

Environmental Assessment for a Research and Development Aquaponics Project

Application for Registration submitted by:

**Lester Farms Inc.
92 Pearltown Road
St. John's, NL
A1G 1P3**

04 February 2014

Table of Contents

	Page
1.0 Proponent	3
2.0 The Undertaking	3
2.1 Geographical location	4
2.2 Physical features	4
2.3 Construction	4
2.4 Operation	4
2.5 Occupations	5
3.0 Approval of the undertaking	8
4.0 Schedule	8
5.0 Funding	8
References	8
Appendix 1	9
Appendix 2	13

1.0 PROPONENT

- (i) Name of Corporate body: Lester Farms Inc.

- (ii) Address: 92 Pearltown Road, St. John's, NL A1G 1P3

- (iii) Chief Executive Officer
Name: Michelle Mary Lester
Official Title: President
Address: 92 Pearltown Road, St. John's, NL A1G 1P3
Telephone No.: (709) 687 2998

- (iv) Principal Contact Person for purposes of environmental assessment
Name: James Patrick Lester
Official Title: Director
Address: 92 Pearltown Road, St. John's, NL A1G 1P3
Telephone No.: (709) 727 5897

2.0 THE UNDERTAKING

- (i) Name of undertaking: Aquaponics facility development
- (ii) Purpose/Rationale/Need for the undertaking: The aquaponics facility is being erected to house a pilot research aquaponics system whereby fish effluent water will be used to grow vegetables in a highly sustainable manner. The project will test the feasibility of commercial aquaponics production under the Newfoundland climate. Aquaponics is the most sustainable food production system in the world (N. Savidov, personal communication, November 11, 2013). Most of the nutrients which plants need are generated by the fish effluent; and aquaponics uses water more efficiently than any other food production system. Research carried out in Alberta by Dr. Nick Savidov showed that aquaponics is 65.7% more efficient in water usage compared to best hydroponic systems. Aquaponics uses only 394.3L of water while the best hydroponic systems use 600L of water for \$100 output of produce. Conventional field vegetable production and dairy-milk production use 37,900L and 147,000L respectively, for the same output ([Savidov, 2005](#)).
Another aspect of this project is Agritourism. Aquaponics is such an efficient system that it is used as a science teaching tool in hundreds of school districts in the U.S. ([Rakocy et al., 2006](#)). Lester Farms Inc., which is already active in organizing guided school tours of their

farm, intend to target a wider audience with this aquaponics facility. Children and their parents will be able to get more insight into sustainable food production techniques, food security issues and see a man-made ecosystem right in the city. In addition, the facility will welcome many interns during the course of the project and afterwards.

It should be noted that the world's best aquaponics Scientists: Dr. Nick Savidov (Government of Alberta) and Dr. James Rakocy (previously with the University of Virgin Islands and considered as the 'father' of aquaponics worldwide) are direct consultants on the current project.

2.1 Geographical Location

The proposed site is found on 92 Pearltown Road, St. John's, NL, where Lester Farms Inc. is located. The aquaponics facility will be erected on agricultural land being presently used by Lester Farms Inc.

[Appendix 1](#) shows the location of the site relative to existing communities.

2.2 Physical Features

The aquaponics facility will consist of a pre-engineered wooden header house (83' long x 40' wide) attached to a pre-engineered greenhouse (192' long x 40' wide). The total size of the facility will hence be 275' long x 40' wide. [Appendix 2](#) shows the layout of the whole building as designed by Silk Stevens Ltd.

As indicated above, the facility is going to be erected on agricultural land being used by Lester Farms Inc. Neither any physical nor any biological environment will be affected by the project.

2.3 Construction

Construction of the facility will take about two months to complete. The aquaponics system will then be assembled inside the facility which will take an additional two to three months. There are no potential sources of pollutants identified during these construction periods which might pose concerns for surrounding areas. Exhaust gases emitted from an excavator and wet concrete trucks are the only identifiable emissions which will result from the construction of the facility. There is no identified potential resource conflicts under the current undertaking.

