. The installation of the four turbines required conducting several activities including access road construction, site clearing, subsurface electrical cabling, foundation construction, and transmission line construction.

Fundy Engineering provided detailed environmental protection standards and mitigation measures to minimize any and all environmental effects pre-, during, and post-construction of the 12 MW wind farm, which generates up to 25 % of the City's energy needs. We were tasked with environmental monitoring during construction and post-construction to ensure the environment was protected and to ensure permit compliance. We also developed conflict resolution and mitigation protocols to address and mitigate negative impacts (e.g., shadow flicker, noise, health issues, etc.) and risky events (e.g., icing of blades, etc.) that may arise from operation of the wind farm.

## CORE PROJECT TEAM

Tim Ryan, *M.Eng., P.Eng.*  
Matthew Alexander, *Ph.D., P.Geo., EP*  
Derrick Mitchell, *B.Sc.F.*  
Chris MacPherson, *P.Eng., CESA*  
Chris Mayes, *P.Tech.*  
Philippe Arseneau, *P.Tech.*

Project Manager  
Senior Environmental Scientist  
Flora and Fauna Expert  
Environmental Support  
Environmental Compliance  
GIS Specialist

## SCOPE OF SERVICES PROVIDED

### *Baseline Environmental Data Collection*

- Field and desk-top studies were completed to determine the environmental conditions prior to construction and operation of the wind farm; those data were compared against operational data to ensure minimal environmental impacts were realized

### *Long-Term Environmental Permitting, Monitoring & Compliance*

- Routine monitoring of groundwater, surface water, sound levels, and flora and fauna (e.g., migratory birds, bats, rare species, etc.) was undertaken to ensure the wind farm had minimal environmental impact over the long-term

### *Environmental Sustainability*

- We provided comprehensive information on how to undertake construction activities in a sustainable manner

### *Conflict Mitigation and Resolution*

- We developed conflict resolution and mitigation protocols to address and mitigate potential risks and impacts that may arise during operation of the wind farm

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# Energy Hub Investment Study

SAINT JOHN, NEW BRUNSWICK

PROJECT MANAGEMENT  
AND  
ENVIRONMENTAL  
ENGINEERING



**Energy Hub Investment Map**  
Deloitte | **FUNDY Engineering**  
Project # 151-7173 Date: January 25, 2010  
Client: Enterprise Saint John  
Source Data: ESJ (New Brunswick Department of Natural Resources)  
Projection: 1982-1983 Canadian National Grid  
Scale: 1:50,000

Hydrocarbon Processing Area			
Area	Area Description	Area Size (km <sup>2</sup> )	Area Value (\$)
Area 1	...	...	...
Area 2	...	...	...
Area 3	...	...	...
Area 4	...	...	...
Area 5	...	...	...

Renewable Energy Area			
Area	Area Description	Area Size (km <sup>2</sup> )	Area Value (\$)
Area 1	...	...	...
Area 2	...	...	...
Area 3	...	...	...
Area 4	...	...	...
Area 5	...	...	...

Electricity Generation Area			
Area	Area Description	Area Size (km <sup>2</sup> )	Area Value (\$)
Area 1	...	...	...
Area 2	...	...	...
Area 3	...	...	...
Area 4	...	...	...
Area 5	...	...	...

Development and Commercialization of Emerging Technologies Area			
Area	Area Description	Area Size (km <sup>2</sup> )	Area Value (\$)
Area 1	...	...	...
Area 2	...	...	...
Area 3	...	...	...
Area 4	...	...	...
Area 5	...	...	...

## PROJECT DATES

- October 2009 – Project kick-off
- Fall 2009 – Data gathering
- Winter 2009 / 2010 – Data analysis
- Spring 2010 – Project completion

## PROJECT OVERVIEW

Our project management team partnered with Deloitte Touche LLP to assist Enterprise Saint John with an opportunity planning project. The key objective of the study was to identify, profile, and prioritize energy-related investment attraction opportunities for the Saint John region in the context of the region's current energy assets.

The team identified short-, medium-, and long-term targets for the region to aggressively drive economic growth by attracting new investments and diversifying the economy. During the project they brought together subject matter experts to provide in-depth information on various aspects of the project to all of those involved. The team developed a detailed five-year plan with action items and key milestones for achieving identified improvements in the region.

Through the project, it was determined that the region's aspiration to transform itself into an energy cluster could be achieved through a focused and stepped process of attracting investments that leverage the current assets and competencies. Improvements to the regional infrastructure and related enablers were fundamental steps identified towards positioning the region to the stepped growth that was anticipated for the next decade. The region will gain momentum as it continues to build on synergies driven through attracting these investments.

## CORE PROJECT TEAM

Tim Ryan, *M.Eng., P.Eng.*  
Erin Norton, *EIT*  
Matthew Alexander, *Ph.D., P.Geo., EP*  
Stephen Little, *P.Tech., CESA*

Project Manager  
Project Coordinator  
Subject Matter Expert  
GIS Mapping

## SCOPE OF SERVICES PROVIDED

- Assessed competing jurisdictions and documented investment attraction best practices, which involved interviewing numerous stakeholders
- Assessed the existing value proposition of the region and provided a future vision for the same, which was done by engaging subject matter experts
- Developed an investment map that identified future energy-related investment potential projects in four key areas:
  - Hydrocarbon processing and distribution
  - Renewable energy
  - Electricity generation and transmission
  - Development and commercialization of emerging technologies
- The project involved compiling and distilling large volumes of data, which had to be easily understood by a broad-based audience

## CLIENT REFERENCE

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Enterprise Saint John  
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# Daniel J. MacDonald Building Waste Audit

CHARLOTTETOWN, PRINCE EDWARD ISLAND

WASTE AUDIT,  
STAKEHOLDER  
CONSULTATIONS,  
AND  
ENVIRONMENTAL  
ENGINEERING



## PROJECT DATES

- September 2009 – Project initiation and stakeholder meetings
- October 2009 – Waste characterization
- November and December 2009 – Report preparation
- January 2010 – Project completion and report submission



## CLIENT REFERENCE

Mr. Pat Cavanagh  
SNC Lavalin, Atlantic Region  
Project Management Office  
1660 Hollis Street, Suite 301  
Halifax, NS B3J 1V7

☎: 902.569.5412  
☎: 902.569.5605

## PROJECT OVERVIEW

In the mid-2000s, an on-site waste management program was implemented at the federal government's Daniel J. MacDonald Building in Charlottetown, Prince Edward Island. The building houses ~ 900 employees of various government agencies and departments. To examine the effectiveness of the waste management program, SNC Lavalin contracted Fundy Engineering to complete a waste audit for the entire building as per the National 5 Phase Solid Waste Management Protocol of Public Works and Government Services Canada.

All waste generated within the building over an entire week was collected, weighed, and sorted into several categories for analysis: compost; paper recyclables; multi-recyclables; solid waste; and bathroom waste. The data were extrapolated to estimate annual waste generated within the building and annual waste per capita. Questionnaires were also issued to employees for completion and submission regarding the overall waste management program on-site.

It was determined that the on-site waste management program is diverting approximately 53 % of the total 24 tonnes generated annually or about 27 kg per employee. Recommendations were provided in order to increase the diversion rate above 60 %, which is the waste reduction goal set by Public Works and Government Services Canada in 2004 for their federal buildings. Perhaps the most interesting find was many half rolls of toilet paper discarded in the waste from multiple washrooms throughout the building.

## CORE PROJECT TEAM

Tim Ryan, *M.Eng., P.Eng.*

Donnie Taweel, *CET*

Matthew Alexander, *P.Geo., Ph.D., EP*

Client Liaison

Project Manager

Senior Environmental Scientist

## SCOPE OF SERVICES PROVIDED

### *Stakeholder Consultations*

- Conducted interviews with building cleaning staff
- Developed a questionnaire for completion and submission by office occupants

### *Waste Audit*

- Collected all waste generated on-site over one week and completed a physical sort of that waste for characterization

### *Environmental Engineering*

- Analyzed all of the data collected through questionnaires and the waste sort
- Prepared a report for the client to serve as a baseline going forward
- Developed recommendations to improve waste diversion



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# Saint John Community Harbour

SAINT JOHN, NEW BRUNSWICK

## PROJECT MANAGEMENT

AND

## GEOTECHNICAL DUE DILIGENCE AND ENGINEERING



## PROJECT DATES

- Winter / Spring 2010 – Preliminary geotechnical due diligence
- Spring 2010 – Marine geotechnical investigation
- Summer 2010 – Results and recommendations submitted
- 2016 – Facility design and bid package development



## CLIENT REFERENCE

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Saint John, NB E2M 7L5

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## PROJECT OVERVIEW

Saint John is not a Department of Fisheries & Oceans (DFO) scheduled harbour, but it is used by about 19 fishing boats on a regular basis for significant periods of the year. The Saint John Community Harbour Authority (SJCHA), a provincially incorporated not-for-profit organization comprised of Saint John fishermen, desires to operate a small boat harbour within Saint John Harbour. The SJCHA's long-term objective is to have the area designated as a DFO scheduled harbour.

A comprehensive engineering, socio-economic, and technical study was undertaken for siting the small boat harbour, which involved reviewing eleven sites. The preferred site is the south face of Pier 14 within Saint John Harbour. The proposed small boat harbour, using floating wharves, will have a berthage capacity for 46 standard-sized boats.

A marine geotechnical investigation was completed between March and April 2010 to assess the soil and bedrock conditions. Six boreholes were extended to a maximum depth of 28 m using a barge-mounted rotary drill supplied by Lantech Drilling Services.

Site and weather conditions resulted in a challenging environment for Fundy Engineering's project team in which to complete the work. Based on the geotechnical information gathered and input from various project stakeholders, a conceptual design was prepared and submitted to the SJCHA. We ultimately developed the facility design and construction bid packages.

## CORE PROJECT TEAM

Gordon Mouland, *M.Eng., P.Eng., P.E.* Geotechnical Engineer  
Matthew Alexander, *Ph.D., .P.Geo., EP* Senior Environmental Scientist  
Alex Mouland, *P.Eng., PMP* Project Manager  
Travis Henrikson Geotechnical Technician

## SCOPE OF SERVICES PROVIDED

### *Geotechnical Due Diligence*

- Historical and current data were assessed to determine subsurface conditions for supporting various components of the proposed small boat harbour
- An intrusive geotechnical investigation was undertaken to determine the nature of underlying marine materials and bedrock

### *Project Management*

- Managed requirements of multiple end users and stakeholders
- Received and incorporated input to develop a conceptual design for the proposed small boat harbour

### *Environmental Permitting*

- Consulted with stakeholders and end users regarding best practices for environmental protection in the design of various components
- Prepared applications for provincial and federal permits and authorizations required to undertake testing for the proposed project and in order to advance the small boat harbour to the construction phase

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ENVIRONMENTAL  
PERMITTING,  
MONITORING, AND  
COMPLIANCE



# Livingston Brook Stream Restoration

SAND POINT, NEW BRUNSWICK



## PROJECT DATES

- June 2010 – Watercourse and wetland alteration order issued
- June 2010 – Cursory review to identify remedial work required review
- July 2010 – Restoration plan submitted to Regulators
- September 2010 – Restoration plan approved
- October 2010 – Restoration work undertaken
- November 2010 – Long-term monitoring plan submitted to Regulators

## CLIENT REFERENCE

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L. Halpin Excavating Ltd.  
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E2N 1L3

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## PROJECT OVERVIEW

A portion of Livingston Brook at Sand Point was realigned in summer and fall 2008 to allow installation of a septic field on an adjacent constrained cottage lot. In May 2010, representatives with the New Brunswick Department of Environment and the Department of Fisheries and Oceans visited the site for a routine inspection and subsequently issued a joint order to undertake restoration work as extensive erosion and sedimentation along the lower portions of Livingston Brook were identified. Fundy Engineering was contracted to complete a watercourse restoration plan for Halpin Excavating.

During an initial site investigation by Fundy Engineering, some deficiencies were observed with respect to the erosion and sedimentation control measures that were previously put in place and previously constructed stream features were washed out by heavy precipitation / high stream flow events.

A restoration plan was developed to manage and control surface water runoff and to remediate previously disturbed areas adjacent to and within Livingston Brook. Erosion and sedimentation control measures included managing stockpiles in the up-gradient quarry, construction of gravel / stone filter berms, erecting silt fences, and installing straw bale barriers. Restoration work included construction of an engineered energy dissipation pool, placement of in-stream boulders and woody debris, and planting of riparian trees, shrubs, and grasses. The plan was successfully implemented at the site.

## CORE PROJECT TEAM

Matthew Alexander, *Ph.D., P.Geo. EP*  
Stephen Little, *P.Tech., CESA*  
Robert Hunt, *C.Tech*  
Lenny Qian, *EIT, MBA, PMP*

Senior Technical Specialist  
GIS Specialist  
Design and Drafting  
Environmental Support

## SCOPE OF SERVICES PROVIDED

### *Develop a Watercourse Restoration Plan*

- Include removal of geotextile fabric embedded in the banks and streambed
- Include planting of native trees and shrubs along streambanks
- Add rock sills to recreate pools and riffles

### *Erosion and Sedimentation Control Plan*

- To prevent further sediment from the up-gradient quarry from entering Livingston Brook using detailed protection measures

### *Long-Term Monitoring*

- Submit a report to the Regulators describing the long-term commitment to monitoring erosion and sedimentation within Livingston Brook





REMEDIAL ACTION  
PLAN,

CANADIAN  
ENVIRONMENTAL  
ASSESSMENT ACT  
SCREENING REPORT,

ENVIRONMENTAL  
PROTECTION PLAN,

AND

ENVIRONMENTAL,  
PERMITTING,  
MONITORING, AND  
COMPLIANCE

# Garcelon Civic Center

ST. STEPHEN, NEW BRUNSWICK



## PROJECT DATES

- Summer and Fall 2010 – Baseline data collection and environmental assessment screening document preparation
- Winter 2010 / 2011 – Development of remedial action plan
- March 2011 – Regulatory approval of remedial action plan
- August 2011 – Final environmental assessment screening submission and regulatory approval
- Fall 2011 through Fall 2014 – Environmental monitoring and compliance

## CLIENT REFERENCE

Mr. Edward Farren  
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## PROJECT OVERVIEW

The Town of St. Stephen desired to transform an existing, but outdated, commercial and retail development into a centrally located, accessible, modern, and vibrant multi-use recreational civic center for residents young and old. The 7 000 m<sup>2</sup> Garcelon Civic Center was pegged as a socio-economic rebirth of the Town and would include an NHL-sized ice arena, aquatic facilities, multi-purpose and meeting room space, and a wellness walking track. Because federal money was being used to construct the facility, an environmental assessment was required pursuant to the *Canadian Environmental Assessment Act*.

Fundy Engineering prepared an environmental screening document for regulatory review. That document assessed the impact of the facility on nine valued environmental components and the impact of the environment on the facility. Construction and operation of the facility was determined to pose little to no potential impact on the environment assuming that mitigation measures were implemented through an environmental protection plan. To facilitate construction, we secured the necessary environmental permits. We were also tasked with environmental monitoring throughout construction to ensure the environment was protected and that permit compliance was achieved.

## CORE PROJECT TEAM

Tim Ryan, *M.Eng., P.Eng.*  
Matthew Alexander, *Ph.D., P.Geo., EP*  
Greg Derrah, *P.Tech., CESA*  
Stephen Little, *P.Tech., CESA*

Project Manager  
Senior Environmental Scientist  
Environmental Technologist  
GIS Specialist

## SCOPE OF SERVICES PROVIDED

### *Baseline Environmental Data Collection*

- Field and desk-top studies were completed to determine the environmental conditions prior to construction and operation of the Garcelon Civic Center

### *Remedial Action Plan*

- A remedial program was conducted to remove hydrocarbon impacted soils surrounding underground storage tanks that were removed during demolition of the former commercial and retail buildings

### *Environmental Screening Report*

- Federal funding for the facility necessitated an environmental assessment screening document be prepared

### *Environmental Permitting*

- Several permits were required for various components of the Garcelon Civic Center to move forward, which were secured by Fundy Engineering

### *Environmental Monitoring and Compliance*

- Routine monitoring of groundwater, surface water, flora and fauna, *etc.* was done to ensure the facility had minimal environmental impact

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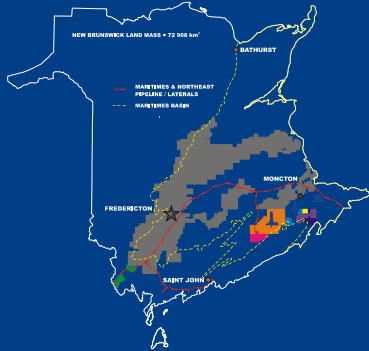
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# New Brunswick Shale Gas Industry White Papers

## SCIENTIFIC RESEARCH AND WRITING

SAINT JOHN, NEW BRUNSWICK



## PROJECT DATES

- Winter 2011 – White Paper on shale gas development in New Brunswick
- Winter 2015 – White Paper on treatment of hydraulic fracturing wastewater



## CLIENT REFERENCE

Ms. Colleen d'Entremont  
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## PROJECT OVERVIEW

Although New Brunswick has one of the most extensive histories of oil and gas development of any province in Canada, the industry has never been robust. That was until the accidental discovery of potentially large natural gas reserves by the Potash Corporation of Saskatchewan (PCS) and Corridor Resources on 20 September 2000. Through a joint partnership, the two companies were drilling a conventional well for the purpose of brine water disposal from the flooding Penobsquis Potash Mine. Natural gas production from the McCully Field, which was used for PCS's operations, was the first to occur in the Province since the exhaustion of the Stony Creek Field in 1991.

For several years, Corridor Resources worked with various partners to further explore the potential for large-scale commercial natural gas extraction in the Province. They completed many firsts in New Brunswick; the first slick water hydraulic fracturing operation occurred on 1 October 2005 within a McCully Field conventional well. Although the stimulation of that and several other wells did not yield the results originally hoped, it did put New Brunswick on the radar.

Soon, large players in the oil and gas industry started appearing in New Brunswick. The flurry of activity sparked unease with the public who were ill informed about the industry. As a result, the New Brunswick government imposed a moratorium on hydraulic fracturing on 18 December 2014.

## CORE PROJECT TEAM

Tim Ryan, *M.Eng., P.Eng.*  
Matthew Alexander, *P.Geo., Ph.D., EP*  
Bryan Morse, *Ph.D., M.Sc., EPT*  
Stephen Little, *P.Tech., CESA*

Project Manager  
Senior Environmental Scientist  
Environmental Scientist  
GIS Specialist

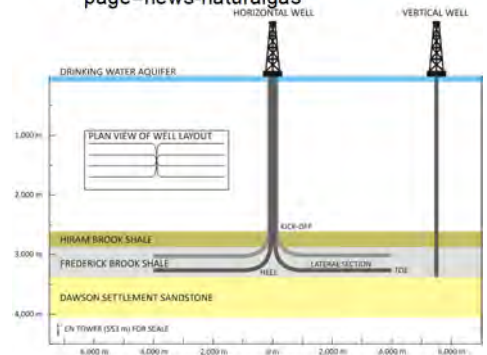
The Atlantica Centre for Energy contracted Fundy Engineering to produce white papers on the shale gas industry to help better inform the public and dispel mistruths.

## SCOPE OF SERVICES PROVIDED

### White Paper Publications

- Considerations for Responsible Gas Development of the Frederick Brook Shale in New Brunswick
- Wastewater from natural gas development – treatment options for New Brunswick and Nova Scotia
- The white papers can be found at:

○ <http://www.atlanticaenergy.org/index.php?page=news-naturalgas>



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# Peel Plaza Parking Garage

SAINT JOHN, NEW BRUNSWICK

PHASE I  
ENVIRONMENTAL SITE  
ASSESSMENT (ESA),  
GEOTECHNICAL  
INVESTIGATION,  
GEOLOGICAL  
ASSESSMENT,  
AND  
MATERIALS TESTING  
AND INSPECTION  
SERVICES



## PROJECT DATES

- Winter 2007 – Phase I environmental site assessment
- Winter 2011 – Geotechnical investigations
- April 2011 – Geological assessment
- 2011 to 2013 – Materials testing
- Summer 2013 – Parking garage opened

## CLIENT REFERENCE

Mr. Gerry Mattsson, *P.Eng., G.S.C.*  
Municipal Engineer  
Transportation and Environment  
City of Saint John  
PO Box 1971  
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## PROJECT OVERVIEW

The state-of-the-art seven level Peel Plaza parking garage was constructed to provide 446 parking spaces for the new Saint John Police headquarters and the Provincial Justice Complex at Peel Plaza. The parking garage is equipped with smart-technology, such as digital screens showing the location of the next available parking spot and charging stations for electric vehicles.

We worked for the City of Saint John on this exciting project, which is located very near our head office. The parking garage fronts on Carleton Street, but users can also access the garage from several levels lower along Sewell Street.

The footprint of the garage was formerly occupied by two three-storey multi-unit apartment buildings. Prior to their demolition, we conducted a Phase I ESA to identify any potential environmental concerns. Through the geotechnical investigations, we provided the designers with recommendations on pre-stressed rock and soil anchors. We also monitored blasting operations conducted to breakup bedrock for constructing the foundation. Once the bedrock was exposed we completed a geological assessment. Throughout construction we tested various materials, such as concrete, masonry, and asphalt.

## CORE PROJECT TEAM

Gordon Mouland, *M.Eng., P.Eng., P.E.* Senior Geotechnical Engineer  
Alex Mouland, *P.Eng., PMP* Project Manager  
Matthew Alexander, *Ph.D., P.Geo., EP.* Senior Environmental Scientist  
Robert Hunt, *CTech* Design and Drafting

## SCOPE OF SERVICES PROVIDED

### *Geotechnical Investigation*

- Conducted to assess underlying soil and bedrock conditions before construction of the parking garage
- Provided information for designing the building, for specifying rock and soil anchors, and for designing controlled blasts to break up bedrock

### *Geological Assessment*

- Completed to collect detailed information on existing conditions of the exposed bedrock prior to the installation of rock anchors and the application of shotcrete

### *Materials Testing*

- Performed as quality control and quality assurance testing for the City of Saint John



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# Tower Road Dam and Reservoir

TURTLE CREEK, NEW BRUNSWICK

## EROSION AND SEDIMENTATION CONTROL PLAN AND STREAM DIVERSION DESIGN



### PROJECT DATES

- August 2011 – Draft erosion and sedimentation control plan
- September 2011 – Erosion and sedimentation control and stream diversion plan issued for construction
- 2012 and 2013 – Updating of erosion and sedimentation control plan as required



### CLIENT REFERENCE

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Project Engineer  
Gulf Operators  
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PO Box 3247  
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✉: robichaud.bernard@gulfooperators.com

### PROJECT OVERVIEW

The Tower Road Dam and Reservoir was constructed to provide additional reservoir capacity for meeting future population projection increases within the Tri-Community area of Moncton, Riverview, and Dieppe for another 50 years. A homogeneous earthen dam 20 m high and approximately 1.8 km long was constructed to form the reservoir. A reinforced concrete spillway with an overflow weir discharges water via a chute to an energy dissipation basin. The spillway crest elevation of 71 m allows storage of  $9.8 \times 10^6 \text{ m}^3$  of water.

Fundy Engineering was contracted by Gulf Operators, the civil contractor for the project, to develop a project-specific erosion and sedimentation control and stream diversion plan. A diversion channel was required to allow for construction of the spillway. That diversion channel had to be sized to accommodate potential 1:100 year storm events and to allow for fish passage because Turtle Creek supports salmonids.

During construction of the dam and reservoir, environmental best-management practices were implemented to prevent sediment from entering Turtle Creek because it is a protected watershed and it was being used throughout construction to provide drinking water to the Tri-Community residents. Strict environmental measures were also established to ensure that water quality was never jeopardized.

### CORE PROJECT TEAM

Matthew Alexander, *Ph.D., P.Geo., EP* Senior Environmental Scientist  
Stephen Little, *P.Tech., CESA* GIS Specialist

### SCOPE OF SERVICES PROVIDED

#### *Erosion and Sedimentation Control Plan*

- Prepared datasheets for the following:
  - Concrete wash water management
  - Fish capture and rescue
  - Hard surface sweeping
  - Rock check dams
  - Sanitary waste management
  - Sediment traps
  - Sedimentation basins
  - Sheet pile walls
  - Silt fences
  - Solid waste management
  - Spill prevention and control
  - Straw bale barriers
  - Stockpile management
  - Structure demolition adjacent to waterbodies
  - Vehicle and equipment cleaning
  - Vehicle and equipment maintenance
  - Wind erosion control
  - Wood turtle protection

#### *Stream Diversion Plan*

- Designed a stream diversion to allow construction of the spillway

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# Pilot-Scale Introduction of Wild-Trapped Wild Turkey

SOUTHCENTRAL, NEW BRUNSWICK

## ENVIRONMENTAL CONSTRAINTS MAPPING AND ENVIRONMENTAL IMPACT ASSESSMENT (EIA)



### PROJECT DATES

- Fall 2011- Environmental constraints mapping and landowner consultations
- Winter 2011 / 2012 – EIA preparation
- March 2012 – EIA registration and response to technical review committee questions
- Decision on the EIA is still pending



### CLIENT REFERENCE

Mr. Joel Pedersen  
Director of Land Access Programs  
National Wild Turkey Federation  
PO Box 530  
770 Augusta Road  
Edgefield, South Carolina 29824

☎: 803.637.3016 ext. 7508

✉: jpedersen@wtf.net

### PROJECT OVERVIEW

Enterprise Fundy, in partnership with the Rural Economic Development Alliance, proposed a four-year pilot-scale introduction of wild-trapped eastern wild turkey (*Meleagris gallopavo silvestris*) to southcentral New Brunswick. The formal introduction of wild turkeys was proposed to bolster the organic ecological expansion of the species and preclude the release of domestically-raised strains, which has been an issue in the past. It is hoped that the establishment of a wild turkey population would lead to a sport hunt in the Province, which would provide significant employment and new revenue opportunities.

Fundy Engineering worked with the proponents and stakeholders to identify several suitable large tracts of land in close proximity to the Maine border for releasing turkeys. Four release sites were selected based on climate suitability, land size, habitat suitability, food availability, and social acceptance. Through the EIA process, potential negative and positive environmental impacts were assessed. Through the implementation of mitigation measures, the proponents are confident that there will be no negative impacts as a result of the release.

Although the introduction of wild-trapped wild turkey to southcentral New Brunswick has not yet been approved, the population continues to increase as the birds naturally migrate northward.

### CORE PROJECT TEAM

Tim Ryan, *M.Eng., P.Eng.*

Matthew Alexander, *Ph.D., P.Geo., EP*

Peter McKelvey, *P.Eng.*

Stephen Little, *P.Tech., CESA*

Project Manager

Senior Environmental Scientist

Senior Associate

GIS Mapping

### SCOPE OF SERVICES PROVIDED

#### *Environmental Constraints Mapping*

- Considerable mapping using geographical information systems was undertaken to identify suitable large tracts of land in close proximity to the Maine border for undertaking the release
- This also involved consultations with landowners

#### *Environmental Impact Assessment*

- The introduction of a wild species to New Brunswick requires registration and review under the EIA process
- Preparation of the EIA was done working closely with members of the Wild Turkey Federation and New Brunswick First Nations Communities
- During review of the EIA, the technical review committee posed several questions to the proponent, which Fundy Engineering prepared a detailed response

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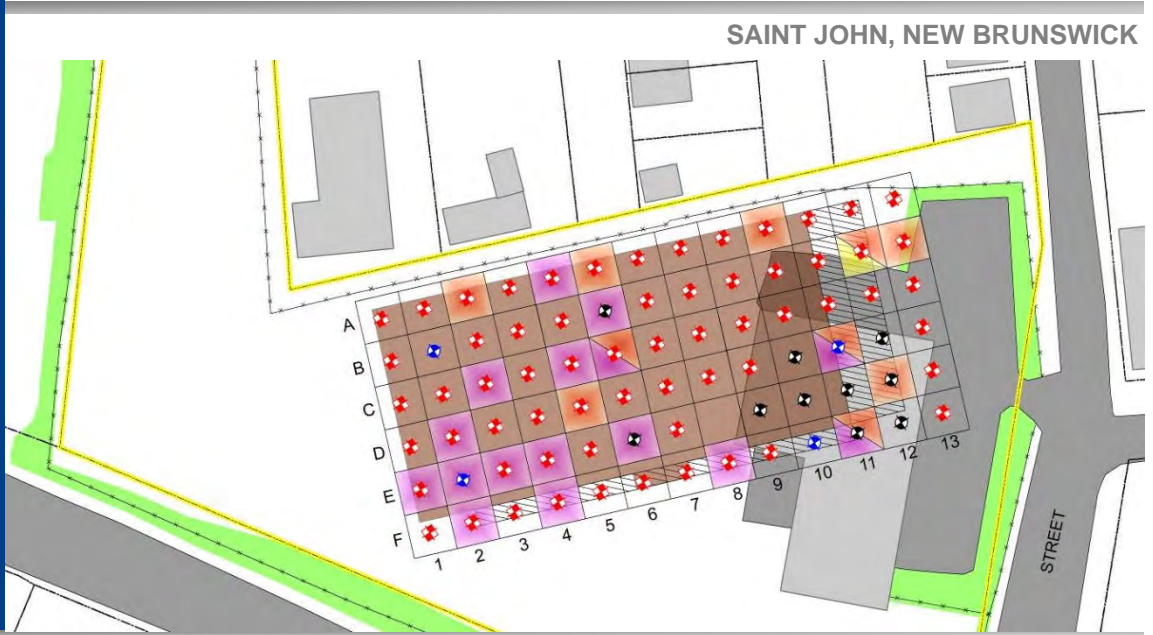
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# Kent Building Supplies Site Remedial Action Plan

## SITE CHARACTERIZATION, REMEDIAL ACTION PLAN, ECOLOGICAL SCREENING, AND HUMAN HEALTH EXPOSURE ASSESSMENT



### PROJECT DATES

- April and June 2012 – Site characterization
- July 2012 - Remedial action plan
- August 2012 – Ecological screening and human health exposure assessment



### CLIENT REFERENCE

Mr. Rick Davis, *P.Eng.*  
Kent Building Supplies  
300 Union Street  
Saint John, NB E2L 4G7

☎: 506.648.3611  
✉ davis.rick@kent.ca

### PROJECT OVERVIEW

Fundy Engineering was retained by Kent Building Supplies, Atlantic Canada's leading chain of home improvement stores, to provide environmental site characterization and associated services. The work was done on a portion of property that formerly housed a semi-truck and trailer maintenance facility. The area now houses a 5 000 m<sup>2</sup> concrete slab on grade Kent Building Supplies retail store.

Because of the presence of on-site contaminated material, the site was originally deemed unsuitable for the construction of the retail store; however, a plan was devised to partially remediate the site and then risk manage the remaining impacts.

Site characterization was done using test pits, boreholes, and groundwater monitoring wells. Sampling indicated that subsurface soils were impacted by petroleum hydrocarbons, metals, and Polycyclic Aromatic Hydrocarbons (PAHs). A Remedial Action Plan (RAP) was developed in collaboration with the owner and the New Brunswick Department of the Environment and Local Government. The RAP involved removing 25 000 m<sup>3</sup> of impacted soil. Petroleum hydrocarbon impacted soils were transferred to a licensed soil handling facility for treatment while the PAH impacted soil was placed within an off-site engineered containment cell. The lined containment cell was designed by Fundy Engineering to safely store 30 000 m<sup>3</sup> of PAH impacted soils. The remaining on-site impacts related to impacted soils were appropriately risk managed by covering with sub-base material and asphalt.

### CORE PROJECT TEAM

Tim Ryan, *M.Eng., P.Eng.*  
Gordon Mouland, *M.Eng., P.Eng.*  
Greg Derrah, *P.Tech, CESA*

Project Manager  
Senior Geotechnical Engineer  
Environmental Technologist

### SCOPE OF SERVICES PROVIDED

#### Site Characterization

- Dug 63 test-pits, extended 14 boreholes, and installed four groundwater monitoring wells across the site
- Collected 135 soil samples to fully delineate on- and off-site impacts

#### Remedial Action Plan

- Included analysis of petroleum hydrocarbons, heavy metals, and polycyclic aromatic hydrocarbons
- Designed and supervised the construction of an engineered containment cell for storing PAH impacted soil
- Provided necessary site information to the New Brunswick Department of the Environment and Local Government to receive file closure

#### Ecological Screening and Human Health Exposure Assessment

- Risk managed the impacted soil remaining on-site in order for the retail store to be built and operated

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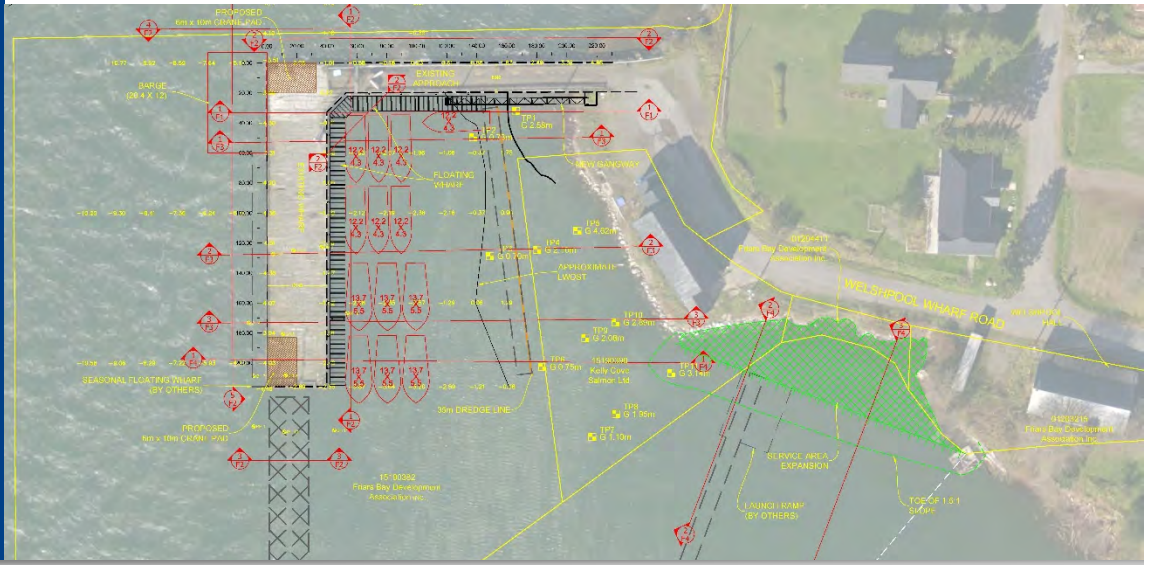




# Welshpool Landing

CAMPOBELLO, NEW BRUNSWICK

GEOTECHNICAL  
INVESTIGATION,  
DESIGN  
RECOMMENDATIONS,  
ENVIRONMENTAL  
IMPACT ASSESSMENT  
(EIA),  
AND  
ENVIRONMENTAL  
PERMITTING



## PROJECT DATES

- Fall 2012 – Geotechnical investigation of existing structures
- 2013 – Provided harbour upgrade design recommendations
- 2013 – EIA preparation and submission and securing of permits
- February 2015 – EIA approval



## CLIENT REFERENCE

Mr. Joseph Gough  
Friars Bay Development  
Association  
11 Welshpool Street  
Welshpool, NB E5E 1G3

☎: 506.752.9103

✉: josephgough@rogers.com

## PROJECT OVERVIEW

In 2012, the non-profit Friars Bay Development Association (FBDA) took control of the Welshpool Harbour through a divestiture process by the Department of Fisheries and Oceans. The harbour had fallen into a state of disrepair when the FBDA assumed ownership.

