

CI C0086325

Maritime Launch Services

REDACTED

October 5, 2026





NSEB APPROVAL SHEET

Project Title: Maritime Launch Services

CI Number: C0086325

Date: October 5, 2026

Expenditure Profile			Type of Filing	
Year	Budget Amount	Project Estimate	☐	Capital Project Authorization
			☒	Unforeseen and Unbudgeted (U&U)
			☐	Planned & Advanced (P&A)
			☐	Subsequent Approval Item
2026		483,733	☐	Authorization to Overspend (ATO)
2026		(483,733)	☐	Scope Change
2027		995,953	☐	Final Cost (FIN)
2027		(995,953)		
Total	\$0	\$0		

COMMENTS

Submitted on behalf of NOVA SCOTIA POWER INCORPORATED

Authorized Signatory
Dave Pickles
Chief Operating Officer

DATE
October 5, 2026

Approved on behalf of NOVA SCOTIA ENERGY BOARD

DATE

CI Number: C0086325

Title: Maritime Launch Services

Start Date: 2026/09
In-Service Date: 2027/05
Final Cost Date: 2028/05
Function: Distribution
Forecast Amount: \$0

DESCRIPTION:

This project involves rebuilding and extending the existing 24C distribution circuit in Canso, Nova Scotia. The work includes upgrading approximately 1.5km of existing three-phase line and constructing approximately 4.7km of new three-phase distribution line to serve Maritime Launch Services.

The assets involved will be the 24C distribution circuit near Middle and Roberts Street, including overhead three-phase distribution line, poles, conductors, voltage regulators, recloser protections, and switching capacitor installations.

Maritime Launch Services will pay the actual costs incurred by NS Power. All work will be performed in accordance with NS Power standard practices.

Summary of Related CIs +/- 2 years:

Pursuant to Section 11.2 of the CEJC, related CIs for Distribution projects include “Work completed on the same asset class (Padmount transformers, Breakers, etc.) or in the same location (feeder, Transmission Line).”

- No other projects in 2024, 2025, 2026, 2027 or 2028

Depreciation Class: Distribution Plant – Poles, Towers and Fixtures
 Distribution Plant – Overhead Conductors and Devices
 Distribution Plant – Line Transformers
 Distribution Plant - Services

Retirement Information:

- Categorization of Retirement: Accounting Policy 6420 - Retirement and Disposal
- Percentage of Asset Pool: 5.00%

Estimated Life of the Asset: 40 years

JUSTIFICATION:

Justification Criteria: Distribution System

Sub Criteria: Requirement to Serve
Why do this project?

Maritime Launch Services is building a spaceport in Canso and requires electrical service to support its operations. To meet this need, 3 MVA of power will be delivered to the site from the nearby 24C-442 feeder extent via a new 5 km line extension. This infrastructure will provide the power required for the spaceport while also supporting future system changes and improving the reliability for the Town of Canso.

Why do this project now?

Maritime Launch Services currently does not have an electrical supply serving its property or planned infrastructure. This line extension will provide the customer with the required power to build, develop, and operate in future. As Maritime Launch Services continues to advance the development of its site, the availability of reliable electrical service is necessary to meet its growing operational needs.

Why do this project this way?

NS Power completed a Load Customer System Impact Study (please refer to Partially Confidential Attachment 1) to identify the most effective method to deliver power to the launchpad. There are six alternative solutions presented within the Load Impact Study. The option selected through the Load Impact Study was the most cost-effective and efficient solution while maintaining flexibility to accommodate future expansion.



1. Tap off 24C-442 from the bottom of Sterling St. near the fish plant with a 3-phase extension
2. Continue up Sterling St. before turning on Route 16
3. Turn up Whitman St. and continue to the end of Whitman St.
4. Continue the 3-phase extension to the MLS site from the end of Whitman St.

Capital Project Detailed Estimate

Location: Distribution CI# : C0086325 Title: Maritime Launch Services Execution Year: 2026-2027						
Description	Unit	Quantity	Unit Estimate	Total Estimate	Cost Support Reference	Completed Similar Projects (FP#'s)
Regular Labour						
Scoping Planner	PD	20	\$ 414	\$ 8,427		
Engineering	PD	11	\$ 461	\$ 4,889		
On Site Supervisor	PD	130	\$ 480	\$ 62,383		
Project Management	PD	28	\$ 414	\$ 11,477		
Sub-Total				\$ 87,177		
Materials						
Wood Poles	Lot	1	\$ 219,652	\$ 219,652		
O/H Conductor	Lot	1	\$ 67,779	\$ 67,779		
O/H Conductor Devices	Lot	1	\$ 284,879	\$ 284,879		
O/H Line Transf.	Lot	1	\$ 1,403	\$ 1,403		
Environmental (Bird Guards)	Lot	1	\$ 56	\$ 56		
Transfer Services	Lot	1	\$ 79	\$ 79		
Sub-Total				\$ 573,849		
Contracts						
Vegetation Management	Lot	1	\$ 5,400	\$ 5,400		
Flagging	Lot	1	\$ 111,218	\$ 111,218		
Backhoe	Lot	1	\$ 155,590	\$ 155,590		
Environmental (Bird Guards)	Lot	1	\$ 101	\$ 101		
Wood Poles	Lot	1	\$ 164,994	\$ 164,994		
O/H Conductor	Lot	1	\$ 158,274	\$ 158,274		
O/H Conductor Devices	Lot	1	\$ 18,212	\$ 18,212		
O/H Line Transf.	Lot	1	\$ 4,897	\$ 4,897		
Transfer Services	Lot	1	\$ 4,540	\$ 4,540		
LED Streetlights	Lot	1	\$ 582	\$ 582		
Rock Breaking	Lot	1	\$ 30,000	\$ 30,000		
Sub-Total				\$ 653,808		
Royalty Easement and Appraisal						
Easements	Lot	1	\$ 20,000	\$ 20,000		
Sub-Total				\$ 20,000		
Meals						
Meals	Lot	1	\$ 1,400	\$ 1,400		
Sub-Total				\$ 1,400		
Vehicle Overhead						
Vehicle Labour AO	Lot	1	\$ 28,052	\$ 28,052		
Sub-Total				\$ 28,052		
Administrative Overhead						
Labour AO				\$ 47,060		
Contractor AO				\$ 68,343		
Sub-Total				\$ 115,402		
SUB-TOTAL (no AO, AFUDC)				\$ 1,336,233		
Capital Contributions				\$ (1,479,687)		
TOTAL (AO, AFUDC included)				\$ -		
Original Cost						
				\$ 19,907		

Note 1: The labour figures noted above are an average of salaries across a variety of jobs within similar classifications including fringe, and are used solely for budgeting purposes.

Note 2: Small differences in totals are attributable to rounding.



Instructions: Select option in Column B.
Columns C through G will auto-populate.

Document No: XXX-XX-XXXX-XXXX

Project Cost Estimate Input Checklist and Maturity Matrix						
Transmission Line Infrastructure	Required fields:	Estimate Classification				
Project Name: Maritime Launch Services	Started or Preliminary	Class 5	Class 4	Class 3	Class 2	Class 1
Maturity Level of Project Definition Deliverables	Defined or Complete					
General Project Data						
A. Scope						
Project Scope of Work Description	Defined (D)	P	P	D	D	D
Site Infrastructure (Access, Construction Power, Camp, etc.)	Defined (D)	NR	P	D	D	D
B. Capacity						
Voltage (kV) and Circuits	Defined (D)	P	P	D	D	D
C. Project Location						
Not Applicable						
D. Requirements						
Codes and/or Standards	Defined (D)	NR	P	D	D	D
Environmental Monitoring	Defined (D)	NR	NR	P	P	D
E. Technology Selection						
Not Applicable						
F. Strategy						
Right-of-Way (ROW)	Preliminary (P)	P	P			
Contracting/Sourcing	Defined (D)	NR	P	D	D	D
Escalation	Defined (D)	NR	P	D	D	D
G. Planning						
System/Grid Planning (including substation and interconnect locations)	Defined (D)	P	P	D	D	D
Logistics Plan	Defined (D)	P	P	P	D	D
Integrated Project Plan	Defined (D)	NR	P	D	D	D
Project Code of Accounts	Defined (D)	NR	P	D	D	D
Project Schedule	Defined (D)	NR	P	D	D	D
Regulatory Approval & Permitting	Defined (D)	NR	P	D	D	D
Risk Register	Defined (D)	NR	P	D	D	D
Stakeholder Consultation/Engagement/Management Plan	Defined (D)	NR	P	D	D	D
Work Breakdown Structure (WBS)	Preliminary (P)	NR	P			
Start-up & Commissioning Plan	Defined (D)	NR	P	P/D	D	D
H. Studies						
Routing Options	Defined (D)	P	P	D	D	D
Topography & Bathymetry	Not Applicable (NA)					
Environmental Impact/Sustainability Assessment	Defined (D)	NR	P	D	D	D
Environment/Existing Conditions	Defined (D)	NR	P	D	D	D
Meteorology and/or Oceanographic/Subsea	Not Applicable (NA)	NR				
Soils & Hydrology	Defined (D)	NR	P	D	D	D
Technical Deliverables (Specifications and/or Drawings)						
Conductor, Insulator, Grounding, Joint Design (including protection for buried or subsea)	Complete (C)	S	P	C	C	C
Foundation/Structure (Tower) Design	Not Applicable (NA)					
Route Mapping/Survey	Preliminary (P)	S/P	P/C			
Design Specifications	Complete (C)	NR	S/P	C	C	C
Instrument List	Not Applicable (NA)	NR				
Construction Permits	Not Applicable (NA)	NR				
Geometric Layout, Alignment, Profile, Cross Section	Not Applicable (NA)	NR				
Land/ROW Title Negotiation	Started (S)	NR	S/P			
Civil/ Site/Structural/Architectural Discipline Drawings	Not Applicable (NA)	NR				
Crossings and Borings Designs and Drawings	Not Applicable (NA)	NR				
Demolition Plans and Drawings	Not Applicable (NA)	NR				
Erosion Control Plan & Drawings	Not Applicable (NA)	NR				
Foundation/Structure (Tower) Discipline Drawings	Not Applicable (NA)	NR				
Tower/Structure Location/Spotting	Not Applicable (NA)	NR				
Instrument Datasheets	Not Applicable (NA)	NR	NR/S			
Electrical Discipline Drawings	Not Applicable (NA)	NR	NR			
Instrumentation/Control System Discipline Drawings	Not Applicable (NA)	NR	NR			
Total # Deliverables for this Project		8	25	22	22	22
% Defined/Complete towards Class Estimate		100%	100%	85%	85%	85%

Comments:

This project is being filed as a Class 3 estimate. The defined deliverables for this project indicate that 85% of Class 3 deliverables are completed. A contingency value of 0% was selected as this project is customer contributed and any potential additional costs will be fully recovered from the customer.

