Newfoundland and Labrador Hydro
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July 15, 2025

Board of Commissioners of Public Utilities
Prince Charles Building
120 Torbay Road, P.O. Box 21040
St. John's, NL A1A 5B2

Attention: Jo-Anne Galarneau
Executive Director and Board Secretary

Re: 2026 Capital Budget Application

Please find enclosed Newfoundland and Labrador Hydro's ("Hydro") 2026 Capital Budget Application ("Application"). Hydro's Application complies with the guidelines and conditions for capital budget proposals outlined by the Board of Commissioners of Public Utilities ("Board") in Order No. P.U. 7(2002–2003), as well as the provisional Capital Budget Application Guidelines issued by the Board.[1]

Through this Application, Hydro is seeking approval of $131.6 million in capital expenditures for 2026. This is comprised of single-year programs and projects for 2026, 2026 expenditures for multi-year proposals commencing in 2026, and 2026 expenditures for programs and projects approved in previous capital budget applications.

Hydro notes that the total planned capital spend for 2026, as outlined in the five-year capital plan, is $140.5 million.[2] This includes expenditures for 2026 previously approved through applications made supplemental to the 2025 Capital Budget Application and expenditures related to applications that Hydro anticipates filing subsequent to this Application, once full analysis has been complete. It also includes $1.5 million in specifically assigned customer contributions, applied for within this Application.

This amount does not include the anticipated capital expenditures for 2026 related to Major Project applications that have been approved or are underway. Hydro anticipates spending approximately $154.1 million on Major Projects in 2026.

Further details regarding the total planned capital spend are provided in Section 6 of Schedule 1 to the Application. Certain projects proposed within Hydro's Application are related to assets that serve only one Hydro customer; in those circumstances, Hydro is seeking approval to request contributions from the customers towards the costs of the improvements to the related property. Hydro is also seeking approval of its 2024 Average Rate Base in the amount of $2,379,043,000, as detailed in Schedule 6 to the Application.

Schedule 8 to the Application provides Hydro's Major Projects Capital Plan. This document includes an overview of Major Projects capital expenditures for the 2026–2030 period, as well as those associated with the Bay d'Espoir Hydroelectric Generating Station and its capital plan for the 2031–2035 period.

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[1] "Capital Budget Application Guidelines (Provisional)," Board of Commissioners of Public Utilities, January 2022.
[2] Hydro's total anticipated capital expenditures for 2026, including Major Projects (projects costing $50 million or greater) is $294.6 million.

Appendix A to this schedule contains specifics pertaining to individual project expenditures and is commercially sensitive information.

An unredacted version of the application is being provided to the Board on a confidential basis; the parties will be provided with a version in which this information has been redacted. Hydro requests that the Board use the redacted version for posting to its website.

Should you have any questions, please contact the undersigned.

Yours truly,

NEWFOUNDLAND AND LABRADOR HYDRO

SWalsh

Shirley A. Walsh
Senior Legal Counsel, Regulatory
SAW/rr.mc.kd

Encl.

ecc:

Board of Commissioners of Public Utilities
Jacqui H. Glynn
Ryan Oake
Board General

Labrador Interconnected Group
Senwung F. Luk, Olthuis Kleer Townshend LLP
Nicholas E. Kennedy, Olthuis Kleer Townshend LLP

Newfoundland Power Inc.
Dominic J. Foley
Douglas Wright
Regulatory Email

Island Industrial Customer Group
Paul L. Coxworthy, Stewart McKelvey
Denis J. Fleming, Cox & Palmer
Glen G. Seaborn, Poole Althouse

Consumer Advocate
Dennis M. Browne, KC, Browne Fitzgerald Morgan & Avis
Stephen F. Fitzgerald, KC, Browne Fitzgerald Morgan & Avis
Sarah G. Fitzgerald, Browne Fitzgerald Morgan & Avis
Bernice Bailey, Browne Fitzgerald Morgan & Avis

Teck Resources Limited
Shawn Kinsella

Iron Ore Company of Canada
Gregory A.C. Moores, Stewart McKelvey

Tacora Resources Inc.
Baseem Saeed

2026 Capital Budget Application

July 15, 2025

An application to the Board of Commissioners of Public Utilities

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Volume I

Volume II

Schedule 7: Capital Programs and Projects (Cont'd)

IN THE MATTER OF the *Electrical Power Control Act, 1994*, SNL 1994, Chapter E-5.1 ("*EPCA*") and the *Public Utilities Act*, RSNL 1990, Chapter P-47 ("*Act*"), and regulations thereunder; and

IN THE MATTER OF an application by Newfoundland and Labrador Hydro ("Hydro") for approval of: (i) its capital budget for 2026, pursuant to Section 41(1) of the *Act*, (ii) its proposed capital purchases and construction projects for 2026 in excess of $750,000, pursuant to Section 41(3)(a) of the *Act,* (iii) contributions by certain Customers for contributions towards the cost of improvements to certain property, pursuant to Section 41(5) of the Act, and (iv) for an Order, pursuant to Section 78 of the *Act,* fixing and determining its average rate base for 2024.