Fundy Engineering conducted a comprehensive geotechnical investigation to document the existing conditions of the wharf infrastructure. In association with Cormier Management Consulting Ltd., we provided the FBDA with design recommendations based on the needs of the users and community with respect to the harbour. Recommendations included new deck surfaces and cribbing, gangways, new lighting, floating wharves, and dredging.

The EIA process was undertaken to identify and evaluate potential impacts of the wharf upgrades on the existing environment. Through the open and transparent public EIA process, it was determined that no additional impact than currently exists would occur.

The FBDA is currently working towards securing funds to complete the work, which will enhance the local fishery and aquaculture users' productivity and will offer four boat operators with a port of call.

## CORE PROJECT TEAM

Gordon Mouland, *M.Eng., P.Eng., P.E.*  
Matthew Alexander, *Ph.D., P.Geo., EP*  
Alex Mouland, *P.Eng, PMP*  
Robert Hunt, *CTech*  
Stephen Little, *P.Tech., CESA*

Project Manager  
Senior Environmental Scientist  
Geotechnical Engineering  
Design and Drafting  
GIS Mapping

## SCOPE OF SERVICES PROVIDED

### Geotechnical Investigation

- A geotechnical investigation was conducted to assess the condition of existing wooden and concrete structures

### Design Recommendations

- Based on the information collected during the geotechnical investigation and the needs of local users, Fundy's team developed recommendations, complete with cost estimates, regarding wharf upgrades

### Environmental Impact Assessment

- All harbour projects in New Brunswick trigger EIA review
- During review of the EIA, the technical review committee posed several questions to the proponent and Fundy Engineering prepared detailed responses

### Environmental Permitting

- Several permits, which were secured by Fundy Engineering, were required for this project to move forward

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# Breviro Caviar Shortnose Sturgeon Hatchery

PENNFIELD, NEW BRUNSWICK

## ENVIRONMENTAL IMPACT ASSESSMENT (EIA)

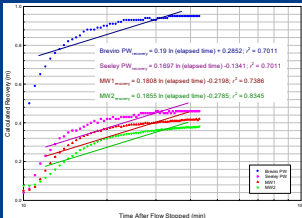
AND

## COMPREHENSIVE WATER SUPPLY SOURCE ASSESSMENT (CWSSA)



### PROJECT DATES

- Fall 2012 - CWSSA field work
- Winter 2012 / 2013 – EIA document submitted for regulatory review
- February 2013 – Final EIA approval



### CLIENT REFERENCE

Mr. Jonathan Barry  
Breviro Caviar Inc.  
181 Mealey Road  
Pennfield, NB E5H 1T3

☎: 506.456.2456

📞: 506.644.8596

✉: jonathan.barry@breviro.com

### PROJECT OVERVIEW

Breviro Caviar Inc. is the only licensed captive breeding producer of shortnose sturgeon (*Acipenser brevirostrum*) in the world. During the summer of 2011, Breviro noticed considerable quality changes and some decreases in quantity of their existing groundwater supply. Concentrations of copper attained levels lethal to *brevirostrum* and resulted in some mortality. To protect the remaining fish at the hatchery, Breviro increased their water withdrawal from a secondary water source, a small stream, until a new groundwater supply could be obtained.

In the winter of 2012 / 2013, Fundy Engineering completed hydraulic testing within a 20.32 cm diameter production well installed on the property of the nearby Crystal Springs hatchery. At the time of installation, that flowing artesian well yielded about  $275 \text{ L} \cdot \text{min}^{-1}$  of water. That overflow was sufficient to supply Breviro's hatchery needs.

A 92-hour constant-rate free-flow test was conducted on the production well while the production well at Crystal Springs was simultaneously and continuously pumped. Drawdown throughout the hydraulic testing was measured within several monitoring wells. Characteristics of the confined sand and gravel aquifer were determined to be  $710 \text{ m}^2 \cdot \text{day}^{-1}$ ,  $6 \times 10^{-5}$ ,  $1140 \text{ m}^2 \cdot \text{day}^{-1}$  and  $19800 \text{ m}^3 \cdot \text{day}^{-1}$  for transmissivity, storativity, long-term specific capacity, and sustainable yield, respectively. The results confirmed that water was available in sufficient quantity and suitable quality for Breviro's needs.

### CORE PROJECT TEAM

Matthew Alexander, *Ph.D., P.Geo., EP* Senior Environmental Scientist  
Stephen Little, *P.Tech., CESA* GIS Specialist

### SCOPE OF SERVICES PROVIDED

#### Baseline Data Collection

- Included the installation of a production well and performing a comprehensive water supply source assessment
- A 92-hour constant-rate free-flow test was completed
- The response of the aquifer to the free-flow extraction and the amount of groundwater available for extraction was determined using the data collected during the test
- Water quality of the groundwater at the site was determined and compared to the Canadian Drinking Water Quality Guidelines

#### Environmental Impact Assessment Registration Document Preparation

- An Environmental Impact Assessment document was prepared for regulatory

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# Former T.S. Simms & Co. Brush Factory

SAINT JOHN, NEW BRUNSWICK

PHASE I, II, AND III  
ENVIRONMENTAL SITE  
ASSESSMENT (ESA),  
HAZARDOUS MATERIALS  
ASSESSMENT AND  
QUANTIFICATION,  
REMEDIAL ACTION  
PLAN,  
AND  
SOIL-REINFORCED  
RETAINING WALL (SRW)  
DESIGN



## PROJECT DATES

- October 2013 – Phase I, II ESA
- December 2013 to January 2014 – Hazardous materials abatement
- Spring / Summer 2014 – Phase III ESA
- Summer / Fall 2014 – Remedial action plan work
- Winter 2016 – Retaining wall design



## CLIENT REFERENCE

Mr. David Muir, *P.Eng.*  
Director of Environmental Affairs  
J.D. Irving Limited  
300 Union Street  
Saint John, NB E2L 4M3

☎: 506.632.6433  
☎: 506.634.4245  
✉: [muir.dave@jdirving.com](mailto:muir.dave@jdirving.com)

## PROJECT OVERVIEW

In 1912, T.S. Simms & Co. Ltd. opened a paint brush factory on Bridge Street in Saint John. Due to dated manufacturing technology, the facility halted production on 29 November 2013 after which it was purchased by J.D. Irving Ltd. Plans were to demolish the buildings and repurpose the site.

A Phase I ESA was conducted to assess the risk of potential environmental issues on the property. Due primarily to the building's age and the materials used during construction, Fundy Engineering identified hazardous materials (e.g., asbestos pipe wrap, lead-based paints, mercury-filled thermostats, etc.) that required abatement prior to demolition. This work advanced to a Phase II ESA and then all potentially hazardous materials were removed from buildings and disposed of in an environmentally-sensitive manner.

Demolition, which spanned about three months, began on 29 January 2014. Following that, a Phase III ESA was completed in order to fully assess and delineate subsurface environmental issues. A remedial action plan was then implemented to obtain regulatory file closure on the site.

The former T.S. Simms & Co. Brush Factory site has since been redeveloped and is now the new entrance to the Reversing Falls Pulp Mill and Irving Tissue Mill.

## CORE PROJECT TEAM

Tim Ryan, *M.Eng., P.Eng.*  
Gordon Moulard, *M.Eng., P.Eng., P.E.*  
Greg Derrah, *P.Tech., CESA*  
Stephen Little, *P.Tech., CESA*  
Robert Hunt, *CTech*

Project Manager  
Geotechnical Engineer  
Environmental Technologist  
GIS Specialist  
Design and Drafting

## SCOPE OF SERVICES PROVIDED

### *Environmental Site Assessments*

- Completed Phase I, II, and III ESAs to identify and delineate potential environmental issues at the site

### *Hazardous Materials Abatement*

- Developed a plan to remove all potentially hazardous materials from the on-site buildings and for their disposal at appropriate handling facilities

### *Remedial Action Plan*

- A remedial program was conducted to remove historical subsurface impacts

### *Retaining Wall Design*

- Designed a 791 block Redi-Rock® soil-reinforced retaining wall to facilitate the construction of a new entrance and weigh station for the Reversing Falls Pulp Mill



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# Chip Handling and Continuous Cooking Digester Plant

SAINT JOHN, NEW BRUNSWICK

ENVIRONMENTAL  
CONSTRAINTS  
MAPPING,  
ENVIRONMENTAL  
IMPACT ASSESSMENT  
(EIA),  
PUBLIC AND  
STAKEHOLDER  
CONSULTATIONS,  
AND  
ENVIRONMENTAL  
PERMITTING,  
PROTECTION,  
MONITORING, AND  
COMPLIANCE



## PROJECT DATES

- Fall 2013 – Baseline data collection, environmental constraints mapping, and EIA document preparation
- March 2014 – EIA registration and public and stakeholder consultations
- May 2014 – EIA approval
- Summer 2014 – Environmental permitting, protection, monitoring, and compliance

## CLIENT REFERENCE

Mr. David Muir, *P.Eng.*  
Director of Environmental Affairs  
J.D. Irving Limited  
300 Union Street  
Saint John, NB E2L 4M3

☎: 506.632.6433  
☎: 506.634.4245  
✉: [muir.dave@jdirving.com](mailto:muir.dave@jdirving.com)

## PROJECT OVERVIEW

Irving Pulp & Paper was required to undertake an EIA for the renewal and upgrade of their chip handling and continuous cooking digester at their Reversing Falls bleached Kraft pulp mill. The renewal and upgrade involved installing and operating: a new chip stoker reclaiming and scalper screen; five new chip reclaim / chip screening feed conveyor belts; new chip screening equipment in a new building; a new chip storage silo with feed and discharge conveyor belts; and a new continuous digester cooking plant in a new building.

The EIA process involved assessing the existing physio-chemical, biological, and socio-economic environment so that potential impacts could be identified. Where the project could potentially impact the environment, mitigation measures were established through an environmental protection plan to limit the potential impact.

The EIA process included a public involvement component. This was to ensure that individuals and groups potentially affected by the project were able to express any and all concerns. An open house was held in a school gymnasium near the Mill.

## CORE PROJECT TEAM

Tim Ryan, *M.Eng., P.Eng.*  
Matthew Alexander, *P.Geo., Ph.D., EP*  
Bryan Morse, *Ph.D., M.Sc., EPT*  
Crystal Caines, *P.Tech., PMP*  
Stephen Little, *P.Tech., CESA*

Project Manager  
Senior Environmental Scientist  
Environmental Scientist  
Environmental Technologist  
GIS Specialist

## SCOPE OF SERVICES PROVIDED

### *Environmental Constraints Mapping*

- Field and desk-top studies were completed to determine baseline environmental conditions and to identify potentially sensitive environmental receptors

### *Environmental Impact Assessment*

- The processing of wood products at the site triggered the environmental impact assessment process

### *Public and Stakeholder Consultations*

- Direct stakeholder communications, communications with potentially affected residents, public notices, and a public open house were undertaken and the process was summarized in a report

### *Environmental Permits*

- Several permits were required for completing the work

### *Environmental Protection*

- A detailed environmental protection plan was developed for the project, which was used by the contractor during construction

### *Environmental Monitoring and Compliance*

- Assistance was provided for routine monitoring and compliance during project construction

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# Natural Gas Extraction Well – Well Pad Design and Consulting

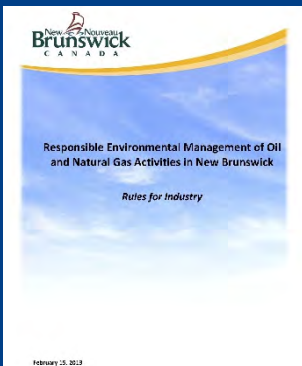
MCCULLY FIELD IN SUSSEX, NEW BRUNSWICK

## GEOTECHNICAL ENGINEERING AND ENVIRONMENTAL PERMITTING



### PROJECT DATES

- December 2013 and January 2014 – Well pad design
- February 2014 – Consultation with regulatory authorities
- March 2014 – Development of containment systems
- Summer 2014 – Well pad construction



### PROJECT OVERVIEW

On 15 February 2013, the New Brunswick government issued the document, “*Responsible Environmental Management of Oil and Natural Gas Activities in New Brunswick, Rules for Industry*”. The document includes regulations for well pad construction, secondary containment, measures to prevent the downwards migration of fluids, and other design considerations. In order to be approved for any new well drilling, development, and / or production, Corridor Resources was required to demonstrate that they met requirements outlined in the document.

Fundy Engineering’s team worked closely with personnel from Corridor Resources and the New Brunswick Department of the Environment and New Brunswick Department of Natural Resources to develop a well pad design that met all of the requirements laid out in the *Rules for Industry* document. In summer 2014, Fundy Engineering oversaw expansion of well pad F-67 in the McCully Field to allow for additional development of natural gas wells.

This Project was a first in New Brunswick for developing a natural gas well pad under such stringent regulations. Our team was able to rely on experience we had learned working in the oil and gas industry of Western Canada.

### SCOPE OF SERVICES PROVIDED

#### Well Pad Design

- Designed the expansion area of existing well pad F-67 in the McCully Field to allow additional exploration and production, which involved:
  - Geotechnical investigations
  - Materials specifications
  - Materials testing and supervision
  - Design drawings
  - Environmental permitting

#### Regulatory Consultation

- Assisted Corridor in the development of responses to regulatory agency comments

#### Containment Systems Plan

- Developed a plan to prevent the escape of fluid or material contaminants from the well pad during construction, drilling, completion, and production activities



### CLIENT REFERENCE

Ms. Candace Quigley  
Procurement Consultant  
Corridor Resources Inc.  
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Halifax, NS B3J 3T2

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✉: cquigley@corridor.ca

### CORE PROJECT TEAM

Tim. Ryan, *M.Eng., P.Eng.*  
Alex Mouland, *P.Eng., PMP*  
Gordon Mouland, *M.Eng., P.Eng., P.E.*  
Matthew Alexander, *P.Geo., Ph.D., EP*  
Robert Hunt, *CTech*

Client Liaison  
Project Manager  
Geotechnical Engineer  
Senior Environmental Scientist  
Design and Drafting

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# Fiddle Parkway Home Heating Oil Release

HATCHET LAKE, NOVA SCOTIA

## PHASE I AND II ENVIRONMENTAL SITE ASSESSMENT (ESA) AND LIMITED REMEDIAL ACTION PLAN



### PROJECT DATES

- March 2014 – Phase I ESA
- April 2014 – Phase II ESA and limited remedial action plan work
- October 2014 – Further limited remedial action plan work
- November 2014 – File closure



### CLIENT REFERENCE

Mr. Peter Michno  
Home Alone Property Management  
Services Limited  
Suite 119-2880 Queen St. E, Unit 4  
Brampton, ON L6S 6H4

☎: 800.668.1947  
☎: 905.271.4401

### PROJECT OVERVIEW

Fundy Engineering was contracted to undertake environmental site assessment for a property foreclosure. The two-storey single-family residential unit circa mid-2000s with a concrete foundation and concrete slab floor is located in Hatchet Lake, Nova Scotia. During a site visit on 4 March 2014, we noted staining on the concrete slab in the vicinity of the oil-fired furnace. Discussions with the property manager suggested that the staining may have been a result of a mechanical issue with the furnace. We also noted that the above-ground storage tank located outside at the rear of the residence had recently been replaced, which raised some concern. Therefore, we recommended sampling the soil below the slab floor.

Several holes were created in the concrete floor and excavated in the ground along the exterior of the home. Soil samples were taken from each location and submitted to an accredited laboratory for analysis of total petroleum hydrocarbons and petroleum aromatic hydrocarbons. Results indicated that some subsurface soils were contaminated above the allowable limits and required remediation.

The concrete slab foundation was jackhammered out and about 4.65 tonnes of impacted soil was removed by bucket for proper disposal. Additional impacted soils were identified below a footing of the slab. To excavate those soils, a structural engineer was contracted to design a temporary shoring system for the structure above.

### CORE PROJECT TEAM

Rob Haineault, *P.Eng.*  
Greg Derrah, *P.Tech., CESA*  
Steve Little, *P.Tech., CESA*

Environmental Engineer  
Environmental Technologist  
GIS Specialist

Once the structure was secured, an additional 4.7 tonnes of impacted material was removed and testing confirmed impacts had been remediated. The excavated area was backfilled, a new footing was poured, the concrete slab was repaired, and interior structural walls were reinstated. The property received closure from the regulator.

### SCOPE OF SERVICES PROVIDED

#### *Environmental Site Assessments*

- Completed Phase I and II ESAs to identify and delineate home heating oil release(s) at the site

#### *Remedial Action Plan Development and Implementation*

- A remedial program was conducted to remove historical subsurface impacts



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# Former KFC Demolition

COLE HARBOUR, NOVA SCOTIA

## DESIGNATED SUBSTANCES SURVEY



## PROJECT DATES

- June 2014 – Designated substances survey



## CLIENT REFERENCE

Mr. Joe Kowalski, *P.Eng.*  
Construction Manager  
Plaza Retail REIT  
98 Main Street  
Fredericton, NB E3A 9N6

☎: 506.451.1826  
☎: 506.451.1802  
✉: joe.kowalski@plaza.ca

## PROJECT OVERVIEW

One of eastern Canada's leading retail property owners and developers, Plaza Retail REIT, often uses Fundy Engineering to undertake environmental services prior to purchasing a property. We were engaged to undertake a designated substances survey at a former Kentucky Fried Chicken restaurant in Cole Harbour, Nova Scotia.

The 1970s era concrete block building was founded on a concrete on-grade slab foundation. The building was serviced with municipal water and sewer. Heating was provided by roof-top Heating, Ventilation, and Air-Conditioning (HVAC) units supplemented with electric baseboards.

On 25 June 2014, we completed a thorough walk over of the property, which included inspecting the building and all mechanical systems. We determined that the former operator of the restaurant had removed the majority of equipment prior to our investigation and that the site was relatively clean. The only items of concern that we identified were potential hazardous refrigerants contained in the HVAC units and mercury-containing thermostats. There were also some cleaning products remaining. We recommended that the Client have the HVAC unit and thermostats removed by qualified personnel and be disposed of in an environmentally-safe manner.

The building has since been demolished and the brownfield site has been repurposed for another commercial development.

## CORE PROJECT TEAM

Rob Haineault, *P.Eng.*  
Greg Derrah, *P.Tech., CESA*  
Steve Little, *P.Tech., CESA*

Environmental Engineer  
Environmental Technologist  
GIS Specialist

## SCOPE OF SERVICES PROVIDED

### Designated Substances Survey

- Identified presence of potential designated substances (*i.e.*, asbestos, lead-based paints, PCB containing materials, halon containing materials, ozone depleting substances, petroleum hydrocarbons, and mercury containing materials)
- Reported on the presence of potential designated substances and how they should be handled in an environmentally safe manner



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# Lillian Drive Home Heating Oil Release

DARTMOUTH, NOVA SCOTIA

## PHASE I AND II ENVIRONMENTAL SITE ASSESSMENT (ESA), LIMITED DESIGNATED WASTE SURVEY, AND LIMITED REMEDIAL ACTION PLAN



### PROJECT DATES

- March 2015 – Phase I, II ESA
- September 2015 – Limited designated waste survey
- January and February 2016 – Limited remedial action plan work
- April 2016 – File closure



### CLIENT REFERENCE

Ms. Tracy Lalonde  
Home Alone Property Management  
Services Limited  
Suite 110, 10-8550 Torbram Road  
Brampton, ON L6T 0H7

☎: 800.668.1947  
☎: 905.271.4401

### PROJECT OVERVIEW

In November 2013, a home heating oil release occurred at a residential duplex property in Dartmouth, Nova Scotia. The two-storey unit was heated via an oil-fired furnace supplied with heating oil from an aboveground storage tank located in the basement. Shortly after a heating oil delivery was made the homeowner discovered the oil tank was empty. It was determined that the oil leaked from the tank and entered the basement floor drain where it made its way to the sewer system and was subsequently intercepted at a municipal wastewater pumping station. During an initial investigation by the oil delivery company, a break in the basement drain was discovered. As a result, the Nova Scotia Department of Environment issued a directive to the homeowner to ensure heating oil contamination within the surrounding subsurface resulting from the broken floor drain was addressed in accordance with the Contaminated Sites Regulations.

Fundy Engineering was contracted to undertake environmental site assessment and remedial action work. In support of this, several test holes were created in the concrete floor and excavated in the ground along the exterior of the home. Soil samples were taken from each location and submitted to an accredited laboratory for analysis of total petroleum hydrocarbons and petroleum aromatic hydrocarbons. Results indicated that some subsurface soils were contaminated above the allowable limits and required remediation.

### CORE PROJECT TEAM

Rob Haineault, *P.Eng.*  
Greg Derrah, *P.Tech., CESA*  
Steve Little, *P.Tech., CESA*

Environmental Engineer  
Environmental Technologist  
GIS Specialist

Fundy Engineering also conducted a limited designated waste survey for the Client to assess the potential presence of hazardous building materials that may be encountered during remedial work; no materials were encountered. Several tonnes of hydrocarbon impacted subsurface materials were removed from the site as part of the remedial action plan. Testing confirmed impacts had been remediated and the property received closure from the regulator.

### SCOPE OF SERVICES PROVIDED

#### *Environmental Site Assessments*

- Completed Phase I and II ESAs to identify and delineate potential environmental issues at the site

#### *Remedial Action Plan*

- A remedial program was conducted to remove historical subsurface impacts

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# Old Sambro Road Recycling Facility

HARRIETSFIELD, NOVA SCOTIA

## PHASE II AND III ENVIRONMENTAL SITE ASSESSMENT (ESA)

AND

## REMEDIAL ACTION PLAN AND MANAGEMENT OF CONTAMINATED SITES



### PROJECT DATES

- June 2015 – Phase II ESA
- February 2017 – Phase III ESA
- Ongoing – Risk management



### CLIENT REFERENCE

Mr. Stephen Kingston  
McInnes Cooper  
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1969 Upper Water Street  
Halifax, NS B3J 3R7

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✉: Stephen.kingston@  
mcinnescooper.com

### PROJECT OVERVIEW

Fundy Engineering was retained by McInnes Cooper to undertake environmental site assessment and remedial action work at a residential property along Old Sambro Road in Harrietsfield, Nova Scotia. A former recycling facility had operated on a nearby up-gradient property and it was suspected that contaminants from that site had migrated in the subsurface to the residential property.

A subsurface investigation was undertaken by drilling several boreholes and collecting soil and groundwater samples. No petroleum hydrocarbon impacts were identified within the samples obtained, but heavy metal contamination was suspected from the former recycling facility due to several parameters exceeding guideline levels.

Upon inspection of the residential property, a circa 1970s garage was noted that was believed to have been operated as a backyard repair garage. The garage, founded on a concrete slab, was equipped with a 2 m deep concrete automotive repair pit. Water contained within the pit was pumped out for proper disposal and holes were excavated in the concrete floor to sample the soil underneath. Two exterior concrete pits were also located on the property, which may have been part of a former septic system. Those pits appeared to have at one time conveyed discharge to a nearby brook. Exceedances noted for volatile aromatic compounds were suspected to be from use of degreasers in the former backyard garage.

### CORE PROJECT TEAM

Rob Haineault, *P.Eng.*  
Greg Derrah, *P.Tech., CESA*  
Steve Little, *P.Tech., CESA*

Environmental Engineer  
Environmental Technologist  
GIS Specialist

During the Phase II and III ESA work, Fundy Engineering conducted some remedial work, such as water and sludges from the automotive repair pit and suspected septic system pits. Those materials were transported off-site for proper handling and disposal. At this time, the site is being risk managed.

### SCOPE OF SERVICES PROVIDED

#### *Environmental Site Assessments*

- Completed Phase II and III ESAs to identify and delineate potential environmental issues at the site

#### *Remedial Action Plan*

- Some remedial work was conducted to remove historical subsurface impacts
- Risk management of the site continues



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# Salmon Aquaculture Greenhouse Gas Emissions Assessment

MULTIPLE MARITIME LOCATIONS



GREENHOUSE GAS  
(GHG) EMISSIONS  
ASSESSMENT,  
ENERGY CONSUMPTION  
ASSESSMENT,  
AND  
PROJECT MANAGEMENT

## PROJECT DATES

- July and August 2015 – Site visits
- September to December 2015 – Data collection, GHG estimation, and reporting

## PROJECT OVERVIEW

Cooke Aquaculture is an integrated aquaculture company based on the east coast of North America that is committed to the long-term social, economic, and environmental sustainability in the communities that they operate and the health of the marine resource upon which they depend. In support of this, they sought third-party certification for its Liverpool Sea Site under the Aquaculture Stewardship Council, which is an independent not-for-profit organization established to help minimize or eliminate negative social and environmental impacts related to aquaculture operations around the world.

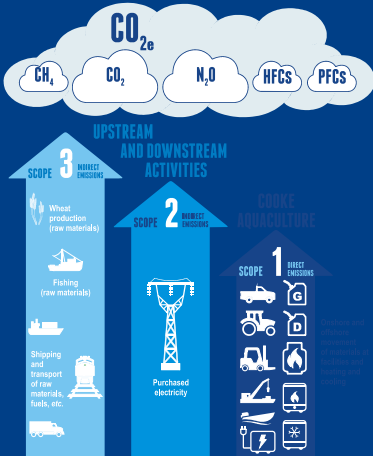
We worked to complete the requirements for Criterion 4.6 and Section 8 indicators of the *Salmon Standard* for seven facilities within Cooke Aquaculture's integrated supply chain, which included two feed mills, four hatcheries, and one sea site. Those particular *Salmon Standard* requirements refer to energy consumption and greenhouse gas emissions on farms.

For this assessment, Scope 1 (direct), Scope 2 (indirect), and Scope 3 (indirect upstream and downstream) emissions were calculated for carbon dioxide, hydrofluorocarbons, perfluorocarbons, methane, nitrous oxide, and carbon dioxide equivalent. The values were calculated using various standardized emissions conversion factors.

In October 2016, Cooke Aquaculture received certification under the Aquaculture Stewardship Council.

## SCOPE OF SERVICES PROVIDED

- Completed a GHG emissions assessment for Cooke Aquaculture to submit to the Aquaculture Stewardship Council
- The GHG emissions assessment included:
  - Delineating assessment boundaries
  - Collecting client data through site visits and correspondence with personnel
  - Evaluating, where possible, of data quality and client data sources
  - Calculating GHG emissions using appropriate conversion factors
  - Calculating Scope 1, Scope 2, and Scope 3 GHG emissions
  - Determining energy use for the hatcheries and sea site
  - Estimating GHGs emitted per unit of feed produced at the feed mills
- Provided recommendations to the client for conducting ongoing GHG emissions assessments at these and other facilities within their operations



## CLIENT REFERENCE

Ms. Jennifer Wiper  
Certification Supervisor  
Cooke Aquaculture  
847 Maine Street  
Blacks Harbour, NB E5H 1E6

☎: 506.755.1021

✉: Jennifer.wiper@cookeaqua.com

## CORE PROJECT TEAM

Tim Ryan, *M.Eng., P.Eng.*

Matthew Alexander, *P.Geo., Ph.D., EP*

Crystal Caines, *P.Tech., PMP*

Hector Lamprea, *P.Eng., P.E., CEM*

Project Manager

Senior Environmental Scientist

Project Coordinator

Energy Efficiency Engineer

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# Pulp Dryer Modernization

SAINT JOHN, NEW BRUNSWICK

## ENVIRONMENTAL IMPACT ASSESSMENT (EIA),

## PUBLIC AND STAKEHOLDER CONSULTATIONS,

AND

## ENVIRONMENTAL PERMITTING AND PROTECTION



### PROJECT DATES

- Winter 2015 / 2016 – Baseline data collection and EIA document preparation
- May 2016 – EIA registration and public and stakeholder consultations
- October 2016 – EIA approval
- Fall 2016 – Environmental permitting and protection



### CLIENT REFERENCE

Mr. David Muir, *P.Eng.*  
Director of Environmental Affairs  
J.D. Irving Limited  
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Saint John, NB E2L 4M3

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☎: 506.634.4245  
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### PROJECT OVERVIEW

Irving Pulp & Paper was required to undertake an EIA for the pulp dryer modernization project at their Reversing Falls bleached Kraft pulp mill near the mouth of the Saint John River. The modernization involved replacing three existing pulp dryers and associated equipment with one new best-available pulp dryer in order to remain globally competitive. The project involved installing and operating: a bleached stock screening system; a new pulp dryer; and a new pulp bailing line. A new machine hall and warehouse were constructed to house the new equipment.

The EIA process involved assessing the existing physio-chemical, biological, and socio-economic environment so that potential impacts could be identified. Where the project could potentially impact the environment, mitigation measures were established through an environmental protection plan to limit the potential impact.

The EIA process included a public involvement component. This was to ensure that individuals and groups potentially affected by the project were able to express any and all concerns. An open house was held in a meeting room at a hotel in the City centre.

### CORE PROJECT TEAM

Matthew Alexander, <i>P.Geo., Ph.D., EP</i>	Senior Environmental Scientist
Bryan Morse, <i>Ph.D., M.Sc., EPT</i>	Environmental Scientist
Crystal Caines, <i>P.Tech., PMP</i>	Project Manager
Stephen Little, <i>P.Tech., CESA</i>	GIS Specialist

### SCOPE OF SERVICES PROVIDED

#### *Environmental Impact Assessment*

- The processing of wood products at the site triggered the environmental impact assessment process

#### *Public and Stakeholder Consultations*

- Direct stakeholder communications, communications with potentially affected residents, public notices, and a public open house were undertaken and the process was summarized in a report

#### *Environmental Permits*

- Several permits were required for completing the work

#### *Environmental Protection*

- A detailed environmental protection plan was developed for the project, which were used by the contractor during construction



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# Albion Street Home Heating Oil Release

AMHERST, NOVA SCOTIA

LIMITED SOIL  
REMOVAL PROGRAM,  
LIMITED REMEDIAL  
ACTION PLAN,  
AND  
LIMITED HAZARDOUS  
MATERIALS SURVEY



## PROJECT DATES

- March 2015 – Sampling and limited soil removal program
- July 2015 – Impacted soil removal and additional sampling
- September 2015 – Limited file closure
- November 2015 – Limited hazardous materials survey



## CLIENT REFERENCE

Ms. Shelly Webb  
Veranova Properties Limited  
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Dartmouth, NS B2Y 2N4

☎: 902.429.9911

☎: 902.429.0195

✉: swebb@veranova.ca

## PROJECT OVERVIEW

During a routine property inspection, representatives with Veranova Properties noted the strong presence of hydrocarbon odours within a multi-unit property in Amherst, Nova Scotia. The 1970s era three-storey unit was heated via an oil-fired furnace supplied with heating oil from an aboveground storage tank located in the building's basement. It was determined that heating oil leaked from a faulty fill pipe during a fuel oil delivery. Fuel oil leaked from the fill pipe and was released on to the floor where it migrated to the soils below the concrete slab foundation via the gap between the slab and concrete / rock foundation wall.

Fundy Engineering was contracted to undertake soil sampling and a limited soil removal program. In support of this, several test holes were created in the concrete floor. Soil samples were taken from each location and submitted to an accredited laboratory for analysis of total petroleum hydrocarbons and petroleum aromatic hydrocarbons. Results indicated that some subsurface soils were contaminated above the allowable limits and required remediation. Sampling also suggested that a spill or spills had also likely occurred previous to this event.

The concrete slab foundation was jackhammered out and about 4.4 tonnes of impacted soil was removed by bucket for proper disposal. Excavation was temporarily halted due to structural integrity concerns. Once the structure was shored up, an additional 2.7 tonnes of impacted soil was removed.

## CORE PROJECT TEAM

Rob Haineault, *P.Eng.*  
Greg Derrah, *P.Tech., CESA*  
Steve Little, *P.Tech., CESA*

Environmental Engineer  
Environmental Technologist  
GIS Specialist

Due to mould issues identified during our work, the Client determined that the building was likely not worth keeping. As a result, we also conducted a limited designated hazardous materials survey. We identified the presence of asbestos-containing siding, some lead paint, and mercury thermostats, which all required proper disposal prior to building demolition.

## SCOPE OF SERVICES PROVIDED

### *Limited Soil Removal Program*

- Removed majority of soils impacted as a result of fuel oil release

### *Limited Remedial Action Plan*

- A remedial program was conducted to remove historical subsurface impacts

### *Limited Hazardous Materials Survey*

- Hazardous materials were identified that required special consideration prior to building demolition

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# Hollis Street Scotiabank Tank Removal

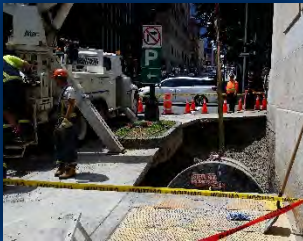
HALIFAX, NOVA SCOTIA

## SITE PROFESSIONAL SERVICES



## PROJECT DATES

- June 2016 – Site professional services



## CLIENT REFERENCE

Ms. Rebecca Bedford  
Project Manager  
Scotiabank, Real Estate 54072  
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Toronto, ON M5J 1E5

☎: 416.866.5940  
☎: 416.866.4304

## PROJECT OVERVIEW

On 3 August 1931, the Bank of Nova Scotia opened one of its most authentically Canadian buildings at 1709 Hollis Street in Halifax. The building's historical significance was recognized on 25 January 1985 under the Nova Scotia *Heritage Property Act*. Since opening, the Renaissance-inspired six-storey sandstone building has undergone several renovations. Today, the building houses Scotiabank's Atlantic Regional Office and the Halifax Main Branch.

In 2015, we conducted a feasibility study to determine whether or not there was a cost-effective alternative to replace the existing oil-fired heating system. Through the feasibility study we were able to recommend conversion of the boilers from fuel oil to natural gas.

On 19 June 2016, the 2 400 L underground fuel oil storage tank was pumped dry and removed from below the sidewalk at the corner of Hollis Street and Prince Street. The tank was in relatively good condition with no signs of tank rupture or any indications of soil contamination. The certified tank installer hauled the empty tank off-site for proper disposal.

Soil samples were collected from the soils surrounding the tank excavation. The samples were submitted to an accredited laboratory to ensure that no potential contaminants from the tank had migrated to the surrounding environment. All soil samples were below the allowable Nova Scotia Environment Tier 1 Environmental Quality Standards criteria.

We provided the necessary documentation to Nova Scotia Environment to confirm that no contamination was present within the excavation for the removed underground storage tank.

## SCOPE OF SERVICES PROVIDED

### Site Professional Services

- Monitor the removal of the underground storage tank
- Conduct soil sampling and analyses
- Regulatory reporting



## CORE PROJECT TEAM

Rob Haineault, *P.Eng.*  
Greg Derrah, *P.Tech., CESA*  
Steve Little, *P.Tech., CESA*

Environmental Engineer  
Environmental Technologist  
GIS Specialist

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# Public Landing Convenience and XTR Service Station

PUBLIC LANDING, NEW BRUNSWICK

## PHASE I, II, AND III ENVIRONMENTAL SITE ASSESSMENT (ESA) AND MANAGEMENT OF CONTAMINATED SITES



### PROJECT DATES

- December 2015 and January 2016 – Phase I, II ESA
- March 2016 – Phase III ESA
- Summer 2016 – Management of contaminated sites
- November 2016 – File closure



### CLIENT REFERENCE

Mr. Sangjin Ha  
24 Longwood Drive  
Quispamsis, NB E2E 2S8

✉: [sangjin@gmail.com](mailto:sangjin@gmail.com)

### PROJECT OVERVIEW

Fundy Engineering was contracted to conduct a Phase I ESA at the Public Landing Convenience and XTR Service Station in order to determine the risk of potential environmental liabilities on the subject property. Although product storage tanks had been changed several times over the years, a gasoline service station with underground storage tanks had existed on the site since the 1960s. While conducting the Phase I, we identified several environmental concerns and recommended proceeding with a Phase II ESA to assess the risk of actual environmental liabilities.