Legend:

The maturity level is an approximation of the completion status of the deliverable. The completion is indicated by the following descriptors:

General Project Data:

- Not Required (NR): May not be required for all estimates of the specified class, but specific project estimates may require at least preliminary development.
- Preliminary (P): Project definition has begun and progressed to at least an intermediate level of completion. Review and approvals for its current status has occurred.
- Defined (D): Project definition is advanced, and reviews have been conducted. Development may be near completion with the exception of final approvals.

Technical Deliverables:

- Not Required (NR): Deliverable may not be required for all estimates of the specified class, but specific project estimates may require at least preliminary development.
- Started (S): Work on the deliverable has begun. Development is typically limited to sketches, rough outlines, or similar levels of early completion.
- Preliminary (P): Work on the deliverable is advanced. Interim, cross-functional reviews have usually been conducted. Development may be near completion except for final reviews and approvals.
- Complete (C): The deliverable has been reviewed and approved as appropriate.

Inclusions:

For the purposes of this document, the term *power transmission line infrastructure industries* is assumed to include greenfield or brownfield sites for overhead, buried and submarine transmission of electrical power in the infrastructure industries. High voltage is typically >100kV but may be less (e.g., 33 or 66kV) if long distance with light electrical loads. This excludes power supply and distribution scope within a process plant, mining facility, building complex or other facility site. It also excludes power generation facilities and substations. The defining deliverables of those excluded project scopes are covered in other RPs (e.g., 18R-97 for process plants [2]).

Power transmission is considered an element of the infrastructure industry. The Construction Industry Institute has provided a good definition of infrastructure in its Project Definition Rating Index for Infrastructure Projects as follows [3]:

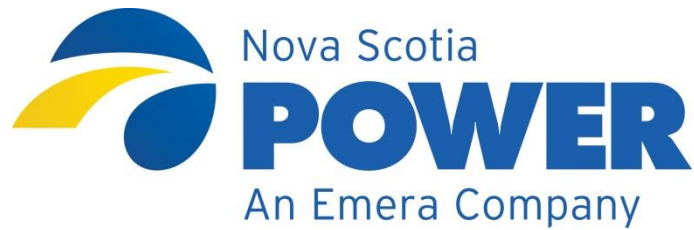
“A capital project that provides transportation, transmission, distribution, collection or other capabilities supporting commerce or interaction of goods, services, or people. Infrastructure projects generally impact multiple jurisdictions, stakeholder groups and/or a wide area. They are characterized as projects with a primary purpose that is integral to the effective operation of a system. These collective capabilities provide a service that is made up of nodes and vectors into a grid or system.”

Using this definition, power transmission lines are a vector or linear scope element that connects substation or other facility nodes at its terminations. The substation nodes may be part of or associated with a generation, consuming or interconnection facility. As such, transmission projects are often executed as part of a program that also involves node project scope or facility operational changes (or at least considerations for integrated system commissioning and startup). As the definition states, a distinguishing feature of these projects is that they often traverse wide areas, cross country or subsea, which puts an emphasis on the definition of routing, land ownership and conditions, and establishing right-of-way (ROW). Associated scope definition challenges include defining stakeholder, permitting and regulatory requirements. Buried and submarine installations increase the focus on the protection philosophy and strategies affecting cable selection, armoring and joint considerations. While many distinguish power transmission (higher voltage, long distances) from power distribution (short distance, lower voltage connections to retail customers), the principles of estimating these elements are similar; i.e., the RP applies to both.

The main physical power transmission line scope elements are conductors and their support structures if installed overhead. Main installation elements include land clearing if over land (including forestry if applicable), foundation and structure erection and conductor stringing if overhead, or trenching, laying and horizontal boring if subsurface or subsea. Special scope elements are involved with crossings of water, road, rail and so on and at terminations. Because conductor (e.g., aluminum) and structure (e.g., steel) material costs are usually a significant cost element, these project estimates are particularly sensitive to escalation uncertainty. In general, the more developed the route, the more complex the installation will be. In urban areas, visual appeal and concern for safety and health can be major issues. Installation in remote location and/or difficult or environmentally sensitive terrain creates its own challenges. Subsea installation adds the need for bathymetry¹ and metocean² studies and specialized installation equipment and vessels. Before any installation work can begin in an area, stakeholder consultation must be advanced (sometimes requiring agreements with local populations with rights), and appropriate land and ROW must be acquired which creates unique scheduling as well as cost challenges.

For the purpose of estimate classification then, the main scope definition deliverables are associated with defining the power requirements (i.e., kV), the conductors and structure, and the routing. Conductors can vary widely in content (copper, aluminum, etc.) and insulation. Overhead structures may be wood, concrete, composite or steel in various configurations with various foundation designs including pilings, concrete and so on. The route's land or subsea characteristics and the nature of developments drive the need for special design features and execution strategies. Operability and maintainability considerations may also affect ROW and access design. Brownfield and revamp projects add their own concerns for interface with existing elements, crowded working conditions, etc. For each scope definition decision, stakeholder requirements need to be considered.

Power substation projects are usually associated with transmission projects. However, substations being equipment-centric and located on a facility site have physical and defining characteristics similar to process plant projects (e.g., reliance on one-line diagrams, plot plans, etc.).



System Impact Study Report N-DLIS-2026-12

Load Customer System Impact Study
3 MVA Load Facility (MLS Spaceport)
Canso, NS

Revision		Date	Drafted By	Reviewed by	Approved By
0	Issued for Release	June 15, 2026	JH	JC	BH

SUMMARY

This report presents the results of a Load Impact Study (LIS) assessing the distribution supply options for the proposed MLS Spaceport facility in the Town of Canso. Several alternative solutions were explored during this assessment including 4 kV supply options from the 19C-Canso Town substation, 25 kV supply options using the 24C-T54 transformer and 24C-442 feeder, and a 25 kV supply within the Town of Canso. Based on this assessment, the proposed solution is to supply a total of 3 MVA to the MLS Spaceport sites at 25 kV using the 24C-442 feeder coming from the Town of Canso detailed in Section 5.3 as it has the lowest amount of line extension work and network upgrades overall.

In order to facilitate this solution, the following modifications are required:

1. Purchase and install electronic recloser and control
2. Extend 24C-442 4.7 kilometers (approx.) from the Town of Canso to the MLS site using 336 ASC conductor
3. Purchase and install set of 200 Amp 25 kV voltage regulators between Queensport and Philips Harbour
4. Purchase and install 900 kVAR (300 kVAR/phase) switched capacitor bank at the load site

Future expansion of the MLS Spaceport site beyond 3 MVA will require a new or upgraded 69-25 kV source within the Town of Canso at MLS's expense. This would also necessitate the submission of a transmission load interconnection request by MLS to the Nova Scotia Independent Energy System Operator (IESO-NS).

The high-level, non-binding cost estimate to complete the work outlined in this solution is \$4,545,000 plus tax. Actual costs will vary with field scoping and detailed design. The costs identified are associated with the design, purchase, and installation of equipment. NSPI will base the extents of Network Upgrades on existing circuit loading, the load details provided in the Load Impact Study Request, and the Load Customer's Electrical Plan Submittal to the Inspection Department.

Any change in the studied load and the plans submitted to the Electrical Inspection Authority must be identified by the Customer and a Materiality Study conducted to confirm the change is not Material (i.e., a lower load than studied may reduce the network upgrades needed reducing costs; an increased load may not be able to be supplied with the upgrades identified in this report). If the change is Material, the Distribution Load Impact Study must be revised to account for the actual load submitted by the Customer to the Electrical Inspection Authority. This could result in a significant impact to the In-Service Date.

With the exception of work fully funded by the Customer under an Engineering and Procurement Agreement, NSPI will not start investing in network upgrades or start any of the work required to supply the load until the Customer submits their plans to the Electrical Inspection Authority. Once the Customer submits their plans, NSPI can begin the processes for procurement, licenses/permits, and construction.

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1.0 SCOPE

Nova Scotia Power Inc. (NSPI) completed an LIS for the proposed MLS Spaceport in 2022. The project was on hold until discussions were picked up again in 2025. Now that federal funding has been secured, the request has been made for permanent power by the end of 2026.