2.4 Operation

This aquaponics facility will house a pilot research aquaponics system which will use effluent fish water (tilapia fish) as a source of natural fertilizer to grow vegetables in a completely closed containment system. The main aim of this research project is to test the feasibility of commercial aquaponics production under Newfoundland's climatic conditions. Production will be year-round (even in full winters) and sale of produce from the aquaponics facility is one of the components to be assessed under this

project. Following a minimum of 18 months of research (maximum of three years research), the facility will then operate as a permanent commercial production facility.

The current system will generate no waste product to the environment. Fish sludge (fish excretion and uneaten fish feed) will be collected and bio-composted inside the facility to be reused as a source of fertilizers for the plants. When there would be need to disinfect floors and drains (using bleach solution), the used water will be collected in a 3,000 L tank and local regular waste companies will be called to dispose of the water. Drains will only have disinfection water temporarily in them. They would otherwise remain empty.

Tilapia fish (*Oreochromis niloticus*) will be raised in six circular fiberglass tanks (10,000L each) at a density of 1000 fish per tank. As the system will be a closed containment one, there would be no risk of live fish escape to natural surrounding ecosystems. No effluent water would be discharged to the environment and drains will not be connected to the municipal system. It should also be pointed out that tilapia is a warm water fish and it will not survive anyway in the local water bodies, even in summer months. The chill-kill method will be used to humanely kill the fish before sale and no live fish will be sold or distributed to any person. Fish will be sold whole, so there will not be any concerns of fish offal on site.

Water to be used in the aquaponics facility will come from a well already found on the farm properties. The water has already been tested by a professional lab and experts from the Fisheries and Marine Institute of Memorial University have approved the water to be safe for aquaculture.

2.5 Occupations

An estimated total of 12 people will be needed for this project. Five people will be needed for the construction of the facility and a total of eight people for the construction of the aquaponics system. All positions on this project have been or will be chosen according to experience and academic merit and not based on age or gender.

Anticipated occupations under the project according to National Occupational Classification 2006:

1. Project Team Leader (direct hiring, full-time):

- Plans, organizes, directs, controls and evaluates the operation of accounting and all financial activities undertaken under the project.
- Plans, organizes, directs, controls and evaluates the purchasing activities under the project.
- Prepares and co-ordinates the preparation of financial statements, summaries, and other cost-benefit analyses and financial management reports.
- Co-ordinates the financial planning and budget process, and analyzes and corrects estimates.
- Recruits, trains, co-ordinates and manages staff.

- Represents the company on matters including legal, municipal, project funding, financial, etc.
- Takes part in technical decisions regarding the whole project.

2. Project Manager (direct hiring, full-time):

- Plans, organizes, directs, controls and evaluates the construction of the aquaponics facility from start to finish according to schedule, specifications and budget.
- Represents the company on matters including legal, municipal, project funding, financial, etc.
- Hires and supervises the activities of subcontractors and subordinate staff.
- Participates in the construction of the aquaponics facility (wooden header house and greenhouse) and aquaponics system.
- Directs and co-ordinates the purchase of building materials.
- Responsible for the sale of produce from the aquaponics facility.

3. Aquaponics Farm Manager/Aquaponics Scientist (direct hiring, full-time):

- Writes applications, proposals, budgets and seeks funds for the pilot research aquaponics facility.
- Head of project planning and design for the aquaponics facility. Assists the engineering team for the engineering of the aquaponics facility.
- Sources equipment, materials and suppliers for the aquaponics facility.
- Oversees and assists in assembling the aquaponics system.
- Organizes, plans, co-ordinates, directs and controls production of fish and plants which includes scientific monitoring of the environmental conditions to maintain optimum conditions for fish and plants.
- Collects, records and analyzes production data.
- Collects, records and analyzes water quality, water nutrient and greenhouse environment data.
- Writes reports and scientific papers for publication following the research.
- Manages, supervises and trains aquaponics support workers and technicians.
- Maintains financial records and establish market strategies, inventory and quality control methods for the aquaponics facility.
- Implements and maintains biosecurity protocols for the aquaponics facility.
- Helps in giving guided tours of the aquaponics facility.
- Be on call 24/7.