Several boreholes were extended into the subsurface at the site for assessing soil and groundwater conditions. Soil and water samples collected from the boreholes were submitted to an accredited laboratory for analysis of total petroleum hydrocarbons and petroleum aromatic hydrocarbons. Results indicated that some subsurface soils and groundwater were contaminated above the allowable Atlantic Risk Based Corrective Action Tier I guidelines for a commercial property with a potable water source.

Subsequent to the Phase II ESA, we conducted a Phase III ESA to delineate the extent of contamination. After fully delineating the subsurface soil and groundwater impacts to the requirements of the New Brunswick Department of the Environment (NBDENV), a vapour monitoring program was conducted to determine if occupants of the building were at risk of being exposed to unacceptable vapours. Upon completion of that testing and identifying no risk, file closure was submitted to the NBDENV.

### CORE PROJECT TEAM

Tim Ryan, *M.Eng., P.Eng.*  
Greg Derrah, *P.Tech., CESA*  
Stephen Little, *P.Tech., CESA*

Environmental Engineer  
Environmental Technologist  
GIS Specialist

Our subsurface investigation work required drilling within the shoulder of a provincial highway. This required the use of safety signs and certified flaggers in order to conduct the work safely. In November 2016, file closure was obtained from the NBDENV.

### SCOPE OF SERVICES PROVIDED

#### *Environmental Site Assessments*

- Completed Phase I, II, and III ESAs to identify and delineate potential and actual environmental issues at the site

#### *Management of Contaminated Sites and Vapour Monitoring*

- A remedial program was developed to manage contamination identified at the site
- Vapour monitoring within the convenience store was done to assess risk to occupants

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# Carl's Auto Service

HARMONY, PRINCE EDWARD ISLAND

## PHASE I AND II ENVIRONMENTAL SITE ASSESSMENT (ESA)

AND

## REMEDIAL ACTION PLAN AND MANAGEMENT OF CONTAMINATED SITES



### PROJECT DATES

- January 2016 – Phase I ESA
- February 2016 – Phase II ESA
- March 2016 – Remedial action plan work



### PROJECT OVERVIEW

In early 2016, Fundy Engineering was contracted to undertake environmental site assessment and remedial action work at Carl's Auto Service. The subject properties reviewed were being used and had been used for over 30 years as an automotive repair and vehicle / scrap metal salvage business. There were concerns about the handling, storage, transportation, and disposal of hazardous materials and the possibility of multiple releases and spills from over 1 800 vehicles and multiple types of equipment stored in the salvage yard.

A subsurface investigation was undertaken by drilling several boreholes and collecting soil and groundwater samples. Samples were also collected from surface waterbodies on-site. All samples collected were submitted to an accredited laboratory for analysis of total petroleum hydrocarbons and petroleum aromatic hydrocarbons. Results showed that subsurface soils in two locations were contaminated above the allowable limits and required remediation. A remedial action plan was developed. A total of 82 metric tonnes of contaminated soils were excavated and disposed of at the East Prince Waste Management Facility.

It was also identified that some spills from the automotive shop were entering the floor drain system untreated. As a result, the sampling also showed some contamination of surface water in the vicinity of the septic field overflow discharge area. An oil / water separator was installed to capture any future spills.

Fundy Engineering conducted confirmatory sampling at the site. All samples showed that subsurface impacts were remediated to levels below the allowable Risk Based Corrective Action Tier I Risk Based Screening Levels for a commercial property with a non-potable water source.

### SCOPE OF SERVICES PROVIDED

#### *Environmental Site Assessments*

- Completed Phase I and II ESAs to identify and delineate multiple potential environmental issues at the site

#### *Remedial Action Plan*

- A remedial program was conducted to remove historical subsurface impacts
- Recommendations were provided to the Client for properly capturing and handling spills within the floor drain system

### CLIENT REFERENCE

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VR Business Brokers Atlantic  
Canada Business Group Inc.  
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Charlottetown, PE C1A 1M9

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✉: kevin@vrpei.com

### CORE PROJECT TEAM

Greg Derrah, *P.Tech., CESA*  
Donnie Taweel, *CET*  
Stephen Little, *P.Tech., CESA*

Environmental Technologist  
Geotechnical Technician  
GIS Specialist

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# Lake Utopia Paper Effluent Treatment Upgrade

LAKE UTOPIA, NEW BRUNSWICK

## ENVIRONMENTAL IMPACT ASSESSMENT (EIA),

## PUBLIC AND STAKEHOLDER CONSULTATIONS,

AND

## ENVIRONMENTAL PERMITTING AND PROTECTION



### PROJECT DATES

- Spring and Summer 2016 – Baseline data collection and EIA document preparation
- September 2016 – EIA registration and public and stakeholder consultations
- Fall 2016 – Environmental permitting and protection
- November 2016 – EIA approval



### CLIENT REFERENCE

Mr. David Muir, *P.Eng.*  
Director of Environmental Affairs  
J.D. Irving Limited  
300 Union Street  
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### PROJECT OVERVIEW

Lake Utopia Paper was required to undertake an EIA for an effluent treatment upgrade project at their high-quality corrugated medium mill in Utopia, New Brunswick. The upgrade saw the replacement of the high-rate up-flow anaerobic sludge blanket digesters and associated equipment with a new system. The project involved installing and operating: a 2 300 m<sup>3</sup> process water storage tank; a pipe bridge; a 150 000 m<sup>3</sup> in-ground earthen basin gas-tight geomembrane-lined low-rate anaerobic digester; a pump house; and a biogas safety release flare.

The EIA process involved assessing the existing physio-chemical, biological, and socio-economic environment so that potential impacts could be identified. Where the project could potentially impact the environment, mitigation measures were established through an environmental protection plan to limit the potential impact.

The EIA process included a public involvement component. This was to ensure that individuals and groups potentially affected by the project were able to express any and all concerns. An open house was held in St. George, the nearest community to the mill.

### CORE PROJECT TEAM

Matthew Alexander, <i>P.Geo., Ph.D., EP</i>	Senior Environmental Scientist
Bryan Morse, <i>Ph.D., M.Sc., EPT</i>	Environmental Scientist
Crystal Caines, <i>P.Tech., PMP</i>	Project Manager
Stephen Little, <i>P.Tech., CESA</i>	GIS Specialist

### SCOPE OF SERVICES PROVIDED

#### *Environmental Impact Assessment*

- The processing of wood products at the site triggered the environmental impact assessment process

#### *Public and Stakeholder Consultations*

- Direct stakeholder communications, communications with potentially affected residents, public notices, and a public open house were undertaken and the process was summarized in a report

#### *Environmental Permits*

- Several permits were required for completing the work

#### *Environmental Protection*

- A detailed environmental protection plan was developed for the project, which was used by the contractor during construction



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# Wolfe Lake Visitor Centre

FUNDY NATIONAL PARK, NEW BRUNSWICK

ELECTRICAL DESIGN,  
MECHANICAL DESIGN,  
GEOTECHNICAL  
INVESTIGATION,  
AND  
ENVIRONMENTAL  
PERMITTING



## PROJECT DATES

- Fall 2016 to Spring 2017 – Project design
- Winter 2016 – Geotechnical investigation
- Spring 2017 – Environmental permitting
- Summer and Fall 2017 – Construction reviews



## CLIENT REFERENCE

Mr. Matt Walsh, *P.Eng.*  
Project Manager  
Public Services &  
Procurement Canada  
189 Prince William Street  
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E2L 2B9

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✉ Matthew.walsh@  
pwgsc.tpsgc.gc.ca

## PROJECT OVERVIEW

In 2012, the original Visitor Reception Centre located at Wolfe Lake in Fundy National Park was demolished because the building was dilapidated and deemed structurally unsound. Wolfe Lake is one of the two entrances to Fundy National Park. In anticipation of the completion of the Fundy Trail Parkway near the Wolfe Lake entrance, planning for a new Visitors Centre began in 2016. Fundy Engineering was contracted by Public Services and Procurement Canada to assist with the building design.

To accommodate the anticipated volume of visitors, a new wastewater treatment system was required, which was designed by Fundy Engineering. The wastewater generated is treated via an on-site sewage disposal system comprising an 18,000 L septic tank and raised infiltration bed consisting of 216 pressure-dosed chambers placed within engineered fills. Due to limited cleared space at the site, the infiltration bed had to be located within 30 m, but no closer than 15 m, to Wolfe Lake.

We also designed the electrical and mechanical systems for the new visitor centre. To ensure the systems were installed as per the specifications, members of our design team regularly visited the site during construction.

The new facility opened to the public in Fall 2018 and it is expected to serve thousands of visitors annually.

## CORE PROJECT TEAM

David Richards, *P.Eng., MBA*  
Ken Carson, *P.Eng.*  
Jacob Beam, *P.Tech.*  
Andy MacVey, *P.Eng.*  
Ryan Gosson, *P.Eng.*  
Matthew Alexander, *P.Geo., Ph.D., EP*

Mechanical Engineer, Project Manager  
Electrical Engineer  
Electrical Support  
Geotechnical Engineer  
Mechanical Engineer  
Senior Environmental Scientist

## SCOPE OF SERVICES PROVIDED

### *Electrical Design*

- Designed lighting, power distribution, communications, and heating systems

### *Mechanical Design*

- Designed the ventilation and plumbing systems for the facility
- Designed the new septic system to conform with the criteria outlined in the On-Site Sewage Disposal Regulation [88-200] of the New Brunswick *Public Health Act*
- Oversaw the construction and installation process

### *Geotechnical Investigation*

- Completed several test pits on the site to characterize the underlying soil conditions for the building and septic system

### *Environmental Permitting*

- Secured a watercourse and wetland alteration permit to allow the installation of the septic field within 30 m of Wolfe Lake

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# Oakwood Avenue Hoarder

DARTMOUTH, NOVA SCOTIA

INDOOR AIR QUALITY  
INVESTIGATION,  
PHASE I, II, AND III  
ENVIRONMENTAL SITE  
ASSESSMENT (ESA)

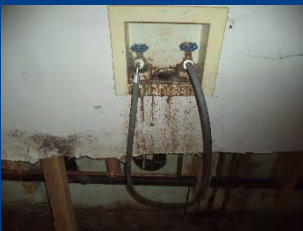
AND

REMEDIAL ACTION PLAN  
AND MANAGEMENT OF  
CONTAMINATED SITES



## PROJECT DATES

- November 2016 – Indoor air quality investigation and modified Phase I ESA
- May 2017 – Phase II ESA
- September 2017 – Phase III ESA



## CLIENT REFERENCE

Ms. Shelly Webb  
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## PROJECT OVERVIEW

Hoarder houses are some of the most difficult jobs mentally and health and safety-wise for our staff to complete. One such case involved a hoarder who was living in his electric car in the garage because his home had become squalid. Following numerous neighbor complaints, the Fire Department attended and deemed the one-storey single-family 1960s residence uninhabitable until remedial measures were undertaken to improve interior conditions.

Fundy Engineering visited the property after the majority of the interior household contents were removed. Power was on at the residence, but the furnace, domestic water, and sanitary sewer had been shut-off. Water had at one-time or several times flooded the basement. Although the gyproc had been removed in the past to the highest level of the flooding, the cause of the flooding, or part of the systemic flooding, had not been remedied.

Indoor air quality sampling revealed elevated concentrations of microbes prohibiting occupation. Moisture levels of structural materials and humidity levels were well above recommended values and promoted microbial growth. During the air quality sampling, strong hydrocarbon odours were present in the basement near the heating oil tank and staining was observed. Review of historical records indicated that in the past, heating oil had leaked from the fuel filter located between the tank and furnace.

## CORE PROJECT TEAM

Rob Haineault, *P.Eng.*  
Greg Derrah, *P.Tech., CESA*  
Greg Hoyt, *CET, WRT*  
Steve Little, *P.Tech., CESA*

Environmental Engineer  
Environmental Technologist  
Air Quality Sampling  
GIS Specialist

During the Phase II and III ESA work, Fundy Engineering identified soils below the slab foundation with hydrocarbon concentrations in excess of the Nova Scotia Environment (NSE) Tier I Environmental Quality Standards (EQS). To delineate the hydrocarbon contamination in the subsurface we drilled several boreholes / monitoring wells around the house. We sampled the groundwater and determined that hydrocarbon concentrations were below the NSE Tier I EQS. We provided the client with a proposal to undertake a remedial action plan, but at this point the contaminated site is being managed.

## SCOPE OF SERVICES PROVIDED

### *Indoor Air Quality Sampling*

- Conducted microbial sampling and moisture, and humidity measurements
- Provided several recommendations for remediating mould and moisture

### *Environmental Site Assessments*

- Completed Phase II and III ESAs to identify and delineate potential environmental issues at the site

### *Remedial Action Plan*

- Risk management of the site continues

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Saint John, NB • Clyde River, PE





# Monobuoy Replacement

MISPEC POINT, NEW BRUNSWICK

## ENVIRONMENTAL PERMITTING



## PROJECT DATES

- January 2017 – Project kick-off
- February and March 2017 – Development of permitting roadmap
- April 2017 to August 2018 – Meeting with regulators and stakeholders and securing environmental permits
- August and September 2018 – Contractor environmental protection orientation
- 28 October 2018 – Monobuoy offloaded first crude carrier

## CLIENT REFERENCE

Mr. Chris Cunningham, *P.Eng.*  
Project Manager  
Engineering and Projects  
340 Loch Lomond Road  
Saint John, NB  
E2L 4H6

☎: 506.333.8876

✉: chris.cunningham@irvingoil.com

## PROJECT OVERVIEW

Irving Oil Limited (IOL) owns and operates the Canaport™ Crude Receiving Terminal at Mispec Point in Saint John, New Brunswick. Commissioned in 1970 as the western hemisphere's first deep-water crude terminal, the facility is capable of offloading crude from ultra large crude carriers. The crude carriers are offloaded one at a time via a monobuoy connected to shore by a 1.3 km subsea pipeline. The monobuoy is a critical component of IOL's refining process.

Fundy Engineering was tasked with obtaining all environmental permits necessary to replace the 1988 second-generation monobuoy with a new state-of-the-art monobuoy to ensure crude feed rates at the refinery in east Saint John remain stable and uninterrupted.

Replacement of the second-generation monobuoy required IOL to obtain several Provincial and Federal permits and authorizations. Those included: a Navigable Waters Protection Permit; Authorization from the Harbour Master; a Migratory Birds Capture and Handling Permit; an Approval to Construct; and an Amended Approval to Operate. A Project-specific environmental protection plan was developed for the contractor to use while conducting the replacement work.

Because the monobuoy is located in an area of Saint John Harbour where an active lobster fishery is located, discussions were conducted well in advance of the work with local fishers. This was done to identify concerns and mitigate them during the permitting process and buoy replacement work.

## CORE PROJECT TEAM

Tim Ryan, *M.Eng., P.Eng.*  
Matthew Alexander, *P.Geo., Ph.D., EP*  
Stephen Little, *P.Tech., CESA*  
Bryan Morse, *M.Sc., Ph.D., EPT*

Project Manager  
Senior Environmental Scientist  
GIS Specialist  
Environmental Scientist

## SCOPE OF SERVICES PROVIDED

### *Environmental Permitting Roadmap*

- A project description was developed to prepare a permitting roadmap

### *Regulatory and Stakeholder Consultations*

- Consultations were undertaken to make those affected / had jurisdiction over the project aware of the replacement work

### *Environmental Permits*

- We prepared the necessary applications for securing environmental permits

### *Environmental Protection*

- A detailed environmental protection plan was developed for the project, which was used by the contractor



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# Violet Solar Farm

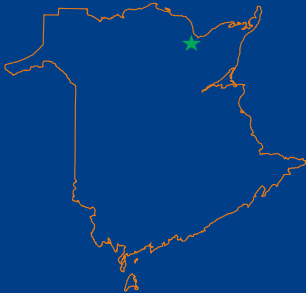
BRUNSWICK MILLS, NEW BRUNSWICK

ENVIRONMENTAL  
CONSTRAINTS MAPPING,  
ENVIRONMENTAL  
IMPACT ASSESSMENT  
(EIA),  
AND  
PUBLIC, STAKEHOLDER,  
AND REGULATORY  
CONSULTATIONS



## PROJECT DATES

- 2018 – Baseline data collection, preliminary design, and EIA document preparation
- July 2019 – EIA registration
- Summer and Fall 2019 – Public, stakeholder, and regulatory consultations
- February 2020 – EIA approval



## CLIENT REFERENCE

Mr. Fraser Forsythe, *P.Eng.*  
Director  
C2 Solar Ltd.  
2151 Sandy Point Road  
Saint John, NB E2K 5H4

☎: 506.639.6200  
✉ forsythe@rogers.com

## PROJECT OVERVIEW

C2 Solar Ltd., a renewable energy start-up company, contracted Fundy Engineering to obtain EIA approval for their project that would see Atlantic Canada's first utility-scale solar farm be built and operated. Their clean, renewable energy Violet Solar Farm will help New Brunswick in its transition to a low-carbon economy. At 10 MW, Phase One of the project will supply green energy to at least 2 000 homes. Over 25 years, the solar farm will have a net carbon offset of about 83 000 tonnes.

The EIA process involved assessing the existing physio-chemical, biological, and socio-economic environment so that potential impacts could be identified. Where the project could potentially impact the environment, mitigation measures were established through an environmental protection plan to limit potential impact. For example, Phase One of the solar farm was shifted slightly within the property boundaries in order to avoid impacting a watercourse.

The Pabineau First Nation is located in close proximity to the project site. As rightsholders in the area, First Nations were consulted and their approval was obtained for the project to proceed. The EIA process also included a public involvement component. This was to ensure that individuals and groups potentially affected by the project were able to express any and all concerns. Because solar is new to the area, several presentations were made to regulatory authorities to assist with their overall understanding of the project.

## CORE PROJECT TEAM

Tim Ryan, *M.Eng., P.Eng.*  
Matthew Alexander, *Ph.D., P.Geo. EP*  
Crystal Caines, *P.Tech., PMP*  
Stephen Little, *P.Tech., CESA*  
Bryan Morse, *M.Sc., Ph.D., EPT*

Senior Project Manager  
Senior Environmental Scientist  
Project Manager  
GIS Specialist  
Environmental Scientist

## SCOPE OF SERVICES PROVIDED

### *Environmental Constraints Mapping*

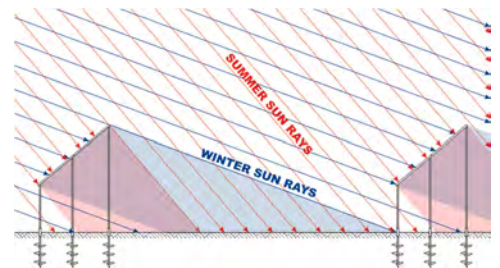
- Field and desk-top studies were completed to determine baseline environmental conditions and to identify potentially sensitive environmental receptors to avoid for site layout

### *Environmental Impact Assessment*

- All electric power generating facilities exceeding 3 MW trigger EIA review and we completed the impact assessment process for the project

### *Public, Stakeholder, and Regulatory Consultations*

- Direct stakeholder communications, communications with potentially affected residents, and public notices were completed and summarized in a report
- Several presentations were also conducted with various regulatory authorities to assist them in understanding the project



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PHASE I  
ENVIRONMENTAL SITE  
ASSESSMENT

MECHANICAL  
ENGINEERING,

ELECTRICAL  
ENGINEERING

AND

ENERGY AUDIT



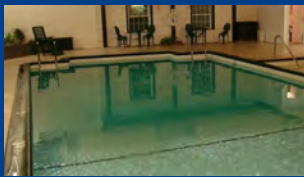
# Former Colonial Inn

SAINT JOHN, NEW BRUNSWICK



## PROJECT DATES

- July 2017 – Site visit for Phase I ESA data collection
- August & September 2017 – Preparation of Phase I ESA report
- October 2017 – Phase I ESA report issued to client
- February 2018 – Site visit for energy audit data collection
- March 2018 – Energy Audit report issued to client



## CLIENT REFERENCE

Mr. Paul Moffett, *MBA, CIRP, LIT*  
Project Manager  
Powell Associates Ltd.  
55 Drury Cove Road  
Saint John, NB  
E2H 2Z4

☎: 506.433.0096

✉: pmoffett@maritimetrustee.com

## PROJECT OVERVIEW

The former 96-room Colonial Inn on City Road in Saint John, which was originally built in the 1930s and underwent major renovations in the 1970s, was saved from the wrecking ball when Ontario developers purchased the property in late 2017. Fundy Engineering was contracted at the outset to assist with the developers' revitalization of the property.

During our review of the property, we did not identify any actual environmental concerns; however, several potential concerns were identified associated with the historical land-use, adjacent property land-use, underground storage tanks, and several hazardous materials.

The energy audit identified several opportunities for the owners to act upon in order to improve and / or enhance the energy performance of the hotel. Those opportunities included adding insulation and replacing windows. Once renovations began, it was clear that the facility's electrical and mechanical components required to be completely renewed in order to meet National Building Code requirements. As a result, we designed the required mechanical and electrical upgrades to meet those requirements.

After undergoing major renovations, the hotel opened in November 2018 under the Days Inn banner.

## CORE PROJECT TEAM

Greg Derrah, *P.Tech., CESA*  
Stephen Little, *P.Tech., CESA*  
Hector Lamprea, *P.Eng., P.E., CEM*  
Ryan Gosson, *P.Eng.*  
Greg Hoyt, *CET, WRT*  
Ken Carson, *P.Eng.*  
Azadeh Majdi, *EIT*  
Seun Ijaola, *EIT, PMP*

Environmental Technologist  
GIS Specialist  
Energy Efficiency Engineer  
Mechanical Engineer  
Drafting  
Electrical Engineer  
Electrical Engineering Support  
Electrical Engineering Support

## SCOPE OF SERVICES PROVIDED

### *Environmental Site Assessment*

- Completed a Phase I ESA to identify and delineate potential environmental issues at the site

### *Mechanical and Electrical Engineering*

- Designed ventilation systems for the lobby, pool area, ballroom, corridors, and kitchen
- Designed a new electrical entrance

### *Energy Audit*

- Analyzed utility data, modelled energy use, and estimated potential energy savings under various scenarios



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# Burchill Wind Farm

SAINT JOHN, NEW BRUNSWICK

ENVIRONMENTAL  
CONSTRAINTS MAPPING,  
ENVIRONMENTAL  
PERMITTING ROADMAP,  
AND  
WIND TURBINE SETBACK  
OPTIMIZATION



## PROJECT DATES

- Fall 2017 – Conducted environmental constraints mapping
- December 2017 – Environmental permitting roadmap issued
- Winter 2017 / 2018 – Completed a wind turbine setback jurisdictional review and regulatory consultations
- April 2018 – Wind turbine setback optimization report issued

## CLIENT REFERENCE

Mr. Ryan Mitchell, *P.Eng., MBA*  
VP Engineering & Operations  
Saint John Energy  
325 Simms Street  
PO Box 850  
Saint John, NB E2L 4C7

☎: 506.658.5252  
✉ ryan.mitchell@sjenergy.com

## PROJECT OVERVIEW

Fundy Engineering was contracted by Saint John Energy to build upon the Province's renewables sector. We completed environmental pre-screening and due-diligence regarding environmental constraints and future permitting requirements for a ten turbine, 40 MW+ wind farm in west Saint John. Through our work, we identified several constraints to siting the wind farm on lands in west Saint John. The three environmental features that constrained siting the wind turbines the most on the property were: watercourses and wetlands; public roads; and telecommunications towers.

In reviewing 70 Canadian and American jurisdictions for wind turbine setbacks, it was determined that New Brunswick has the most stringent setbacks. Furthermore, it was identified that there are five setbacks unique to New Brunswick. Although regulatory authorities believe that the Province is a leader in establishing wind turbine setbacks, there needs to be an appropriate balance between environmental protection and wind energy development.

Construction and operation of the wind farm will require several regulatory permits. In September 2019, Saint John Energy announced a partnership with Natural Forces, a Halifax-based renewable energy company, to build and operate the Burchill Wind Farm. An environmental impact assessment was submitted by Natural Forces for provincial review in February 2020.

## CORE PROJECT TEAM

Tim Ryan, *M.Eng., P.Eng.*  
Matthew Alexander, *Ph.D., P.Geo. EP*  
Crystal Caines, *P.Tech., PMP*  
Stephen Little, *P.Tech., CESA*  
Bryan Morse, *M.Sc., Ph.D., EPT*

Senior Project Manager  
Senior Environmental Scientist  
Project Manager  
GIS Specialist  
Environmental Scientist

## SCOPE OF SERVICES PROVIDED

### *Environmental Constraints Mapping*

- Field and desk-top studies were completed to determine baseline environmental conditions and to identify potentially sensitive environmental receptors

### *Environmental Permitting Roadmap*

- Identified all of the municipal, provincial, and federal permits that would be required to construct and operate a wind farm

### *Wind Turbine Setback Optimization*

- Reviewed wind turbine setbacks from environmentally-sensitive receptors for 70 Canadian and American jurisdictions and compared them to New Brunswick's setbacks
- Conducted consultation sessions with various New Brunswick regulators to gain an understanding of how the Province's wind turbine setbacks were established
- Identified options for optimizing New Brunswick's wind turbine setbacks to provide an appropriate balance between environmental protection and wind energy development

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# St. Andrews Biological Station Energy Audits

ST. ANDREWS, NEW BRUNSWICK



## ENERGY AUDITS



## PROJECT DATES

- January 2018 – Project kick-off and coordination
- January and February 2018 – Site visits, desktop data review, and detailed energy modelling
- March 2018 – Final report binder issued to Client



## CLIENT REFERENCE

Ms. Tasha Andrews, Manager  
Facilities Management and  
Accommodation  
Fisheries and Oceans Canada  
50 Discovery Drive  
Dartmouth, Nova Scotia  
B2Y 4A2

☎: 902.292.0641  
☎: 902.426.6501

## PROJECT OVERVIEW

Founded in 1908, the St. Andrews Biological Station (SABS) is Atlantic Canada's oldest permanent marine research facility. Situated on the shores of Passamaquoddy Bay, science conducted at the SABS campus encompasses the Bay of Fundy and Gulf of Maine as well as coastal ecosystems and traditional fisheries in Nova Scotia and Prince Edward Island. In 2012, SABS underwent a major renovation and opened a new science building and wet laboratory.

Fundy Engineering was contracted by SABS to undertake comprehensive energy audits for 18 buildings on the campus in support of the Federal Government's greenhouse gas reduction strategy. The objective of Fundy Engineering's work was to provide a master plan that included identifying equipment life expectancy, estimating annual energy consumption, suggesting renewable energy technologies, estimating probable costs for retrofits, assessing annual energy savings for retrofits, and approximating simple payback periods for retrofits.

To complete the audits, we formed an integrated engineering team. Detailed site visits were performed to assess building envelopes, which primarily involved reviewing heating, ventilation, and air-conditioning equipment, and inspecting lighting systems. All of the collected data were used to complete power analyses for the various buildings. We also identified numerous upgrades for SABS to undertake to reduce overall annual energy consumption.

## CORE PROJECT TEAM

Hector Lamprea, *P.Eng., P.E., CEM*  
Seun Ijaola, *P.Eng., PMP*  
Shelby Gallant, *P.Tech.*  
Jacob Beam, *P.Tech.*

Energy Efficiency Engineer  
Electrical Engineer  
Project Management  
Electrical Support

## SCOPE OF SERVICES PROVIDED

- Systems inspections
- Data collection and review
- Analysis of building utility data
- Building envelope assessments
- Analysis of building mechanical and electrical equipment
- Heating plant surveys and system measurements
- Data analysis and energy modelling
- Estimating potential energy savings under various scenarios



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# Delong Drive C&D Debris Disposal Site

MONCTON, NEW BRUNSWICK

ENVIRONMENTAL  
COMPLIANCE  
AUDITING  
AND  
ENVIRONMENTAL  
MONITORING



## PROJECT DATES

- 2018 – First round of bi-annual monitoring
- 2019 – Second round of bi-annual monitoring



## PROJECT OVERVIEW

Construction and Demolition (C&D) debris disposal sites are used for managing waste materials generated during the construction, renovation, and demolition of buildings, roads, bridges, and other infrastructure. In New Brunswick, C&D sites operate under strict approvals, including an Approval To Operate (ATO), from the New Brunswick Department of the Environment and Local Government. Fairlanes Ltd. contracted Fundy Engineering to provide environmental compliance auditing for a C&D debris disposal site along Delong Drive in Moncton, New Brunswick.

Environmental compliance auditing for the C&D site includes the biannual sampling of surface water and groundwater. Samples were collected from existing on-site monitoring wells and surface water features while measuring several parameters in the field, such as temperature, dissolved oxygen, and conductivity. The collected samples were submitted to an accredited laboratory for analysis of parameters outlined in the site's ATO including petroleum hydrocarbon constituents, chemical oxygen demand, general chemistry, and trace metals.

Laboratory results were compared against the thresholds identified in the ATO. Results were also compared between sampling events in order to identify any trends. To date, all results for samples collected by Fundy Engineering have been consistent with results recorded by others and parameters assessed have been below the ATO thresholds.

## SCOPE OF SERVICES PROVIDED

- Surface water sampling
- Developed groundwater wells for sampling
- Groundwater sampling
- Assessed laboratory sampling results to identify trends between sampling events and to compare against allowable thresholds
- Provided client with reports suitable for regulatory submission



## CLIENT REFERENCE

Mr. Larry Kinden, *CPA, CGA*  
Chief Operating Officer  
Fairlanes Ltd.  
Moncton, NB E1C 1W6

☎: 506.850.8049  
✉: lkinden@heritagemanagement.ca

## CORE PROJECT TEAM

Tim Ryan, *M.Eng., P.Eng.*  
Greg Derrah, *P.Tech, CESA*  
Lindsay Cail, *GIS*

Project Manager  
Environmental Technologist  
GIS Support

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# Market Slip Dredging

SAINT JOHN, NEW BRUNSWICK

GEOTECHNICAL  
INVESTIGATION,  
COST-ESTIMATE AND  
TENDER PACKAGE  
DEVELOPMENT,  
ENVIRONMENTAL  
PERMITTING,  
AND  
PROJECT MANAGEMENT



## PROJECT DATES

- Summer 2019 - Geotechnical investigation
- Fall 2019 and Winter 2020 – Cost-estimating, tender package development, and environmental permitting
- Spring 2020 – Dredging of Market Slip



## CLIENT REFERENCE

Mr. Samir Yammine, *P.Eng.*  
City of Saint John  
15 Market Square  
PO Box 1971  
Saint John, NB E2L 4L1

☎: 506.648.4667

✉: samir.yammine@saintjohn.ca

## PROJECT OVERVIEW

Dredging of slips within Saint John Harbour is required every several years. Prior to 2020, Market Slip was last dredged in 2004. During that time, sediment built up via natural siltation to the point where maintenance dredging was required.

The City of Saint John contracted Fundy Engineering to oversee the dredging project. The first part of the process involved assessing the current depths within Market Slip. Once those data were available, a cost-estimate was prepared for representatives of the City of Saint John to determine if the project was feasible. We also prepared a tender package for contractors to bid the work and obtained various environmental permits to allow the work to be completed.

The dredging of Market Slip was somewhat unique because it was done by building a road out into the water that could be worked from during low tides. Once dredge depths were achieved, the roadway was removed leaving behind a deepened waterway.

About 3 000 m<sup>3</sup> of material was removed from Market Slip in spring 2020 and placed within a lined disposal cell in west Saint John. Water depths are now able to accommodate visiting recreational vessels and pleasure craft. An agreement between the City of Saint John and Port Saint John will see annual maintenance dredging done over the next 12 years.

## CORE PROJECT TEAM

Gordon Mouland, *M.Eng., P.Eng., P.E.*  
Matthew Alexander, *Ph.D., P.Geo. EP*  
Robert Hunt, *CTech.*  
Josh Cosman, *EIT*

Senior Geotechnical Engineer  
Senior Environmental Scientist  
Design and Drafting  
Geotechnical Technologist

## SCOPE OF SERVICES PROVIDED

### *Geotechnical Investigation*

- A geotechnical investigation was conducted to determine the existing soil depths within Market Slip

### *Cost-Estimate and Tender Package*

- A cost-estimate to complete the work was provided to the City of Saint John prior to issuing the tender package that was prepared for contractors to bid on the dredging contract

### *Environmental Permitting*

- Secured the necessary federal, provincial, and municipal permit and authorizations required to complete the dredging

### *Project Management*

- Managed the project on behalf of the City of Saint John to ensure the dredging was completed as per the contract



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# Woodwards Cove Harbour Design

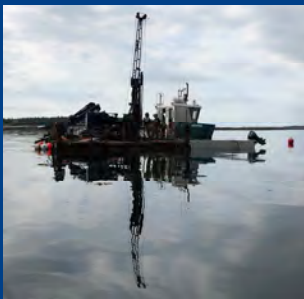
GRAND MANAN, NEW BRUNSWICK

DESIGN  
RECOMMENDATIONS,  
ENVIRONMENTAL  
PERMITTING ROADMAP,  
AND  
GEOTECHNICAL  
INVESTIGATION



## PROJECT DATES

- Winter and Spring 2019 – Design recommendations and environmental permitting roadmap
- Summer 2019 - Geotechnical investigation, conceptual plan development and cost-estimating



## PROJECT OVERVIEW

The Grand Manan Harbour Authority (GMHA) operates six harbour facilities in Grand Manan. Woodward's Cove is the largest of those facilities, but was closed to access in 2000 because the timber structure became unsafe for use. Recognizing the dilapidated condition of the fisherman's wharf in Woodward's Cove and the need for safe harbour facilities, the GMHA and Atlantic Canada Fish Farmers Association contracted Fundy Engineering to prepare conceptual designs for a new harbour.

The conceptual harbour design included rock breakwaters surrounding a basin that would be dredged to - 3.0 m to allow use during low tide. By installing floating wharves, there would be space within the harbour for about 30 skiffs / scows, 42 small boats, and 48 large boats. A marginal wharf, road, and 178 space parking lot constructed adjacent to the harbour would provide land access and storage.

The environmental permitting roadmap was completed to identify all of the regulators with jurisdiction over the conceptual design should it move forward.

A geotechnical investigation was completed to assess the subsurface soil and bedrock conditions. That information was used to develop a cost-estimate for undertaking dredging work and constructing the breakwater.