To: The Board of Commissioners of Public Utilities ("Board")

THE APPLICATION OF HYDRO STATES THAT:

A. Background

1. Hydro is a corporation continued and existing under the *Hydro Corporation Act, 2024*, is a public utility within the meaning of the *Act,* and is subject to the provisions of the *Electrical Power Control Act, 1994.*

B. Application

2. The 2026 Capital Budget Application proposes $131.6 million in 2026 expenditures, comprised of expenditures related to single-year programs and projects proposed for completion in 2026, 2026 expenditures for multi-year programs and projects commencing in 2026, as well as those expenditures in 2026 related to multi-year programs and projects approved in previous capital budget applications.[1] This amount includes $1.5 million in expenditures for which approval to specifically assign the costs to certain customers is requested herein. No new leases with costs in excess of $750,000 over the expected life of the lease are proposed for 2026.

[1] Sch. 1, app. B.

3. The 2026 Capital Budget Application request for approval does not include the 2026 expenditures related to supplemental applications approved by or currently before the Board, or those anticipated to be filed with the Board in 2026 as supplemental applications once a full analysis of the proposed project is complete. The request for approval also does not include the 2026 expenditures for Major Project[2] applications approved or currently before the Board, or those anticipated to be filed with the Board in 2026.

4. Schedules 1 to 8 to this application are the 2026 Capital Budget Overview, Five-Year Capital Plan (2026–2030), Holyrood Thermal Generating Station Overview – Future Operation and Capital Expenditure Requirements, Bay d'Espoir Hydroelectric Generating Station – Projected Capital Expenditures (2026–2035), 2025 Capital Expenditures Overview, 2024 Average Rate Base, Capital Programs and Projects, and Major Projects – Five-Year Capital Plan (2026–2030).

5. Schedule 1: The 2026 Capital Budget Overview provides:

a) An overview of Hydro's capital investment strategy and the capital budget proposed for 2026;

b) A summary of the revenue requirement impact of Hydro's proposed 2026 Capital Budget Application;

c) Hydro's 2026 Capital Budget financial schedules with projects listed by investment classification, asset category, materiality, and program and project (Schedule 1, Appendix A), by single- and multi-year programs and projects (Schedule 1, Appendix B), and by materiality: for programs and projects over $5 million (Schedule 1, Appendix C), for programs and projects $1 million to $5 million (Schedule 1, Appendix D), and for programs and projects under $1 million (Schedule 1, Appendix E);[3]

d) The 2025 Update to the Terminal Station Asset Management Strategy (Schedule 1, Appendix F); and

e) Hydro's Risk Evaluation Matrix (Schedule 1, Appendix G).

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[2] For the purposes of this Application, the term 'Major Project' is generally used to describe regulated projects and programs with an anticipated cost of $50 million or greater under the accountability of Hydro's Major Projects department.

[3] A listing of Hydro's planned 2026 projects and programs under $750,000 is contained within Schedule 7 to this application.

6. Schedule 2: Five-Year Capital Plan (2026–2030) provides an overview of Hydro's investment strategy and associated planned capital work for the period 2026–2030, as well as a summary of Hydro's actual and projected capital expenditures for the period 2021–2030 (Schedule 2, Appendix B).

7. Schedule 3: Holyrood Thermal Generating Station Overview – Future Operation and Capital Expenditure Requirements provides an overview of future operating and capital requirements for the Holyrood Thermal Generating Station, as well as the ten-year forecast of the system equipment maintenance projects for the Holyrood Thermal Generating Station (Schedule 3, Appendices B and C).

8. Schedule 4: Bay d'Espoir Hydroelectric Generating Station – Projected Capital Expenditures (2026–2035) provides an operational review of the Bay d'Espoir Hydroelectric Generating Station, as well as details of its capital plan for the period 2026–2035.[4]

9. Schedule 5: 2025 Capital Expenditures Overview summarizes 2025 capital expenditures year-to-date May 31, 2025, and provides explanations for reportable variances between the approved budget and the forecasted total budget.

10. Schedule 6: 2024 Average Rate Base sets out Hydro's proposed 2024 rate base of $2,379,043,000.

11. Schedule 7: Capital Programs and Projects contains evidentiary information to support the proposed 2026 construction projects and capital purchases exceeding $750,000, segmented by programs and projects. Also contained in Schedule 7 is a listing of the 2026 proposed programs and projects under $750,000. Capital purchases are included within the programs and projects.

12. Schedule 8: Major Projects Capital Plan provides an overview of Hydro's investment strategy and associated planned capital work for Major Projects. The Major Projects Capital Plan provides an overview of Major Projects capital expenditures for the 2026–2030 period, as well as those associated with the Bay d'Espoir Hydroelectric Generating Station and its capital plan for the 2031–2035 period. Proposed expenditures for Major Projects are not included within this Application.

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[4] This report is provided in compliance with the direction of the Board in Order No. P.U. 28(2024).

13. There are a number of projects proposed within Hydro's 2026 Capital Budget Application related to assets that serve only one Hydro customer. Hydro's practice regarding assets that serve only one Hydro customer is that the costs of construction and ongoing maintenance of those assets are the responsibility of that customer. Those costs are not borne by other customers through rates or otherwise.