4. Aquaponics Farm Technician (direct hiring, full-time):

- Assists in the installation of all aquaponics equipment and piping works.
- Assists in electrical wiring inside the aquaponics facility.
- Assists Aquaponics Farm Manager in day to day running of the aquaponics facility which includes: water quality testing, data collection, report writing, fish feeding, fish harvesting, fish

transfer, plant harvesting, seeding new plants, general cleaning and maintenance and other specific work as directed by the Aquaponics Farm Manager.

- Daily maintenance and troubleshooting of all aquaponics equipment.
- Ensure that the facility is running at its best on a day to day basis.
- Ensure that biosecurity protocols are properly maintained.
- Be on call 24/7.

5. Project team Officer (direct hiring, part-time, 24h/week):

- Assists team leader in processing claims for the project.
- Assists in the processing of invoices, data entries, budget organization, data filing, etc.
- Codes, totals, batches, enters, verifies and reconciles transactions such as accounts payable and receivable, payroll, purchase orders, cheques, invoices, cheque requisitions, and bank statements in a computer system.
- Compiles budget data and documents based on estimated revenues and expenses and previous budgets.

6. Aquaponics facility construction/manual workers (4 x direct hiring, full-time):

- Building foundations for the aquaponics facility which includes using an excavator.
- Erecting a commercial-style greenhouse according to the manufacturer's plans and specifications.
- Erecting a wooden header house according to engineered plans and drawings.

Note: Two of these workers will act as manual workers for the aquaponics facility following its completion while the other two will be redirected towards day to day general farm activities.

7. Electricians for the Aquaponics Facility (2 individuals, contracting out):

- Installation of electrical panels to supply the aquaponics facility.
- Electrical wiring of all aquaponics equipment inside the facility.
- Installation of plant grow lights and light controllers inside the greenhouse.
- Installation of power generators.

8. Plumber for the aquaponics system (1 individual, contracting out):

- Installation of plumbing for the aquaponics system.

3.0 Approval of the undertaking

1. Aquaculture License by Department of Fisheries and Aquaculture (In last stages of approval).
2. Approval from St. John’s City Council to carry out Aquaculture on Agricultural land (Already approved on 02 December 2013).
3. Building permit for Aquaponics Facility (Already approved on 31 January 2014).

4.0 Schedule

Earliest date to commence construction: As soon as possible.

Latest dates to commence construction: Construction should commence as soon as possible so that the research facility takes advantage of the summer months for good vegetable production data collection.

Note: No Aquaculture Licence is needed for the construction of the facility and the system. The license would be needed to bring fish on-site to commence production.

5.0 Funding

The project is funded by the following organizations and programs:

1. National Research Council-Industrial Research Assistance Program (NRC-IRAP).
2. Research and Development Corporation (RDC).
3. Canadian Agricultural Adaptation Program (CAAP).
4. Agriculture Research Initiative (ARI).

Project Capital Costs estimate: \$500,000.

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Date

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Signature of Chief Executive Officer