## CORE PROJECT TEAM

Gordon Mouland, *M.Eng., P.Eng., P.E.*  
Alex Mouland, *P.Eng., PMP*  
Robert Hunt, *CTech.*  
Josh Cosman, *EIT*

Senior Geotechnical Engineer  
Project Manager  
Design and Drafting  
Geotechnical Technologist

## SCOPE OF SERVICES PROVIDED

### *Design Recommendations*

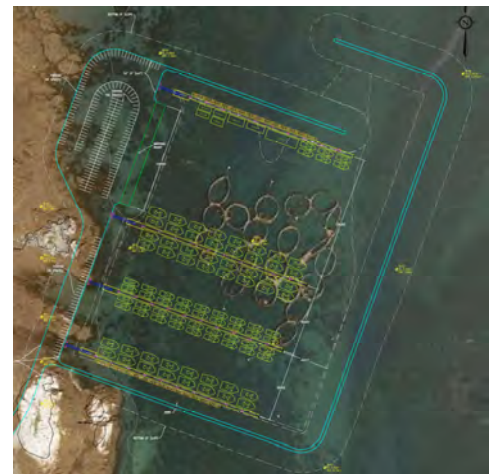
- Based on information collected during a previous study, a conceptual plan was developed for the harbour that would suit the majority of intended users

### *Environmental Permitting Roadmap*

- A roadmap that identified the local, provincial, and federal permits, authorizations, and approvals required to undertake the work was generated

### *Geotechnical Investigation*

- A geotechnical investigation was conducted to assess the subsurface soil and bedrock conditions for constructing a breakwater



## CLIENT REFERENCE

Mr. Skip Cormier  
Cormier Management Consulting  
35 Rowan Berry Terrace  
Saint John, NB E2K 4R3

☎: 506.632.1899

✉: skipcormier@rogers.com

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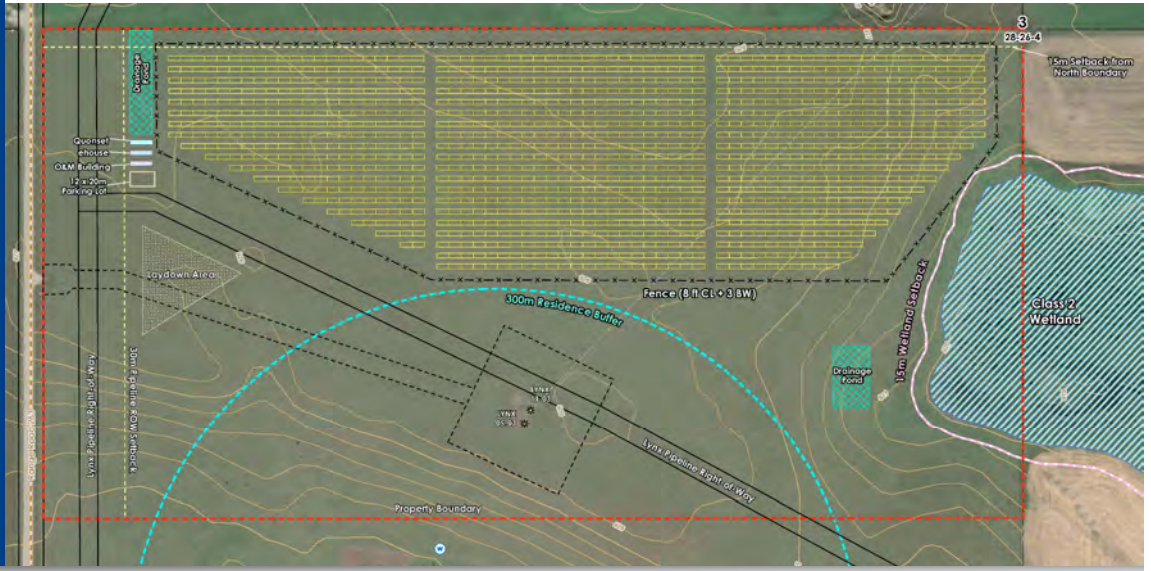




# Southern Alberta Utility Solar Projects

BASSANO AND IRRICANA, ALBERTA

## STORM WATER MANAGEMENT DESIGN



## PROJECT DATES

- May and June 2019 – Storm water management plan design and modelling
- July 2019 – Design submission



## PROJECT OVERVIEW

In collaboration with our Alberta partner Summit Liability Solutions Inc., Fundy Engineering developed Storm Water Management Plans (SWMP) for two proposed solar farms. The first solar farm, a 5 MW photovoltaic solar grid-tied installation, was proposed for Irricana, while an 11.3 MW solar farm was proposed for Bassano. The purpose of a SWMP is to evaluate the existing and post-development site conditions from a storm water runoff perspective and to design civil engineering solutions to control surface runoff as required. With respect to solar farms, a third scenario, the interim / construction phase, is also considered as this generally represents the most critical hydrologic site impact.

Hydrologic modeling was undertaken for the existing site conditions, as well as the proposed interim and post-development site layouts. The modelling was completed using the well-recognized US Army Corps of Engineers Hydrologic Modelling System (HEC-HMS) software.

Detention basins were designed to limit the storm water runoff to existing peak 1 in 100 discharges during construction. Natural overland sheet flow, grassed waterways, and infiltration berms were included in the designs. In addition to helping control storm water runoff, those features promote the removal of suspended sediment in the water. Monitoring of the water quality from the water discharged from the detention basins was recommended as part of the erosion and sediment control plan.

## CORE PROJECT TEAM

Tim Ryan, *M.Eng., P.Eng.*  
Rob Haineault, *P.Eng.*  
Matthew Alexander, *Ph.D., P.Geo. EP*

Senior Project Manager  
Senior Engineer  
Senior Technical Specialist

## SCOPE OF SERVICES PROVIDED

- Reviewed relevant site information, such as figures and reports, to form the basis of the study
- Completed hydrological modeling to determine the peak discharge and design volume for three site conditions:
  - existing
  - interim / construction
  - and post-development
- Used the modelling results to develop a SWMP to accommodate / attenuate any increase in storm water generated by the construction and operation of the solar farm
- Developed an erosion and sediment control plan primarily for construction



## CLIENT REFERENCE

Mr. Tony Smith  
Irricana Power Generation  
Suite 2250  
1078 - 6 Avenue Southwest  
Calgary, AB T2P 5N6

☎: 403.615.7494  
✉ ahs.tonymsmith@gmail.com

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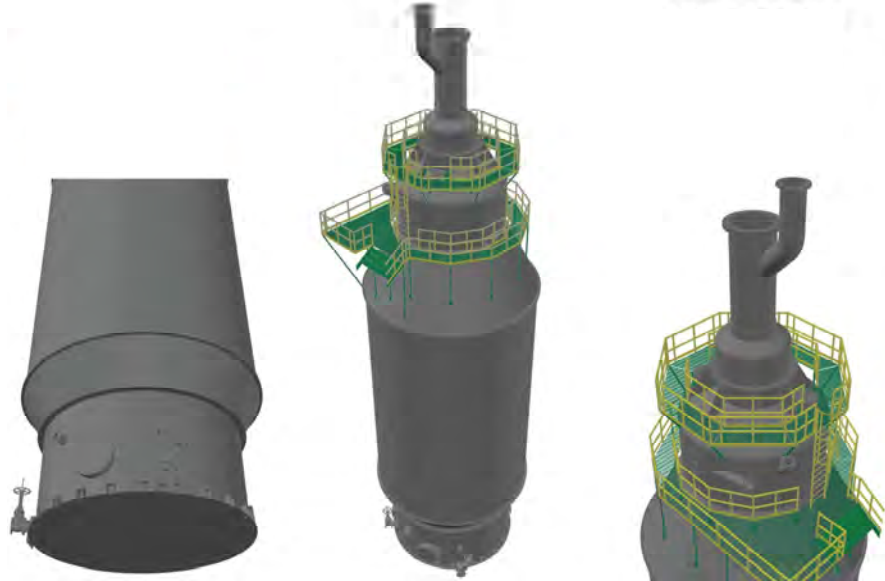




# AV Group Blow Tank #2

NACKAWIC, NEW BRUNSWICK

**BUILDING SYSTEMS  
DESIGN (MECHANICAL  
AND ELECTRICAL)**



## PROJECT DATES

- Summer and Fall 2019 – Prepared design drawings for new blow tank
- November 2019 – Issued drawings for construction



## PROJECT OVERVIEW

Fundy Engineering's Building System team has designed various systems for AV Group's dissolving grade pulp mill in Nackawic, New Brunswick. One of the more interesting projects we worked on was with MQM Quality Manufacturing Ltd. on the design of a new blow tank. During the manufacture of pulp, wood chips are blown to an atmospheric collection tank after being cooked in a digester. That collection tank is referred to in the industry as a blow tank.

A maintenance upgrade was required for one of the blow tanks at the mill; however, there were no drawings available for that original tank. Therefore, Fundy Engineering undertook detailed three-dimensional (3D) surveys of the existing blow tank in order to incorporate those measurements into the design of a new blow tank. The surveys were complex as the blow tank was located in a congested area of the operating mill. We worked closely with several other consultants to provide MQM with a design package so that they could manufacture the new blow tank. Fabrication of that blow tank began at the mill site in January 2020.

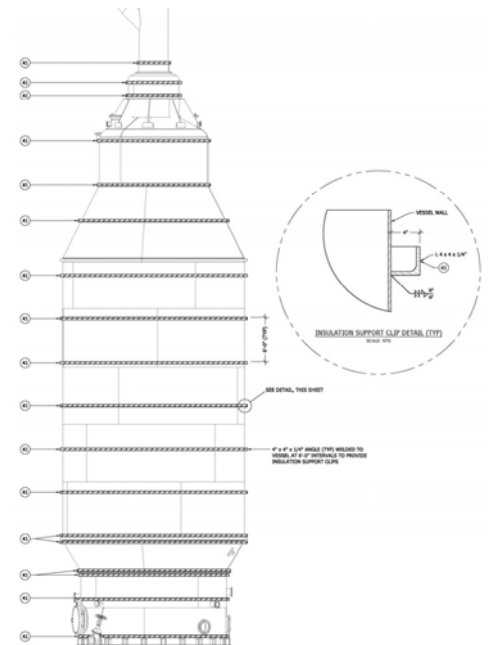
Through this job, Fundy Engineering was able to showcase our 3D rendering talent to AV Group personnel.



## SCOPE OF SERVICES PROVIDED

### Blow Tank #2

- Undertook 3D surveys for one of the existing blow tanks
- Provided mechanical system design drawings and specifications for a new blow tank at the mill, which included 3D renderings



## CLIENT REFERENCE

Mr. Serge Theriault  
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## CORE PROJECT TEAM

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Mechanical Engineer  
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# Monobuoy Anchor Chain Replacement

MISPEC POINT, NEW BRUNSWICK

## ENVIRONMENTAL PERMITTING



## PROJECT DATES

- May 2020 – Project kick-off and development of permitting roadmap
- June 2020 – Meeting with regulators and stakeholders and securing environmental permits
- August 2020 – Crude oil offloading halted at Monobuoy while anchor chains replaced
- September 2020 – Offloading resumed at Monobuoy



## CLIENT REFERENCE

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## PROJECT OVERVIEW

Irving Oil Limited (IOL) owns and operates the Canaport™ Crude Receiving Terminal at Mispec Point in Saint John, New Brunswick. Commissioned in 1970 as the western hemisphere's first deep-water crude terminal, the facility is capable of offloading crude from ultra large crude carriers. The crude carriers are offloaded one at a time via a monobuoy connected to shore by a 1.3 km subsea pipeline. The monobuoy is a critical component of IOL's refining process.

The monobuoy is moored to the seabed using eight heavy pre-tensioned 92 mm stud link anchor chains placed radially on the seafloor. This allows the buoy to move freely within defined limits for wind, waves, current, and tanker conditions. Over time, the monobuoy's anchor chains wear and the wear is more prominent near the surface where the buoy moves with the tides.

Fundy Engineering was tasked with obtaining the environmental permits necessary to replace the upper half on six of the monobuoy's eight anchor chains. Permitting required authorization from the Harbour Master, sign-off from the Department of Fisheries and Oceans, and sign-off from Transport Canada. The New Brunswick Department of the Environment was also consulted as were local fishers who use the area. To mitigate potential environmental impacts during the anchor chain replacement, a Project-specific environmental protection plan was developed for the contractor to use while conducting the replacement work.

## CORE PROJECT TEAM

Tim Ryan, *M.Eng., P.Eng.* Project Manager  
Matthew Alexander, *P.Geo., Ph.D., EP* Senior Environmental Scientist

## SCOPE OF SERVICES PROVIDED

### *Environmental Permitting Roadmap*

- A project description was developed to prepare a permitting roadmap

### *Regulatory and Stakeholder Consultations*

- Consultations were undertaken to make those affected / had jurisdiction over the project aware of the replacement work

### *Environmental Permits*

- We prepared the necessary applications for securing environmental permits

### *Environmental Protection*

- A detailed environmental protection plan was developed for the project, which was used by the contractor



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# Aquaculture Technical Due Diligence

NORTH AMERICA, SOUTH AMERICA, CENTRAL AMERICA, AND EUROPE

## OPERATIONAL ASSESSMENTS



## PROJECT DATES

- Winter 2020/2021 - Development of workstreams and comprehensive asset checklists
- Spring 2021 – Asset visits and assessments
- July 2021 – Report issued to Client



## CLIENT REFERENCE

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## PROJECT OVERVIEW

Fundy Engineering in partnership with SIMCorp conducted a due diligence exercise to support an investment decision by the Crown Corporation Public Sector Pension Investments Board. The exercise was completed for a cross-section of a global portfolio of integrated aquaculture and seafood businesses. The cross-section of assets assessed included two feed mills, one broodstock holding facility, five hatcheries, 37 on-grow sites, a shipyard, 18 vessels, and 15 seafood processing facilities.

The assets were evaluated against a dozen technical, operational, environmental, sustainability, and governance workstreams developed in collaboration with the Client. Given the various skill sets required to conduct the due-diligence, the global extents of the assets, and the complications for travel because of the COVID-19 global pandemic, approved specialty subconsultants were engaged.

Comprehensive due-diligence checklists were developed for each asset type and each applicable workstream. Use of those checklists ensured a consistent set of data were collected regardless of the sub-consultant that completed the work and geographical location. The report issued to the Client included snapshots for each asset assessed. It also identified instances of noteworthy performance, potential risks and areas for improvement for the assets.

## CORE PROJECT TEAM

Tim Ryan, *M.Eng., P.Eng.*  
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Lindsay Cail, *P.Tech.*

Project Coordinator  
Project Manager  
Senior Environmental Scientist  
Environmental Technologist  
GIS Specialist

## SCOPE OF SERVICES PROVIDED

### *Technical and Operational Workstreams*

- Upstream operations and hatcheries fish health
- Aquaculture farming infrastructure
- Farm numbers, health, and reproduction
- Quotas and fishing methods
- Vessel maintenance and technology
- Fish processing and logistics
- Marketing and sales

### *Environment, Sustainability, and Governance Workstreams*

- Aquaculture and wild catch certifications
- Product stewardship and food safety
- Environmental review
- Community relations and labour market
- Worker health and safety



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## SURFACE WATER MANAGEMENT PLAN



## Former Sour Gas Plant Surface Water Management Plan

BALZAC, ALBERTA



### PROJECT DATES

- May 2022 – Contract awarded
- Summer and Fall 2022 – Meetings with various stakeholders and development of three-dimensional models
- December 2022 – Conceptual surface water management plan submitted



### CLIENT REFERENCE

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### PROJECT OVERVIEW

Commercial quantities of natural gas were discovered in Balzac, Alberta in 1956. In 1961, a plant was built along the shoreline of McDonald Lake to process the sour gas collected from the developed wellfield. Although the sour gas plant and associated wellfield were closed in 2011, the onsite Balzac Power Station remains operational. Following decommissioning of the gas plant, the equipment and connected infrastructure was dismantled. Site reclamation began shortly thereafter. The Alberta Energy Regulator required a surface water management plan be developed by the site's owner as part of the reclamation process.

S2 Environmental contracted Fundy Engineering to assist with the preparation of a conceptual design as part of a surface water management plan for the ~ 170 ha site. Over a series of several months and using a variety of data sources, we developed a passive design for the surface water management plan. The conceptual plan limits the amount of cut and fill to only that necessary across the site to achieve the appropriate grades for water drainage and retention.

### SCOPE OF SERVICES PROVIDED

#### *Conceptual Surface Water Management Plan*

- Developing a conceptual plan for drainage and contours across the site while adhering to the Alberta Energy Regulator standards and while reducing the amount of land lost to management requirements
- Creating a net zero cut and fill plan
- Liaising with the Balzac Power Station operator on the future surface water management plan for that site
- Collaborating with the County of Rocky View on future site land-use designation
- Submitting the conceptual surface water management plan to the Alberta Energy Regulator



### CORE PROJECT TEAM

Tim Ryan, *M.Eng., P.Eng.*  
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# GEOTECHNICAL DUE DILIGENCE AND ENGINEERING

AND

# ENVIRONMENTAL DUE DILIGENCE



# North Head Harbour Blasting for Dredging

NORTH HEAD ON GRAND MANAN, NEW BRUNSWICK



## PROJECT DATES

- Spring and Summer 2021 - Pre-blast surveys
- Fall 2021 – Blast monitoring



## PROJECT OVERVIEW

North Head on Grand Manan is an active harbour that services the commercial fishery, aquaculture industry, and recreational users. Harbour improvements, comprising a new 20 m x 100 m marginal concrete wharf, dredging approximately 18 000 m<sup>2</sup> of class A material (bedrock), and installation of harbour floats began in early 2021 to improve safety and provide an adequate depth of water for vessel navigation and berthing. The removal of bedrock in the harbour required blasting. The blasting involved drilling boreholes and using explosive charges to break the bedrock.

Fundy Engineering completed pre-blast structural surveys on over 120 residential and commercial buildings within 600 m of the blasting work. The surveys were done to document the condition of the buildings before the start of blasting and included taking photographs and collecting water samples to assess groundwater quality.

During the blasting work within the harbour, seismographic monitoring was completed at residential and commercial buildings. For each blast, seismographs were placed at three different locations to monitor vibrations and over pressure to ensure the explosive charges used did not exceed the allowable blasting limits.

## SCOPE OF SERVICES PROVIDED

### *Pre-Blast Structural Surveys*

- Interviewing building occupants
- Documenting structures with photographs and notes
- Collection of water samples for analysis of microbiology and general chemistry

### *Blast Monitoring*

- Setting up seismographs to record vibrations and over pressured during the blasting work
- Reporting results to the regulator to ensure compliance with regulations



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## CORE PROJECT TEAM

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# North Head Harbour Dredged Materials Disposal Permitting

NORTH HEAD ON GRAND MANAN, NEW BRUNSWICK

## ENVIRONMENTAL PERMITTING

AND

## ENVIRONMENTAL MONITORING



### PROJECT DATES

- April 2021 – Contract awarded
- Fall 2021 – Permanent disposal approvals obtained for class B materials
- Fall 2022 – Permanent disposal approvals obtained for class A materials



### PROJECT OVERVIEW

North Head on Grand Manan is an active harbour that services the commercial fishery, aquaculture industry, and recreational users. Harbour improvements, comprising a new 20 m x 100 m marginal concrete wharf, dredging approximately 18 000 m<sup>2</sup> of class A material (bedrock) and 7 500 m<sup>3</sup> of class B material (sediment), and installation of harbour floats began in early 2021 to improve safety and provide an adequate depth of water for vessel navigation and berthing. Disposal of the dredged class A and class B material required environmental permitting.

Fundy Engineering was engaged by Greenfield Construction to obtain the environmental permits necessary for temporarily and permanently disposing of the dredged materials on land. The bedrock removed from the harbour was permanently disposed of at a construction and demolition site operated by the Village of Grand Manan. The silty sand and gravel class B material dredged from the harbour was temporarily placed on land adjacent to the harbour within a containment cell. Once that material was dewatered, it was transported offsite to a quarry on Grand Manan for use as cover material.

Testing was undertaken to ensure dredged materials were not contaminated and could be safely disposed of permanently. An environmental risk receptor assessment was also completed to ensure there would be no issues with material disposal.

### CORE PROJECT TEAM

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Project Manager  
Senior Geotechnical Engineer  
Civil Engineer  
Civil Works Technologist  
Environmental Technologist  
GIS Analyst

### SCOPE OF SERVICES PROVIDED

#### *Environmental Permitting*

- Evaluating and assessing suitability of disposal sites
- Preparing regulatory permit applications
- Securing regulatory permits

#### *Environmental Monitoring*

- Collecting rock and soil samples for analysis of general chemistry, heavy metals, and the presence of polyaromatic hydrocarbons, benzene, toluene, ethylbenzene, and xylenes
- Assessing potential risk to human and ecological receptors related to dredged materials disposal



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# St. Andrews Blockhouse Seawall Repairs

ST. ANDREWS, NEW BRUNSWICK

## ENVIRONMENTAL PROTECTION PLAN



## PROJECT DATES

- June 2021 – EPP development
- July and August 2021 – Seawall rehabilitation work completed



## PROJECT OVERVIEW

The St. Andrews Blockhouse was built by townspeople to protect them against American privateers and military personnel during the War of 1812. The original wooden blockhouse, the only remaining blockhouse in Canada from that War, was designated a National Historic Site in 1962 for its significant role in defence and for its 19<sup>th</sup> century military architecture.

The 1 hectare waterfront site is subjected to significant wave action and sea level rise, which both contribute to coastal erosion. In the 1960s, a stone seawall was constructed at the perimeter shoreline to protect the natural and cultural features of the site. In 1990, a significant project was undertaken to repair damages to that original seawall. Inspections in 2020 identified several deficiencies that could potentially result in the failure of the seawall if left unattended. Parks Canada in association with the Department of Fisheries and Oceans developed a rehabilitation design for the seawall.

In 2021, Fundy Contractors, Ltd. was awarded the tender to complete the shoreline protection and seawall repairs. Parks Canada, the administrator of the site, required that the rehabilitation work be completed in an environmentally-appropriate manner. Fundy Engineering was tasked with development an Environmental Protection Plan. The EPP was an essential component of the overall work because it stressed the importance of environmental protection standards and prescribed additional measures that had to be employed by the contractor to mitigate potential environmental effects.

## SCOPE OF SERVICES PROVIDED

*EPP Best-Management Practice Datasheets*

- Aquatic flora and fauna protection
- Archaeological discovery
- Equipment fueling
- Equipment maintenance
- Sanitary waste management
- Shoreline stabilization
- Silt fence
- Solid waste management
- Spill incident response
- Spill prevention and control
- Terrestrial flora and fauna protection
- Erosion and sedimentation control plan



## CLIENT REFERENCE

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# GHG Predictive Model and Emissions Calculator

ATLANTIC CANADA

## GREENHOUSE GAS (GHG) EMISSIONS ASSESSMENT, GHG EMISSIONS CALCULATOR, AND PROJECT MANAGEMENT



### PROJECT DATES

- Fall 2021 – Contract awarded
- Fall 2021 through Summer 2022 – Data collection and spreadsheet model development
- August 2022 – Draft report and spreadsheet model issued
- September 2022 – Final report and spreadsheet model issued
- October 2022 – Model presented at the ACFFA Fall Forum

### CLIENT REFERENCE

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### PROJECT OVERVIEW

The Atlantic Canada Fish Farmers Association (ACFFA) is constantly seeking to understand and improve the environmental sustainability of their industry. Understanding GHG emissions is necessary to navigate and propel the industry forward in a sustainable manner and knowledge of GHG emissions sources helps identify emissions mitigation measures. Improving efficiency and offsetting increases in production allows the industry to continue making an important contribution to global food security.

Fundy Engineering, with support from SIMCorp, developed a Microsoft Excel Spreadsheet model to allow ACFFA members to estimate GHG emissions from the operations. The *ACFFA Model* was developed based on the best-available ACFFA member data and literature data circa 2022.

The developed user-friendly model requires minimal input to estimate GHG emissions per weight of fish grown from feed production through to marine site harvest. Ultimately, the model generalizes how Atlantic Canada salmon farming operations are performing and allows growers to understand how system changes can affect their overall GHG emissions and improve upon their sustainability.

The *ACFFA Model* comprises several detailed spreadsheets that include GHG estimates for feed production, transportation, parr and smolt production, and fish grow-out. The GHG estimates from the *ACFFA Model* align with literature values.

### CORE PROJECT TEAM

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Project Coordinator  
Project Manager  
Senior Environmental Scientist  
Environmental Scientist

### SCOPE OF SERVICES PROVIDED

- GHG emission data:
  - Coordinating with ACFFA members to obtain detailed facility data for estimating GHG emissions
  - Conducting literature reviews for parameters, such as feed conversion ratios for various life stages and types of aquaculture facilities
- The *ACFFA Model* includes the following spreadsheets to estimate GHG emissions:
  - Salmon feed production
  - Salmon feed distribution
  - Land-based parr production
  - Land-based smolt production
  - Land-based biomass transfer
  - Marine-based grow-out sites
  - Cradle to marine-based farm-gate



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# ENVIRONMENTAL MONITORING PLAN AUDIT

AND

# ENVIRONMENTAL MONITORING PROGRAM AUDIT



# Vaughn Creek Covered Bridge Replacement

ST. MARTIN'S, NEW BRUNSWICK



## PROJECT DATES

- August 2021 – Environmental protection plan audit
- August 2021 through October 2022 – Monthly environmental monitoring program site audits
- September 2021 – Bridge construction initiated
- September 2022 – New covered bridge opened



## CLIENT REFERENCE

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## PROJECT OVERVIEW

St. Martin's is located along the northern shore of the Bay of Fundy. In 1935, a 22 m long covered bridge was built in the village to cross Vaughn Creek / Irish River and gain access to the local sea caves. That covered bridge was closed in June 2017 due to advanced deterioration. A single-lane modular steel bridge was erected as a temporary replacement immediately upstream of the original structure.

The new 32 m long double-barreled wooden covered bridge was built using hemlock and cedar on the same alignment as the 1935 bridge. The design resembles the traditional style of New Brunswick's covered bridges; however, the design accounts for today's operational traffic needs. It was designed to accommodate two-lanes of large sized vehicles such as buses, a first in New Brunswick. Like the 1935 bridge, the new bridge also includes a covered pedestrian throughway. The new bridge is supported by reinforced concrete abutments and the base elevation was raised to accommodate boat navigation within the creek below.

Construction of the new bridge required permits from Transport Canada, Fisheries and Oceans Canada, the New Brunswick Department of the Environment, and the New Brunswick Department of Transportation. The regulatory permits required implementation of an environmental protection plan and monitoring program. Fundy Engineering was contracted to audit the plan and program.

The new covered bridge opened in September 2022.

## CORE PROJECT TEAM

Tim Ryan, *M.Eng., P.Eng.*  
Greg Derrah, *P.Tech., CESA*  
Angela Dick, *B.Sc. ENR, EPT*

Project Manager  
Environmental Technologist  
GIS Analyst

## SCOPE OF SERVICES PROVIDED

### *Environmental Protection Plan Audit*

- Ensuring that the environmental protection plan developed for the work incorporated all requirements of the issued regulatory permits
- Providing recommendations on enhanced protection measures

### *Environmental Monitoring Program Audit*

- Reviewing the environmental protection measures established at the construction site with respect to the protection plan
- Providing recommendations to the contractor regarding any identified deficiencies with the environmental protection measures put in place



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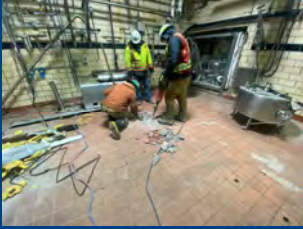




# Soil Sampling of Former Saputo Facility

SAINT JOHN, NEW BRUNSWICK

## SITE DECOMMISSIONING SERVICES



## PROJECT DATES

- January 2022 – Contract awarded
- March 2022 – Data collection and spreadsheet model development
- April 2022 – Report issued to client and facility demolished



## PROJECT OVERVIEW

In 1931, Baxter's Dairy opened a milk processing facility on Millidge Avenue in Saint John, New Brunswick. The facility, which employed hundreds of people, was acquired by Saputo in 2001. The facility, which produced milk products, was shuttered in 2021 and later decommissioned and demolished due to significant changing market conditions in the region.

When the production room was originally constructed at the facility, a layer of sand was placed between the floor and sub-floor for the purposes of collecting spilled products from various equipment and cleaning products. Because demolition of the facility and cleaning the site would involve removing the floor, sub-floor, and sand layer, the contractor was required to undertake sampling of the sand prior to removal.

Fundy Engineering was contracted by Galbraith Construction Ltd. to undertake a soil sampling program at the facility. The work involved exposing the sand layer by cutting through the production room floor in several locations. Once the sand layer was exposed, samples were collected and submitted to a third-party laboratory for analysis. Samples were analyzed for the presence of petroleum hydrocarbons, polyaromatic hydrocarbons, volatile organic compounds, and heavy metals.

## SCOPE OF SERVICES PROVIDED

- Soil sampling program:
  - Reviewed historical facility information to identify suitable locations for soil sampling
  - Supervised jackhammering of holes through the floor in several locations throughout the facility to access the sand layer
  - Collected samples of the sand and submitted the samples to the laboratory for analysis
  - Reviewed the laboratory results and assessed the results against applicable regulatory guidelines



## CLIENT REFERENCE

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## CORE PROJECT TEAM

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**GEO TECHNICAL & SURVEYING**



# Red Head Slope Stability

SAINT JOHN, NEW BRUNSWICK

GEOTECHNICAL  
ENGINEERING,  
SURVEYING,  
AND  
LONG-TERM SLOPE  
MONITORING



## PROJECT DATES

- 2000 – Slope monitoring
- 2001 – Slope monitoring
- 2006 – Slope monitoring
- 2007 – Slope monitoring
- 2008 – Slope monitoring
- 2011 – Slope monitoring



## CLIENT REFERENCE

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## PROJECT OVERVIEW

In Red Head, New Brunswick, the Bay of Fundy's unrelenting tides have swallowed three homes and are threatening more homes, a major roadway, and municipal infrastructure as the waters advance inland and cause slope failures.

Compounding the problem are the clays and tills that overlie the bedrock layers in the Red Head area that slope down and towards the Bay of Fundy. The exposed bluffs routinely suffer slope failures involving debris flow, frost creep, and slumping.

As a safety concern, our staff has been monitoring slope stability in the Red Head area since 2000, but substantial slope failures date back to the 1970s. During our investigations, we have observed slumping of up to 10 meters along several hundred meters of the natural bluffs. This has caused the catastrophic loss of property to several homeowners in the area.

As a result of our continued investigations and long-term monitoring, we have provided recommendations for stabilizing the slopes to limit the amount of potential future damage to property and infrastructure.

## CORE PROJECT TEAM

Gordon Mouland, *M.Eng., P.Eng., P.E.*  
Andy MacVey, *P.Eng.*  
Alex Mouland, *P.Eng, PMP*  
Rob Haineault, *P.Eng.*  
Robert Hunt, *CTech*

Project Manager  
Geotechnical Engineer  
Geotechnical Engineer  
Geotechnical Engineer  
Drafting

## SCOPE OF SERVICES PROVIDED

### *Surveying*

- Several initial surveys were completed in order to gather baseline information for comparison with future surveys

### *Long-Term Slope Monitoring*

- Slope elevations were monitored at several locations along the Red Head Road alignment to determine rate of slumping in the area

### *Geotechnical Engineering*

- Based on the information collected in the field, recommendations were made to the client regarding methods for stabilizing slopes to limit the amount of potential future slumping



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# Prince William Street Retaining Wall

SAINT JOHN, NEW BRUNSWICK

## GEOTECHNICAL INVESTIGATION AND RETAINING WALL DESIGN



### PROJECT DATES

- June 2002 – Geotechnical investigation
- 2002 to 2004 – Monitoring of wall movement
- 2005 – Retaining wall design and quality control inspections



### CLIENT REFERENCE

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### PROJECT OVERVIEW

During the winter of 2001 / 2002, cracks started to appear in a concrete block wall at 133 Prince William Street. Fundy Engineering was engaged to investigate the cracks and to conduct a geotechnical investigation for obtaining information on soil and bedrock conditions behind the remnant wall that the concrete block wall sat atop of. The remnant wall, which was a random course random rock foundation wall of a former multi-level building between Prince William Street and Water Street, was being used to support a portion of Prince William Street and its sidewalk.

Over time, frost action and soil pressures against the wall had progressively caused it to move. The movement of the wall and the street was also due to the lack of support from the floors that were lost when the former multi-level building was demolished. Fundy Engineering monitored the movement of the remnant wall over several seasons and recommended that it be removed and replaced with an engineered retaining structure. In June 2005, an adjacent remnant wall at 135 Prince William Street collapsed.

Fundy Engineering designed a retaining wall for the area between 133 and 135 Prince William Street. The new concrete wall sits atop a concrete footing. Unique to the design of this wall in Saint John is the use of rock anchors to secure the bottom two thirds of the wall to the shale bedrock behind. Also, a drain was installed in the space between the wall and bedrock, which was later filled with a controlled low-strength material.

### CORE PROJECT TEAM

Gordon Mouland, *M.Eng., P.Eng., P.E.*  
Andy MacVey, *P.Eng.*

Senior Geotechnical Engineer  
Geotechnical Engineer

### SCOPE OF SERVICES PROVIDED

#### *Geotechnical Investigations*

- Several boreholes were put down behind the retaining wall using a rubber-tire mounted drill rig
- Soil samples collected from the holes were tested in the laboratory for classification and analysis

#### *Retaining Wall Design*

- Designed a retaining wall unique to the area

#### *Quality Control Investigations*

- Fundy Engineering staff routinely inspected during construction of the retaining wall



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# Rothesay Avenue Reconstruction

SAINT JOHN, NEW BRUNSWICK

GEOTECHNICAL  
INVESTIGATION,  
DESIGN  
RECOMMENDATIONS,  
MATERIALS TESTING,  
COMPACTION TESTING,  
AND  
QUALITY CONTROL  
INSPECTIONS



## PROJECT DATES

- 2002 – Geotechnical investigation and design recommendations
- 2003, 2004, and 2005 – Materials testing, compaction testing, and quality control



## CLIENT REFERENCE

Mr. Jim Flogeras, *P.Eng.*  
City of Saint John  
Municipal Operations  
PO Box 1971  
Saint John, NB E2L 4L1

☎: 506.658.4455

## PROJECT OVERVIEW

Rothesay Avenue, a main commercial arterial in Saint John, experiences differential settlement because it is built atop the former marshlands of the Marsh Creek floodplain. In the early 2000s, the differential settling had resulted in numerous asphalt patches, asphalt separation, rutting, local dips, and considerable changes in grades over short sections of Rothesay Avenue.

Fundy Engineering was contracted to assist in the design of a 5 km long pavement structure that would minimize the differential settlement of the road surface while maximizing the lifecycle cost. In order to recommend design specifications, a geotechnical investigation was conducted using a tire-mounted drill rig. A total of 15 boreholes were drilled along Rothesay Avenue and revealed that the underlying organic silt and peat is up to 10 m thick.

We recommended lighter weight free-draining fills be used for the roadway subbase. Additionally, we recommended that a geotextile filter fabric and a geo-grid be incorporated into the design in order to reduce the subbase thickness and overall weight.

Reconstruction was carried out over three years. During the work, we ensured quality control by conducting materials testing, compaction testing, and review of geotextile fabric and geo-grid installation.

## CORE PROJECT TEAM

Gordon Mouland, *M.Eng., P.Eng., P.E.*  
Andy MacVey, *P.Eng.*  
Alex Mouland, *P.Eng., PMP*

Project Manager  
Geotechnical Engineer  
Geotechnical Engineer

## SCOPE OF SERVICES PROVIDED

### *Geotechnical Investigation*

- A geotechnical investigation was conducted to determine soil, bedrock, and groundwater conditions

### *Design Recommendations*

- Based on the information collected during the geotechnical investigations, recommendations were made regarding the roadway design in order to limit differential settling while maximizing the lifecycle cost

### *Compaction Testing*

- Field inspections were completed to ensure the roadway subbase was being properly compacted as per the design recommendations

### *Materials Testing*

- The size and quality of materials used for the subbase were monitored to ensure they conformed with design specifications

### *Quality Control Inspections*

- The geotextile fabric and geo-grid was routinely inspected to ensure that the contractor was properly laying it out

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# 14 Wing Greenwood Training Facility

GREENWOOD, NOVA SCOTIA

## GEOTECHNICAL ENGINEERING



### PROJECT DATES

- Fall 2002 – Geotechnical investigation
- Spring 2004 – Groundwater investigation



### PROJECT OVERVIEW

14 Wing Greenwood is the Canadian Forces largest air base on the East Coast. It is home to the 405 Long Range Patrol Squadron, which flies CP-140 Auroras, the 404 Long Range Patrol and Training Squadron, which operates Aurora and tactical simulators, and the 413 Transport and Rescue Squadron, which flies CC-130 Hercules planes and CH-149 Cormorant Helicopters.