The 2022 LIS included the following language:

*“The addition of large load facilities in the surrounding areas of Guysborough supplied via the radial 69 kV line L-5524 require investigation of the impact to the transmission system. With the projected demand load of 4 MVA given for the MLS site, it has been determined that no transmission Network Upgrades are required. **The results of this report’s transmission system analysis remain valid only while other pending large load requests in the Guysborough area remain uncommitted. Future increases in the MLS site load beyond 4 MVA may require additional studies to be completed and network upgrades may be required to serve incremental load increases.**”*

As there is now a committed large load customer in the Guysborough area, the results of the 2022 LIS are no longer valid. Additionally, the recommended solution in the 2022 LIS is no longer viable as the requested end of 2026 in-service date using that solution cannot be met due to equipment lead times.

While any transmission constraints are investigated separately, alternative distribution supply options at reduced load requirements (3 MVA) will be investigated with the goal of achieving the requested end of 2026 in-service date. Note that loads >3 MVA will require a new or upgraded 69-25 kV source within the Town of Canso and will require a transmission interconnection request to the IESO-NS by MLS.

2.0 PROPOSED LOAD

MLS is proposing a new 4 MVA load facility in Canso to be connected by end of 2026 with operations to begin in 2027. Neither substation transformer 19C-T51 nor 24C-T54 have sufficient capacity to supply the full 4 MVA of additional load. Details of the proposed project are provided below in Table 1.

Table 1: Proposed MLS Spaceport Load Facility

MLS Spaceport Load Facility	
Site Location	Canso, N.S.
3 Phase Supply	25 kV, 4 MVA Demand Load
Facility Voltage & Power Factor	25 kV-600/347 V, 0.9 pf
Load Pattern	Peak load during launch events, normal day to day load would be significantly lower (~1 MVA)
Type of Load	Induction motor loads, pumps at steady loading, fuel refrigeration, small amount of lighting, etc.

Assumptions:

1. The Load Customer is in Construction Phase in Q1/Q2 2026
2. The Load Customer is in Operations Phase Q4 2026/Q1 2027
3. The load site is currently running on generators
4. Power quality to existing customers cannot be negatively impacted
5. Future expansion plans >3 MVA will require a load interconnection request to the IESO-NS

3.0 SYSTEM INFORMATION

Table 2: Substation Loading Overview

Substation	Transformer	Feeders	Winter Peak
19C-Canso Town	19C-T51	203, 204	1.4 MVA
24C-Dickie Brook Hydro	24C-T54	442, 443	6.3 MVA

Table 3: Feeder Loading Overview

Transformer	Feeder	Winter Peak (Amps)	Winter Peak (MVA)
19C-T51	203	74	0.54
	204	114	0.84
24C-T54	442	47	2.0
	443	97	4.3

Table 4: Distribution Substation Transformers

Substation	Transformer	Transformer Data				
		Manufacturer	kV	Rating (MVA)	Impedance	Age
19C	19C-T51	C.G.E.	69-4.16	3/4//4.48	7.50%	1966
24C	24C-T54	F.P.E.	69-25	5.6/6.7//7.55	7.04%	1972

4.0 SYSTEM CONDITIONS

NSPI will load distribution load serving substation transformers to 110% of top nameplate rating (summer) and 133% (winter) based on normal cyclic daily loading, unless other limiting factors such as bushing rating or tap changer rating are more restrictive. System power transformers (i.e., 138-69 kV) are limited to 100% of the 65°C manufacturer nameplate MVA for summer and 110% for winter under normal system conditions.

The fully loaded capacity of an NSPI distribution feeder is the lower of the thermal capacity of the feeder circuit conductors, or 325 Amps (14 MVA at 25 kV / 2.34 MVA at 4.16 kV). Feeder loading can exceed 325 Amps for a dedicated feeder for the load site with proper design.

4.1 19C-T51 Transformer Loading

Based on the available load check data, transformer 19C-T51 supplies a total peak winter load of approximately 1.4 MVA and is not at risk of overloading. The condition of the transformer would need to be assessed prior to connecting a new large load site. While the 19C-T51 transformer could technically support the proposed 4 MVA load, 4 kV feeder design limitations prevent this from being a viable alternative (voltage drop and non-standard construction).

4.2 24C-T54 Transformer Loading

Based on the available load check data, transformer 24C-T54 supplies a total peak winter load of approximately 6.3 MVA and is not at risk of overloading. 3 MVA of new load could be supplied from this transformer without exceeding 133% of its 7.55 MVA top rating. The addition of voltage regulators would be required on circuit 24C-442 to support feeder voltage in Canso and at the MLS Spaceport site.

4.3 19C New Feeder Loading

In order to supply a 3 MVA demand load from the 19C 4 kV distribution system from a single feeder (built to 25 kV standards), it would need to be built with 556 ACSR conductor and two sets of 400 Amp 4 kV voltage regulators to maintain adequate voltage at the launch site. Otherwise, two feeders would be required each with a set of 4 kV voltage regulators. As transformer 19C-T51 is 60 years old, and as 556 ACSR distribution at 4 kV is non-standard construction, this is alternative not recommended.

4.4 24C-442 Feeder Loading

The load on 24C-442 peaks in the winter at 47 Amps (2 MVA), which remains below the 325 Amp overload criterion. However, the addition of a 3 MVA demand load at the end of a 45-50 kilometer feeder creates voltage issues along the feeder. Voltage regulators will be required to support voltage on the feeder.

4.5 Power Factor

Should the customer utilize a Rate with a demand charge based on kW of Maximum Demand, the power factor of their load facility must be at least 90% per Regulation 4.7. NSPI's Rates and Regulations can be found on the www.nspower.ca website for reference. There is no requirement to improve Power Factor when utilizing a Rate based on kVA of Maximum Demand. However, the installation of power factor correction capacitors would also serve to improve voltage at the MLS Spaceport site.

4.6 Voltage Flicker, Dips, and Unbalance

Voltage flicker and voltage dips refer to transient or periodic variations of voltage which cause objectionable lamp flicker and/or disturbances to connected equipment. Inrush current during starting of motors or generators typically causes a voltage dip whereas voltage flicker is a quasi-continuous variation of voltage that could be caused by arc-welder, arc-furnaces, or variations in the real or reactive power output of a generator. NSPI has established guidelines for the Distribution System regarding voltage dips and voltage flicker:

Table 5: NSPI Voltage Dip Criteria

$\Delta V/V$ (%)	Occurrences
2.5	≤ 1 time / hr
2.0	≤ 5 time / hr
1.0	≤ 50 time / hr
0.5	≤ 500 time / hr
Dynamic Voltage Changes Must be $\leq 2.5\%$	

Section 8.1 of the Nova Scotia Power Utility Service Requirements specifies a maximum of 40 hp for motors started across the line. Any motor larger than this requires reduced voltage or variable frequency start, or utility approval.

4.7 System Reliability

NSPI tracks the reliability of each distribution feeder in NS, including the number of Customer Interruptions (CI) and Customer Hours of Interruption (CHI). These are utilized to determine the CKAIFI and CKAIDI parameters, where CKAIFI is the Circuit Average Interruption Frequency Index, and CKAIDI refers to Circuit Average Interruption Duration Index.

Figure 1 and 2 below provides the previous five years of CKAIFI and CKAIDI data for the 19C-204 feeder, respectively.

Figure 3 and 4 below provides the previous five years of CKAIFI and CKAIDI data for the 24C-442 feeder, respectively.