References

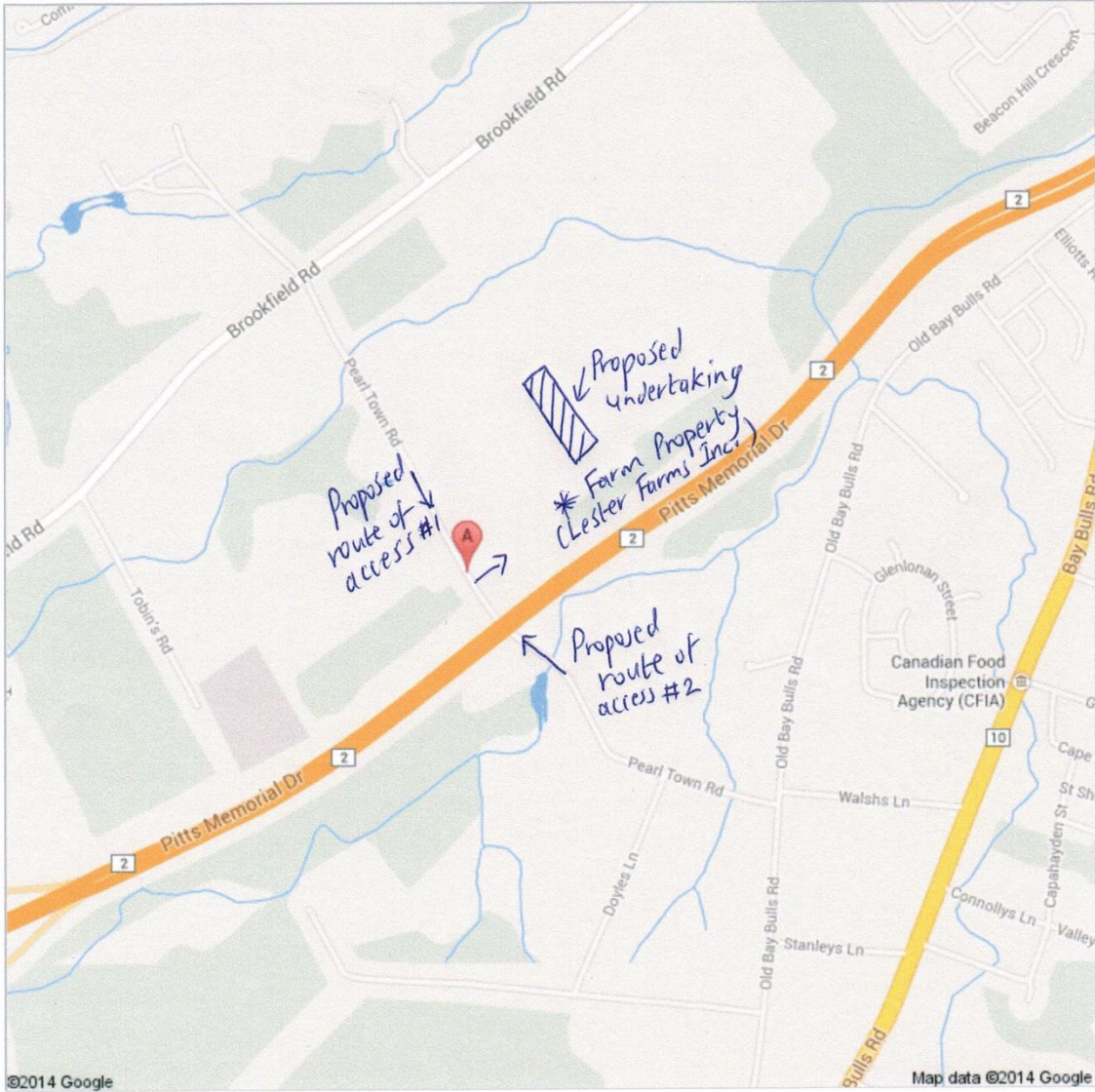
Rakocy, J.E., Masser, M.P. and Losordo, T.M. (2006). Recirculating Aquaculture Tank Production Systems: Aquaponics—Integrating Fish and Plant Culture. *Southern Regional Aquaculture Centre, 454.*

Savidov, N. (2005). Evaluation and Development of Aquaponics Production and Product Market Capabilities in Alberta, Phase 2. *Alberta Agriculture, Food and Rural Development, Final Report Project # 200467905621.*

Appendix 1: Location of undertaking



Address **92 Pearl Town Rd**
St John's, NL A1G 1P3



Approximate Location: 47° 30' 30" N
52° 46' 23" W



Google earth



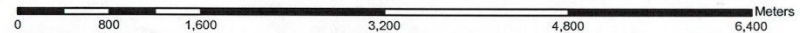
Approximate Location: 47° 30' 30" N
52° 46' 23" W