Fundy Engineering was contracted to complete a geotechnical investigation prior to the construction of a new training centre at the site of the old Senior NCM Mess and Community Centre along Administration Drive. Our findings and recommendations were useful for the design of the new building's foundations and for site earthwork.

During the geotechnical investigation, we determined that groundwater was located at shallow depths. As a result, we recommended that the building excavation include over digging for soil improvement to be taken below the water table.

Subsequently, we were contracted to undertake a more in-depth groundwater investigation. Due to the high water table at the site, we designed a dewatering system that facilitated the construction of the new training centre.

### CORE PROJECT TEAM

Gordon Mouland, *M.Eng., P.Eng., P.E.*  
Andy MacVey, *P.Eng.*

Senior Geotechnical Engineer  
Geotechnical Engineer

### SCOPE OF SERVICES PROVIDED

#### *Geotechnical Investigation*

- Our engineering team completed a field investigation comprised of 11 boreholes and six auger probes using a truck-mounted drill rig
- Bulk soil samples were collected from the site and tested in the laboratory for grain size analysis and compaction

#### *Groundwater Investigation*

- Our engineering team installed a dozen monitoring wells across the site
- Groundwater levels were monitored to assess seasonal fluctuations, flow direction, and gradient
- We designed a dewatering system to facilitate construction of the facility



### CLIENT REFERENCE

Major Marcel Côte  
101 Colonel By Drive  
Ottawa, Ontario  
K1A 0K2

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# Jean Canfield Building Remedial Action Plan

CHARLOTTETOWN, PRINCE EDWARD ISLAND

## SITE CHARACTERIZATION, REMEDIAL ACTION PLAN, RISK ASSESSMENT, AND SPECIFIC RISK MANAGEMENT PLAN



### PROJECT DATES

- 2004 – Site characterization and remediation
- 2005 – Specific risk management plan
- 2008 – Building opening



### CLIENT REFERENCE

Mr. David Bergmark, *AAPEI, MRAIC*  
BGHJ Architects  
63 Fitzroy Street  
PO Box 1719  
Charlottetown, PE C1A 1R4

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☎: 902.566.1235  
✉: architects@bghj.com

### PROJECT OVERVIEW

The Jean Canfield office building is Public Works and Government Services Canada's most environmentally friendly building. The building was constructed on a formerly heavily contaminated block of 11 properties in downtown Charlottetown.

Fundy Engineering was contracted to provide site professional services to characterize the extent of contamination of the block. Historical land uses included scrap metal storage, automotive repair, welding, fuel distribution, commercial, and residential. Soil and water samples taken from test pits, boreholes, and groundwater monitoring wells on the site showed subsurface soils to be heavily impacted by metals and petroleum hydrocarbons.

To maximize remedial work efficiencies, Fundy Engineering utilized an on-site laboratory for quick analysis. Soils to be remediated were managed by strategically stockpiling them based on the level of contamination: metals exceeding Canadian Council of Ministers of the Environment (CCME) criteria; metals exceeding CCME criteria and Site-Specific Target Levels (SSTL); metals exceeding landfill disposal criteria; and petroleum hydrocarbons exceeding SSTLs. To reduce overall remediation costs, the impacted soils were either disposed of at a licensed management facility or managed on-site.

Environmental risks to the building occupants were eliminated following the removal of the highly impacted soils and using institutional controls in the design of the building and for the facility's long-term monitoring.

### CORE PROJECT TEAM

Tim Ryan, *M.Eng., P.Eng.*  
Gordon Mouland, *M.Eng., P.Eng.*  
Greg Derrah, *P.Tech, CESA*

Project Manager  
Senior Geotechnical Engineer  
Environmental Technologist

### SCOPE OF SERVICES PROVIDED

#### Site Characterization

- Test-pits, boreholes, and groundwater monitoring wells were used to characterize subsurface soils and groundwater and to fully delineate on- and off-site impacts

#### Remedial Action Plan

- Coordinated sampling to maximize remedial work efficiencies
- Designed a site-specific risk management plan to handle impacted soils stored on-site within an engineered cell
- Supervised the remedial work
- Provided necessary site documentation to the Department of Environment



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# Renforth Wharf Reconstruction

ROTHESAY, NEW BRUNSWICK

GEOTECHNICAL  
INVESTIGATION,  
WHARF DESIGN,  
ENVIRONMENTAL  
PERMITTING,  
AND  
SOIL REINFORCED WALL  
(SRW) DESIGN



## PROJECT DATES

- Fall 2004 – Geotechnical investigation
- Summer / Fall 2006 – Marine retaining wall construction supervision
- Fall / Winter 2007 – Design
- Spring / Summer 2007 – Wharf construction supervision
- Spring 2006 and 2007 – Environmental permitting
- Summer 2014 – SRW design and construction supervision

## CLIENT REFERENCE

Mr. John Jarvie  
Town Manager  
Town of Rothesay  
70 Hampton Road  
Rothesay, NB E2E 5L5

☎: 506.848.6600  
☎: 506.848.6677  
✉: johnjarvie@rothesay.ca

## PROJECT OVERVIEW

Fundy Engineering determined that wave action and ice impact and abrasion during the spring freshet on the Kennebecasis River led to the failure of deck sections on Renforth Wharf. The original wharf was constructed using a treated wood deck over timbers that were used to build a ballasted crib work.

We completed a borehole investigation to assess the soil conditions below the existing and proposed wharf. Using the information collected in the field, we developed designs for the reconstruction. We designed the wharf as a sheet pile structure in order to provide a solid and long-lasting structure. A Redi-Rock® retaining wall was designed to protect against shoreline erosion and to support the shoreline boardwalk. We also designed a new boat launch ramp and an SRW that was built as approaches to the community wharf.

Our engineers designed and were on-site to oversee the reconstruction of the community wharf. The reconstructed wharf is a hub of community activity ranging from the dragon boat races in the summer to the 100+ ice shack fishing village in the winter.



## CORE PROJECT TEAM

Gordon Mouland, *M.Eng., P.Eng., P.E.*  
Andy MacVey, *P.Eng.*  
Alex Mouland, *P.Eng., PMP*  
Robert Hunt, *C.Tech*

Senior Geotechnical Engineer  
Geotechnical Engineer  
Geotechnical Engineer  
Design and Drafting

## SCOPE OF SERVICES PROVIDED

### *Geotechnical Investigation*

- Completed a field investigation to determine the nature of deck failures
- Provided recommendations on the type of required remedial action

### *Geotechnical Design*

- Undertook a borehole investigation to assess soil conditions
- Designed a shoreline retaining wall and a new wharf

### *Environmental Permitting*

- Watercourse alteration permits were required through the Department of the Environment

### *Soil Reinforced Wall*

- Designed an SRW deck skirting for around the light house at the associated park



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# East Point Soil-Reinforced Retaining Wall

SAINT JOHN, NEW BRUNSWICK

GEOTECHNICAL  
ENGINEERING,  
SOIL-REINFORCED  
RETAINING WALL (SRW)  
DESIGN,  
AND  
QUALITY CONTROL  
INSPECTIONS



## PROJECT DATES

- 2008 – Geotechnical investigations and segmental block retaining wall design
- 2009 – Quality control inspections



## CLIENT REFERENCE

Mr. Troy Northrup  
East Point Inc.  
Ashburn Place  
479 Rothesay Avenue  
Saint John, NB E2J 2C6

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☎: 506.634.2236  
✉: info@eastpointshopping.ca

## PROJECT OVERVIEW

East Point Shopping has been developing a unique shopping district in east Saint John. In 2008, several hectares of exposed bedrock was leveled for additional retail space in the 25 ha development. 300 Retail Drive is now the site of Atlantic Canada's largest Costco.

Several months were spent preparing a pad for constructing Costco. Topographically high areas of exposed bedrock were drilled and blasted while topographically low areas were built up using the material excavated from the high areas. In order to keep the unconsolidated materials in the filled areas from moving, a large retaining wall was required.

Fundy Engineering considered two designs for the retaining wall: a Soil Reinforced Wall (SRW); and a segmental block retaining wall. The SRW design was determined as the best option for the site.

A total of 1 836 concrete blocks were used to build the wall that is prominently featured at the site. The blocks fit together similar to LEGO® and provide a face for a high strength durable wall. The SRW uses geogrids attached to the face blocks to reinforce the soil so that it acts as a large integrated block.

## CORE PROJECT TEAM

Gordon Mouland, *M.Eng., P.Eng., P.E.*  
Andy MacVey, *P.Eng.*  
Alex Mouland, *P.Eng., PMP*  
Robert Hunt, *CTech*

Project Manager  
Geotechnical Engineer  
Geotechnical Engineer  
Design and Drafting

## SCOPE OF SERVICES PROVIDED

### *Geotechnical Investigations*

- Several surveys were completed in order to gather baseline information for designing the retaining wall

### *Soil-Reinforced Retaining Wall Design*

- Different concepts were developed for the retaining wall and in the end an SRW design was selected

### *Quality Control Investigations*

- Fundy Engineering staff routinely inspected the placement of the concrete blocks during construction of the retaining wall



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# Long Wharf Development Program

SAINT JOHN, NEW BRUNSWICK

PROJECT  
MANAGEMENT,  
ENVIRONMENTAL DUE  
DILIGENCE AND  
PERMITTING,  
AND  
GEOTECHNICAL DUE  
DILIGENCE AND  
ENGINEERING



## PROJECT DATES

- Spring 2008 – Preliminary environmental and geotechnical due diligence
- Summer and Fall 2008 – Detailed environmental and geotechnical due diligence assessments
- Spring 2009 – Environmental permitting under the *Canadian Environmental Assessment Act* & building registered for LEED®
- Summer and Fall 2009 – Pile driving inspection and environmental monitoring
- Winter 2009 through Winter 2010 – Project management support

## CLIENT REFERENCE

Mr. Warren Long, *P.Eng.*  
President  
Milkish Oaks Inc.  
77 Joe Long Road  
Summersville, NB E5S 1H8

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☎: 506.333.6281  
✉: wrlong@milkishoaks.ca

## PROJECT OVERVIEW

Irving Oil Limited started developing a highly-visible architecturally unique 15 300 m<sup>2</sup> four-storey world headquarters office building on Long Wharf in September 2009. The building, which was cancelled in early 2010, would have provided Class A office space for up to 1 000 employees. Irving Oil Limited had a vision to “*deliver a world class, sustainable corporate headquarters office building that compliments a developed site, enhancing the Saint John uptown core and promotes significant public use.*”

A powerhouse design team was assembled to achieve the design goals and included the world-renowned architectural firm Robert A.M. Stern LLP of New York and leading edge sustainability consultants of the Rocky Mountain Institute in Boulder, Colorado. Fundy Engineering was contracted to provide Irving Oil Limited with local top-quality talent in the fields of geotechnical and environmental engineering and project management. We provided environmental due diligence, permitting, monitoring, and compliance support, environmental sustainability assistance, geotechnical due diligence and support, and Leadership in Energy and Environmental Design (LEED®). One of our Project Managers was seconded to Irving Oil Limited full-time to fulfill a role as Project Management Office Manager and Sustainability Team Coordinator.

## CORE PROJECT TEAM

Gordon Mouland, *M.Eng., P.Eng., P.E.* Geotechnical Engineer  
Matthew Alexander, *Ph.D., P.Geo., EP* Senior Environmental Scientist  
Alex Mouland, *P.Eng., PMP* Project Manager  
Darryl Ford, *P.Eng., FEC* LEED® Commissioning Agent

## SCOPE OF SERVICES PROVIDED

### *Environmental Due Diligence:*

- The site was intensively investigated for potential impacts dating back to the 1800s when the Long Wharf site was first developed; studies included archaeology and Phase II Environmental Assessments

### *Geotechnical Due Diligence:*

- Historical and current data were assessed to determine subsurface conditions for supporting development

### *Environmental Permitting:*

- Development at the site required that the project be assessed under the *Canadian Environmental Assessment Act* and several permits under different regulatory agencies were required

### *Project Management:*

- One of our Project Managers provided full-time support to the Project Management Office as a Coordination Manager and headed the Sustainability Team

### *LEED® Commissioning Agent:*

- One of our Professionals was overseeing the commissioning process

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# Saint John Transit Garage Retaining Walls

SAINT JOHN, NEW BRUNSWICK

## SOIL-REINFORCED RETAINING WALL (SRW) DESIGN



### PROJECT DATES

- Winter 2008 / 2009 – SRW design
- Summer 2009 – SRW construction supervision



### PROJECT OVERVIEW

In 2010, Saint John Transit, New Brunswick's largest public transit system, moved its operations centre from Fairville Boulevard in west Saint John to 55 McDonald Street in east Saint John. Although a fairly large and accessible site, the McDonald Street site presented a challenge for construction due to the grade changes across the property.

We designed four Redi-Rock® soil-reinforced retaining walls for the site:

- Wall A – 634 blocks;
- Wall B – 203 blocks;
- Wall C – 318 blocks; and
- Wall D – 127 blocks.

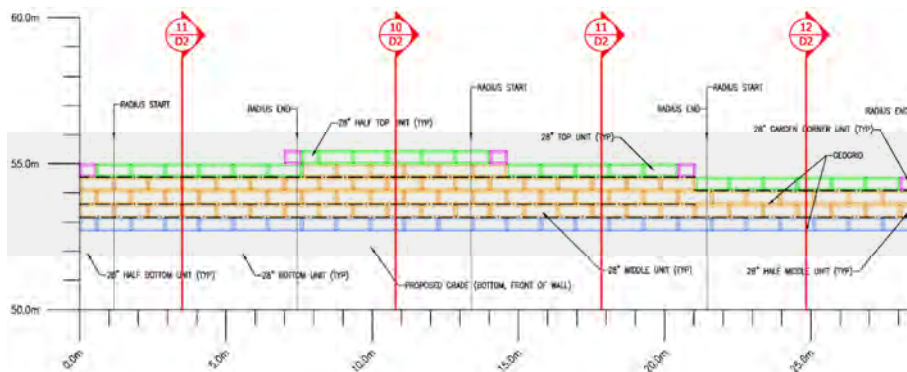
In total, the walls were built using 1 282 concrete blocks that fit together similar to LEGO®. The walls provide a face for a high-strength durable wall; the soil-reinforced walls use geogrids attached to the face of the blocks to reinforce the wall so that it acts as a large integrated block.

Public art entitled “in transit” was installed on the MacDonald Street wall as part of the City of Saint John's One Percent for Art Program.

### SCOPE OF SERVICES PROVIDED

#### Soil-Reinforced Walls

- Designed four soil-reinforced walls for areas around the Transit garage



### CLIENT REFERENCE

Mr. Doug McLean  
Quality Concrete  
20 MacDonald Avenue  
Dartmouth, NS B3B 1C5

☎: 902.468.6643  
☎: 902.835.2997

### CORE PROJECT TEAM

Gordon Moulard, *M.Eng., P.Eng., P.E.*  
Andy MacVey, *P.Eng.*  
Robert Hunt, *C.Tech*

Senior Geotechnical Engineer  
Geotechnical Engineer  
Design and Drafting

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# Digby Harbour Design

DIGBY, NOVA SCOTIA

## GEOTECHNICAL INVESTIGATION AND DESIGN RECOMMENDATIONS



### PROJECT DATES

- Winter 2008 / 2009 – Geotechnical investigation of existing structures
- Winter 2008 / 2009 – Provided harbour upgrade design recommendations
- October 2012 – Breakwater geotechnical borehole investigation
- 2013 – Construction inspection



### CLIENT REFERENCE

Mr. Edwin Chisholm  
Harbour Manager  
Digby Harbour Port Association  
PO Box 1792  
Digby, NS B0V 1A0

☎: 902.245.1867

✉: chisholm@portofdigby.ca

### PROJECT OVERVIEW

The economy of Digby, Nova Scotia is highly dependent on the harbour, which provides a link to the sea-based fishery and aquaculture operations. In 2007, when the not-for-profit Digby Harbour Port Association (DHPA) assumed ownership of the harbour, it had fallen into a state of disrepair.

Fundy Engineering conducted a comprehensive geotechnical investigation to document the existing conditions of the wharf infrastructure. In association with Cormier Management Consulting Ltd., we provided the DHPA with design recommendations based on the needs of the users and community with respect to the harbour. Recommendations included new floats, gangways, and new lighting. A major component of the design was also a new 300 m long breakwater.

Because of the poor soil conditions in the area that were revealed during the borehole investigation, the design had to be altered. A traditional armour stone breakwater was used for the near shore to full height. A traditional armour stone breakwater was constructed to a +1.5 m elevation for the remainder of the breakwater. That section was then finished with a wooden crib component filled with ballast rock to provide maximum protection at low tide.

Area fishers now have a safe and efficient facility.

### CORE PROJECT TEAM

Gordon Mouland, *M.Eng., P.Eng., P.E.*  
Alex Mouland, *P.Eng, PMP*  
Travis Henrikson  
Robert Hunt, *CTech*

Senior Geotechnical Engineer  
Project Manager  
Geotechnical Technician  
Design and Drafting

### SCOPE OF SERVICES PROVIDED

#### *Geotechnical Investigation*

- A geotechnical investigation was conducted to assess the condition of existing wooden and concrete structures

#### *Design Recommendations*

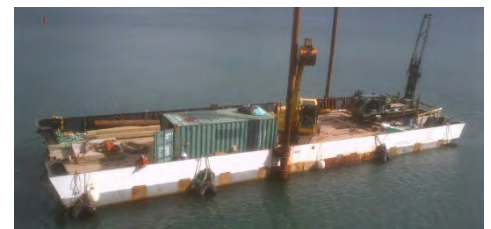
- Based on the information collected during the geotechnical investigation, Fundy's team developed recommendations, complete with cost-estimates, regarding wharf upgrades

#### *Borehole Investigation*

- A borehole investigation was undertaken to assess the subsurface soil and bedrock conditions for constructing a breakwater

#### *Construction Inspection*

- Inspected the construction work to ensure it was being completed as designed



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# Poley Mountain Ski Lodge

WATERFORD, NEW BRUNSWICK

## GEOTECHNICAL INVESTIGATION

AND

## PHASE I ENVIRONMENTAL SITE ASSESSMENT (ESA)



### PROJECT DATES

- April 2015 – Geotechnical investigation for assessing subsurface soil conditions
- June 2015 – Site visits for conducting Phase I ESA
- July 2015 – Reporting



### CLIENT REFERENCE

Mr. Bill Anderson  
Manager  
Poley Mountain Resorts Ltd.  
PO Box 4466  
Sussex, NB E4E 5L6

☎: 506.433.7653  
☎: 506.432.1009  
✉: info@poleymountain.com

### PROJECT OVERVIEW

Poley Mountain's 1 580 m<sup>2</sup> ski lodge was completely destroyed by fire on 9 December 2014. After operating out of six portable trailers during the 2015 season and undertaking considerable work, a new 2 700 m<sup>2</sup> lodge opened in time for the 2016 season.

Fundy Engineering completed a geotechnical investigation for the foundation of the new ski lodge. Based on the findings, it was recommended that the site be prepared for drainage around and within the excavation to minimize the degradation of the bearing soils. Furthermore, placement of engineered fills was recommended for the excavation in order to adequately support the foundation of the new ski lodge.

A Phase I ESA was completed at the site to assess the risk of potential environmental issues on the property due in part to the fire. A thorough review of the site conditions was completed and available records of historical property use were examined to ensure compliance with applicable environmental regulations prior to building the new lodge. As a result of the work completed, no significant environmental issues were identified for further investigation and / or remedial action.

### CORE PROJECT TEAM

Andy MacVey, *P.Eng.*  
Rob Haineault, *P.Eng.*  
Robert Hunt, *CTech*  
Tim Ryan, *M.Eng., P.Eng.*  
Greg Derrah, *P.Tech., CESA*  
Stephen Little, *P.Tech., CESA*

Geotechnical Engineer  
Geotechnical Engineer  
Design and Drafting  
Environmental Engineer  
Environmental Technologist  
GIS Specialist

### SCOPE OF SERVICES PROVIDED

#### *Geotechnical Investigation*

- Conducted to determine the characteristics of the underlying soils in the area of the new foundation

#### *Phase I ESA*

- Performed a detailed site review to assess potential environmental issues following the fire



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# Summerside Wind Farm

SUMMERSIDE, PRINCE EDWARD ISLAND

## GEOTECHNICAL INVESTIGATION



### PROJECT DATES

- April 2009 – Test pit and borehole program
- May 2009 – Geotechnical investigation results and recommendations issued



### PROJECT OVERVIEW

Fundy Engineering was retained by Frontier Power Systems to conduct geotechnical investigations for the construction and operation of four 80 m tall Vesta V90 turbines. The wind farm is located at the northern municipal boundary of the City of Summerside adjacent to Malpeque Bay. The purpose of the work was to determine the properties of the soils and the bedrock within the project area and to provide geotechnical design parameters to facilitate foundation design for the wind turbines. Our work also involved providing recommendations for the construction of access roads and the design of crane pads to erect the wind turbines.

We supervised the excavation of several test pits and the drilling of several boreholes at the turbine base locations to assess the underlying soil and bedrock conditions. Those data were used in the design of the wind turbine foundations, heavy lift crane pads, and roadways.

The 12 MW wind farm, which generates up to 25 % of the City of Summerside's energy needs, began operations in January 2010.

### SCOPE OF SERVICES PROVIDED

#### *Geotechnical Investigation*

- Conducted to assess underlying soil and bedrock conditions before construction of the access roads and crane pads
- Provided information, such as static and dynamic allowable bearing pressures, sliding resistance, expected settlement, and Earth pressure coefficients, for designing the wind turbine foundations
- Recommended the use of shallow foundation systems for the wind turbines consisting of foundation systems extended to the underlying bedrock or use of piles



### CLIENT REFERENCE

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frontierpowersystemcs.ca

### CORE PROJECT TEAM

Gordon Mouland, *M.Eng., P.Eng., P.E.* Senior Geotechnical Engineer  
Chris MacPherson, *P.Eng., CESA* Geotechnical Engineer  
Donnie Taweel, *CET* Materials Testing  
Robert Hunt, *CTech.* Design and Drafting

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# Saint John Community Harbour

SAINT JOHN, NEW BRUNSWICK

## PROJECT MANAGEMENT

AND

## GEOTECHNICAL DUE DILIGENCE AND ENGINEERING



## PROJECT DATES

- Winter / Spring 2010 – Preliminary geotechnical due diligence
- Spring 2010 – Marine geotechnical investigation
- Summer 2010 – Results and recommendations submitted
- 2016 – Facility design and bid package development



## CLIENT REFERENCE

Mr. Bill Thompson  
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Saint John, NB E2M 7L5

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☎: 506.650.7059  
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## PROJECT OVERVIEW

Saint John is not a Department of Fisheries & Oceans (DFO) scheduled harbour, but it is used by about 19 fishing boats on a regular basis for significant periods of the year. The Saint John Community Harbour Authority (SJCHA), a provincially incorporated not-for-profit organization comprised of Saint John fishermen, desires to operate a small boat harbour within Saint John Harbour. The SJCHA's long-term objective is to have the area designated as a DFO scheduled harbour.

A comprehensive engineering, socio-economic, and technical study was undertaken for siting the small boat harbour, which involved reviewing eleven sites. The preferred site is the south face of Pier 14 within Saint John Harbour. The proposed small boat harbour, using floating wharves, will have a berthage capacity for 46 standard-sized boats.

A marine geotechnical investigation was completed between March and April 2010 to assess the soil and bedrock conditions. Six boreholes were extended to a maximum depth of 28 m using a barge-mounted rotary drill supplied by Lantech Drilling Services.

Site and weather conditions resulted in a challenging environment for Fundy Engineering's project team in which to complete the work. Based on the geotechnical information gathered and input from various project stakeholders, a conceptual design was prepared and submitted to the SJCHA. We ultimately developed the facility design and construction bid packages.

## CORE PROJECT TEAM

Gordon Mouland, *M.Eng., P.Eng., P.E.* Geotechnical Engineer  
Matthew Alexander, *Ph.D., .P.Geo., EP* Senior Environmental Scientist  
Alex Mouland, *P.Eng., PMP* Project Manager  
Travis Henrikson Geotechnical Technician

## SCOPE OF SERVICES PROVIDED

### *Geotechnical Due Diligence*

- Historical and current data were assessed to determine subsurface conditions for supporting various components of the proposed small boat harbour
- An intrusive geotechnical investigation was undertaken to determine the nature of underlying marine materials and bedrock

### *Project Management*

- Managed requirements of multiple end users and stakeholders
- Received and incorporated input to develop a conceptual design for the proposed small boat harbour

### *Environmental Permitting*

- Consulted with stakeholders and end users regarding best practices for environmental protection in the design of various components
- Prepared applications for provincial and federal permits and authorizations required to undertake testing for the proposed project and in order to advance the small boat harbour to the construction phase

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# Lorneville Barge Loading Facility

SAINT JOHN, NEW BRUNSWICK

GEOTECHNICAL  
INVESTIGATION,  
DESIGN  
RECOMMENDATIONS,  
AND  
BID PACKAGE  
DEVELOPMENT



## PROJECT DATES

- Winter 2010 – Project initiation and site evaluations
- April 2010 – Shortlisting of sites
- May & June 2010 – Detailed comparison of shortlisted sites
- July 2010 – Site evaluation report submission
- January 2012 – Project completion

## CLIENT REFERENCE

Mr. Brian Irving  
General Manager  
Saint John Industrial Parks Ltd.  
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PO Box 1971  
Saint John, NB E2L 4L1

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☎: 506.658.2837  
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## PROJECT OVERVIEW

Fundy Engineering, in association with Cormier Management Consulting Ltd., undertook a siting review for a barge loading facility to export fabricated heavy industry steel modules from Saint John in support of the local metal fabrication industry. Seven sites were identified, inspected, and evaluated, including: Maguire's Cove; Tiner's Point; Saint John Harbour Pier 14; Black Beach; Spruce Lake Industrial Park; Lorneville Fishing Harbour; and Hardy Island.

The pros and cons of the seven sites were identified and thirteen criteria were used to compare and contrast the sites. Two sites were shortlisted; Saint John Harbour Pier 14 and the Spruce Lake Industrial Park (*i.e.*, Lorneville). A more detailed comparison of those two sites was then completed. The Lorneville concept was identified as being the best option suited to meet the full-suite of needs of Saint John's metal fabricating sector.

Following the siting work, Fundy Engineering was contracted to develop viable design scenarios for the Lorneville concept. After being in the works for almost 15 years, the barge terminal, which was constructed in 2015, officially opened on 24 June 2016. Saint John's metal fabricators are now able to export to the world.

## CORE PROJECT TEAM

Gordon Mouland, <i>M.Eng., P.Eng., P.E.</i>	Senior Geotechnical Engineer
Matthew Alexander, <i>Ph.D., .P.Geo., EP</i>	Senior Environmental Scientist
Rob Haineault, <i>P.Eng.</i>	Geotechnical Engineer
Robert Hunt, <i>CTech</i>	Design and Drafting

## SCOPE OF SERVICES PROVIDED

### *Geotechnical Investigations*

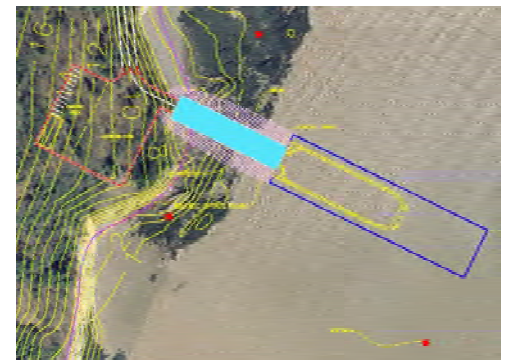
- Geotechnical investigations were completed to assess the conditions at the shortlisted sites

### *Design Recommendations*

- Based on the information collected and the analyses completed, Fundy Engineering's team developed recommendations, complete with cost-estimates, regarding the shortlisted sites

### *Bid Package Development*

- Developed the construction bid package for the proponent to use in selecting a contractor for the project



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# Wood Islands Wharf Reconstruction

WOOD ISLANDS, PRINCE EDWARD ISLAND

MATERIALS TESTING,  
COMPACTION TESTING,  
AND  
QUALITY CONTROL  
INSPECTIONS



## PROJECT DATES

- August and September 2010 – Gravel compaction and concrete inspections
- February and March 2013 – Concrete inspections
- October and November 2015 – Concrete inspections
- April 2016 – Concrete inspections



## CLIENT REFERENCE

Ms. Pamela MacAdam  
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Public Services and Procurement  
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## PROJECT OVERVIEW

Wood Islands, Prince Edward Island is a quaint farming and fishing community. The local wharf is the heart of the community's small harbour where Northumberland Ferries Limited manages and operates ferry service between Wood Islands and Caribou, Nova Scotia. The federal government maintains the majority of the community's wharf infrastructure and regularly dredges the harbour to maintain depths for the ferry service.

Fundy Engineering was contracted by Public Works and Government Services Canada, now Public Services and Procurement Canada, to provide engineering consulting services during reconstruction of the Wood Islands wharf. A major component of the reconstruction work, which occurred over several years, involved the replacement of concrete portions of the wharf. Our extensive experience in the design and construction of wharves was invaluable for this work. Users of the Wood Islands wharves now have renewed infrastructure.



## CORE PROJECT TEAM

Donnie Taweel, *CET*  
Gordon Mouland, *M.Eng., P.Eng., P.E.*  
Alex Mouland, *P.Eng, PMP*  
Dave Richard

Project Manager  
Senior Geotechnical Engineer  
Geotechnical Engineer  
Geotechnical Technician

## SCOPE OF SERVICES PROVIDED

### *Materials Testing*

- Performed quality control and quality assurance testing on concrete used for reconstruction of the wharf

### *Compaction Testing*

- Field inspections were completed to ensure gravel placed was compacted as per the design recommendations

### *Quality Control Inspections*

- Fundy Engineering staff routinely inspected the placement of materials during reconstruction work



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# Peel Plaza Parking Garage

SAINT JOHN, NEW BRUNSWICK

PHASE I  
ENVIRONMENTAL SITE  
ASSESSMENT (ESA),  
GEOTECHNICAL  
INVESTIGATION,  
GEOLOGICAL  
ASSESSMENT,  
AND  
MATERIALS TESTING  
AND INSPECTION  
SERVICES



## PROJECT DATES

- Winter 2007 – Phase I environmental site assessment
- Winter 2011 – Geotechnical investigations
- April 2011 – Geological assessment
- 2011 to 2013 – Materials testing
- Summer 2013 – Parking garage opened

## CLIENT REFERENCE

Mr. Gerry Mattsson, *P.Eng., G.S.C.*  
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## PROJECT OVERVIEW

The state-of-the-art seven level Peel Plaza parking garage was constructed to provide 446 parking spaces for the new Saint John Police headquarters and the Provincial Justice Complex at Peel Plaza. The parking garage is equipped with smart-technology, such as digital screens showing the location of the next available parking spot and charging stations for electric vehicles.

We worked for the City of Saint John on this exciting project, which is located very near our head office. The parking garage fronts on Carleton Street, but users can also access the garage from several levels lower along Sewell Street.

The footprint of the garage was formerly occupied by two three-storey multi-unit apartment buildings. Prior to their demolition, we conducted a Phase I ESA to identify any potential environmental concerns. Through the geotechnical investigations, we provided the designers with recommendations on pre-stressed rock and soil anchors. We also monitored blasting operations conducted to breakup bedrock for constructing the foundation. Once the bedrock was exposed we completed a geological assessment. Throughout construction we tested various materials, such as concrete, masonry, and asphalt.

## CORE PROJECT TEAM

Gordon Mouland, *M.Eng., P.Eng., P.E.* Senior Geotechnical Engineer  
Alex Mouland, *P.Eng., PMP* Project Manager  
Matthew Alexander, *Ph.D., P.Geo., EP.* Senior Environmental Scientist  
Robert Hunt, *CTech* Design and Drafting

## SCOPE OF SERVICES PROVIDED

### *Geotechnical Investigation*

- Conducted to assess underlying soil and bedrock conditions before construction of the parking garage
- Provided information for designing the building, for specifying rock and soil anchors, and for designing controlled blasts to break up bedrock

### *Geological Assessment*

- Completed to collect detailed information on existing conditions of the exposed bedrock prior to the installation of rock anchors and the application of shotcrete

### *Materials Testing*

- Performed as quality control and quality assurance testing for the City of Saint John



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# WEICan Wind Energy Project

NORTH CAPE, PRINCE EDWARD ISLAND

## GEOTECHNICAL INVESTIGATION AND MATERIALS TESTING AND INSPECTION SERVICES



### PROJECT DATES

- Winter 2011 – Geotechnical investigations
- Summer 2011 – Materials testing and inspection



### CLIENT REFERENCE

Mr. Scott Harper  
Chief Executive Officer  
Wind Energy Institute of Canada  
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### PROJECT OVERVIEW

In 2011, the Wind Energy Institute of Canada (WEICan) received federal funding for a 10 MW wind plant and energy storage system at their 15 ha North Cape Research and Development Park. The site is beneficial for research because it has a 300 degree exposure to the winds off the Gulf of St. Lawrence.

Fundy Engineering was retained to complete geotechnical investigations. The purpose of the work was to determine the properties of the soils and the bedrock within the project area and to provide geotechnical design parameters to facilitate the foundation design for the construction of five 2 MW wind turbines and an energy storage substation. Our work also involved providing recommendations for the construction of access roads across wetlands and the design of crane pads to erect the wind turbines.

We supervised the drilling of several boreholes and the excavation of several test pits across the site to assess the underlying soil and bedrock conditions. Those data were used in the design of the roadways, heavy lift crane pads, and wind turbine foundations. During the construction of all those features, our team members were on-site to test and report on the various materials used by the contractors and report back to WEICan.

### CORE PROJECT TEAM

Gordon Mouland, *M.Eng., P.Eng., P.E.*  
Chris MacPherson, *P.Eng., CESA*  
Donnie Taweel, *CET*  
David Richard

Senior Geotechnical Engineer  
Geotechnical Engineer  
Materials Testing  
Materials Testing

### SCOPE OF SERVICES PROVIDED

#### *Geotechnical Investigation*

- Conducted to assess underlying soil and bedrock conditions before construction of the access roads and crane pads
- Provided information, such as static and dynamic allowable bearing pressures, sliding resistance, expected settlement, and Earth pressure coefficients, for designing the wind turbine foundations
- Recommended the use of shallow foundation systems for the wind turbines consisting of conventional spread footings

#### *Materials Testing*

- Performed quality control and quality assurance testing on materials used for constructing the access roads, crane pads, and wind turbine foundations



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# Wright Street Rock Wall Failure

SAINT JOHN, NEW BRUNSWICK

GEOTECHNICAL  
INVESTIGATION,  
GEOLOGICAL  
ASSESSMENT,  
AND  
RETAINING WALL  
DESIGN



## PROJECT DATES

- April 2013 – Geotechnical investigation, geological assessment, and three-dimensional surveying
- Summer 2013 – Geotechnical investigation and retaining wall design
- Spring 2014 – Update on condition of collapsed Wright Street retaining wall

## CLIENT REFERENCE

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## PROJECT OVERVIEW

In April 2013, a rock fall occurred on the southern side slope below Wright Street along the Saint John Throughway. A portion of a previously constructed retaining wall and weathered rock fell to the ground and spilled out into the northern westbound lane of the Throughway. Fundy Engineering was contacted by the City of Saint John to assess the cause(s) of the retaining wall collapse and natural rock fall.