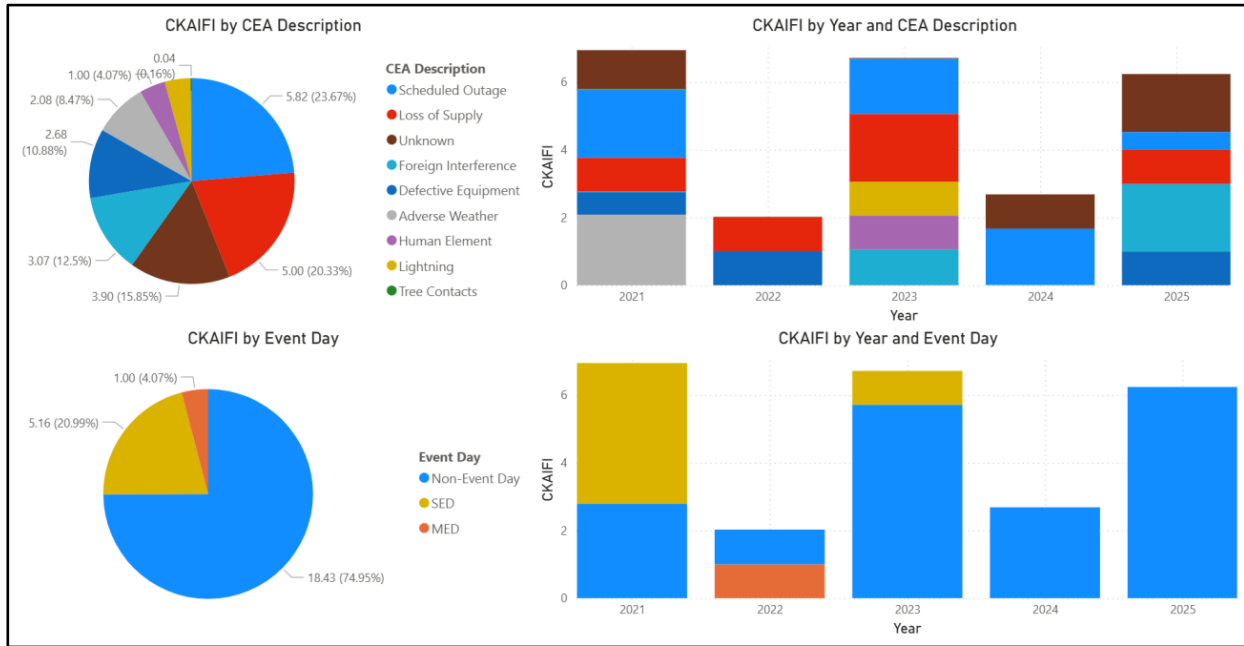


Figure 1: Feeder 19C-204 CKAIFI Data – 2021-2025

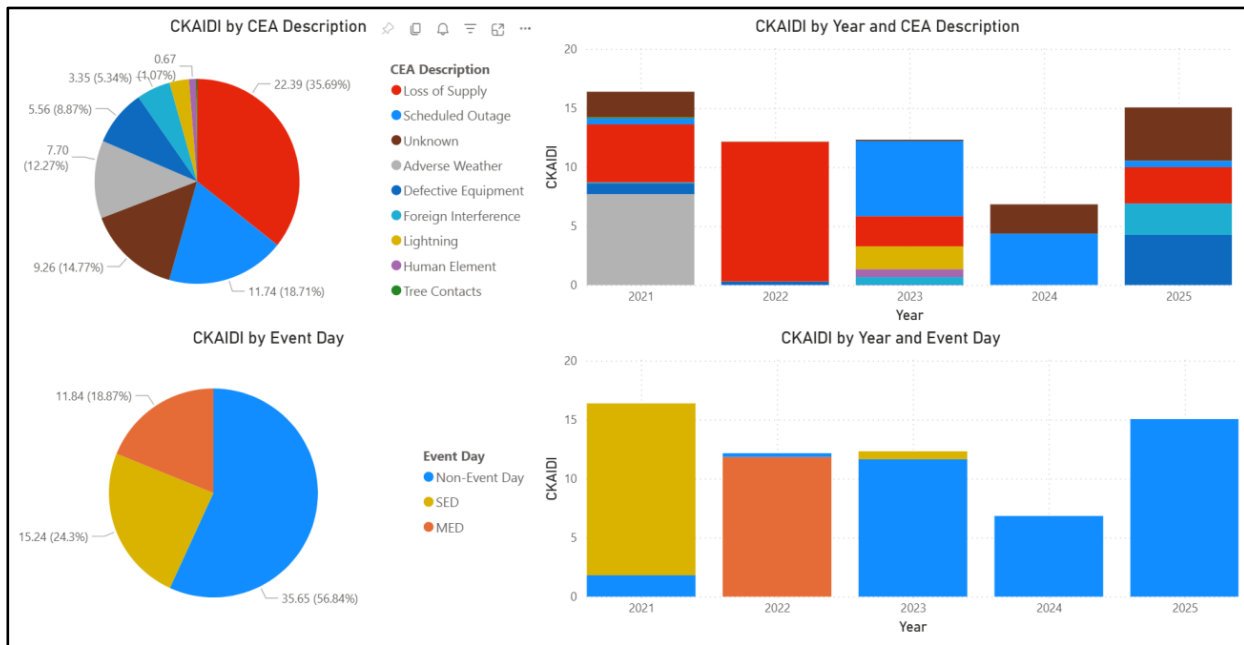


Figure 2: Feeder 19C-204 CKAIDI Data – 2021-2025

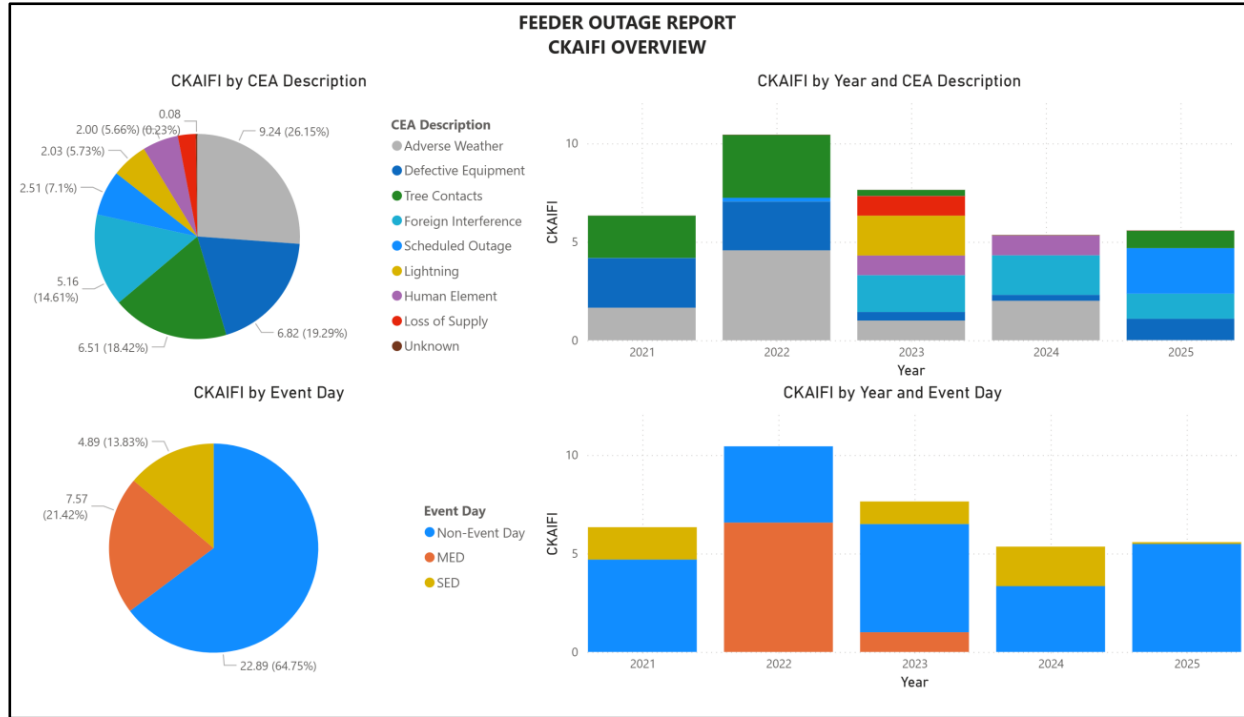


Figure 3: Feeder 24C-442 CKAIFI Data – 2021-2025

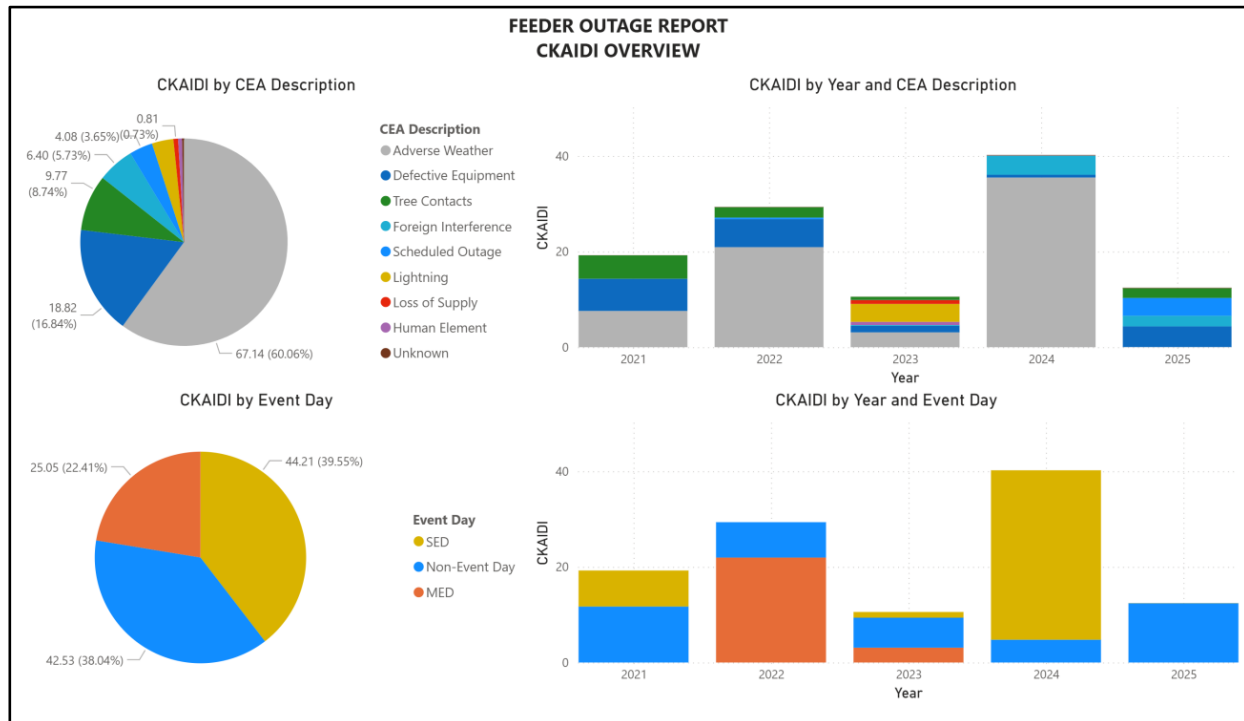


Figure 4: Feeder 24C-442 CKAIDI Data – 2021-2025

4.8 Age of Plant

The R2.5 Iowa State Survivor Curve was used to determine the remaining useful life for each substation transformer included in this study based on a 42-year average lifespan of a utility transformer. Table 6 summarizes this data for each transformer.

Table 6: Estimated Remaining Life According to the 42-Year R2.5 Iowa State Survivor Curve

NSPI Life	Transformer	Vintage	Age	Estimated Life (Years)	Years Remaining
42 Years	19C-T51	1966	60	63.7	3.7
	24C-T54	1972	54	59.6	5.6

Based on the estimated remaining life in Table 6, 19C-T51 may need to be replaced in 2029 and 24C-T54 in 2031. Replacement of these units will be based on condition-based assessments of the units or the impact of any large load interconnections.