14. The projects, as outlined in Table 10 of Schedule 1 to this Application, are:

(i) The replacement of disconnect B4L34-1 and circuit breaker B4L34 at the Wabush Terminal Station as part of the continuation of Hydro's "Replace Disconnects Program (2025–2026)" and "Renew Circuit Breakers Program (2025–2026)" previously approved in Board Order No. P.U. 28(2024). In addition, the replacement of circuit breaker B4L35 as part of Hydro's "Renew Circuit Breakers Program (2026–2028)", more particularly discussed in Schedule 7, Program 5. These assets specifically serve Tacora. The total estimated specifically assigned costs for Tacora in 2026 is $732,100;

(ii) The refurbishment of B2L64 in the Buchans Terminal Station as part of the continuation of Hydro's "Renew Circuit Breakers Program (2025-2026)", previously approved in Board Order No. P.U. 28(2024). In addition, the inspection of wood poles on Transmission Line TL264 as part of Hydro's "Wood Pole Line Management (2026) Program" more particularly discussed at Schedule 7, Program 1. These assets specifically serve Teck Resources Limited ("Teck"). The total estimated specifically assigned costs for Teck in 2026 is $348,100;

(iii) The replacement of the protective relays for Transformer T1 and T2 in the Come By Chance Terminal Station as part of the continuation of Hydro's "Replace Protective Relays Program (2025-2026)" previously approved in Board Order P.U. 28(2024). These assets specifically serve Braya Renewable Fuels ("Braya"). The total estimated specifically assigned costs for Braya in 2026 is approximately $412,200; and

(iv) The replacement of circuit breaker B4L6 and line protection for Wabush Terminal Station Transmission Line L6 as part of Hydro's "Renew Circuit Breakers Program (2026–2027)" and "Replace Protective Relays Program (2026–2027)" more particularly discussed in Schedule 7, Programs 5 and 11. These assets specifically serve the Iron Ore Company of Canada ("IOC"). The total estimated specifically assigned costs for IOC in 2026 is approximately $39,400.

15. As noted above, the assets solely serve the indicated customer, and the costs allocated to those assets will be specifically assigned for recovery from each customer.

16. Hydro has provided each respective customer with the cost estimates associated with each project and each customer has acknowledged its responsibility for its specific costs.

C. Reason for Approval

17. The proposed capital expenditures for 2026 as set out in the 2026 Capital Budget Application are necessary to allow Hydro to continue to provide to its customers service and facilities that are reasonably safe, adequate, and just and reasonable, as required by Section 37 of the *Act*.

D. Newfoundland and Labrador Hydro's Request

18. Hydro requests that the Board make an Order as follows:

a) Approving Hydro's 2026 capital budget of $131.6 million as set out in Appendix A of Schedule 1, pursuant to Section 41(1) of the *Act*;

b) Approving Hydro's 2026 capital purchases and construction projects in excess of $750,000 as set out in the appendices to Schedule 1, pursuant to Section 41(3) of the *Act*;

c) Approving a contribution by those customers noted in paragraph 14 above, of an amount equal to the capital cost of the work described herein related to assets which solely serve the identified customer, pursuant to section 41(5) of the *Act*; and

d) Fixing and determining Hydro's average rate base for 2024 in the amount of $2,379,043,000 as set out in Schedule 6, pursuant to Section 78 of the *Act.*

E. Communications

19. Communications with respect to this application should be forwarded to Shirley A. Walsh, Senior Legal Counsel, Regulatory for Hydro.

DATED at St. John's in the Province of Newfoundland and Labrador this 15th day of July 2025.

NEWFOUNDLAND AND LABRADOR HYDRO

SWalsh

Shirley A. Walsh
Counsel for the Applicant
Newfoundland and Labrador Hydro,
500 Columbus Drive, P.O. Box 12400
St. John's, NL A1B 4K7
Telephone: (709) 685-4973

Affidavit

IN THE MATTER OF the *Electrical Power Control Act, 1994*, SNL 1994, Chapter E-5.1 ("*EPCA*") and the *Public Utilities Act*, RSNL 1990, Chapter P-47 ("*Act*"), and regulations thereunder; and

IN THE MATTER OF an application by Newfoundland and Labrador Hydro ("Hydro") for approval of: (i) its capital budget for 2026, pursuant to Section 41(1) of the *Act*, (ii) its proposed capital purchases and construction projects for 2026 in excess of $750,000, pursuant to Section 41(3)(a) of the *Act*, (iii) contributions by certain Customers for contributions towards the cost of improvements to certain property, pursuant to Section 41(5) of the Act, and (iv) for an Order, pursuant to Section 78 of the *Act*, fixing and determining its average rate base for 2024.

AFFIDAVIT

I, Paul Dillon, of St. John's in the province of Newfoundland and Labrador, make oath and say as follows:

1) I am Director of Engineering, Engineering and Technology, Newfoundland and Labrador Hydro, the applicant named in the attached application.

2) I have read and understand the foregoing application.