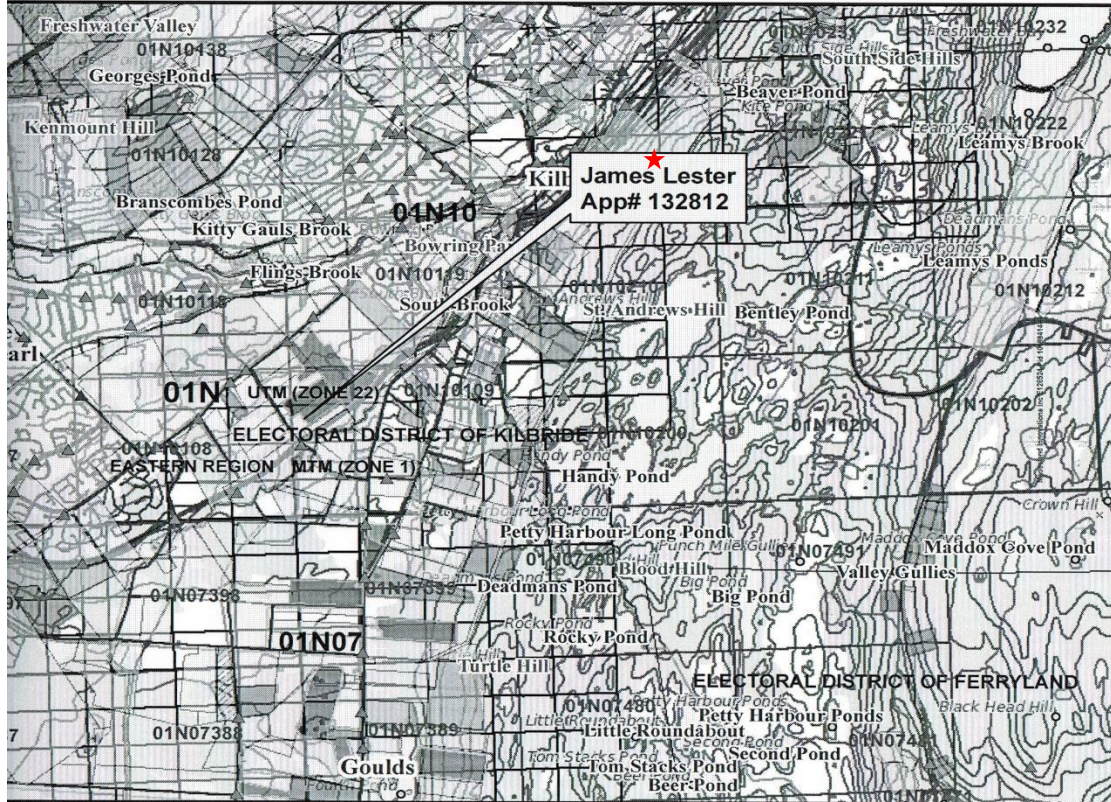
Government of Newfoundland & Labrador
 Department of Environment & Conservation



Scale 1:50,000
 Compiled on Sep 19, 2008

Crown Lands Division





NOTE TO USERS

The information on this map was compiled from land surveys registered in the Crown Lands Registry.

Since the Registry does not contain information on all land ownership within the Province, the information depicted cannot be considered complete.

The boundary lines shown are intended to be used as an index to land titles issued by the Crown. The accuracy of the plot is not sufficient for measurement purposes and does not guarantee title.

Users finding any errors or omissions on this map sheet are asked to contact the Crown Titles Mapping Section, Howley Building Higgins Line, St. John's Newfoundland.

Users finding error or omissions can contact the Crown Titles Mapping Section by telephone at 729-0061. Some titles may not be plotted due to Crown Lands volumes missing from the Crown Lands registry or not plotted due to insufficient survey information.