Through a geotechnical investigation we determined that the partial collapse of the Wright Street retaining wall occurred as the result of portions of the exposed 16 m high rock face naturally falling away. The geological assessment, which included performing a three-dimensional survey along a 100 m portion of the rock face, identified that several portions of the rock face had previously broken away along cleavage planes. The falling rock was a result of natural weathering processes and regular freeze-thaw cycles. We also identified areas where scaling should be undertaken to remove loose rock and areas where rock anchors should be installed.

We completed further geotechnical investigations to assess the subsurface conditions along Wright Street. Using those data, we designed a pre-cast block retaining wall to support Wright Street and the associated municipal infrastructure.

## CORE PROJECT TEAM

Gordon Moulard, *M.Eng., P.Eng., P.E.* Project Manager  
Alex Moulard, *P.Eng., PMP* Geotechnical Engineer  
Matthew Alexander, *Ph.D., P.Geo., EP.* Senior Environmental Scientist  
Robert Hunt, *CTech* Design and Drafting

## SCOPE OF SERVICES PROVIDED

### *Geotechnical Investigation*

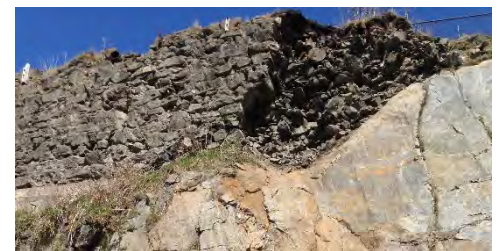
- Conducted to determine the cause of the retaining wall failure that supported the base of Wright Street and the associated municipal services and to assess subsurface conditions along Wright Street

### *Geological Assessment*

- Completed to identify the cause of the natural rock fall
- Organized a three-dimensional survey to collect detailed information on existing conditions of the rock face

### *Retaining Wall Design*

- Designed a Redi-Rock® retaining wall to support Wright Street and associated municipal infrastructure



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# Fundy Trail Parkway Extension

ST. MARTIN'S, NEW BRUNSWICK

DESIGN  
RECOMMENDATIONS,  
MATERIALS TESTING,  
COMPACTION TESTING,  
AND  
QUALITY CONTROL  
INSPECTIONS



## PROJECT DATES

- Spring 2013 to Fall 2014



## CLIENT REFERENCE

Mr. Calvin Rice, *P.Eng.*  
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## PROJECT OVERVIEW

The Fundy Trail Development Authority (FTDA) contracted Fundy Engineering for geotechnical services along the Fundy Trail Parkway. The Parkway is a two-lane road that opens up areas along the Bay of Fundy coastline that were previously inaccessible to vehicle traffic. The Parkway begins 10 km east of St. Martin's and it is the FTDA's long-term objective to connect the Parkway to Fundy National Park.

In 2013 and 2014, Gulf Operators Ltd. constructed a 2.25 km section of new road to the end of the existing 10 km Parkway. Although this section of new road was short, it was constructed over extremely steep terrain. For instance, some sections of the road required heavy blasting of bedrock while others required substantial fills; some fills were 18 m to 20 m thick. Construction of the road was also difficult given the inclement weather that is often experienced along the coastline.

Extension of the Parkway required the crossing of Long Beach Brook, a fish-bearing watercourse. To allow the brook to flow freely under the Parkway, a 4.4 m diameter structural plate corrugated aluminum pipe was installed. The crossing included fish weirs and interceptor ditches.

Because of the sensitive nature of the environment in this area, considerable precautions were taken to ensure that best-management practices were implemented throughout the project.

## CORE PROJECT TEAM

Gordon Mouland, *M.Eng., P.Eng., P.E.* Senior Geotechnical Engineer  
Matthew Alexander, *Ph.D., P.Geo., EP* Senior Environmental Scientist  
Alex Mouland, *P.Eng, PMP* Project Manager

## SCOPE OF SERVICES PROVIDED

### *Stream Diversion Design*

- Fundy Engineering designed the a diversion channel to allow the construction of a large culvert for Long Beach Brook to flow under the Parkway
- We also supervised the fish rescues required to facilitate the work

### *Compaction Testing*

- Field inspections were completed to ensure the roadway subbase was being properly compacted
- Compaction testing was done using a nuclear density machine and plate loads

### *Materials Testing*

- The size and quality of materials used for the subbase were monitored to ensure they conformed with design specifications
- Concrete testing was also completed, where necessary along the Parkway

### *Quality Control Inspections*

- A technologist, under the supervision of an engineer, was on-site full-time to inspect material placement

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# Former T.S. Simms & Co. Brush Factory

SAINT JOHN, NEW BRUNSWICK

PHASE I, II, AND III  
ENVIRONMENTAL SITE  
ASSESSMENT (ESA),  
HAZARDOUS MATERIALS  
ASSESSMENT AND  
QUANTIFICATION,  
REMEDIAL ACTION  
PLAN,  
AND  
SOIL-REINFORCED  
RETAINING WALL (SRW)  
DESIGN



## PROJECT DATES

- October 2013 – Phase I, II ESA
- December 2013 to January 2014 – Hazardous materials abatement
- Spring / Summer 2014 – Phase III ESA
- Summer / Fall 2014 – Remedial action plan work
- Winter 2016 – Retaining wall design



## CLIENT REFERENCE

Mr. David Muir, *P.Eng.*  
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## PROJECT OVERVIEW

In 1912, T.S. Simms & Co. Ltd. opened a paint brush factory on Bridge Street in Saint John. Due to dated manufacturing technology, the facility halted production on 29 November 2013 after which it was purchased by J.D. Irving Ltd. Plans were to demolish the buildings and repurpose the site.

A Phase I ESA was conducted to assess the risk of potential environmental issues on the property. Due primarily to the building's age and the materials used during construction, Fundy Engineering identified hazardous materials (e.g., asbestos pipe wrap, lead-based paints, mercury-filled thermostats, etc.) that required abatement prior to demolition. This work advanced to a Phase II ESA and then all potentially hazardous materials were removed from buildings and disposed of in an environmentally-sensitive manner.

Demolition, which spanned about three months, began on 29 January 2014. Following that, a Phase III ESA was completed in order to fully assess and delineate subsurface environmental issues. A remedial action plan was then implemented to obtain regulatory file closure on the site.

The former T.S. Simms & Co. Brush Factory site has since been redeveloped and is now the new entrance to the Reversing Falls Pulp Mill and Irving Tissue Mill.

## CORE PROJECT TEAM

Tim Ryan, *M.Eng., P.Eng.*  
Gordon Mouland, *M.Eng., P.Eng., P.E.*  
Greg Derrah, *P.Tech., CESA*  
Stephen Little, *P.Tech., CESA*  
Robert Hunt, *CTech*

Project Manager  
Geotechnical Engineer  
Environmental Technologist  
GIS Specialist  
Design and Drafting

## SCOPE OF SERVICES PROVIDED

### *Environmental Site Assessments*

- Completed Phase I, II, and III ESAs to identify and delineate potential environmental issues at the site

### *Hazardous Materials Abatement*

- Developed a plan to remove all potentially hazardous materials from the on-site buildings and for their disposal at appropriate handling facilities

### *Remedial Action Plan*

- A remedial program was conducted to remove historical subsurface impacts

### *Retaining Wall Design*

- Designed a 791 block Redi-Rock® soil-reinforced retaining wall to facilitate the construction of a new entrance and weigh station for the Reversing Falls Pulp Mill



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# Natural Gas Extraction Well – Well Pad Design and Consulting

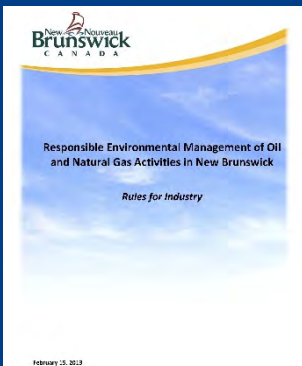
MCCULLY FIELD IN SUSSEX, NEW BRUNSWICK

## GEOTECHNICAL ENGINEERING AND ENVIRONMENTAL PERMITTING



### PROJECT DATES

- December 2013 and January 2014 – Well pad design
- February 2014 – Consultation with regulatory authorities
- March 2014 – Development of containment systems
- Summer 2014 – Well pad construction



### PROJECT OVERVIEW

On 15 February 2013, the New Brunswick government issued the document, “*Responsible Environmental Management of Oil and Natural Gas Activities in New Brunswick, Rules for Industry*”. The document includes regulations for well pad construction, secondary containment, measures to prevent the downwards migration of fluids, and other design considerations. In order to be approved for any new well drilling, development, and / or production, Corridor Resources was required to demonstrate that they met requirements outlined in the document.

Fundy Engineering’s team worked closely with personnel from Corridor Resources and the New Brunswick Department of the Environment and New Brunswick Department of Natural Resources to develop a well pad design that met all of the requirements laid out in the *Rules for Industry* document. In summer 2014, Fundy Engineering oversaw expansion of well pad F-67 in the McCully Field to allow for additional development of natural gas wells.

This Project was a first in New Brunswick for developing a natural gas well pad under such stringent regulations. Our team was able to rely on experience we had learned working in the oil and gas industry of Western Canada.

### SCOPE OF SERVICES PROVIDED

#### Well Pad Design

- Designed the expansion area of existing well pad F-67 in the McCully Field to allow additional exploration and production, which involved:
  - Geotechnical investigations
  - Materials specifications
  - Materials testing and supervision
  - Design drawings
  - Environmental permitting

#### Regulatory Consultation

- Assisted Corridor in the development of responses to regulatory agency comments

#### Containment Systems Plan

- Developed a plan to prevent the escape of fluid or material contaminants from the well pad during construction, drilling, completion, and production activities



### CLIENT REFERENCE

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### CORE PROJECT TEAM

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Gordon Mouland, *M.Eng., P.Eng., P.E.*  
Matthew Alexander, *P.Geo., Ph.D., EP*  
Robert Hunt, *CTech*

Client Liaison  
Project Manager  
Geotechnical Engineer  
Senior Environmental Scientist  
Design and Drafting

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# Sand Cove Road Slope Stability

SAINT JOHN, NEW BRUNSWICK

GEOTECHNICAL  
INVESTIGATION,  
SURVEYING,  
SLOPE MONITORING,  
AND  
SLOPE STABILIZATION  
TECHNIQUES



## PROJECT DATES

- January 2015 – Preliminary slope stability assessment
- Winter 2015 – Installation of groundwater wells and inclinometer casings
- 2015 – Routine monitoring
- Winter 2016 – Reporting and stabilization recommendations



## CLIENT REFERENCE

Mr. Michael Hugenholtz, *P.Eng.*  
Commissioner  
Transportation and Environment  
City of Saint John  
Municipal Operations  
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## PROJECT OVERVIEW

The McLarens Beach area along Sand Cove Road in west Saint John has experienced numerous slope failures. Previous tension cracks and landslides have resulted in broken water lines, downed hydro poles, lost survey pins, and damage to property and residences. Fundy Engineering was contracted by the City of Saint John to investigate the cause of local slope failures and identify potential solutions following partial collapse of the roadbed along Sand Cove Road.

The principal contributing factors of the slope failures are the high-energy erosive environment along McLaren's Beach at the toe of the slope, the thick layer of weak unconsolidated soils sitting atop bedrock that comprise the slope above McLaren's Beach, and the high pore water pressures within the unconsolidated soils.

Successive block failures have occurred, which move material into the foreshore of McLaren's Beach. From there, the material is removed by wave action and laterally drifts to the east. Erosion is most prevalent during winter storms in the Bay of Fundy. Slope failures in the area are expected to continue.

A foreshore berm and a breakwater located at low water where the failure exits the slope were provided as potential stabilization recommendations to be further explored.

## CORE PROJECT TEAM

Gordon Mouland, *M.Eng., P.Eng., P.E.*  
Andy MacVey, *P.Eng.*  
Robert Hunt, *CTech*

Project Manager  
Geotechnical Engineer  
Design and Drafting

## SCOPE OF SERVICES PROVIDED

### Geotechnical Investigation

- Conducted to determine the cause of the repeated slope failures along Sand Cove Road
- Installed groundwater wells for monitoring *in-situ* pore pressures
- Installed inclinometer casings for measuring horizontal displacements

### Slope Monitoring

- Slope measurements were monitored at several locations along Sand Cove Road to assess the rate of localized slumping

### Slope Stabilization

- Based on the data collected, stabilization techniques were presented in order to limit the amount of potential slumping in the future



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# Naufrage Fishing Harbour Breakwater

NAUFRAGE, PRINCE EDWARD ISLAND



## MATERIALS TESTING



## PROJECT DATES

- Winter 2016 through Winter 2018  
– Materials testing



## CLIENT REFERENCE

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## PROJECT OVERVIEW

Naufrage (French for shipwreck) Fishing Harbour is located along the northeastern coast of Prince Edward Island. A 250 m+ long breakwater with a narrow inlet leads to the safety of the harbour that is primarily used to shelter lobster and tuna fishing boats. An assessment completed on the breakwater's condition in 2016 revealed that work was required to maintain the breakwater because some of the armour stone had broken down due to the crashing waves.

Public Works and Government Services Canada contracted Fundy Engineering to complete materials testing during upgrades to the breakwater. One of the main tasks was to inspect the thousands of tonnes of armour stone trucked across the Confederation Bridge from New Brunswick to Naufrage. The armour stone had to be imported because there is no suitable source located on Prince Edward Island. The project specifications indicated that conglomerate was not acceptable as an armour stone material. Some of the rock was being sourced from a quarry where a seam of conglomerate was present.

The improvements to the Naufrage Harbour breakwater will benefit the small fishing community for many years to come.

## CORE PROJECT TEAM

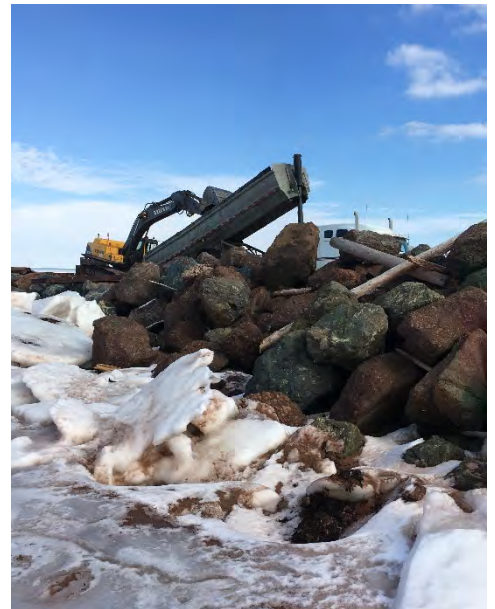
Gordon Mouland, *M.Eng., P.Eng., P.E.*  
Donnie Taweel, *CET*  
Matthew Alexander, *Ph.D., P.Geo. EP*  
Rickey Wakelin  
Tyler Pineau

Senior Geotechnical Engineer  
Project Manager  
Senior Environmental Scientist  
Engineering Technologist  
Field Technician

## SCOPE OF SERVICES PROVIDED

### *Materials Testing*

- Conducted testing on rebar, concrete, asphalt, compaction, filter stone, and armour stone during the reconstruction of the breakwater into the Naufrage fishing harbour



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# Concrete Lighthouse Restoration

MACHIAS SEAL ISLAND, NEW BRUNSWICK

GEOTECHNICAL  
ENGINEERING

AND

MATERIALS TESTING



## PROJECT DATES

- November 2016 – Project initiation
- November 2016 to February 2017 – On-island materials testing
- March 2017 – Project completion



## PROJECT OVERVIEW

In 2016, repairs were initiated on the 102 year old Machias Seal Island lighthouse because the 20 m tall tapered octagonal reinforced concrete tower was showing signs of concrete deterioration. The lighthouse, which is a designated structure under Parks Canada, is operated by the Canadian Coast Guard on the 8 ha island located in the Gulf of Maine.

Fundy Engineering was retained by Boston Construction Corporation to undertake materials testing during the restoration work on the lighthouse. Members of our team flew from Saint John by helicopter to Machias Seal Island to complete routine on-site testing.

The entire lighthouse, save for the glass lantern, was covered to shield work on the structure from inclement conditions and in order to keep the work area at a temperature above ambient. Because of the remote location, bagged concrete was mixed on-site by construction workers. We slump tested the mixed concrete and broke cast cylinders at our laboratory to assess the mixed concrete's comprehensive strength. We also completed testing on new anchor bolts that were installed within the structure.



## SCOPE OF SERVICES PROVIDED

### Materials Testing

- Performed quality control and quality assurance testing on the concrete used for making the repairs to the lighthouse



## CLIENT REFERENCE

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## CORE PROJECT TEAM

Gordon Mouland, *M.Eng., P.Eng., P.E.*

Andy MacVey, *P.Eng.*

Justin Tinker, *MIT*

Geotechnical Engineer

Project Manager

Geotechnical Technologist

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# QEH Cancer Treatment Centre

CHARLOTTETOWN, PRINCE EDWARD ISLAND

GEOTECHNICAL  
INVESTIGATION,  
MATERIALS TESTING,  
AND  
QUALITY CONTROL  
INSPECTIONS



## PROJECT DATES

- Spring and Summer 2017 – Materials testing during construction



## CLIENT REFERENCE

Mr. Phillip Jefferson, MA, MArch  
Department of Transportation,  
Infrastructure, and Energy  
Public Works and Planning  
PO Box 2000  
Charlottetown, PE C1A 7N8

☎: 902.620.3884  
☎: 902.569.0590  
✉: prjefferson@gov.pe.ca

## PROJECT OVERVIEW

In 1999, the PEI Cancer Treatment Centre opened at the Queen Elizabeth Hospital. The Centre has state-of-the-art high-precision radiation therapy on-site and is able to provide specialized care and well-being for individuals diagnosed with cancer. The Centre was expanded in 2003, again in 2008, and a further expansion and upgrades to the Centre began in 2017 to accommodate the addition of a third linear accelerator.

The PEI Department of Transportation, Infrastructure, and Energy hired Fundy Engineering to conduct materials testing services during the most recent expansion and upgrades. Our team was able to draw upon their experience from working on the 2008 expansion and from doing extensive work across the Island.

Adequate shielding is required to protect health practitioners and the general public from the high-energy radiation therapy completed at the Centre. As such, a concrete bunker was a major component of the 2017 expansion. Members of our team were on-site to undertake full-time inspection and testing of the concrete pours for the floor, walls, and roof slab of the bunker. They were also regularly on-site to complete inspections and testing of materials used for construction of the Centre's ancillary spaces.

## CORE PROJECT TEAM

Donnie Taweel, *CET*  
Alex Moulard, *P.Eng., PMP*  
Rickey Wakelin, *CTech*  
Tyler Pineau

Project Manager  
Geotechnical Engineer  
Geotechnical Technologist  
Geotechnical Field Technician

## SCOPE OF SERVICES PROVIDED

### Geotechnical Investigation

- Conducted bearing capacity testing on the soils to assess their ability to support the treatment centre

### Materials Testing

- Performed quality control and quality assurance testing on materials used for constructing the treatment centre such as rebar, concrete, and asphalt

### Quality Control Inspections

- Fundy Engineering staff routinely inspected the placement of materials during construction of the treatment centre



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# Kingsbrae Garden Amphitheatre

SAINT ANDREWS, NEW BRUNSWICK

GEOTECHNICAL  
ENGINEERING,  
SOIL-REINFORCED  
RETAINING WALL (SRW)  
DESIGN,  
AND  
QUALITY CONTROL  
INSPECTIONS



## PROJECT DATES

- Fall 2017 – Design
- January to May 2018 - Construction
- June 2018 – Project completion and amphitheatre opening



## CLIENT REFERENCE

Mr. Tim Henderson  
Managing Director  
Kingsbrae Garden  
220 King Street  
Saint Andrews, NB  
E5B 1Y8

☎: 506.529.9039

✉: tim@kingsbraegarden.com

## PROJECT OVERVIEW

Kingsbrae Garden was created to preserve and maintain the former Flemer Estate in Saint Andrews, New Brunswick. The 11 ha horticultural masterpiece opened to the public in the spring of 1998. Since then, the site has continued to see additions each year as its arts and culture base flourishes. The newest addition in spring 2018 was the Kingsbrae International Residency for the Arts (KIRA) Amphitheatre with surrounding artist studios.

Fundy Engineering's geotechnical team was engaged to create a Redi-Rock® design of the tiered amphitheatre seating. Overall the amphitheatre seating design comprised four rows of steps and three bench seating sections with 12 tiers each using 506 Redi-Rock® soil-reinforced blocks. The design allows spectators to either sit on a concrete seat or place a portable chair on the artificial turf between the concrete seating of each tier. During construction, our team was on-site to undertake periodic quality control investigations for concrete, compaction, placing of blocks, etc.

The KIRA Amphitheatre was debuted on 9 June 2018 under clear skies and it promises to be an awesome open-air venue for many years to come!

## SCOPE OF SERVICES PROVIDED

### Geotechnical Investigations

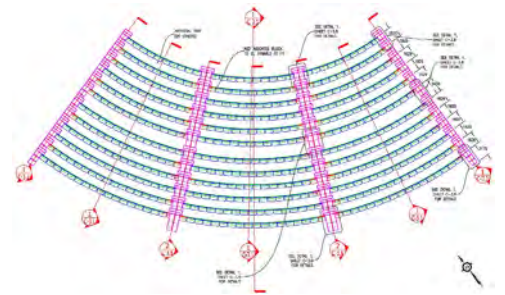
- Several surveys were completed in order to gather baseline information for design

### Soil-Reinforced Retaining Wall Design

- Different concepts were developed for the overall tiered seating design
- The design was altered after construction began to meet demanding site conditions and promote more efficient workflow

### Quality Control Investigations

- Fundy Engineering staff periodically inspected the placement of the concrete blocks during construction



## CORE PROJECT TEAM

Andy MacVey, P.Eng.  
Robert Hunt, CTech  
Justin Tinker

Geotechnical Engineer  
Design and Drafting  
Materials Testing

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# Canadian Coast Guard Tower

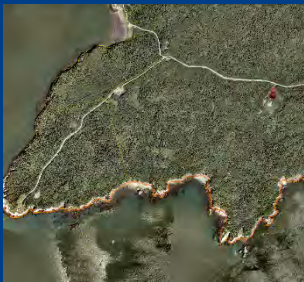
COLESON COVE, NEW BRUNSWICK

## GEOTECHNICAL INVESTIGATION



## PROJECT DATES

- December 2017 – Geotechnical investigation



## CLIENT REFERENCE

Mr. Aaron Slaney, *P.Eng.*  
Project Engineer  
Department of Fisheries & Oceans  
Canadian Coast Guard  
Marine and Civil Infrastructure  
PO Box 5667  
St. John's, NL A1C 5X1

☎: 709.772.7310  
☎: 709.772.2169  
✉: aaron.slaney@dfo-mpo.gc.ca

## PROJECT OVERVIEW

The aging 34 m tall Differential Global Positioning System (DGPS) tower located on Partridge Island in the Saint John Harbour required replacement. The Canadian Coast Guard, which has infrastructure near Coleson Cove including a lighthouse and foghorn, contracted Fundy Engineering to undertake a geotechnical investigation for a new guyed tower along Black Beach Road. The investigation was carried out to determine whether a gravity-based or anchor-based anchoring system would be required to support the new DGPS tower.

We engaged subcontractors to clear part of the site to complete the geotechnical investigation, to provide survey support, and to drill the boreholes. Eight boreholes, one at each of the six anchor locations, one at the tower base, and one at a midpoint anchor, were extended at the tower site using a track-mounted drill rig. Our geotechnical work also included providing recommendations on the anchoring system design and the site's classification for seismic response.

Construction of the new Canadian Coast Guard DGPS tower occurred in spring 2018 and became operational soon thereafter. Seafarers continue to have an operational DGPS to assist them with navigation in the Bay of Fundy.

## CORE PROJECT TEAM

Gordon Mouland, *M.Eng., P.Eng., P.E.*  
Andy MacVey, *P.Eng.*  
Robert Hunt, *CTech.*

Senior Geotechnical Engineer  
Geotechnical Engineer  
Design and Drafting

## SCOPE OF SERVICES PROVIDED

### *Geotechnical Investigation*

- Conducted to assess the underlying soil and bedrock conditions for designing the tower anchoring system
- Provided information, such as borehole logs, rock density, rock quality designation, compressive strengths, and bearing pressures



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# Atlanding Sea Cucumber Facility

BLACKS HARBOUR, NEW BRUNSWICK

COMPLETE  
ARCHITECTURAL,  
MECHANICAL,  
ELECTRICAL,  
STRUCTURAL, AND  
GEOTECHNICAL DESIGN



## PROJECT DATES

- Spring 2018 – Project initiation
- Fall 2019 – Project completion



## CLIENT REFERENCE

Mr. Jamie Olsen  
Quality Manager  
252 Red Barn Road  
Blacks Harbour, NB E5H 1E1

☎: 506.755.0905  
✉ jamie@atlanding.ca

## PROJECT OVERVIEW

The sea cucumber (*Cucumaria frondosa*), which is considered a luxury seafood in east Asia, is a thin-walled marine animal that attaches itself to the bottom using tube feet. There is a limited fishery in southwestern New Brunswick with the primary focus being in *The Passages*, the area between Letete on the mainland and Deer Island. Individuals are harvested from the seafloor by commercial divers.

Atlanding is a primary processor of sea cucumbers in New Brunswick. They contracted Fundy Engineering to transform a former fish meal production facility in Blacks Harbour into a sea cucumber processing facility. The overall work also included design of a new effluent and boiler building.

Our team worked with Atlanding personnel throughout the project by sizing and selecting processing equipment, preparing design drawings and tender documents, and administering contract and construction documents throughout the building process. We also worked with Estabrooks Engineering who completed the structural engineering review and design.

Sea cucumbers are washed, cut, blanched, and frozen at the facility prior to export to the United States and overseas.

## CORE PROJECT TEAM

Darryl Ford, *P.Eng., FEC*  
David Richards, *P.Eng., MBA*  
Ryan Gosson, *P.Eng.*  
Seun Ijaola, *P.Eng., PMP*  
Richard Frenette, *P.Eng.*  
Jon Pitman, *CTech*  
Al Moulard, *P.Eng., PMP*  
Robert Hunt, *CTech*

Senior Mechanical Engineer  
Project Manager  
Mechanical Engineer  
Electrical Engineer  
Revit® Design  
Architectural Support  
Geotechnical Engineer  
Design and Drafting

## SCOPE OF SERVICES PROVIDED

### Architectural Support

- Obtained certified field measurements of the building structure and layout floorplans, including interior / exterior walls and key structural components including beams, trusses, joists, and load-bearing walls
- Generated architectural floor plans, layouts, and building sections

### Geotechnical Investigation and Materials Testing

- Installed several test pits to characterize the underlying soil conditions in the area of the new effluent and boiler building
- Completed various tests on *in-situ* soils during the geotechnical investigation and compaction and concrete testing during construction

### Electrical Design

- Designed an upgraded service entrance and power distribution

### Mechanical Design

- Sized and specified the boiler system for heating the overall facility and process water for washing and blanching
- Sized and specified processing equipment and piping

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# Clyde River Bridge Crane Pads Design

CLYDE RIVER, PRINCE EDWARD ISLAND

GEOTECHNICAL  
INVESTIGATION,  
GEOTECHNICAL  
DESIGN,  
AND  
MATERIALS TESTING



## PROJECT DATES

- July 2018 – Project kick-off
- Fall 2018 – Geotechnical investigation
- Winter 2018 – Geotechnical design and materials testing



## CLIENT REFERENCE

Mr. Michael Bingley  
Project Manager  
Noye & Noye Limited  
PO Box 58  
Tyne Valley, Prince Edward Island  
C0B 2C0

☎: 902.831.2541

✉: mike.noyeandnoye@outlook.com

## PROJECT OVERVIEW

Phase 2 of the Cornwall Bypass Project began in spring 2018. The \$58 million Phase 2 routes the Trans-Canada Highway around Cornwall by going between North River and New Haven. A major component of Phase 2 was the 140 m concrete and steel bridge spanning over the Clyde River.

One of the bridge's subcontractors, Noye & Noye Limited, contracted Fundy Engineering to complete geotechnical services related to bringing a Manitowoc 440 ton heavy-lift crawler crane to the site for installing steel girders between the bridge's abutments and centre pier.

Based on our geotechnical observations and investigations, it was determined that excavation of existing fills and improvements of the soil conditions would be required to support the heavy lift crane. Preparation of the crane pads involved excavation to an adequate bearing soil, fill in the form of compacted Select Borrow and Class A gravel. Two layers of Tensar TriAx 130S Geogrid were also installed at each crane pad. All of the excavation, placement of fills, and installation of geogrid was done under the supervision of Fundy Engineering.

The heavy lift crane was brought to the site in January 2019 for assembly atop the engineered pads. Installation of the steel girders was successfully done in February and March 2019.

## CORE PROJECT TEAM

Gordon Mouland, *M.Eng., P.Eng., P.E.*  
Alex Mouland, *P.Eng., PMP*  
Robert Hunt, *CTech*  
Donnie Taweel, *CET*  
Rickey Wakelin, *CTech*  
Tyler Pineau

Senior Geotechnical Engineer  
Senior Geotechnical Engineer  
Design and Drafting  
Senior Technologist  
Geotechnical Technologist  
Geotechnical Field Technician

## SCOPE OF SERVICES PROVIDED

### *Geotechnical Investigation*

- Installed several boreholes and test pits to characterize the underlying soil conditions

### *Geotechnical Design*

- Designed three crane pads for bearing capacities ranging from  $24\,500\text{ kg} \cdot \text{m}^{-2}$  to  $61\,000\text{ kg} \cdot \text{m}^{-2}$

### *Materials Testing*

- Proctor densities, sieve analyses, and compaction tests were completed



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# Latimore Lake Water Intake Upgrades

SAINT JOHN, NEW BRUNSWICK

## GEOTECHNICAL INVESTIGATION



## PROJECT DATES

- September 2018 – Project kick-off and borehole investigation
- October 2018 – Geotechnical investigation report issued



## PROJECT OVERVIEW

Port City Water Partners signed an agreement in 2013 with the City of Saint John as part of the Safe, Clean, Drinking Water Project to build and operate a water treatment facility in order to guarantee access to quality drinking water for Saint John homes and businesses. The intake for the system is located at Latimer Lake in east Saint John, which is then sent by pipeline to a new water treatment facility along the banks of the Little River Reservoir.

Port City Water Partners contracted Fundy Engineering to undertake a land- and water-based geotechnical investigation at the Latimer Lake Dam and Intake Structures. The purpose of the geotechnical investigation was to characterize soil and bedrock information in the vicinity of the proposed new three 1 050 mm diameter water intake pipes in order to evaluate the feasibility of various excavation and construction methods for installing the new water intake pipes on the reservoir floor.

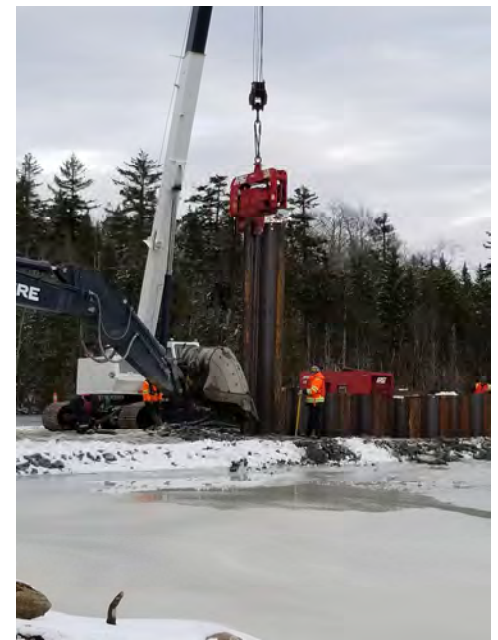
Between 17 and 21 September 2018, sixteen boreholes were drilled using a tack-mounted rotary rig. Five of the boreholes were drilled below the water by placing the drill rig on a portable barge. Core samples were obtained from the majority of the boreholes.

Based on the geotechnical investigation findings, we recommended that Port City Water Partners install a cofferdam in order to safely allow for excavation to bedrock so that the new intake pipes could be installed on the floor of the Latimer Lake Reservoir.

## SCOPE OF SERVICES PROVIDED

### *Geotechnical Investigation*

- Installed several land- and water-based boreholes to characterize soil and bedrock information in the vicinity of the proposed new intake pipes



## CLIENT REFERENCE

Mr. Antonio Tenorio  
Project Manager  
Port City Water Partners  
380 Bayside Drive, Suite 101  
Saint John, New Brunswick  
E2J 4Y8

## CORE PROJECT TEAM

Gordon Mouland, *M.Eng., P.Eng., P.E.*  
Alex Mouland, *P.Eng., PMP*  
Robert Hunt, *CTech*  
Devan Thomas

Senior Geotechnical Engineer  
Project Manager  
Design and Drafting  
Geotechnical Field Technician

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# Market Slip Dredging

SAINT JOHN, NEW BRUNSWICK

GEOTECHNICAL  
INVESTIGATION,  
COST-ESTIMATE AND  
TENDER PACKAGE  
DEVELOPMENT,  
ENVIRONMENTAL  
PERMITTING,  
AND  
PROJECT MANAGEMENT



## PROJECT DATES

- Summer 2019 - Geotechnical investigation
- Fall 2019 and Winter 2020 – Cost-estimating, tender package development, and environmental permitting
- Spring 2020 – Dredging of Market Slip



## CLIENT REFERENCE

Mr. Samir Yammine, *P.Eng.*  
City of Saint John  
15 Market Square  
PO Box 1971  
Saint John, NB E2L 4L1

☎: 506.648.4667

✉: samir.yammine@saintjohn.ca

## PROJECT OVERVIEW

Dredging of slips within Saint John Harbour is required every several years. Prior to 2020, Market Slip was last dredged in 2004. During that time, sediment built up via natural siltation to the point where maintenance dredging was required.

The City of Saint John contracted Fundy Engineering to oversee the dredging project. The first part of the process involved assessing the current depths within Market Slip. Once those data were available, a cost-estimate was prepared for representatives of the City of Saint John to determine if the project was feasible. We also prepared a tender package for contractors to bid the work and obtained various environmental permits to allow the work to be completed.

The dredging of Market Slip was somewhat unique because it was done by building a road out into the water that could be worked from during low tides. Once dredge depths were achieved, the roadway was removed leaving behind a deepened waterway.

About 3 000 m<sup>3</sup> of material was removed from Market Slip in spring 2020 and placed within a lined disposal cell in west Saint John. Water depths are now able to accommodate visiting recreational vessels and pleasure craft. An agreement between the City of Saint John and Port Saint John will see annual maintenance dredging done over the next 12 years.