3) To the best of my knowledge, information, and belief, all of the matters, facts, and things set out in this application are true.

SWORN at St. John's in the province of Newfoundland and Labrador this 15th day of July 2025, before me:

Renée Reardon

Commissioner for Oaths, Newfoundland and Labrador

Paul Dillon

RENEE REARDON
A Commissioner for Oaths in and for
the Province of Newfoundland and Labrador.
My commission expires on December 31, 2029.

Sch 1: 2026 Capital Budget Overview

Schedule 1

2026 Capital Budget Overview

2026 Capital Budget Application

2026 Capital Budget Overview

Executive Summary

Newfoundland and Labrador Hydro's ("Hydro") 2026 Capital Budget Application ("CBA") requests approval for $131.6 million of capital investment, driven primarily by the need for increased investment in asset renewal and increasing costs associated with a period of sustained high inflation. The 2026 CBA proposed investment equates to approximately 5.5% of the net book value of Hydro's regulated property, plant and equipment and intangible assets.[1]

As Hydro prepares to enter an era of expansion to reliably meet growing electricity demand, it is imperative that Hydro continue to prudently invest in its existing assets to ensure it continues to provide a level of reliability consistent with customer needs and expectations. To that end, Hydro's 2026 capital budget consists largely of investments related to the renewal of existing core assets, which account for two-thirds of Hydro's planned 2026 capital expenditures.

In the interest of balancing cost, reliability, and environmental responsibility, Hydro has carefully considered its capital investment portfolio for 2026 to ensure its proposed programs and projects represent an achievable level of execution success and contain those which are most critical to supporting the operation of Hydro's system. In doing so, Hydro has deferred or cancelled over 30 projects in preparing its 2026 CBA, which corresponds to an estimated 15,000 internal engineering hours and over $18.5 million[2] in capital investment in 2026.[3]

Hydro recognizes the impact of increased capital investment on its customers, including the associated impacts on rates and revenue requirements, with the impacts to customers limited as a result of the province's rate mitigation plan. Through to and including 2030, the Government of Newfoundland and Labrador ("Government") has committed to target domestic rate increases limited to 2.25% annually. In effect, this means that the capital expenditures required to ensure the delivery of reliable, environmentally responsible power will not create an undue burden on customers. Beyond 2030, the Government has publicly stated that it is committed to rate mitigation.

[1] As of March 31, 2025.
[2] This number was derived from Class 5 estimates, and the true amount of deferred investment is likely higher. Note that this total does not include proposals which have been cancelled due to scopes being included under other capital projects.
[3] A list of the programs and projects which were deferred or cancelled for the 2026 CBA is provided in Section 5.1.1.

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List of Appendices

1.0 Introduction

Hydro's capital investment philosophy is founded on its obligation to invest responsibly in the electrical system to the benefit of its customers. Hydro is committed to investing in capital in a manner that meets its legislated mandate to provide service and facilities that are reasonably safe and adequate, and just and reasonable[4] and to deliver power to consumers at the lowest possible cost, in an environmentally responsible manner, consistent with reliable service.[5]

A key area of strategic focus for Hydro is balancing the management of its aging infrastructure with its mandate. The majority of Hydro's installed assets, including the hydroelectric installation at the Bay d'Espoir Hydroelectric Generating Station ("Bay d'Espoir"), the Holyrood Thermal Generating Station ("Holyrood TGS"), the Stephenville Gas Turbine, the Hardwoods Gas Turbine ("Hardwoods GT"), and much of Hydro's transmission and distribution systems, are more than 40–50 years old. As a result, Hydro's capital investment strategy aims largely to sustain current system-level reliability by undertaking renewal-driven capital investment.

When supported by least-cost and risk evaluation, Hydro's capital investment strategy also proposes targeted service-enhancement investments to address specific issues impacting system-level or localized reliability.

In its aim to balance the provision of reliable service with cost management, Hydro focuses on sound utility asset management practices, condition-based investments (versus age-based investments) where appropriate, and operational and system requirements. Hydro also seeks to engage with stakeholders and customers to inform its capital investment considerations. As part of the ongoing *Reliability and Resource Adequacy Study Review* proceeding, Hydro conducted a digital engagement process where it asked customers to share their thoughts on the costs and reliability of the province's electrical grid. As part of that process, four out of five customers told Hydro they believed the system was reliable, and 87% said they did not want to pay more for reliability improvements that led to fewer or shorter outages.[6] Customers largely prioritize the lowest impact on electricity rates rather than other factors, and Hydro is mindful of this concern as it continues asset management planning.

[4] *Public Utilities Act,* RSNL 1990, c P-47, s 37(1).
[5] *Electrical Power Control Act, 1994*; SNL 1990, c E-5.1, s 3(b)(iii).
[6] "2024 Resource Adequacy Plan – An Update to the Reliability and Resource Adequacy Study," Newfoundland and Labrador Hydro, rev. August 26, 2024 (originally filed July 9, 2024), app. D.

Hydro has applied these practices, particularly in recent years, to work toward reduced investment to the minimum prudent capital level to not compromise customer reliability, safety, or the environment. Hydro also continues to refine its budgeting and integrated planning processes to support the efficient execution of its capital plans.