5.0 ALTERNATIVE SOLUTIONS

5.1 Single Dedicated Feeder from the 19C Substation

In order to facilitate this solution, the following modifications are required:

1. Substation modifications required to construct new feeder exit
2. Purchase and install electronic recloser and control
3. Construct 4.6 kilometer (approx.) line extension from 19C to MLS site using 556 ASCR conductor
4. Purchase and install two sets of 400 Amp 4 kV voltage regulators
5. Purchase and install 900 kVAR (300 kVAR/phase) switched capacitor bank at load site

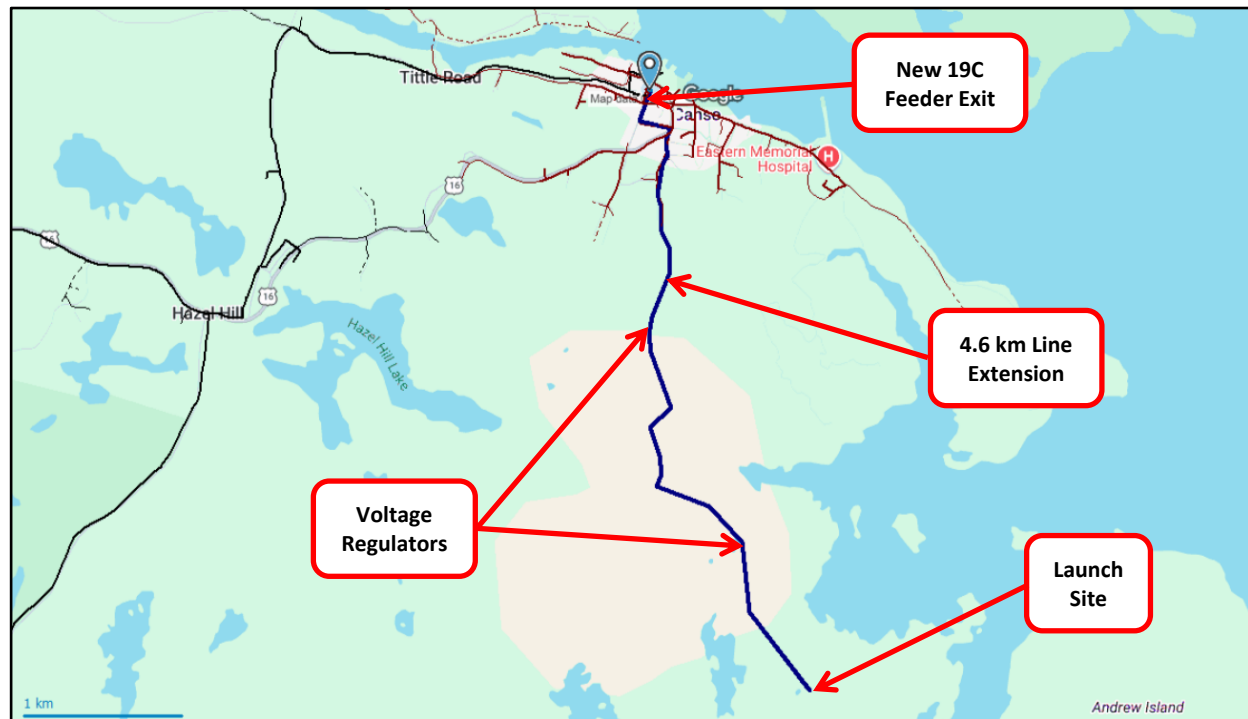


Figure 5: Feeder Exit and Line Extension

According to Cymdist, the feeder load in addition to the estimated demand load requested for the MLS Spaceport load facility (3 MVA) would result in approximately 437 Amps averaged across the three phases on the 19C feeder during peak load conditions. Loading on the 19C-T51 transformer would be approximately 4.8 MVA.

The 556 ASCR conductor is not a standard size for 4 kV distribution line construction at NSPI and would require approval for a non-standard design. Two sets of 400 Amp 4 kV voltage regulators and a 900 kVAR (300 kVAR/phase) capacitor bank at the load site were required to maintain adequate voltage at the launch site based on the load flow analysis in CYME. As mentioned in Section 4.3, this is not a recommended alternative.

5.2 Two Dedicated Feeders from the 19C Substation

In order to facilitate this solution, the following modifications are required:

1. Substation modifications required to construct two new feeder exits
2. Purchase and install two electronic reclosers and two controls
3. Construct 4.6 kilometer (approx.) double-circuit line extension from 19C to MLS site using 336 ASC conductor
4. Purchase and install two sets of 200 Amp 4 kV voltage regulators
5. Purchase and install two 600 kVAR (200 kVAR/phase) switched capacitor banks at the load site (one per feeder)

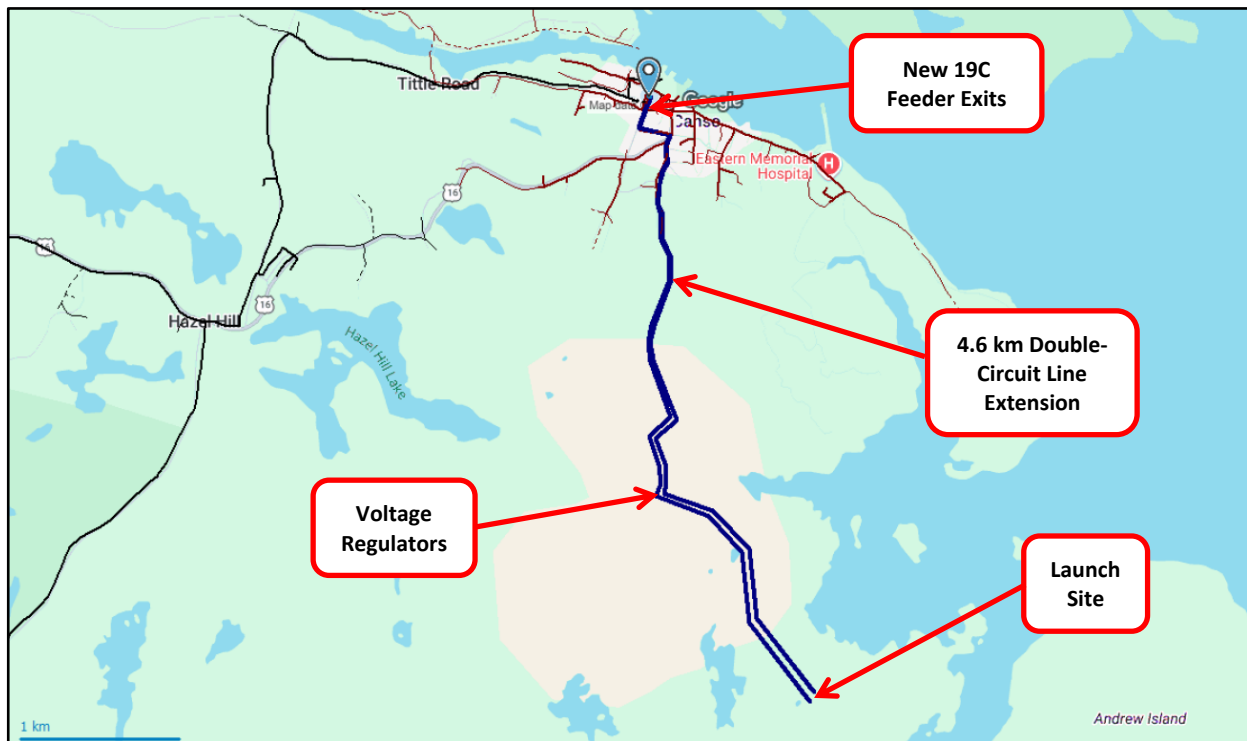


Figure 6: Feeder Exits and Double-Circuit Line Extension

According to Cymdist, the feeder load in addition to the estimated demand load requested for the MLS Spaceport load facility (3 MVA) would result in approximately 209 Amps averaged across the three phases on each of the new 19C feeders during peak load conditions, assuming the load is equally distributed between them. Loading on the 19C-T51 transformer would be approximately 4.8 MVA.

Two sets of 200 Amp 4 kV voltage regulators and two 600 kVAR (200 kVAR/phase) capacitor banks at the load site were required to maintain adequate voltage at the launch site based on the load flow analysis in CYME. Building two new feeders will be cost prohibitive versus building or extending one feeder to the load site. As mentioned in Section 4.3, this is not a recommended alternative.