## CORE PROJECT TEAM

Gordon Mouland, *M.Eng., P.Eng., P.E.*  
Matthew Alexander, *Ph.D., P.Geo. EP*  
Robert Hunt, *CTech.*  
Josh Cosman, *EIT*

Senior Geotechnical Engineer  
Senior Environmental Scientist  
Design and Drafting  
Geotechnical Technologist

## SCOPE OF SERVICES PROVIDED

### *Geotechnical Investigation*

- A geotechnical investigation was conducted to determine the existing soil depths within Market Slip

### *Cost-Estimate and Tender Package*

- A cost-estimate to complete the work was provided to the City of Saint John prior to issuing the tender package that was prepared for contractors to bid on the dredging contract

### *Environmental Permitting*

- Secured the necessary federal, provincial, and municipal permit and authorizations required to complete the dredging

### *Project Management*

- Managed the project on behalf of the City of Saint John to ensure the dredging was completed as per the contract



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# Woodwards Cove Harbour Design

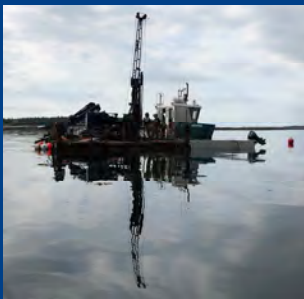
GRAND MANAN, NEW BRUNSWICK

DESIGN  
RECOMMENDATIONS,  
ENVIRONMENTAL  
PERMITTING ROADMAP,  
AND  
GEOTECHNICAL  
INVESTIGATION



## PROJECT DATES

- Winter and Spring 2019 – Design recommendations and environmental permitting roadmap
- Summer 2019 - Geotechnical investigation, conceptual plan development and cost-estimating



## CLIENT REFERENCE

Mr. Skip Cormier  
Cormier Management Consulting  
35 Rowan Berry Terrace  
Saint John, NB E2K 4R3

☎: 506.632.1899

✉: skipcormier@rogers.com

## PROJECT OVERVIEW

The Grand Manan Harbour Authority (GMHA) operates six harbour facilities in Grand Manan. Woodward's Cove is the largest of those facilities, but was closed to access in 2000 because the timber structure became unsafe for use. Recognizing the dilapidated condition of the fisherman's wharf in Woodward's Cove and the need for safe harbour facilities, the GMHA and Atlantic Canada Fish Farmers Association contracted Fundy Engineering to prepare conceptual designs for a new harbour.

The conceptual harbour design included rock breakwaters surrounding a basin that would be dredged to - 3.0 m to allow use during low tide. By installing floating wharves, there would be space within the harbour for about 30 skiffs / scows, 42 small boats, and 48 large boats. A marginal wharf, road, and 178 space parking lot constructed adjacent to the harbour would provide land access and storage.

The environmental permitting roadmap was completed to identify all of the regulators with jurisdiction over the conceptual design should it move forward.

A geotechnical investigation was completed to assess the subsurface soil and bedrock conditions. That information was used to develop a cost-estimate for undertaking dredging work and constructing the breakwater.

## CORE PROJECT TEAM

Gordon Mouland, *M.Eng., P.Eng., P.E.*  
Alex Mouland, *P.Eng., PMP*  
Robert Hunt, *CTech.*  
Josh Cosman, *EIT*

Senior Geotechnical Engineer  
Project Manager  
Design and Drafting  
Geotechnical Technologist

## SCOPE OF SERVICES PROVIDED

### *Design Recommendations*

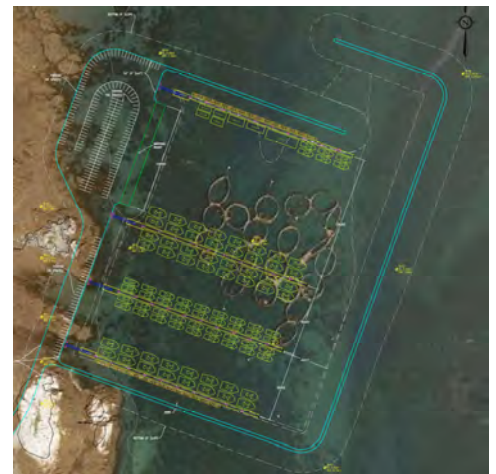
- Based on information collected during a previous study, a conceptual plan was developed for the harbour that would suit the majority of intended users

### *Environmental Permitting Roadmap*

- A roadmap that identified the local, provincial, and federal permits, authorizations, and approvals required to undertake the work was generated

### *Geotechnical Investigation*

- A geotechnical investigation was conducted to assess the subsurface soil and bedrock conditions for constructing a breakwater



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# University of Prince Edward Island Residence

CHARLOTTETOWN, PRINCE EDWARD ISLAND



## MATERIALS TESTING



## PROJECT DATES

- Summer and Fall 2020 – Materials testing



## CLIENT REFERENCE

Ms. Jackie MacPhail  
Capital Projects, UPEI  
550 University Avenue  
Charlottetown, PE C1A 4P3

☎: 902.566.6034

✉: jmacphail@upe.i.ca

## PROJECT OVERVIEW

Formed in 1969, the University of Prince Edward Island (UPEI) is the only publicly-funded University in the Province. Enrollment at the 57 ha campus is about 5 000 students. In 2020, the institution only had the capacity to house about 9.5 % of its student population on campus. Recognizing the need for additional housing, the University embarked on the design and development of a new residence.

The new 17 200 m<sup>2</sup> nine-storey residence will have accommodations for 260 students, common areas, lecture halls, a multi-purpose room, and parking for 80 vehicles. Construction of the \$60 million facility began in summer 2020. Completion is expected in 2022 in advance of the 2023 Canada Winter Games where the residence will feature prominently within the Athletes' Village.

Fundy Engineering was contracted by UPEI to complete materials testing during construction of the residence. Our team was on-site to observe various phases of construction.

Through this Project, UPEI will have the capacity to house about 15 % of its student population on campus.

## CORE PROJECT TEAM

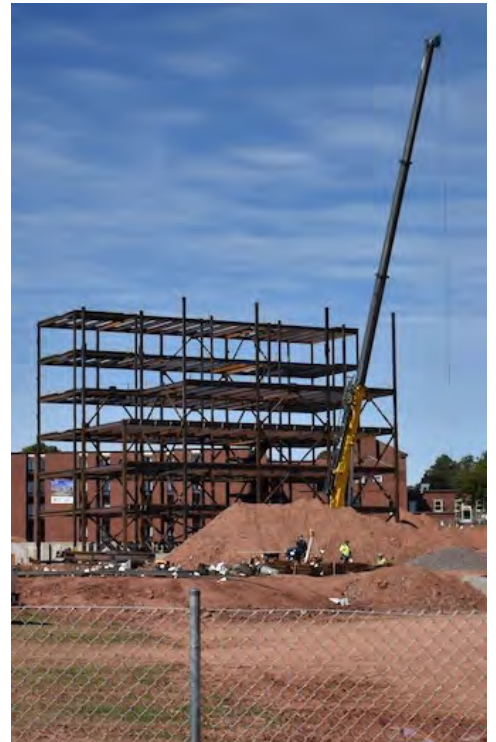
Donnie Taweel, *CET*  
Alexander Mouland, *P.Eng., PMP*  
Patrick MacDonald, *EIT*  
Rickey Wakelin  
Tyler Pineau

Project Manager  
Geotechnical Engineer  
Engineering Support  
Engineering Technologist  
Field Technician

## SCOPE OF SERVICES PROVIDED

### Materials Testing

- Conducted testing on compaction, rebar, concrete, and asphalt during construction of the new residence



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# Kennebecasis Land & Leisure

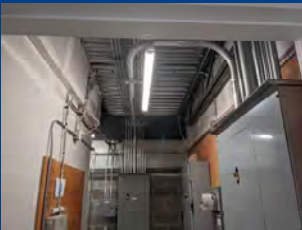
QUISPAMIS, NEW BRUNSWICK

GEOTECHNICAL  
INVESTIGATION,  
MATERIALS TESTING,  
AND  
BUILDING SYSTEMS  
DESIGN



## PROJECT DATES

- Summer and Fall 2021 – Building systems design
- Winter 2020/2021 and Spring 2021 – Geotechnical inspections and materials testing
- Summer 2021 – Construction reviews and completion



## CLIENT REFERENCE

Mr. Durck deWinter  
Iron Maple Construction  
119 B Cogle Road  
Sussex Corner, NB E4E 2S5

☎: 506.808.1826

✉: durck.dewinter@ironmaple.ca

## PROJECT OVERVIEW

Kennebecasis Land & Leisure is a one-stop shop for homeowners to purchase or rent all equipment they need to maintain their property. The facility is also a service centre for purchased and rented equipment. The operation was moved to a modern, newly constructed building on a greenfield site in 2021 after spending many years in a small warehouse type building in the heart of Rothesay. This site is located adjacent to major transportation routes and there is ample room for equipment storage and expansion.

This project was a design build. Fundy Engineering was hired by the contractor, Iron Maple Construction, to undertake all building systems design work and geotechnical aspects of the project. During construction, our Project Team worked closely with the contractor to ensure that all systems designed for the building were installed as per the specifications. This involved regular site inspections.

## CORE PROJECT TEAM

Darryl Ford, *P.Eng., FEC*  
Alex Moulard, *P.Eng., PMP*  
Ryan Gosson, *P.Eng.*  
Richard Frenette, *P.Eng.*  
Jacob Beam, *P.Tech.*  
Dexter Tan, *TGIT*  
Seun Ijaola, *P.Eng., P.E., PMP*  
Myles Munn, *P.Tech.*

Building Systems Project Manager  
Geotechnical Project Manager  
Mechanical Engineer, Project Coordinator  
Revit® Design  
Electrical Support  
Drafting  
Electrical Engineer  
Civil Works Technologist

## SCOPE OF SERVICES PROVIDED

### *Building Systems Design*

- Heating, ventilation, and air-conditioning design
- Plumbing systems design
- Fire protection systems specifications
- Electrical power distribution design
- Interior and exterior lighting design
- Building access control and security system design
- Communications system design
- Construction reviews
- Responding to contractor enquires during construction

### *Geotechnical Investigation*

- Test pits to assess subsurface soil, bedrock, and groundwater conditions
- Sieve analysis of *insitu* soils
- Foundation earthwork

### *Materials Testing*

- Compaction testing
- Proctor testing
- Concrete slump, air, and compressive strength testing

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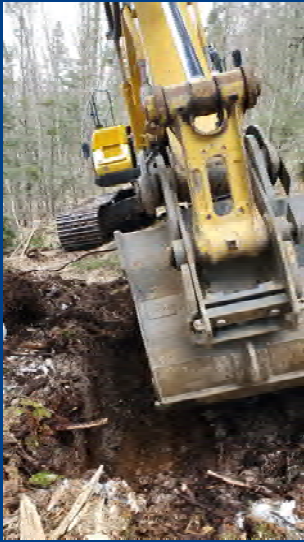
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## GEOTECHNICAL INVESTIGATION



# Burchill Wind Geotechnical Investigation

SAINT JOHN, NEW BRUNSWICK



### PROJECT DATES

- January 2021 – Site geotechnical investigations
- February 2021 – Laboratory analyses
- March 2021 – Reporting



### PROJECT OVERVIEW

Fundy Engineering was retained by Natural Forces to undertake a geotechnical investigation for the Burchill Wind Project, a ten turbine 45 MW wind farm in west Saint John. Once completed, the Project will provide clean and green electricity to Saint John Energy's electrical grid. Each turbine proposed for the wind farm is 205 m tall from base to blade tip. These will be the tallest wind turbines in the Province.

Geotechnical investigations were completed to understand the underlying soil, bedrock, and groundwater conditions across the rugged coastal site. The collected data were important for providing geotechnical design parameters to facilitate detailed engineering foundation design for the wind turbines.

Based on the detailed field investigations, we recommended that all vegetation, organic materials, and softened and unsuitable overburden soils be removed and then engineered fills be laid down to provide suitable bases for roads, turbine laydown areas, and heavy lift crane pads. It was determined that the turbines could be founded on prepared bedrock surfaces.

### SCOPE OF SERVICES PROVIDED

#### *Geotechnical Investigation*

- Many test pits were excavated along service roads, turbine laydown areas, and heavy lift crane pad locations using a tracked excavator to determine soil, bedrock, and groundwater conditions
- Boreholes were put down at the centre of each turbine site using a track-mounted drill rig to assess bedrock conditions
- Core samples were collected from the boreholes and tested in the laboratory for classification and analysis for parameters such as bearing capacity
- Generated a report with recommendations for founding the turbines and the placement of engineered fills for roadways, heavy lift crane pads, and pre-assembly areas



### CLIENT REFERENCE

Mr. Chris Veinot  
Natural Forces Construction Inc.  
1801 Hollis Street, Suite 1250  
Halifax, NS B3J 3N4

☎: 902.422.96630  
✉: cveinot@naturalforges.ca

### CORE PROJECT TEAM

Alex Mouland, *P.Eng., PMP*  
Gordon Mouland, *M.Eng., P.Eng., P.E.*  
John McKelvey, *P.Eng., NBLS*  
Myles Munn, *P.Tech.*  
Robert Hunt, *CTech.*  
Tyler Hogan, *P.Tech.*

Project Manager  
Senior Geotechnical Engineer  
Senior Survey Engineer  
Civil Works Technologist  
Drafting  
Drafting

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Saint John, NB • Clyde River, PE





# GEOTECHNICAL DUE DILIGENCE AND ENGINEERING

AND

# ENVIRONMENTAL DUE DILIGENCE



# North Head Harbour Blasting for Dredging

NORTH HEAD ON GRAND MANAN, NEW BRUNSWICK



## PROJECT DATES

- Spring and Summer 2021 - Pre-blast surveys
- Fall 2021 – Blast monitoring



## PROJECT OVERVIEW

North Head on Grand Manan is an active harbour that services the commercial fishery, aquaculture industry, and recreational users. Harbour improvements, comprising a new 20 m x 100 m marginal concrete wharf, dredging approximately 18 000 m<sup>2</sup> of class A material (bedrock), and installation of harbour floats began in early 2021 to improve safety and provide an adequate depth of water for vessel navigation and berthing. The removal of bedrock in the harbour required blasting. The blasting involved drilling boreholes and using explosive charges to break the bedrock.

Fundy Engineering completed pre-blast structural surveys on over 120 residential and commercial buildings within 600 m of the blasting work. The surveys were done to document the condition of the buildings before the start of blasting and included taking photographs and collecting water samples to assess groundwater quality.

During the blasting work within the harbour, seismographic monitoring was completed at residential and commercial buildings. For each blast, seismographs were placed at three different locations to monitor vibrations and over pressure to ensure the explosive charges used did not exceed the allowable blasting limits.

## SCOPE OF SERVICES PROVIDED

### *Pre-Blast Structural Surveys*

- Interviewing building occupants
- Documenting structures with photographs and notes
- Collection of water samples for analysis of microbiology and general chemistry

### *Blast Monitoring*

- Setting up seismographs to record vibrations and over pressured during the blasting work
- Reporting results to the regulator to ensure compliance with regulations



## CLIENT REFERENCE

Mr. Tyler Roy  
Greenfield Construction  
209 General Manson Way  
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## CORE PROJECT TEAM

Tim Ryan, *M.Eng., P.Eng.*  
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Project Manager  
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Project Coordinator  
Civil Works Technologist  
Environmental Technologist

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SURVEY  
ENGINEERING

AND

GEOTECHNICAL  
INVESTIGATION



# Gannet Rock Lighthouse 3D Scanning

GANNET ROCK WITHIN BAY OF FUNDY, NEW BRUNSWICK



## PROJECT DATES

- November 2021 – Site visit to complete 3D scan and geotechnical investigation
- December 2021 – Reporting



## PROJECT OVERVIEW

Gannet Rock is located within the Bay of Fundy 13 km south of Grand Manan. Because dangerous shoals in the area presented a hazard to ships entering the Bay of Fundy *en route* to Saint John, a lighthouse was built and first lit in 1831. The seven-storey tapered octagonal lighthouse was staffed until 1996 when it became automated. Structures, such as lightkeeper houses and facilities for storing fuel to power the light, were housed on the island over the years.

Parks Canada assigned heritage designation to the lighthouse tower in 1991 for being the most isolated light station on the Fundy coast and for being the second-oldest wooden tower within Canada. In 2014, the lighthouse was named to Heritage Canada The National Trust's lists of top 10 endangered places in Canada.



This work was done to understand the existing conditions of the structures and for creating a 3D digital surface of the island for siting potential new structures. A laser scanner was used because it is a fast, precise, and cost-effective way to collect data in three dimensions. The end goal was to determine how the site can be stabilized and redeveloped for the Grand Manan tourism industry.

## SCOPE OF SERVICES PROVIDED

### Survey Engineering

- Collect detailed site information using a 3D laser scanner
- Process field data and generate a 3D point cloud of the existing structures
- Produce a site plan and cross sections

### Geotechnical Investigation

- Visit site and assess existing structures
- Produce a geotechnical condition assessment report



## CLIENT REFERENCE

Mr. Shane Ho  
Virtual Bookkeeping Ltd.  
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## CORE PROJECT TEAM

Gordon Mouland, *M.Eng., P.Eng., P.E.* Senior Geotechnical Engineer  
John McKelvey, *P.Eng., NBLS* Senior Survey Engineer  
Robert Hunt, *CTech.* Drafting  
Richard Frenette, *P.Eng.* Drafting

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**PROJECT MANAGEMENT**

## Award Winner

2006 Association of Consulting  
Engineering Companies (ACEC) – New  
Brunswick Showcase Award for

TECHNICAL EXCELLENCE

## BUILDING SYSTEMS DESIGN (MECHANICAL AND ELECTRICAL) AND PROJECT MANAGEMENT

# Heritage Building – CenterBeam Place

SAINT JOHN, NEW BRUNSWICK



### PROJECT DATES

- 2002 – Restoration of Phase One began
- 2002 through 2008 – Design and installation of mechanical and electrical systems during renovations
- 2005 – Phase One completed and opened for business
- 2008 – Phase Two completed and opened for business

### CLIENT REFERENCE

Mr. Chris Lawrence  
Commercial Properties Limited  
Suite 110 Brunswick House  
44 Chipman Hill  
PO Box 20114  
Saint John, NB E2L 5B2

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☎: 506.635.6006  
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### PROJECT OVERVIEW

A keystone block of prominent heritage buildings (circa 1878 to 1880) situated in the heart of Uptown Saint John was redeveloped to create modern office spaces that preserve and embrace the historic architecture. In 2002, a team of architects, designers, and engineers was chosen to breathe new life into the buildings located at the foot of King and Prince William Streets. CenterBeam Place, as it is now known, presented architectural and engineering challenges because the buildings were horizontally and vertically connected and the 4<sup>th</sup> and 5<sup>th</sup> floors of 60 Prince William Street were previously ravaged by fire.

It was a major undertaking to completely overhaul the outdated mechanical and electrical systems and bring them in-line with modern standards while maintaining the historic charm inherent in the buildings. Fundy Engineering successfully designed the natural gas-fired heating plants, the overall building management system, and the plumbing, air conditioning, and fire suppression systems.

The 13 500 m<sup>2</sup> redevelopment is now home to several commercial spaces including an IT firm, a handicrafts store, an upscale jeweler, and a coffee shop. In the end, the heritage architecture has been preserved for future generations to appreciate and enjoy.

### CORE PROJECT TEAM

Darryl Ford, *P.Eng., FEC*  
Hector Lamprea, *P.Eng., P.E., CEM*  
Brian Manley, *P.Eng.*  
Ian Flower, *P.Eng.*

Project Manager  
Energy Efficiency Engineer  
Mechanical Engineer  
Mechanical Engineer

### SCOPE OF SERVICES PROVIDED

#### Heating Systems Design

- A new boiler room was constructed for housing an entirely new high-efficiency natural gas-fired heating plant; all 2 600 m of water heating pipe was replaced

#### Ventilation Systems Design

- A ventilation system, designed to meet ASHRAE standards, exchanges outside air for stale air within the occupied spaces; the new system has reduced total energy costs by ~ 70 % and has considerably decreased greenhouse gas emissions

#### Air-Conditioning System Design

- The installed flexible air-conditioning system has generated about 30 % in energy savings compared to a conventional system, it cannot be seen or heard, and it performs effectively

#### Building Management System Design

- A key element in the mechanical engineering design is a building management system that completely and digitally integrates operation of the heating, ventilation, and air-conditioning systems

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# Ultra Low Sulphur Diesel Pipeline

SAINT JOHN, NEW BRUNSWICK

## ENVIRONMENTAL PERMITTING AND PROJECT MANAGEMENT



### PROJECT DATES

- December 2004 – ULSD application submitted to the PUB
- January 2005 – Response submitted to PCC
- February 2005 – Supplemental information submitted to PCC
- April 2005 – PUB hearings
- July 2005 – Final application submitted to the PUB
- August 2005 – Permit to Construct (2005-01) issued by PUB
- Fall 2005 – ULSD pipeline construction

### CLIENT REFERENCE

Mrs. Louise Stewart, *P.Eng.*  
Refinery Environment Manager  
Irving Oil Limited  
PO Box 1260  
Saint John, NB E2L 4H6

### PROJECT OVERVIEW

Fundy Engineering assisted with regulatory permitting to the Public Utilities Board (PUB) for a dedicated 1.85 km long 610 mm diameter pipeline to transport Ultra Low Sulphur Diesel (ULSD) from the Irving Refinery to the Courtney Bay refined products terminal. ULSD contains 97 % less sulphur than the industry standard diesel product.

Although a relatively short pipeline, its route was complicated by several crossings, including:

- Bayside Drive;
- a Canadian National Railway line;
- Little River;
- Irving Paper's waterline;
- a City of Saint John waterline;
- Maritimes & Northeast gas line;
- several NB Power transmission lines; and
- several SJ Energy distribution lines.

Modifications were required to the original application submitted to the PUB based on regulatory reviews. After approval was granted from the PUB, the ULSD pipeline was built. The ULSD pipeline was installed on a newly constructed pipeline support system. That new support system was constructed atop 111 concrete spread footing foundations.

As a result of this project, ULSD is transported by ship from the East Saint John Product Terminal to domestic and foreign markets.

### CORE PROJECT TEAM

Tim Ryan, *M.Eng., P.Eng.*  
Matthew Alexander, *Ph.D., P.Geo., EP*  
Crystal Caines, *P.Tech., PMP*

Project Manager  
Senior Environmental Scientist  
Environmental Technologist

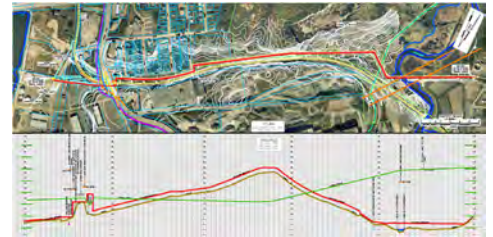
### SCOPE OF SERVICES PROVIDED

#### Permitting

- Several permits were required for various components of the pipeline to move forward, which were secured by Fundy Engineering
- We developed briefing presentations for the PUB and the Pipeline Coordinating Committee (PCC)
- We prepared responses to requests for information from the PUB and PCC and we submitted supplementary information, when necessary

#### Project Management

- We tracked inquiries made by several interveners throughout the public hearing
- We liaised with property and easement owners to obtain necessary agreements to construct and operate the ULSD pipeline



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## Award Winner

2006 Association of Consulting  
Engineering Companies (ACEC) – New  
Brunswick Showcase Award for

TECHNICAL EXCELLENCE

# Fundy Linen Services

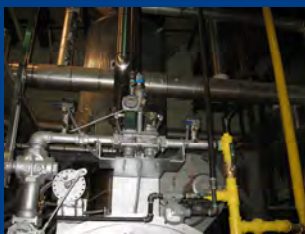
SAINT JOHN, NEW BRUNSWICK

**BUILDING SYSTEMS  
DESIGN (MECHANICAL  
AND ELECTRICAL)  
AND  
PROJECT MANAGEMENT**



## PROJECT DATES

- Spring 2006 – Design of facility upgrades
- Summer 2006 – Assistance with overseeing the construction and conversion to the new systems
- Fall 2006 – As-built review



## CLIENT REFERENCE

Mr. Shane Steeves  
Manager Commercial Installations  
Enbridge Gas New Brunswick  
Moncton, New Brunswick  
E2L 5E6

☎: 506.384.5058  
☎: 506.382.4655

## PROJECT OVERVIEW

Fundy Linen Services, now part of FacilicorpNB, provides laundry services for New Brunswick's hospitals and nursing homes. Their 4 300 m<sup>2</sup> laundry services building in Saint John is located in the Spruce Lake Industrial Park. The original facility, which opened in 1979, was designed to process 3 630 000 kg of linen annually.

The facility houses production equipment including tunnel washers, washer extractors, driers, irons, chemical processing, plant heating, and a steam generator. The original hot-oil heating plant system comprised three fuel-oil fired thermal heaters. Each of those heaters had an output rating of 6 000 000 BTU per hour. The boilers supplied heat to the building through a steam heat exchanger located in the main air handling units.

Fundy Engineering was contracted to modernize the heating plant system. We sized and selected the new heating plant, gas piping distribution system, hot-oil pumps, and economizer. The design documents produced specified the necessary work required to replace the fuel-oil fired thermal heaters with natural gas-fired units. Additionally, some of the smaller systems that were propane-fired were also converted to natural gas-fired units.

Conversion involved planning demolition of the existing equipment while maintaining the facility in an operational state.

## CORE PROJECT TEAM

Darryl Ford, *P.Eng., FEC*  
Hector Lamprea, *P.Eng., P.E., CEM*

Project Manager  
Energy Efficiency Engineer

## SCOPE OF SERVICES PROVIDED

### *Boiler Replacement Design*

- Three old fuel oil-fired boilers were replaced by two new natural gas-fired boilers that were sized and selected by Fundy Engineering

### *Boiler Room Design*

- Located all new boiler equipment (boilers, piping, and economizers) in a dedicated room at the facility

### *Natural Gas Piping Design*

- Construction drawings for the new natural gas piping distribution to the existing and new equipment was laid out and sized by Fundy Engineering

### *Demolition Drawings*

- Demolition drawings were created for the demolition of the existing propane pipe lines and for the existing boilers, chimney, and breaching

### *Economizer Support Design*

- Chimney was selected for the economizer

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# Dutch Point Wetland Restoration

HAMPTON, NEW BRUNSWICK

ENVIRONMENTAL  
CONSTRAINTS  
MAPPING,  
WETLAND RESTORATION  
DESIGN,  
ENVIRONMENTAL  
PERMITTING,  
PROTECTION,  
MONITORING, AND  
COMPLIANCE,  
AND  
PROJECT MANAGEMENT



## PROJECT DATES

- 2007 – Site evaluation and baseline data collection
- September to December 2009 – Lagoon dewatering, sediment stabilization, grading, and berm re-shaping
- 2010 – Berm re-shaping and native plant seeding and re-vegetation
- 2011 and 2013 – Post-restoration environmental monitoring

## CLIENT REFERENCE

Mr. Fraser Forsythe, *P.Eng.*  
Health, Safety, Security, and  
Environment Manager  
Canaport™ LNG<sub>LP</sub>  
2530 Red Head Road  
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## PROJECT OVERVIEW

In the 1970s, a backwater area of the Kennebecasis River adjacent to Dutch Point in Hampton, NB was developed into a municipal wastewater treatment lagoon. In 2005, the lagoon was decommissioned when a new treatment plant was brought on-line. Fundy Engineering worked with the Town of Hampton and Canaport™ LNG<sub>LP</sub> to reclaim the lagoon and transform it into a functional floodplain wetland that is accessible for local residents and visitors to view birds and wildlife at Randall Park.

The wetland restoration work comprised three phases:

- Phase I: lagoon dewatering and sediment stabilization;
- Phase II: site preparation, grading, berm re-shaping, and geotextile installation; and
- Phase III: native plant seeding and re-vegetation.

Restoration efforts were completed in 2010 and yielded 8.98 ha of restored wetland habitat. Not only was the restoration effort effective at restoring the habitat lost from the wastewater treatment lagoon development, but it also restored much of the fragmented habitat within the original bog of the Kennebecasis River.

## CORE PROJECT TEAM

Tim Ryan, *M.Eng., P.Eng.*  
Matthew Alexander, *P.Geo., Ph.D., EP*  
Crystal Caines, *P.Tech., PMP*  
Stephen Little, *P.Tech., CESA*

Project Manager  
Senior Environmental Scientist  
Environmental Technologist  
GIS Specialist

## SCOPE OF SERVICES PROVIDED

### *Baseline Environmental Data Collection*

- Field and desk-top studies were completed to determine the environmental conditions prior to restoration

### *Environmental Permitting*

- Several permits were required for various components of the restoration work

### *Optimized Wetland Restoration Planning*

- Using the extensive field survey data from the baseline data collection work, we used ArcGIS to iteratively determine a wetland restoration plan best suited for the site

### *Project Management*

- This multi-year project involved the management of several work scopes and various contractors for different stages

### *Project Tendering and Site Supervision*

- Fundy Engineering administered the tendering process and undertook the on-site restoration supervision to ensure project success

### *Long-Term Environmental Monitoring and Compliance*

- Post-restoration sampling (*i.e.*, water and sediment quality) and monitoring was undertaken to evaluate restoration success

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# Matthews Cove Wetland Restoration

QUISPAMIS, NEW BRUNSWICK

ENVIRONMENTAL  
CONSTRAINTS  
MAPPING,  
WETLAND RESTORATION  
DESIGN,  
ENVIRONMENTAL  
PERMITTING,  
PROTECTION,  
MONITORING, AND  
COMPLIANCE,  
AND  
PROJECT MANAGEMENT



## PROJECT DATES

- Fall 2007 – Site evaluation and baseline data collection
- Spring 2008 to Spring 2010 – Permitting and wetland design
- Summer and Fall 2010 – Lagoon dewatering and sediment stabilization
- Spring and Summer 2011 - Grading, berm re-shaping, and hydroseeding
- October 2011 – Restoration complete
- 2012 and 2014 – Post-restoration environmental monitoring

## CLIENT REFERENCE

Mr. Fraser Forsythe, *P.Eng.*  
Health, Safety, Security, and  
Environment Manager  
Canaport™ LNG<sub>LP</sub>  
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✉: [fforsythe@canaportlng.com](mailto:fforsythe@canaportlng.com)

## PROJECT OVERVIEW

In the 1970s, a wastewater treatment lagoon was constructed at Matthews Cove to serve the village of Gondola Point. To accommodate the lagoon, Saunders Brook, which flowed into Matthews Cove, was diverted to Matthews Brook. The 2.3 ha clay bermed lagoon was fed by a wastewater discharge pipe located in the former Saunders Brook channel. In 1998, Gondola Point amalgamated with Quispamsis.

Around 2003, the flow of wastewater to the lagoon was halted when a lift station came online and diverted the sewage to a centralized municipal wastewater treatment plant. The lagoon sat full and collecting surface water runoff for several years.

Fundy Engineering worked with the Town of Quispamsis and Canaport™ LNG<sub>LP</sub> to reclaim the lagoon and transform it into a functional shallow open-water wetland that would be accessible for local residents and visitors.

Restoration work, which yielded 7.86 ha of wetland habitat, was completed over several years and also involved restoring Saunders Brook to its former natural channel. Since the work was completed, native plant species have re-established themselves and grow within the wetland and provide the basis for a functioning ecosystem.

## CORE PROJECT TEAM

Tim Ryan, *M.Eng., P.Eng.*  
Matthew Alexander, *P.Geo., Ph.D., EP*  
Crystal Caines, *P.Tech., PMP*  
Stephen Little, *P.Tech., CESA*

Project Manager  
Senior Environmental Scientist  
Environmental Technologist  
GIS Specialist

## SCOPE OF SERVICES PROVIDED

### *Baseline Environmental Data Collection*

- Field and desk-top studies were completed to determine the environmental conditions prior to restoration

### *Environmental Permitting*

- Several permits were required for various components of the restoration work to move forward

### *Optimized Wetland Restoration Planning*

- Using the extensive field survey data from the baseline data collection work, we used ArcGIS to iteratively determine a wetland restoration plan best suited for the site

### *Project Management*

- This multi-year project involved the management of several work scopes and various contractors for different stages

### *Project Tendering and Site Supervision*

- Fundy Engineering administered the tendering process and undertook the on-site restoration supervision

### *Long-Term Environmental Monitoring and Compliance*

- Post-restoration sampling (*i.e.*, water and sediment quality) and monitoring was undertaken to evaluate restoration success



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# Energy Feasibility Studies for Wastewater Facilities

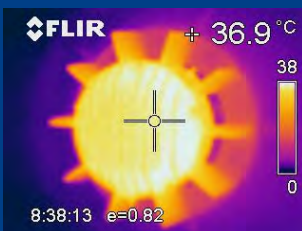
SAINT JOHN, NEW BRUNSWICK

## ENERGY FEASIBILITY STUDIES AND PROJECT MANAGEMENT



### PROJECT DATES

- Fall 2007 – Initial data review and site visits
- Winter 2007 / 2008 – Data collection and energy consumption analyses
- Spring 2008 – Draft energy feasibility reports issued
- Fall 2008 – Final report issued to Client for implementation



### CLIENT REFERENCE

Mr. Samir Yammine, *P.Eng.*  
Energy Manager  
City of Saint John  
Municipal Operations  
PO Box 1971  
Saint John, NB E2L 4L1

✉: samir.yammine@saintjohn.ca

### PROJECT OVERVIEW

The City of Saint John retained the services of Fundy Engineering to review energy consumption at 32 wastewater pumping facilities, 11 water pumping facilities, and five wastewater treatment plants at various locations across the City. The purpose of the reviews was to identify potential energy savings opportunities and to estimate the energy savings and payback periods for recommended system improvements.

The project comprised two phases. The first phase involved screening all of the facilities in order to prioritize them with respect to detailed analyses. The second phase involved conducting site visits of all facilities.

Fundy Engineering's recommended improvements included:

- reviewing and adjusting heating and ventilation system settings;
- replacing electricity as an energy source for heat;
- insulating and weather stripping areas to reduce air leakage and heat loss;
- eliminating pump inefficiencies resulting from pump age and wear and improper sizing; and
- reducing the volume of clean stormwater pumped due to inflow and infiltration issues.

### CORE PROJECT TEAM

Darryl Ford, *P.Eng., FEC*  
Hector Lamprea, *P.Eng., P.E., CEM*

Senior Mechanical Engineer  
Energy Efficiency Engineer

### SCOPE OF SERVICES PROVIDED

- Data collection and review
- Analyses of building utility data
- Analyses of building mechanical equipment
- Heating plant survey and system measurements
- Observation and review of operating practices
- Data analyses
- Recommend energy savings opportunities
- Estimated potential energy savings
- Estimated payback periods

The study examined alternative energy sources that could be considered by the City, such as, ground or water source heat pumps, wind turbines, and photovoltaics.



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# Saint John YM / YWCA Decommissioning

SAINT JOHN, NEW BRUNSWICK

HAZARDOUS MATERIALS  
SURVEY,  
PROJECT  
MANAGEMENT,  
AND  
AIR QUALITY  
MONITORING



## PROJECT DATES

- July 2007 – Hazardous material assessment completed prior to decommissioning building
- October 2007 – Building decommissioned and hazardous materials removed
- February 2008 – Building demolished and project substantially completed
- December 2008 – New Brunswick Department of the Environment (NBDENV) issued file closure

## CLIENT REFERENCE

Mr. Kevin Logan, *P.Eng.*  
New Brunswick Department of  
Supply and Services  
PO Box 5001  
Saint John, NB E2L 4Y9

☎: 506.658.2412  
☎: 506.658.3045

## PROJECT OVERVIEW

The New Brunswick Department of Supply and Services (DSS) retained Fundy Engineering to provide engineering-consulting services for the high-profile decommissioning and subsequent demolition of the YM / YWCA building located in Uptown Saint John. The site of the out-lived community pillar was transformed as a hub of revitalization through the construction of the Saint John Justice Complex.