Hydro's 2026 CBA requests approval for $131.6 million of capital investment of which $93.1 million consists of newly proposed programs and projects, and $38.4 million related to previously proposed programs and projects, as seen in Figure 1.[7]

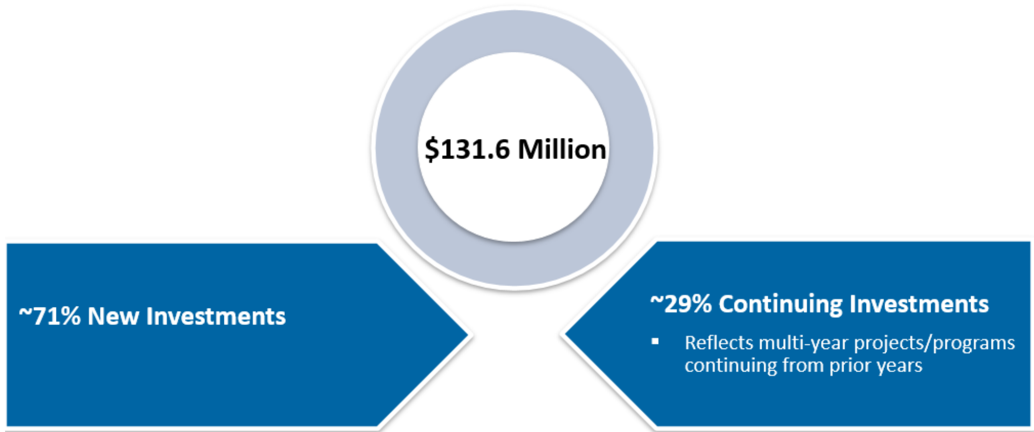

Figure 1: Hydro's 2026 Capital Budget Summary

Increased capital expenditures in recent years primarily reflects ongoing inflation as well as increased renewal-driven expenditures to ensure system reliability, particularly related to aging assets where larger investments are required for major overhaul work, as outlined in Section 6.1. Further detail on Hydro's efforts to manage its 2026 capital spend is included in Section 5.2 of this report.

As outlined in the Five-Year Capital Plan (2026–2030), excluding expenditures related to Major Projects,[8] the total planned 2026 capital spend is $140.5 million, including $1.5 million in specifically assigned customer contributions. The remaining planned capital spend not outlined in this application is associated with supplemental capital expenditures that have been approved, are currently before the Board of Commissioners of Public Utilities ("Board"), or those which Hydro intends to file in future

[7] Totals may not add due to rounding.
[8] For the purposes of this document, the term 'Major Project' is generally used to describe regulated projects and programs with an anticipated cost of $50 million or greater under the accountability of Hydro's Major Projects department.

supplemental applications. In addition, Hydro is anticipating spending approximately $154.1 million on Major Projects in 2026. Further details on Hydro's Major Projects Capital Plan is provided in Schedule 8 to this application.

A summary of Hydro's anticipated 2026 Capital Expenditures is provided in Table 1.

Table 1: Anticipated 2026 Capital Expenditures[9]

Item	2026 Cost Estimate ($ Millions)
2026 CBA	131.6
Replacement of Information Systems	0.2[10]
Interconnection and Integration of the Puffin Wind Inc. Renewable Energy Project (2025–2027) – Ramea	0.9[11]
Renew Microsoft Enterprise License	0.4[12]
Install Carbon Dust Collection System – Hinds Lake	0.4[13]
Additions for Load Growth – Unit 2065 Replacement and Fuel Storage Upgrades (2024–2027) – Rigolet	3.1[14]
Additions for Load Distribution Systems (2024–2027) – Cartwright	0.0[15]
Construction and Installation of Ultra-Fast Electric Vehicle Charging Stations Phase 2 (2026–2027)	3.9[16]
Total 2026 Planned Capital Spend excluding Major Projects	**140.5[17]**
2026 Anticipated Capital Spend – Major Projects[18]	154.1
Total 2026 Anticipated Capital Spend including Major Projects	**294.6**

[9] Note that there are no planned expenditures for the approved Purchase Spare Generator Step-Up Transformer (2023–2028) project in 2026.
[10] As approved in Board Order No. P.U. 11(2025).
[11] As approved in Board Order No. P.U. 9(2025).
[12] As reported in "Report on Amalgamation Activities," Newfoundland and Labrador Hydro, rev. April 17, 2025 (originally filed April 15, 2025).
[13] The total project budget is less than $750,000, and will be reported in a future Quarterly Regulatory Report upon internal approval by Hydro.
[14] As approved in Board Order No. P.U. 25(2024).
[15] As reported in "Quarterly Regulatory Report for the Quarter Ended December 31, 2024," Newfoundland and Labrador Hydro, February 14, 2025. The project budget for 2026 is $930.
[16] Supplemental application to be filed in the third quarter of 2025. To be filed as a supplemental, as approval is required in advance of approval of the 2026 CBA. This project is in partnership with the Government who will fund the majority of the capital cost; Hydro will contribute the residual remaining funds necessary beyond what is funded by the Government (approximately $0.4 million).
[17] Includes $1.5 million in specifically assigned expenditures to be recovered directly from specifically assigned customers. This does not include contributions associated with service extensions that are determined during the execution of the project in accordance with the Contributions in Aid of Construction Policy. A breakdown of specifically assigned customer contributions is provided in Section 6.7 of this report.
[18] This value represents a portfolio of project estimates generally considered Class 3 Association for the Advancement of Cost Engineering ("AACE") classifications. The "Authorized Cost" for each estimate includes management reserve, contingency, escalation, interest during construction, and the base cost estimate.