5.3 24C-442 Supply from the Town of Canso

In order to facilitate this solution, the following modifications are required:

1. Purchase and install electronic recloser and control
2. Extend 24C-442 4.7 kilometers (approx.) from the Town of Canso to the MLS site using 336 ASC conductor
3. Purchase and install set of 200 Amp 25 kV voltage regulators between Queensport and Philips Harbour
4. Purchase and install 900 kVAR (300 kVAR/phase) switched capacitor bank at the load site

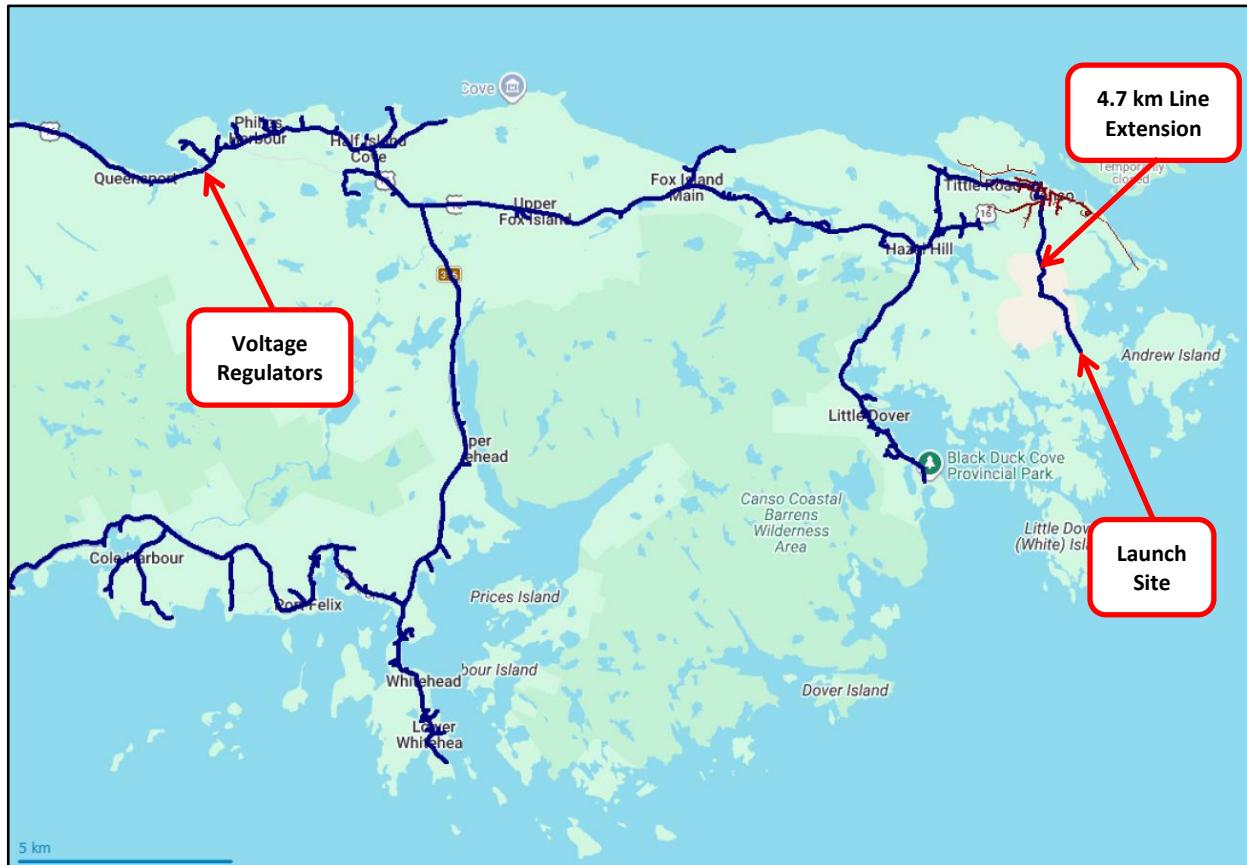


Figure 7: 24C-442 Supply from the Town of Canso

According to Cymdist, the feeder load in addition to the estimated demand load requested for the MLS Spaceport load facility (3 MVA) would result in approximately 117 Amps averaged across the three phases on the 24C-442 feeder during peak load conditions. Loading on the 24C-T54 transformer would be approximately 9.6 MVA.

A set of 200 Amp 25 kV voltage regulators located between Queensport and Philips Harbour and a 900 kVAR (300 kVAR/phase) capacitor bank at the load site were required to maintain adequate voltage at the launch site based on the load flow analysis in CYME.

The location of the new electronic recloser and control will be determined through a separate protection coordination study.

5.4 24C-442 Supply from Hazel Hill

In order to facilitate this solution, the following modifications are required:

1. Purchase and install electronic recloser and control
2. Upgrade 840 meters of 1-phase line to 3-phase and reconductor the existing phase with 336 ASC
3. Extend 24C-442 1.9 kilometers (approx.) along Main Street to Whitman Street using 336 ASC
4. Rebuild the line on Whitman Street (~610 meters) to 25 kV standard using 336 ASC and transfer to 24C-442
5. Extend 24C-442 3.7 kilometers (approx.) Whitman Street to the MLS site using 336 ASC conductor
6. Purchase and install set of 200 Amp 25 kV voltage regulators between Queensport and Philips Harbour
7. Purchase and install 900 kVAR (300 kVAR/phase) switched capacitor bank at the load site

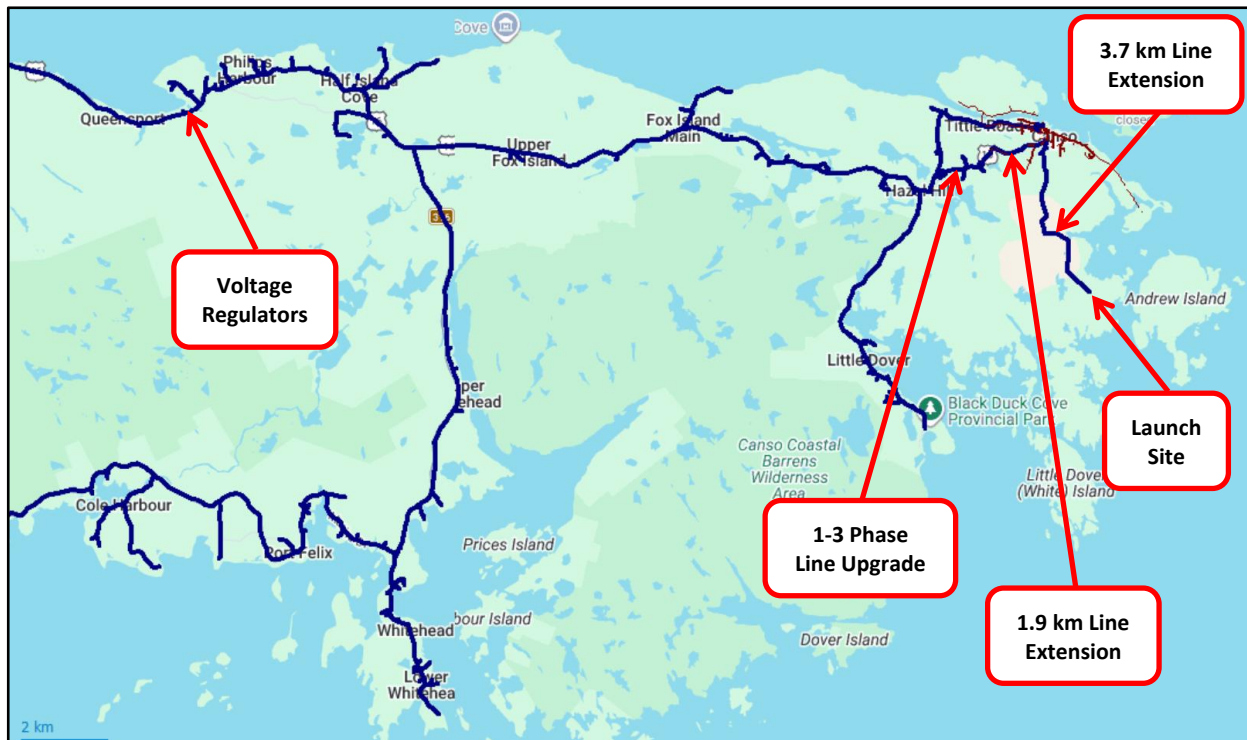


Figure 8: 24C-442 Supply from Hazel Hill

According to Cymdist, the feeder load in addition to the estimated demand load requested for the MLS Spaceport load facility (3 MVA) would result in approximately 118 Amps averaged across the three phases on the 24C-442 feeder during peak load conditions. Loading on the 24C-T54 transformer would be approximately 9.6 MVA.

A set of 200 Amp 25 kV voltage regulators located between Queensport and Philips Harbour and a 900 kVAR (300 kVAR/phase) capacitor bank at the load site were required to maintain adequate voltage at the launch site based on the load flow analysis in CYME.

The location of the new electronic recloser and control will be determined through a separate protection coordination study.

5.5 25 kV Feeder from the 19C Substation Using 19C-T52

In order to facilitate this solution, the following modifications are required:

1. Change the Point of Interconnection for the 19C-Sable Wind Farm from 69 kV to 25 kV (GIP interconnection request to IESO-NS and associated studies required), including all associated modifications to facilitate this change
2. Substation modifications required to construct new feeder exit
3. Purchase and install electronic recloser and control
4. Construct 4.6 kilometer (approx.) line extension from 19C to MLS site using 556 ASCR conductor
5. Purchase and install set of 200 Amp 25 kV voltage regulators at the substation for the new distribution feeder