Fundy Engineering was responsible for ensuring that the YM / YWCA building was decommissioned and demolished in a safe and environmentally responsible manner according to all applicable Acts and Regulations. Consistent with the age of the building, decommissioning assessments showed the presence of asbestos-containing insulation and plaster (friable and non-friable asbestos), PCB-containing light ballasts, and lead-based paints. Soil and groundwater investigations at the site of the underground storage tanks for petroleum hydrocarbons and Bunker C revealed contamination.

Hazardous materials crews were supervised and air quality monitoring was undertaken to ensure crew safety. All hazardous materials removed by the crews were quantified and disposed of safely. The building was demolished in early 2008 and contaminated soils were removed. The brownfield site received file closure from the NBDENV indicating the once contaminated site no longer presented a health and safety issue and that it could be redeveloped.

## CORE PROJECT TEAM

Tim Ryan, *M.Eng., P.Eng.*  
Richard Frenette, *P.Eng.*  
Stephen Little, *P.Tech., CESA*  
Joel Forsythe, *P.Eng.*

Project Manager  
Technical Specialist  
Environmental Technologist  
Environmental Support

## SCOPE OF SERVICES PROVIDED

- Prior to demolition, a hazardous materials survey was completed throughout the building to qualify and quantify asbestos (*i.e.*, piping insulation and plaster), lead-based paints, and PolyChlorinated Biphenyls (PCBs) (*i.e.*, light ballasts and electrical transformers) contaminants
- Demolition specifications were developed and contracts were administered on behalf of DSS
- Air quality monitoring was conducted during the removal of all hazardous materials to ensure worker safety
- Site supervision was provided for DSS and all materials removed during all phases of the decommissioning process were quantified and tracked
- As per the *Guideline for the Management of Contaminated Sites*, additional site work (*e.g.*, borehole / monitoring well investigations) was undertaken to support the unconditional closure documentation for the NBDENV

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# Long Wharf Development Program

SAINT JOHN, NEW BRUNSWICK

PROJECT  
MANAGEMENT,  
ENVIRONMENTAL DUE  
DILIGENCE AND  
PERMITTING,  
AND  
GEO TECHNICAL DUE  
DILIGENCE AND  
ENGINEERING



## PROJECT DATES

- Spring 2008 – Preliminary environmental and geotechnical due diligence
- Summer and Fall 2008 – Detailed environmental and geotechnical due diligence assessments
- Spring 2009 – Environmental permitting under the *Canadian Environmental Assessment Act* & building registered for LEED®
- Summer and Fall 2009 – Pile driving inspection and environmental monitoring
- Winter 2009 through Winter 2010 – Project management support

## CLIENT REFERENCE

Mr. Warren Long, *P.Eng.*  
President  
Milkish Oaks Inc.  
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☎: 506.333.6281  
✉: wrlong@milkishoaks.ca

## PROJECT OVERVIEW

Irving Oil Limited started developing a highly-visible architecturally unique 15 300 m<sup>2</sup> four-storey world headquarters office building on Long Wharf in September 2009. The building, which was cancelled in early 2010, would have provided Class A office space for up to 1 000 employees. Irving Oil Limited had a vision to “*deliver a world class, sustainable corporate headquarters office building that compliments a developed site, enhancing the Saint John uptown core and promotes significant public use.*”

A powerhouse design team was assembled to achieve the design goals and included the world-renowned architectural firm Robert A.M. Stern LLP of New York and leading edge sustainability consultants of the Rocky Mountain Institute in Boulder, Colorado. Fundy Engineering was contracted to provide Irving Oil Limited with local top-quality talent in the fields of geotechnical and environmental engineering and project management. We provided environmental due diligence, permitting, monitoring, and compliance support, environmental sustainability assistance, geotechnical due diligence and support, and Leadership in Energy and Environmental Design (LEED®). One of our Project Managers was seconded to Irving Oil Limited full-time to fulfill a role as Project Management Office Manager and Sustainability Team Coordinator.

## CORE PROJECT TEAM

Gordon Mouland, *M.Eng., P.Eng., P.E.* Geotechnical Engineer  
Matthew Alexander, *Ph.D., P.Geo., EP* Senior Environmental Scientist  
Alex Mouland, *P.Eng., PMP* Project Manager  
Darryl Ford, *P.Eng., FEC* LEED® Commissioning Agent

## SCOPE OF SERVICES PROVIDED

### *Environmental Due Diligence:*

- The site was intensively investigated for potential impacts dating back to the 1800s when the Long Wharf site was first developed; studies included archaeology and Phase II Environmental Assessments

### *Geotechnical Due Diligence:*

- Historical and current data were assessed to determine subsurface conditions for supporting development

### *Environmental Permitting:*

- Development at the site required that the project be assessed under the *Canadian Environmental Assessment Act* and several permits under different regulatory agencies were required

### *Project Management:*

- One of our Project Managers provided full-time support to the Project Management Office as a Coordination Manager and headed the Sustainability Team

### *LEED® Commissioning Agent:*

- One of our Professionals was overseeing the commissioning process

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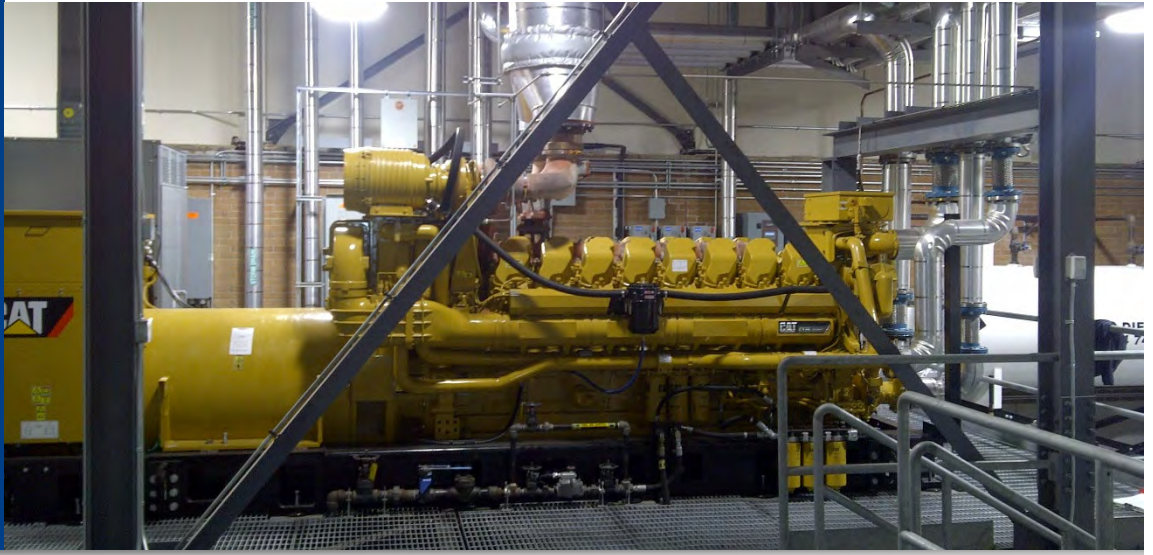
Saint John, NB • Clyde River, PE



# Bell Aliant 3.0 MW Generator

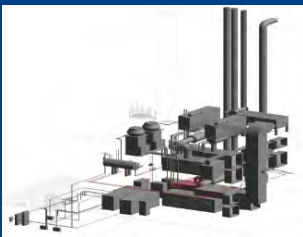
SAINT JOHN, NEW BRUNSWICK

PROJECT MANAGEMENT  
AND  
BUILDING SYSTEMS  
DESIGN (MECHANICAL  
AND ELECTRICAL)



## PROJECT DATES

- Winter 2009 / 2010 – System design, tender document preparation, and selection of contractors
- 2010 – Construction and installation of generator and associated infrastructure
- 2011 – System turned over to client for operational phase



## CLIENT REFERENCE

Mr. Jamie Cote  
Bell Aliant  
One Brunswick Square, 6<sup>th</sup> Floor  
PO Box 1430  
Saint John, NB E2L 4K2

✉: jamie.cote@bellaliant.ca

## PROJECT OVERVIEW

To accommodate ever-increasing server data load, Bell Aliant contracted Fundy Engineering to oversee a generator upgrade to 3.0 MW in their Uptown Saint John Tower. It was critical to consolidate Bell Aliant's data and technical support in one central location while fully utilizing existing infrastructure and services in order to reduce duplication and save on costs.

We provided engineering support, tender document control, and construction phase services associated with the design, planning, and construction of the new generator. This project presented several challenges to the team:

- restricted access and minimal site space for contractor construction activities;
- existing infrastructure and systems are sensitive to dust, water, and contractor intrusion;
- constraints of multi-storey city construction whereby services penetrated structures at several different levels; and
- maintaining compliance with applicable building codes and fire codes.

The generator is online and operating within design specifications.

## CORE PROJECT TEAM

Darryl Ford, *P.Eng., FEC*  
David Richards, *P.Eng., MBA*  
Hector Lamprea, *P.Eng., P.E., CEM*  
Richard Frenette, *P.Eng.*  
Greg Hoyt, *CET, WRT*

Senior Mechanical Engineer  
Project Manager  
Energy Efficiency Engineer  
Revit® Design  
Drafting

## SCOPE OF SERVICES PROVIDED

### *Project Management*

- Provided advice and guidance to Bell Aliant from project planning through to project completion
- Provided construction management including the tendering process and contract administration

### *Mechanical Design*

- Designed and sketched the new systems in Revit® for client review and construction

### *Electrical Design*

- Sized new services to accommodate the new systems



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# Energy Hub Investment Study

SAINT JOHN, NEW BRUNSWICK

PROJECT MANAGEMENT  
AND  
ENVIRONMENTAL  
ENGINEERING



**Energy Hub Investment Map**  
Deloitte | **FUNDY Engineering**  
Project # 151-7173 Date: January 25, 2010  
Client: Enterprise Saint John  
Source Data: ESJ (New Brunswick Department of Natural Resources)  
Projection: 1982 UTM (Universal Transverse Mercator) Datum: NAD 83  
Scale: 1:50,000

Hydrocarbon Processing Area			
Area	Area (km <sup>2</sup> )	Value (\$M)	Notes
Area 1	1.2	100	Refined oil products
Area 2	1.5	120	Refined oil products
Area 3	1.8	150	Refined oil products
Area 4	2.1	180	Refined oil products
Area 5	2.4	210	Refined oil products
Area 6	2.7	240	Refined oil products
Area 7	3.0	270	Refined oil products
Area 8	3.3	300	Refined oil products
Area 9	3.6	330	Refined oil products
Area 10	3.9	360	Refined oil products
Area 11	4.2	390	Refined oil products
Area 12	4.5	420	Refined oil products
Area 13	4.8	450	Refined oil products
Area 14	5.1	480	Refined oil products
Area 15	5.4	510	Refined oil products
Area 16	5.7	540	Refined oil products
Area 17	6.0	570	Refined oil products
Area 18	6.3	600	Refined oil products
Area 19	6.6	630	Refined oil products
Area 20	6.9	660	Refined oil products
Area 21	7.2	690	Refined oil products
Area 22	7.5	720	Refined oil products
Area 23	7.8	750	Refined oil products
Area 24	8.1	780	Refined oil products
Area 25	8.4	810	Refined oil products
Area 26	8.7	840	Refined oil products
Area 27	9.0	870	Refined oil products
Area 28	9.3	900	Refined oil products
Area 29	9.6	930	Refined oil products
Area 30	9.9	960	Refined oil products
Area 31	10.2	990	Refined oil products
Area 32	10.5	1020	Refined oil products
Area 33	10.8	1050	Refined oil products
Area 34	11.1	1080	Refined oil products
Area 35	11.4	1110	Refined oil products
Area 36	11.7	1140	Refined oil products
Area 37	12.0	1170	Refined oil products
Area 38	12.3	1200	Refined oil products
Area 39	12.6	1230	Refined oil products
Area 40	12.9	1260	Refined oil products
Area 41	13.2	1290	Refined oil products
Area 42	13.5	1320	Refined oil products
Area 43	13.8	1350	Refined oil products
Area 44	14.1	1380	Refined oil products
Area 45	14.4	1410	Refined oil products
Area 46	14.7	1440	Refined oil products
Area 47	15.0	1470	Refined oil products
Area 48	15.3	1500	Refined oil products
Area 49	15.6	1530	Refined oil products
Area 50	15.9	1560	Refined oil products
Area 51	16.2	1590	Refined oil products
Area 52	16.5	1620	Refined oil products
Area 53	16.8	1650	Refined oil products
Area 54	17.1	1680	Refined oil products
Area 55	17.4	1710	Refined oil products
Area 56	17.7	1740	Refined oil products
Area 57	18.0	1770	Refined oil products
Area 58	18.3	1800	Refined oil products
Area 59	18.6	1830	Refined oil products
Area 60	18.9	1860	Refined oil products
Area 61	19.2	1890	Refined oil products
Area 62	19.5	1920	Refined oil products
Area 63	19.8	1950	Refined oil products
Area 64	20.1	1980	Refined oil products
Area 65	20.4	2010	Refined oil products
Area 66	20.7	2040	Refined oil products
Area 67	21.0	2070	Refined oil products
Area 68	21.3	2100	Refined oil products
Area 69	21.6	2130	Refined oil products
Area 70	21.9	2160	Refined oil products
Area 71	22.2	2190	Refined oil products
Area 72	22.5	2220	Refined oil products
Area 73	22.8	2250	Refined oil products
Area 74	23.1	2280	Refined oil products
Area 75	23.4	2310	Refined oil products
Area 76	23.7	2340	Refined oil products
Area 77	24.0	2370	Refined oil products
Area 78	24.3	2400	Refined oil products
Area 79	24.6	2430	Refined oil products
Area 80	24.9	2460	Refined oil products
Area 81	25.2	2490	Refined oil products
Area 82	25.5	2520	Refined oil products
Area 83	25.8	2550	Refined oil products
Area 84	26.1	2580	Refined oil products
Area 85	26.4	2610	Refined oil products
Area 86	26.7	2640	Refined oil products
Area 87	27.0	2670	Refined oil products
Area 88	27.3	2700	Refined oil products
Area 89	27.6	2730	Refined oil products
Area 90	27.9	2760	Refined oil products
Area 91	28.2	2790	Refined oil products
Area 92	28.5	2820	Refined oil products
Area 93	28.8	2850	Refined oil products
Area 94	29.1	2880	Refined oil products
Area 95	29.4	2910	Refined oil products
Area 96	29.7	2940	Refined oil products
Area 97	30.0	2970	Refined oil products
Area 98	30.3	3000	Refined oil products
Area 99	30.6	3030	Refined oil products
Area 100	30.9	3060	Refined oil products

## PROJECT DATES

- October 2009 – Project kick-off
- Fall 2009 – Data gathering
- Winter 2009 / 2010 – Data analysis
- Spring 2010 – Project completion

## PROJECT OVERVIEW

Our project management team partnered with Deloitte Touche LLP to assist Enterprise Saint John with an opportunity planning project. The key objective of the study was to identify, profile, and prioritize energy-related investment attraction opportunities for the Saint John region in the context of the region's current energy assets.

The team identified short-, medium-, and long-term targets for the region to aggressively drive economic growth by attracting new investments and diversifying the economy. During the project they brought together subject matter experts to provide in-depth information on various aspects of the project to all of those involved. The team developed a detailed five-year plan with action items and key milestones for achieving identified improvements in the region.

Through the project, it was determined that the region's aspiration to transform itself into an energy cluster could be achieved through a focused and stepped process of attracting investments that leverage the current assets and competencies. Improvements to the regional infrastructure and related enablers were fundamental steps identified towards positioning the region to the stepped growth that was anticipated for the next decade. The region will gain momentum as it continues to build on synergies driven through attracting these investments.

## CORE PROJECT TEAM

Tim Ryan, *M.Eng., P.Eng.*  
Erin Norton, *EIT*  
Matthew Alexander, *Ph.D., P.Geo., EP*  
Stephen Little, *P.Tech., CESA*

Project Manager  
Project Coordinator  
Subject Matter Expert  
GIS Mapping

## SCOPE OF SERVICES PROVIDED

- Assessed competing jurisdictions and documented investment attraction best practices, which involved interviewing numerous stakeholders
- Assessed the existing value proposition of the region and provided a future vision for the same, which was done by engaging subject matter experts
- Developed an investment map that identified future energy-related investment potential projects in four key areas:
  - Hydrocarbon processing and distribution
  - Renewable energy
  - Electricity generation and transmission
  - Development and commercialization of emerging technologies
- The project involved compiling and distilling large volumes of data, which had to be easily understood by a broad-based audience

## CLIENT REFERENCE

Mr. Stephen Carson  
Chief Executive Officer  
Enterprise Saint John  
40 King Street  
Saint John, NB E2L 1G3

☎: 506.658.2995  
✉: scarson@enterprisesj.com

**FUNDY Engineering**

www.fundyeng.com

Toll Free: 1.877.635.1566  
Saint John, NB • Clyde River, PE



# Saint John Community Harbour

SAINT JOHN, NEW BRUNSWICK

## PROJECT MANAGEMENT

AND

## GEOTECHNICAL DUE DILIGENCE AND ENGINEERING



## PROJECT DATES

- Winter / Spring 2010 – Preliminary geotechnical due diligence
- Spring 2010 – Marine geotechnical investigation
- Summer 2010 – Results and recommendations submitted
- 2016 – Facility design and bid package development



## CLIENT REFERENCE

Mr. Bill Thompson  
664 Bay Street  
Saint John, NB E2M 7L5

☎: 506.672.8110  
☎: 506.650.7059  
✉: w.m.thompson@rogers.com

## PROJECT OVERVIEW

Saint John is not a Department of Fisheries & Oceans (DFO) scheduled harbour, but it is used by about 19 fishing boats on a regular basis for significant periods of the year. The Saint John Community Harbour Authority (SJCHA), a provincially incorporated not-for-profit organization comprised of Saint John fishermen, desires to operate a small boat harbour within Saint John Harbour. The SJCHA's long-term objective is to have the area designated as a DFO scheduled harbour.

A comprehensive engineering, socio-economic, and technical study was undertaken for siting the small boat harbour, which involved reviewing eleven sites. The preferred site is the south face of Pier 14 within Saint John Harbour. The proposed small boat harbour, using floating wharves, will have a berthage capacity for 46 standard-sized boats.

A marine geotechnical investigation was completed between March and April 2010 to assess the soil and bedrock conditions. Six boreholes were extended to a maximum depth of 28 m using a barge-mounted rotary drill supplied by Lantech Drilling Services.

Site and weather conditions resulted in a challenging environment for Fundy Engineering's project team in which to complete the work. Based on the geotechnical information gathered and input from various project stakeholders, a conceptual design was prepared and submitted to the SJCHA. We ultimately developed the facility design and construction bid packages.

## CORE PROJECT TEAM

Gordon Mouland, *M.Eng., P.Eng., P.E.* Geotechnical Engineer  
Matthew Alexander, *Ph.D., .P.Geo., EP* Senior Environmental Scientist  
Alex Mouland, *P.Eng., PMP* Project Manager  
Travis Henrikson Geotechnical Technician

## SCOPE OF SERVICES PROVIDED

### *Geotechnical Due Diligence*

- Historical and current data were assessed to determine subsurface conditions for supporting various components of the proposed small boat harbour
- An intrusive geotechnical investigation was undertaken to determine the nature of underlying marine materials and bedrock

### *Project Management*

- Managed requirements of multiple end users and stakeholders
- Received and incorporated input to develop a conceptual design for the proposed small boat harbour

### *Environmental Permitting*

- Consulted with stakeholders and end users regarding best practices for environmental protection in the design of various components
- Prepared applications for provincial and federal permits and authorizations required to undertake testing for the proposed project and in order to advance the small boat harbour to the construction phase

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# Barbour's Peanut Roaster

SUSSEX, NEW BRUNSWICK

PROJECT  
MANAGEMENT,  
ARCHITECTURAL  
SUPPORT,  
AND  
BUILDING SYSTEMS  
DESIGN (MECHANICAL  
AND ELECTRICAL)



## PROJECT DATES

- September 2013 – Project start
- December 2014 – Project completion



## PROJECT OVERVIEW

G.E. Barbour Inc., a multi-product food processing company contracted Fundy Engineering to assist with adding a new peanut roaster at their processing plant in Sussex, New Brunswick to meet demand. The installation of the new peanut roaster included the design of the peanut bin structure and the hopper support and managing the installation of the new roaster, erection of an existing hopper to the new peanut roaster, and the blancher conveyor to the bucket elevator.

Our project team used Revit® software to design the overall facility layout with the new peanut roaster. It was essential that the new roaster be installed with minimal interference with the existing operation processes at the manufacturing plant. Therefore, the use of Revit® proved to be invaluable because it allowed for three dimensional models to be produced in order to work out any potential conflicts with existing systems well before any construction took place.

The new peanut roaster is now a key component in the manufacture of Barbour's natural and organic peanut butters.

## SCOPE OF SERVICES PROVIDED

### *Project Management*

- Provided advice and guidance to Barbour's from project planning through to project completion
- Provided construction management including the tendering process and contract administration

### *Architectural Support*

- Fundy Engineering sketched the existing floor layout and the new layout that incorporated the new peanut roaster

### *Mechanical Design*

- Designed and sketched the new peanut roaster including all plumbing, propane, and ventilation distribution systems

### *Electrical Design*

- Sized a new electrical panel to accommodate the new systems and production requirements

### *Structural Design*

- Designed all structural components including the concrete pad for siting the new peanut roaster and the associated stairs and catwalk

## CLIENT REFERENCE

Mrs. Sylvia MacVey  
G.E. Barbour Inc.  
165 Stewart Avenue  
Sussex, NB E4E 3H1

☎: 506.432.2300

☎: 506.432.2323

✉: inquiries@barbours.ca

## CORE PROJECT TEAM

Crystal Caines, *P.Tech., PMP*  
Darryl Ford, *P.Eng., FEC*  
David Richards, *P.Eng., MBA*  
Mitchell Muscroft, *P.Eng.*  
Chris Legault, *P.Eng.*  
Greg Hoyt, *CET, WRT*  
Jon Pitman, *CTech*

Project Manager  
Senior Mechanical Engineer  
Mechanical Engineer  
Electrical Engineer  
Structural Engineer  
Drafting  
Drafting

**FUNDY Engineering**

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# Canaport™ LNG<sub>LP</sub> Marine Jetty

SAINT JOHN, NEW BRUNSWICK

## PROJECT MANAGEMENT

AND

## MARINE JETTY STRUCTURAL SURVEY



## PROJECT DATES

- Winter 2014 / 2015 – Marine jetty structural survey and client reporting



## CLIENT REFERENCE

Mr. Al Clarke, *P.Eng.*  
Electrical Maintenance  
Superintendent  
Canaport™ LNG<sub>LP</sub>  
2530 Red Head Road  
Saint John, NB E2L 3T5

☎: 506.638.1372

✉: al.clarke@canaportlng.com

## PROJECT OVERVIEW

Canaport™ LNG<sub>LP</sub> is Canada's first and only Liquefied Natural Gas (LNG) regasification terminal. The state-of-the-art facility has a deep water marine jetty for receiving Q-Max vessels, which are the largest LNG carriers in the world. The jetty comprises mooring dolphins, berthing dolphins, catwalks, and a main platform. The concrete decks of the jetty are supported on steel-framed metal jackets connected to piles installed in the seabed. The jetty provides a key connection between the Q-Max vessels and the on-shore regasification terminal infrastructure.

To ensure the jetty is structurally safe, an above water and underwater inspection must be conducted every five years. Fundy Engineering undertook the first structural survey of the operational jetty. To facilitate the survey, our project management team subcontracted a crew of commercial divers, dive support personnel, and structural engineers.

The work presented several significant challenges including inclement weather delays and strong tidal currents, which limited the amount of time available daily to complete the work. Those challenges were managed with an acceptable level of impact on the project budget and schedule.

## CORE PROJECT TEAM

Tim Ryan, *M.Eng., P.Eng.*  
Alex Moulard, *P.Eng., PMP*  
Kent Grass  
James Holder, *M.Eng., P.Eng.*  
Chris Kenney, *BSc.*  
Monte Nickerson, *DCBC Certified*

Project Manager  
Project Coordinator  
Diver (All-Sea Atlantic)  
Structural Engineer  
Diver (All-Sea Atlantic)  
Diver (All-Sea Atlantic)

## SCOPE OF SERVICES PROVIDED

- Developed initial scope of work with the Client and adjusted, as required, throughout the project
- Assembled a project team that included individuals from four separate companies: Fundy Engineering; J.B. Holder Engineering Ltd.; All-Sea Atlantic; and DMK Marine
- Conducted thickness measurements of the jetty foundation piles using non-destructive testing methods
- Performed an underwater visual inspection of the jetty foundation piles
- Completed a visual inspection of the entire jetty structure above the water
- Provided the Client with a flexible billing structure, which resulted in a reduction in the overall budget
- Managed the project team, budget, and scope of work
- Provided recommendations to the client for conducting ongoing maintenance and management of the jetty infrastructure

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# Scotiabank Heating System Feasibility Studies

MULTIPLE ATLANTIC CANADA LOCATIONS

## MECHANICAL FEASIBILITY STUDIES AND PROJECT MANAGEMENT



### PROJECT DATES

- January 2015 – Project start
- May 2015 – Project completion



### CLIENT REFERENCE

Ms. Rebecca Bedford  
Project Manager  
Scotiabank, Real Estate 54072  
61 Front Street, 4<sup>th</sup> Floor  
Toronto, ON M5J 1E5

☎: 416.866.5940  
☎: 416.866.4304

### PROJECT OVERVIEW

The Bank of Nova Scotia, Real Estate Department contracted Fundy Engineering to complete comprehensive heating feasibility studies for 30 of their locations across Atlantic Canada. Those locations comprised six New Brunswick sites, five Newfoundland sites, 14 Nova Scotia sites, and five sites on Prince Edward Island.

We provided the client with an accurate baseline assessment of the existing oil-fired heating systems within each of their buildings. Following our detailed site visits, we reviewed the data from each location to determine whether there was a cost-effective alternative to oil-fired heating.

For sites where options were available for upgrading, we generated a cost comparison analysis for alternate fuel sources with expected payback. Those data allowed the client to make informed decisions on the best approach with respect to upgrades, fuel conversion, and / or total replacement. If there was not a cost-effective alternative, we recommended system upgrades to mitigate potential environmental risk posed by the existing oil-fired heating system.

### CORE PROJECT TEAM

Darryl Ford, *P.Eng., FEC*  
David Richards, *P.Eng., MBA*  
Hector Lamprea, *P.Eng., PE, CEM*  
Ryan Gosson, *P.Eng.*  
Greg Hoyt, *CET, WRT*  
Shelby Gallant, *P.Tech.*

Senior Mechanical Engineer  
Project Manager  
Energy Efficiency Engineer  
Mechanical Engineer  
Project Support  
Project Support

### SCOPE OF SERVICES PROVIDED

#### *Feasibility Studies*

- Assessed the condition of the existing heating systems
- Generated cost-effective heating system replacement options
- Provided order of magnitude replacement costs for budgeting purposes
- Developed strategies to mitigate potential environmental risks posed by systems where replacement was not feasible
- Prioritized system upgrades for the locations assessed

#### *Project Management*

- Scheduled site visits to all locations and geographically grouped visits in order to reduce travel expenses for the client
- Ensured reports were timely



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# Hollis Street Scotiabank

HALIFAX, NOVA SCOTIA

COMPLETE  
ARCHITECTURAL,  
MECHANICAL,  
ELECTRICAL, AND  
STRUCTURAL  
ENGINEERING DESIGN,  
AND  
PROJECT MANAGEMENT



## PROJECT DATES

- Spring / Summer 2015 – Feasibility study
- Fall / Winter 2015 – Design
- Spring 2016 – Construction



## CLIENT REFERENCE

Ms. Rebecca Bedford  
Project Manager  
Scotiabank, Real Estate 54072  
61 Front Street, 4<sup>th</sup> Floor  
Toronto, ON M5J 1E5

☎: 416.866.5940  
☎: 416.866.4304

## PROJECT OVERVIEW

On 3 August 1931, the Bank of Nova Scotia opened one of its most authentically Canadian buildings at 1709 Hollis Street in Halifax. The building's historical significance was recognized on 25 January 1985 under the Nova Scotia *Heritage Property Act*. Since opening, the Renaissance-inspired six-storey sandstone building has undergone several renovations. Today, the building houses Scotiabank's Atlantic Regional Office and the Halifax Main Branch.

In 2015, we conducted a feasibility study to determine whether or not there was a cost-effective alternative to replace the existing oil-fired heating system. Through the feasibility study we were able to recommend several improvements for consideration by Scotiabank that went beyond just the heating system.

Following through with many of the recommendations, Fundy Engineering was contracted for complete architectural and mechanical, electrical, and structural engineering design and project management services for the replacement of existing rooves, rooftop Heating, Ventilation, and Air-Conditioning (HVAC) equipment, and conversion of the boilers from fuel oil to natural gas.

## CORE PROJECT TEAM

Darryl Ford, *P.Eng., FEC*  
David Richards, *P.Eng., MBA*  
Hector Lamprea, *P.Eng., PE, CEM*  
Mitchell Muscroft, *P.Eng.*  
Richard Frenette, *P.Eng.*  
Jacob Beam, *P.Tech.*

Senior Mechanical Engineer  
Project Manager  
Energy Efficiency Engineer  
Electrical Systems  
Revit® Design  
Electrical Support

## SCOPE OF SERVICES PROVIDED

### *Vault Roof Replacement*

- Removal of outdated HVAC equipment
- Ductwork modification
- Structural design for new ductwork
- Designed, tendered, and oversaw contract administration for new roof construction

### *Main Roof Replacement, Boiler Conversion, and Rooftop Unit Replacement*

- Developed plan for converting oil-fired boilers to natural gas-fired boilers
- Designed new HVAC ductwork
- Sized new rooftop air handling unit
- Designed, tendered, and oversaw contract administration for new roof construction, boiler conversion, and all associated infrastructure



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# Market Slip Dredging

SAINT JOHN, NEW BRUNSWICK

GEOTECHNICAL  
INVESTIGATION,  
COST-ESTIMATE AND  
TENDER PACKAGE  
DEVELOPMENT,  
ENVIRONMENTAL  
PERMITTING,  
AND  
PROJECT MANAGEMENT



## PROJECT DATES

- Summer 2019 - Geotechnical investigation
- Fall 2019 and Winter 2020 – Cost-estimating, tender package development, and environmental permitting
- Spring 2020 – Dredging of Market Slip



## CLIENT REFERENCE

Mr. Samir Yammine, *P.Eng.*  
City of Saint John  
15 Market Square  
PO Box 1971  
Saint John, NB E2L 4L1

☎: 506.648.4667

✉: samir.yammine@saintjohn.ca

## PROJECT OVERVIEW

Dredging of slips within Saint John Harbour is required every several years. Prior to 2020, Market Slip was last dredged in 2004. During that time, sediment built up via natural siltation to the point where maintenance dredging was required.

The City of Saint John contracted Fundy Engineering to oversee the dredging project. The first part of the process involved assessing the current depths within Market Slip. Once those data were available, a cost-estimate was prepared for representatives of the City of Saint John to determine if the project was feasible. We also prepared a tender package for contractors to bid the work and obtained various environmental permits to allow the work to be completed.

The dredging of Market Slip was somewhat unique because it was done by building a road out into the water that could be worked from during low tides. Once dredge depths were achieved, the roadway was removed leaving behind a deepened waterway.

About 3 000 m<sup>3</sup> of material was removed from Market Slip in spring 2020 and placed within a lined disposal cell in west Saint John. Water depths are now able to accommodate visiting recreational vessels and pleasure craft. An agreement between the City of Saint John and Port Saint John will see annual maintenance dredging done over the next 12 years.

## CORE PROJECT TEAM

Gordon Mouland, *M.Eng., P.Eng., P.E.*  
Matthew Alexander, *Ph.D., P.Geo. EP*  
Robert Hunt, *CTech.*  
Josh Cosman, *EIT*

Senior Geotechnical Engineer  
Senior Environmental Scientist  
Design and Drafting  
Geotechnical Technologist

## SCOPE OF SERVICES PROVIDED

### *Geotechnical Investigation*

- A geotechnical investigation was conducted to determine the existing soil depths within Market Slip

### *Cost-Estimate and Tender Package*

- A cost-estimate to complete the work was provided to the City of Saint John prior to issuing the tender package that was prepared for contractors to bid on the dredging contract

### *Environmental Permitting*

- Secured the necessary federal, provincial, and municipal permit and authorizations required to complete the dredging

### *Project Management*

- Managed the project on behalf of the City of Saint John to ensure the dredging was completed as per the contract



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Saint John, NB • Clyde River, PE



# GHG Predictive Model and Emissions Calculator

ATLANTIC CANADA

## GREENHOUSE GAS (GHG) EMISSIONS ASSESSMENT, GHG EMISSIONS CALCULATOR, AND PROJECT MANAGEMENT



### PROJECT DATES

- Fall 2021 – Contract awarded
- Fall 2021 through Summer 2022 – Data collection and spreadsheet model development
- August 2022 – Draft report and spreadsheet model issued
- September 2022 – Final report and spreadsheet model issued
- October 2022 – Model presented at the ACFFA Fall Forum

### CLIENT REFERENCE

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### PROJECT OVERVIEW

The Atlantic Canada Fish Farmers Association (ACFFA) is constantly seeking to understand and improve the environmental sustainability of their industry. Understanding GHG emissions is necessary to navigate and propel the industry forward in a sustainable manner and knowledge of GHG emissions sources helps identify emissions mitigation measures. Improving efficiency and offsetting increases in production allows the industry to continue making an important contribution to global food security.

Fundy Engineering, with support from SIMCorp, developed a Microsoft Excel Spreadsheet model to allow ACFFA members to estimate GHG emissions from the operations. The *ACFFA Model* was developed based on the best-available ACFFA member data and literature data circa 2022.

The developed user-friendly model requires minimal input to estimate GHG emissions per weight of fish grown from feed production through to marine site harvest. Ultimately, the model generalizes how Atlantic Canada salmon farming operations are performing and allows growers to understand how system changes can affect their overall GHG emissions and improve upon their sustainability.

The *ACFFA Model* comprises several detailed spreadsheets that include GHG estimates for feed production, transportation, parr and smolt production, and fish grow-out. The GHG estimates from the *ACFFA Model* align with literature values.

### CORE PROJECT TEAM

Tim Ryan, *M.Eng., P.Eng.*  
Crystal Caines, *P.Tech., PMP*  
Matthew Alexander, *P.Geo., Ph.D., EP*  
Ashton Howe, *B.Sc., M.Sc., EPt*

Project Coordinator  
Project Manager  
Senior Environmental Scientist  
Environmental Scientist

### SCOPE OF SERVICES PROVIDED

- GHG emission data:
  - Coordinating with ACFFA members to obtain detailed facility data for estimating GHG emissions
  - Conducting literature reviews for parameters, such as feed conversion ratios for various life stages and types of aquaculture facilities
- The *ACFFA Model* includes the following spreadsheets to estimate GHG emissions:
  - Salmon feed production
  - Salmon feed distribution
  - Land-based parr production
  - Land-based smolt production
  - Land-based biomass transfer
  - Marine-based grow-out sites
  - Cradle to marine-based farm-gate



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