This 2026 Capital Budget Overview report generally discusses the capital plan proposed for 2026, which is primarily driven by the following:

- Renewal required to support the reliable operation of aging assets;
- Extension of the service life of the Holyrood TGS;[19]
- Continuation of programs to address in-service failures and miscellaneous upgrades; and
- Legislative compliance (i.e., safety and environmental).

Appendices A through E of this report present Hydro's 2026 CBA expenditures of $131.6 million by asset category, investment classification, single- and multi-year expenditures, and program or project materiality.

1.1 Provisional Capital Budget Guidelines

The Board issued provisional CBA Guidelines ("Guidelines") that outline the evidentiary requirements to be applied, beginning with the 2023 CBA.[20] Table 2 outlines where Hydro has included the required information within the 2026 CBA as part of Hydro's compliance with each section of the Guidelines. Beginning in its 2026 CBA, Hydro has segregated its five-year capital expenditure plan between regulated projects and programs under $50 million and its Major Projects. Schedule 8 to this Application provides an overview of capital expenditures related to Major Projects.

[19] As per "Reliability and Resource Adequacy Study Review – 2022 Update," Newfoundland and Labrador Hydro, October 3, 2022, the Holyrood TGS shall remain available for a "Bridging Period" until 2030, or until such time that sufficient alternative generation is commissioned, adequate performance of the Labrador-Island Link is proven, and generation reserves are met.
[20] "Capital Budget Application Guidelines (Provisional)," Board of Commissioners of Public Utilities, January 2022.

Table 2: Guideline Requirements

Guidelines Section	Content	2026 CBA Location
Application Summary	Activity Drivers per Investment Classification	Schedule 1, Section 6.0
	Determination of Expenditure	Schedule 1, Section 5.0
Reliability Information	Historical SAIDI & SAIFI statistics: Ten Years	Schedule 1, Section 4.0
	Forecast SAIDI & SAIFI statistics: Five Years	Schedule 1, Section 4.0
	Benchmarking against Other Utilities	Schedule 1, Section 4.0
	Worst Performing Feeders	Schedule 1, Section 4.0
Rate Impact Summary	Historical Rates	Schedule 1, Section 6.9
	Project Budget Impact	Schedule 1, Section 6.9
Capital Expenditures Summary	Historical Capital: Ten Years	Schedule 1, Section 2.0
	Current Capital Budget	Schedule 1, Section 2.0
	Forecast Capital Budget: Five Years	Schedule 1, Section 2.0
Five-Year Capital Plan	Capital Plan 2026–2030	Schedule 2
		Schedule 8
Organization	2026 Capital Budget:	
	By Investment Classification, Major and Minor Asset Category,	Schedule 1, Appendix A
	Materiality, and Programs and Projects	Schedule 8, Appendix A
	By Single- and Multi-Year Programs and Projects	Schedule 1, Appendix B
	By Materiality – Programs and Projects over $5 Million	Schedule 1, Appendix C
	By Materiality – Programs and Projects $1 Million to $5 Million	Schedule 1, Appendix D
	By Materiality – Programs and Projects $750,000 to $1 Million	Schedule 1, Appendix E
Required Information	Programs over $750,000	Schedule 7 (Volume I)
	Projects over $750,000	Schedule 7 (Volume II)
	Programs and Projects under $750,000	Schedule 7 (Volume II)
Prioritization	By Risk Mitigated per $1 Million	Schedule 1, Appendix G
	By Risk Mitigated	Schedule 1, Appendix G

1.1.1 Compliance with and Interpretation of Guidelines

Hydro has continued to strive to comply with the evidentiary requirements set out in the Guidelines and has strived to meet the spirit and intent of the Guidelines where full adherence is not yet possible.[21] In most instances, Hydro has fully adhered to the Guidelines. In others, data is presented to the fullest extent practical, along with insight into Hydro's interpretation and application of the Guidelines within its 2026 CBA.

[21] In "Provisional Capital Budget Application Guidelines," December 20, 2021, the Board noted that full implementation of the Guidelines would be challenging in 2022. The Board acknowledged that strict adherence to all aspects of the Guidelines may not be possible, but requested that the parties make their best efforts to respect the spirit and intent of the Guidelines. As Hydro has previously stated, full compliance will take years to achieve. In 2026, Hydro has made progress towards full compliance with the Guidelines and will continue to advance amendments to its CBA process to fully satisfy the Guidelines.