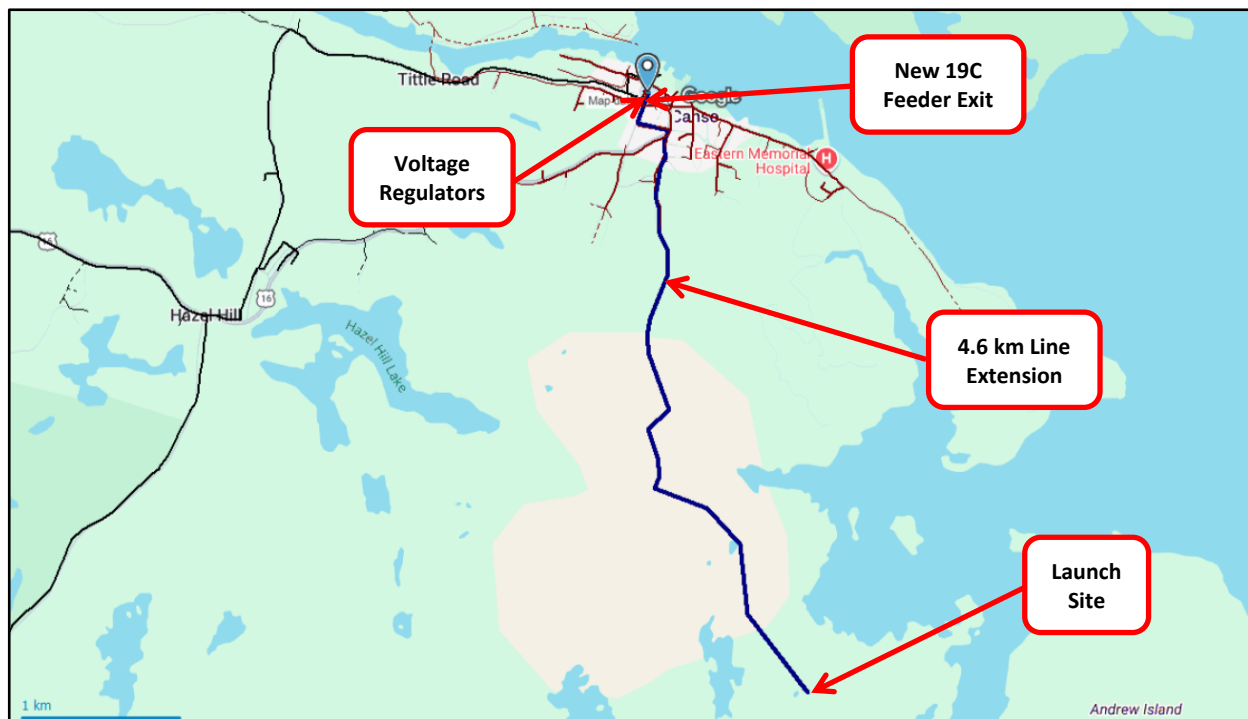


Figure 9: 19C 25 kV Feeder Exit and Line Extension

According to Cymdist, the feeder load in addition to the estimated demand load requested for the MLS Spaceport load facility (3 MVA) would result in approximately 72 Amps averaged across the three phases on the new 19C 25 kV feeder during peak load conditions. Loading on the 19C-T52 transformer would be approximately 3.3 MVA assuming no wind generation.

A set of 200 Amp 25 kV voltage regulators are required as there is no OLTC on the 19C-T52 to provide the ability to regulate voltage. A set of 200 Amp voltage regulators would also be sufficiently sized for future MLS expansion plans requiring 7-9 MW.

5.6 Feeder from New 25 kV Source at 19C or New Substation Location

In order to facilitate this solution, the following modifications are required:

1. Purchase and install a 138/69-25 kV 7.5/10 MVA transformer with an OLTC at the 19C substation or new location and upgrade/build all associated infrastructure (structures, bus, feeder exits, etc.)
2. Purchase and install electronic recloser and control
3. Use the 603C-T41 stepdown transformers to supply the 4 kV load in the Town of Canso until 25 kV voltage conversions are completed
4. Construct 4.6 kilometer (approx.) line extension from 19C to MLS site using 556 ASCR conductor
5. Purchase and install a 69 kV capacitor bank at the 19C substation

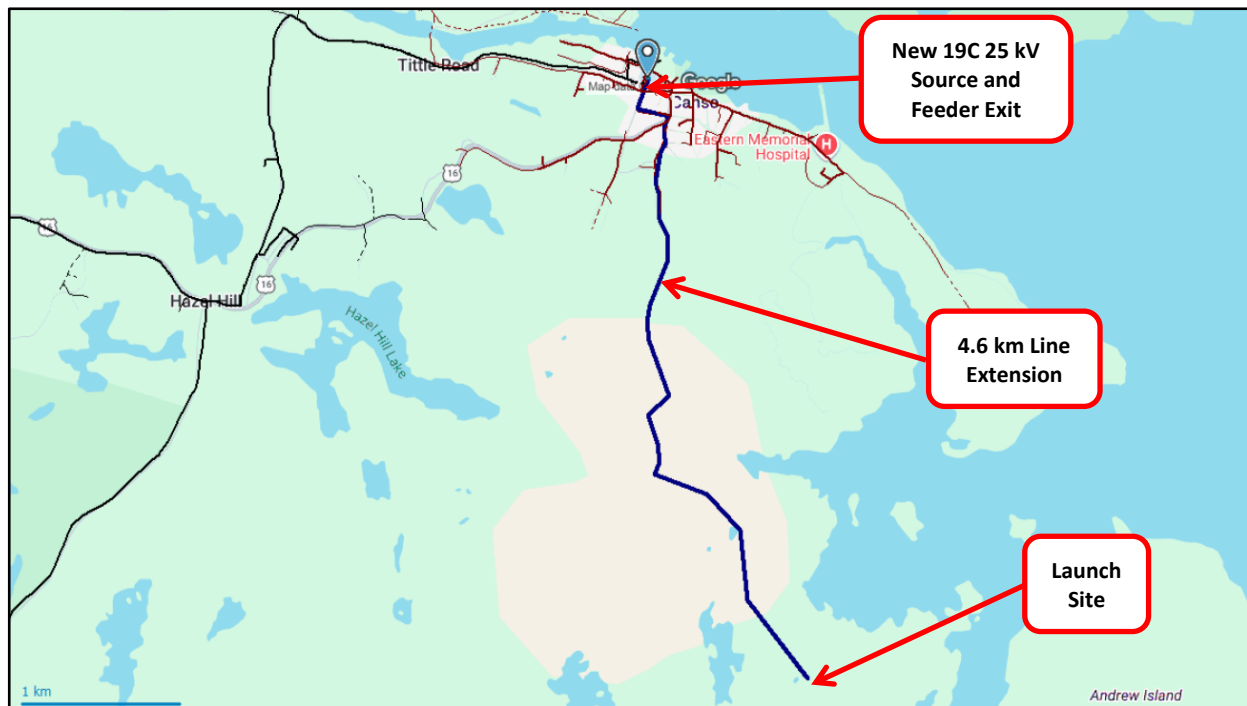


Figure 10: New 19C 25 kV Source, Feeder Exit, and Line Extension

According to Cymdist, the feeder load in addition to the estimated demand load requested for the MLS Spaceport load facility (3 MVA) would result in approximately 72 Amps averaged across the three phases on the new 19C 25 kV feeder during peak load conditions. Loading on the new 19C transformer would be approximately 4.6 MVA.

This alternative would require the advancement of a new 25 kV source/19C-T51 transformer replacement and all associated substation infrastructure by approximately 6 years (estimated failure date) at MLS's expense. The addition of a 69 kV capacitor bank at the 19C substation would also be required. Lastly, the 603C-T41 25-4 kV stepdown transformers will be required to supply the local 4 kV distribution in the Town of Canso until the 25 kV voltage conversions are completed.

It should be noted that given the age of the 19C-T51 transformer, it is expected to fail within approximately the next six years. When the transformer fails, NSPI will replace it with a 138/69-25 kV 7.5/10 MVA unit.

6.0 PROPOSED SOLUTION

Based on the alternative solutions available, the 19C 4 kV options can be ruled out immediately due to the anticipated costs and additional equipment required to facilitate them. The 400 Amp 4 kV regulators are not a standard item for NSPI and would have limited use on NSPI's distribution system after the Town of Canso is converted to 25 kV. The line extension for a single 4 kV feeder is similar to what is required for a 24C-442 supply, but the additional set of regulators would rule it out due to the increased cost. Similarly, a double-circuit supply from 19C would be significantly more costly. Significant modifications and upgrades at the 19C substation would be required to build the additional feeder exit(s).

The 24C-442 supply options are similar in terms of load flow results. The supply option coming from the Town of Canso (just outside 19C) may be more challenging in terms of constructability as it is a more congested area with narrow roads and an existing double-circuit exiting the substation on Sterling Street (wind farm collector circuit on top of the 19C 4 kV circuit). However, building the line extension from the Town of Canso involves less line extension work and network upgrades compared to the supply option coming from Hazel Hill. The 24C-442 supply option coming from Hazel Hill requires additional line upgrades but avoids construction in more congested areas.

Non-committal discussions have been initiated with the Municipality of the District of Guysborough (MODG) regarding the purchase of their portion of the 19C-T52 transformer, substation, and collector circuit, all of which are being maintained by NSPI. However, a GIP interconnection request to IESO-NS would be required with timelines for associated studies estimated at 1-2 years that will rule this solution out in the short term. Additionally, this would involve moving the MODG POI from 69 kV to 25 kV and require costly PSCAD models for the MODG wind turbine generators.

The 24C-442 supply option from the Town of Canso as detailed in Section 5.3 is currently being scoped by a capital planner, which is the preferred solution at this time.

It should be noted that this is not intended to be a long term solution. The length of the 24C-442 and the loading on it as well as the 24C-T54 transformer will present operational challenges. Upgrading the Town of Canso to 25 kV will only resolve the distribution system constraints and these operational challenges, but not any existing or forecasted transmission system constraints.

6.1 Load Flow Results

Based on the load flow analysis, the 24C-442 feeder will not become overloaded based on the 3 MVA MLS Spaceport load addition. The 24C-T54 transformer is not expected to become overloaded based on the 3 MVA MLS Spaceport load addition, though it is expected to reach approximately 9.6 MVA (127% of its top rating) during peak load conditions, assuming no hydro generation during peak times.

Table 7: 24C-442 Feeder Loading After Proposed Modifications

Feeder	Current Winter Peak (Amps)	Winter Peak After Modifications (Amps)
24C-442	47	117

Table 8: 24C-T54 Transformer Loading After Proposed Modifications

Feeder	Current Winter Peak (MVA)	Winter Peak After Modifications (MVA)
24C-T54	6.3	9.6

6.2 Feeder Voltage

The Cymdist models of the distribution feeder circuit 24C-Dickie Brook Hydro was modified to include the circuit upgrades and/or modifications needed to supply three-phase power to the MLS Spaceport site. The subsequent load flow analysis provided the following voltage profile at the site after the demand load is added.