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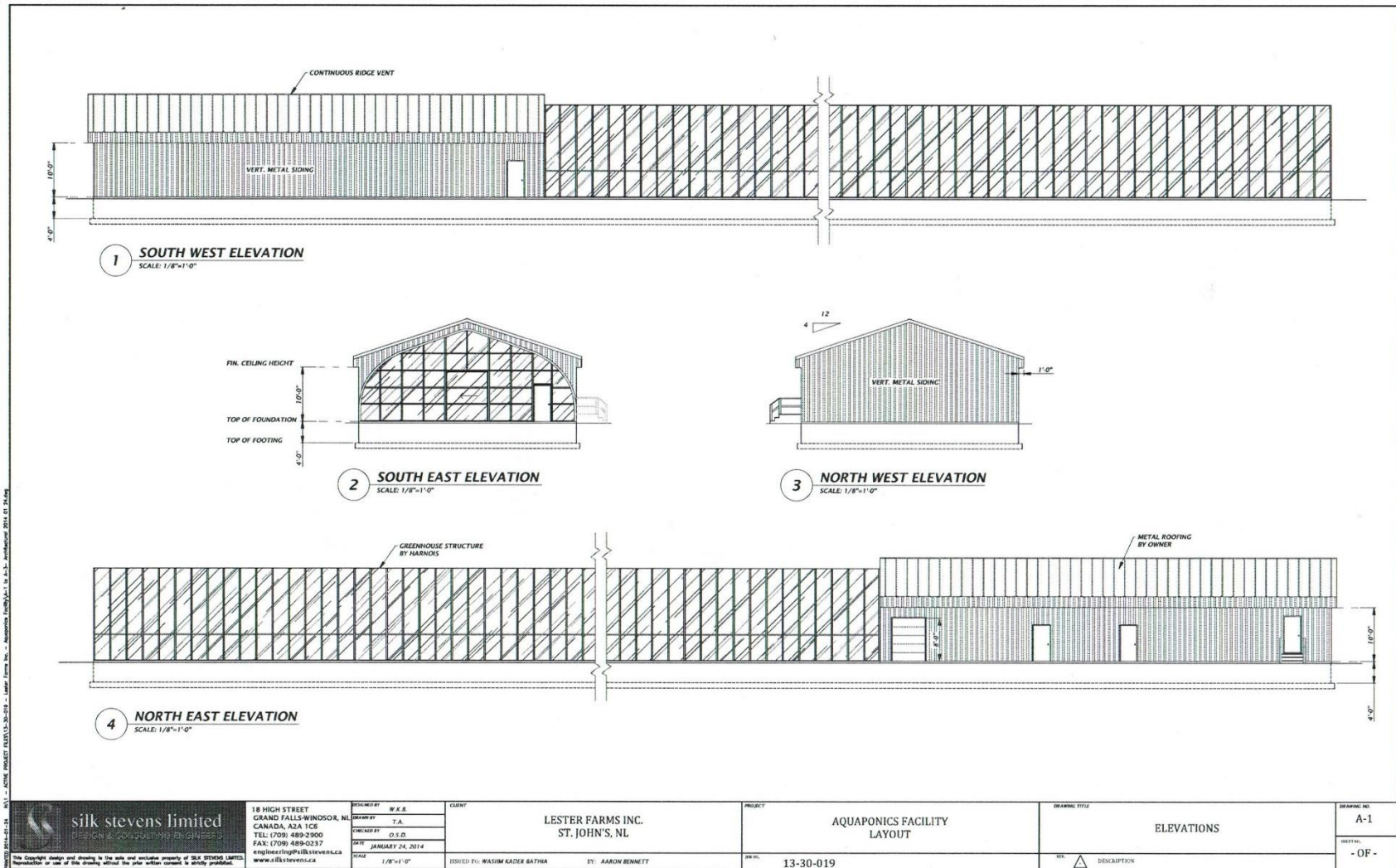
For inquiries please contact a Regional Lands Office.
 Corner Brook - 637-2387
 Gander - 256-1400
 Goose Bay - 896-2488
 St. John's - 729-2654
 Clarenville - 466-4074

Crown Lands Division



★Note: This map was used for another application, hence the display of an application number on the document.

Appendix 2: Aquaponics Facility layout



<p>silk stevens limited DESIGN & CONSULTING ENGINEERS</p> <p>18 HIGH STREET GRAND FALLS-WINDSOR, NL CANADA, A2A 1G6 TEL: (709) 489-2900 FAX: (709) 489-0237 engineer@silksilver.ca www.silksilver.ca</p>	<p>DESIGNED BY: W.K.B.</p> <p>DRAWN BY: T.A.</p> <p>CHECKED BY: O.S.D.</p> <p>DATE: JANUARY 24, 2014</p> <p>SCALE: 1/8"=1'-0"</p>	<p>CLIENT:</p> <p>LESTER FARMS INC. ST. JOHN'S, NL</p>	<p>PROJECT:</p> <p>AQUAPONICS FACILITY LAYOUT</p>	<p>DRAWING TITLE:</p> <p>ELEVATIONS</p>	<p>DRAWING NO.:</p> <p>A-1</p>
	<p>ISSUED TO: WASIM KADER BATHA</p> <p>BY: AARON BENNETT</p> <p>PR. NO.:</p> <p>13-30-019</p>	<p>DESIGNER:</p> <p>DISCLAIMER</p>	<p>SHEET:</p> <p>- OF -</p>		