Hydro acknowledges that the Board's process is ongoing regarding revisions to the Guidelines based on feedback from the utilities and regulatory stakeholders, and welcomes further discussion on this matter before the finalization of the Guidelines in future.

Organization – Programs versus Projects

Consistent with the approach that began in the 2023 CBA, Hydro has again classified the project or program by the primary driver of investment and continues to define programs as only those expenditures that are expected to continue indefinitely.[22] In cases where multi-year expenditures are required to place the asset into service, programs have instead been proposed as multi-year expenditures. Expenditures that span multiple years but will ultimately no longer be required following the completion of an ongoing initiative (e.g., Hydro's previous program to install fire protection in 230 kV stations) have been redefined as projects.[23]

Following the receipt of the 2025 CBA Board Order No. P.U. 28(2024), Hydro conducted a review of the classification of its programs within the 2025 CBA to better conform to the materiality threshold as set out in the Guidelines. In its 2026 CBA, Hydro has defined programs as expenditures that are expected to continue indefinitely but which comprise assets with individual asset values significantly less than the lowest materiality threshold. Due to the nature of the assets being replaced (i.e., individual asset values higher than the lowest materiality threshold), Hydro determined that several of its programs were more appropriately defined as projects (e.g., Hydro's previous program to Upgrade Power Transformers). Hydro continues to evaluate the project or program classification for its expenditures and welcomes further discussion on this matter.

Required Information – Asset Data

Hydro has endeavoured to provide the evidentiary requirements prescribed in the Guidelines to the best of its ability based on the data available; however, for some programs or projects, asset data to meet all requirements, such as the quantification of asset condition and asset remaining life, or historical

[22] Prior to the 2023 CBA, Hydro generally defined programs as those expenditures that span multiple years and address specific requirements for investment, with similar justification and scope year-over-year. Hydro redefined programs in its 2023 CBA to comply with the definition of programs provided in the Guidelines.
[23] Hydro continues to classify some expenditures associated with the Holyrood TGS as programs, despite the planned retirement of the Holyrood TGS by 2030. Hydro believes that the evidentiary requirements for programs are better suited to allow a fulsome review of these expenditures.

trending to the level of detail as outlined in the Guidelines, may not be available. Hydro anticipates that asset data will improve with the continuous improvement of Hydro's asset management systems.

Hydro continues to improve its asset management systems, with an emphasis on the implementation of processes to improve and expand on asset and maintenance data. Hydro is continuing to mature its information base, with the goal of establishing a technologically-driven maintenance management system, while setting a solid foundation for potential asset management growth. This effort is an important step toward continued improvement of policy, decision-making processes, training and standardization across all areas of asset management, and will be reviewed during the *Asset Management Assessment of Newfoundland and Labrador Hydro* to be completed by the Board's external consultant, EA Technology Ltd. in the third quarter of this year.[24]

In 2025, Hydro is continuing to progress a review of its Computerized Maintenance Management System for its hydraulic generating assets. This year will focus on preventative maintenance review for hydraulic assets on the island, as well as the role this plays in equipment health monitoring, with the aim of increasing understanding of capital investment requirements and work prioritization requests. This effort is a significant undertaking which includes, but is not limited to, a review of equipment records and hierarchy, maintenance routines and workflow authorization process optimization, and improved identification of equipment maintenance resources and outage requirements. This review is a crucial step in advancing Hydro's asset management systems and is foundational as it will form the framework for similar reviews of Hydro's other operational areas. Based on the work and understanding gained from last year's efforts, Hydro has begun policy and framework development in 2025. Hydro has also developed document control standards for Major Projects, with the intent of rolling out the standards organizationally over time, and plans to update its distribution outage database, which will enable increased outage analysis, including updated cause codes and trend reporting.

While a common asset management system for both regulated and non-regulated assets can take up to a decade to implement, Hydro is utilizing information learned to further bolster its capital planning efforts. Hydro is committed to continuous improvement in this area, and recognizes the value improved asset management systems and data will add in enabling a fulsome review of Hydro's capital

[24] "Asset Management Assessment of Newfoundland and Labrador Hydro To Parties – Engagement of EA Technology Ltd.," Board of Commissioners of Public Utilities, May 23, 2025.

investments by its stakeholders; Hydro believes that the evidence provided in support of this application fully supports the proposed investments.

Prioritization

Hydro recognizes the Board's request that projects be prioritized based on risk mitigated per dollar spent, as well as by reliability improvement per dollar spent. On a case-by-case basis, such as its use within Hydro's new Perform Facilities Refurbishments program, risk mitigated per dollar spent can be an effective tool in prioritizing scopes of a similar materiality and purpose within a single program. However, as previously communicated, Hydro believes that generally, prioritization by risk mitigated per dollar spent may not be an effective comprehensive risk indicator for prioritization of projects. Nonetheless, Hydro has provided this metric herein in compliance with the Guidelines currently in effect. As Hydro continues to develop its asset management systems, Hydro will assess opportunities to collect and analyze data to facilitate the prioritization of projects and programs by reliability improvement.