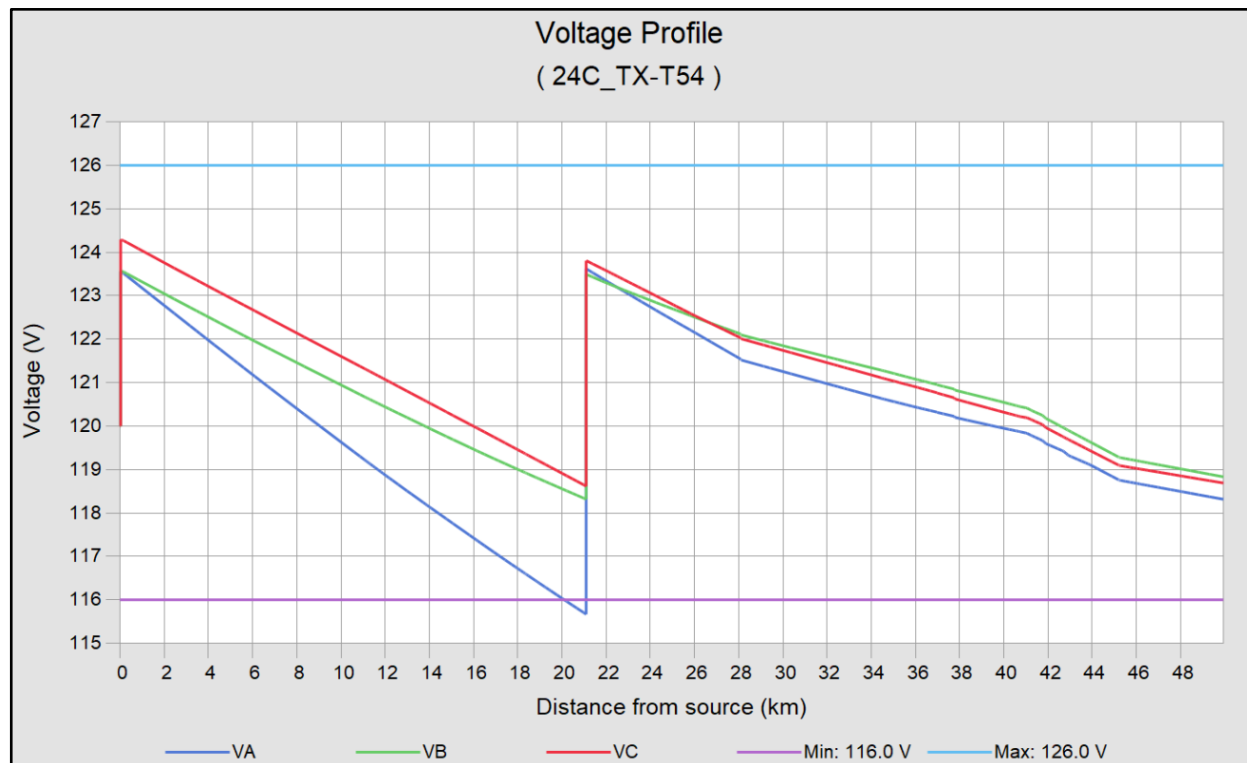


Figure 11: 24C-442 Voltage Profile After MLS Spaceport Addition

6.3 Feeder Voltage Imbalance

The voltage imbalance at the MLS Spaceport site is shown for circuit 24C-442 after the proposed circuit modifications at peak load conditions in Table 9 below.

Table 9: Voltage Imbalance During Winter Peak Loading After Proposed Modifications

Supply Feeder	Voltage Imbalance at the MLS Spaceport Site			
	Phase Voltage	After Modifications		
		Voltage	Average	Imbalance
24C-442	Va	118.3	118.6	0.25%
	Vb	118.8		0.17%
	Vc	118.7		0.08%

6.4 System Short Circuit Levels

The NSPI design criteria for maximum fault capacity (three-phase, symmetrical) is 346 MVA for the 25 kV Distribution System (8000 A) and 195 MVA for the 12.5 kV Distribution System (9000 A). New equipment added to the system must be designed to withstand fault levels of this magnitude.

Actual fault levels vary from substation to substation and decrease with distance from the substation. Table 10 below shows the maximum expected fault levels at the MLS Spaceport site after the proposed modifications.

Table 10: Short Circuit Data After Proposed Modifications

Supply Feeder	Maximum Short Circuit Level at the MLS Spaceport Site			
	Fault	Amps	MVA	X/R Ratio
24C-442	LLL	1361	59	3.76
	LG	879	38	2.87

7.0 COST & RIGHT OF WAY RESPONSIBILITY

In accordance with NSPI Regulation 2.6, a load customer is responsible for providing the following:

- a. A capital contribution for all line extension work in excess of 92m.
 - i. If a line previously existed at the site and was removed < 5 years previously, a similar line extension would be provided at reduced cost to the customer.
 - ii. Refunds are available each time a new customer is connected to the line extension within 10 years of the capital contribution (maximum refund of 90%) per Regulation 2.12.
- b. When building on the Customer's property, provision of a registered easement in NSPI's name.
- c. When building on private property:
 - i. Provision of a suitable Right of Way registered in NSPI's name.
 - ii. Suitable clearing of the ROW.

Section 5.1 of the NSPI's Utility Service Requirements (January 2026) further clarifies the ROW requirements for line extensions as follows:

- a. The customer has overall responsibility for obtaining any easements or licenses.
- b. Where a service route as approved by the Supply Authority crosses private property the Customer shall be responsible for supplying and clearing the route.
- c. The Customer is responsible for any costs incurred by NSPI in acquiring easements or licenses where regulations do not allow the customer to obtain them on behalf of NSPI.

The Utility Service Requirements can be accessed on www.nspower.ca under Electrical Inspections.

Required network upgrades will be determined using load details provided in the Load Impact Study Request. The load customer will be required to make a capital contribution for the cost of any upgrades required to supply the requested load. The exception to this is where network upgrades are planned or justified per NSPI's board-approved Capital Expenditure Justification Criteria (CEJC), which can be found at nsuarb.novascotia.ca/mandates/electricity/nova-scotia-power-capital-expenditures.

The cost responsibilities identified above are associated with the design, purchase, and installation of equipment.

8.0 COST ESTIMATE

The following high-level, non-binding, cost estimates include the costs associated with the proposed solution to supply the MLS Spaceport site via 24C-442 from the Town of Canso. The customer is responsible for the actual costs of the design and construction of the proposed solution.

Table 11: Cost Estimates

		Estimate
1	Purchase and install electronic recloser and control	\$75,000
2	Extend 24C-442 4.7 kilometers (approx.) from the Town of Canso to the MLS site using 336 ASC conductor	\$4,000,000
3	Purchase and install set of 200 Amp 25 kV voltage regulators between Queensport and Philips Harbour	\$400,000
4	Purchase and install 900 kVAR (300 kVAR/phase) switched capacitor bank at the load site	\$70,000
-	Total (HST not included)	\$4,545,000

8.1 Lead Time to Implement Circuit Modifications

The estimated time required to complete the circuit modifications is approximately 6-12 months following the Load Customer's Electrical Plan Submittal to the Inspection Department.

9.0 CONCLUSION

This report presents the results of a Load Impact Study (LIS) assessing the distribution supply options for the proposed MLS Spaceport facility in the Town of Canso. Several alternative solutions were explored during this assessment including 4 kV supply options from the 19C-Canso Town substation, 25 kV supply options using the 24C-T54 transformer and 24C-442 feeder, and a 25 kV supply within the Town of Canso. Based on this assessment, the proposed solution is to supply a total of 3 MVA to the MLS Spaceport sites at 25 kV using the 24C-442 feeder coming from the Town of Canso detailed in Section 5.3 as it has the lowest amount of line extension work and network upgrades overall.

In order to facilitate this solution, the following modifications are required:

1. Purchase and install electronic recloser and control
2. Extend 24C-442 4.7 kilometers (approx.) from the Town of Canso to the MLS site using 336 ASC conductor
3. Purchase and install set of 200 Amp 25 kV voltage regulators between Queensport and Philips Harbour
4. Purchase and install 900 kVAR (300 kVAR/phase) switched capacitor bank at the load site

Future expansion of the MLS Spaceport site beyond 3 MVA will require a new or upgraded 69-25 kV source within the Town of Canso at MLS's expense. This would also necessitate the submission of a transmission load interconnection request by MLS to the Nova Scotia Independent Energy System Operator (IESO-NS).

The high-level, non-binding cost estimate to complete the work outlined in this solution is \$4,545,000 plus tax. Actual costs will vary with field scoping and detailed design. The costs identified are associated with the design, purchase, and installation of equipment. NSPI will base the extents of Network Upgrades on existing circuit loading, the load details provided in the Load Impact Study Request, and the Load Customer's Electrical Plan Submittal to the Inspection Department.

Any change in the studied load and the plans submitted to the Electrical Inspection Authority must be identified by the Customer and a Materiality Study conducted to confirm the change is not Material (i.e., a lower load than studied may reduce the network upgrades needed reducing costs; an increased load may not be able to be supplied with the upgrades identified in this report). If the change is Material, the Distribution Load Impact Study must be revised to account for the actual load submitted by the Customer to the Electrical Inspection Authority. This could result in a significant impact to the In-Service Date.

With the exception of work fully funded by the Customer under an Engineering and Procurement Agreement, NSPI will not start investing in network upgrades or start any of the work required to supply the load until the Customer submits their plans to the Electrical Inspection Authority. Once the Customer submits their plans, NSPI can begin the processes for procurement, licenses/permits, and construction.

Appendix A

System Operating Diagram