Hydro has also proposed to the Board the addition of 'Economics' to the categories in which projects and programs are evaluated for risk mitigation. Hydro believes this will enable a fulsome evaluation of service enhancement-driven expenditures that may be motivated by cost savings for customers.[25]

2.0 Capital Expenditures Summary

Hydro determined its proposed 2026 capital expenditures in accordance with its capital investment strategy, as shown in Figure 2. Hydro considers many factors in the selection of the projects and programs for inclusion in its budget, including operational risks, ability to execute, total investment, and cumulative risk associated with balancing aging assets while providing least-cost, reliable service in an environmentally responsible manner. The focus of the 2026 CBA is to maintain the expected level of reliability while ensuring prudent and reasonable expenditures reflective of Hydro's capital plan considerations, which represent an achievable level of execution success.

[25] "Capital Budget Application Guidelines Review – Request for Comments/Input Regarding Draft Changes – Hydro's Comments," Newfoundland and Labrador Hydro, May 5, 2023.

Figure 2: Hydro's Capital Investment Strategy

Chart 1 demonstrates the trend in capital expenditures, including anticipated capital expenditures for Major Projects from 2015 to 2030 against Hydro's historical average.[26] To date, Hydro has largely been focused on the refurbishment of its aging assets to ensure customers continued to receive reliable electricity service at least-cost for the useful life of an asset; however, those assets are approaching retirement and require replacement. As Hydro undertakes the Major Projects to enable the system expansion required to reliably meet growing demand, replace retiring sources of generation and perform major life extension work on its existing assets, there is a significant increase in average annual capital expenditures from historical levels. Hydro's average capital expenditure from 2015 through 2024 was approximately $154.1 million annually, which was driven primarily by expenditures on asset renewal; from 2025 to 2030 the anticipated average expenditure increases to approximately $525.5 million annually. Accordingly, Hydro's primary investment driver also changes from asset renewal to system growth. Hydro recognizes that these expenditures are significant, and feedback from customers has been very clear. The cost of living, including electricity rates, is a concern. Hydro is diligently reviewing its proposed capital expenditures and is continuing to recommend only the work scopes that absolutely and urgently must be completed to support reliability and begin to prepare for load growth.

[26] 2025 Anticipated Capital Expenditures include carryover from 2024.

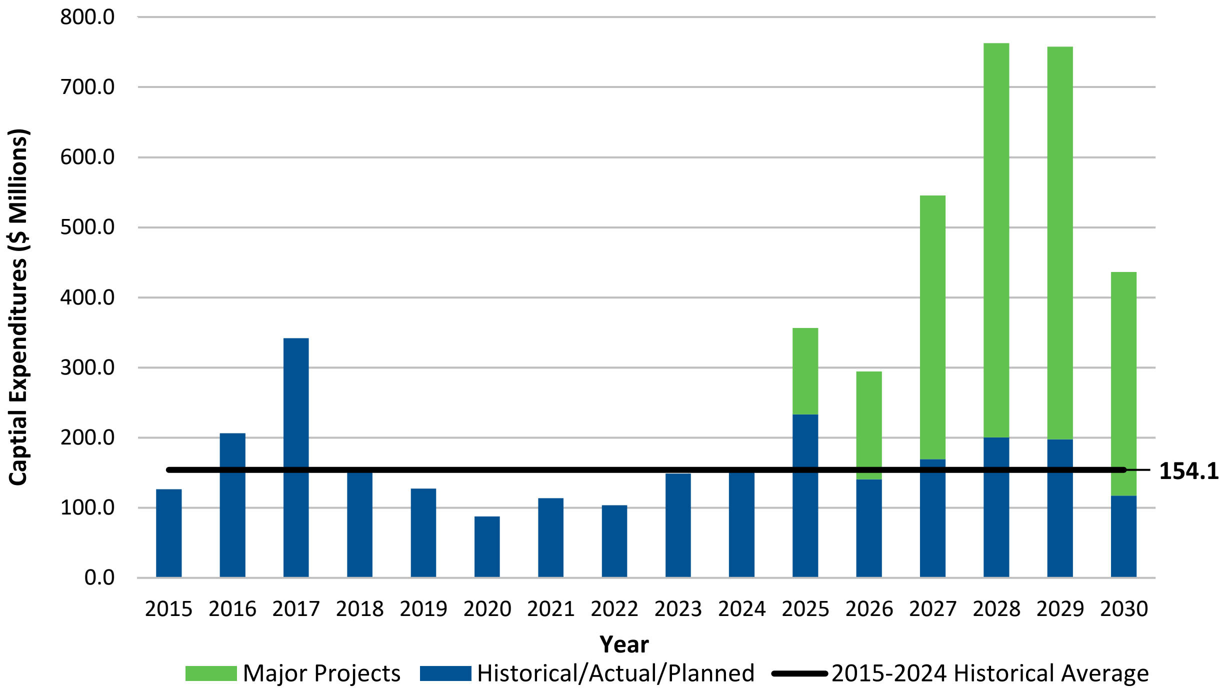

Chart 1: Historical, Actual and Anticipated Capital Expenditures including Major Projects[27,28]

As shown in Chart 1, Hydro's anticipated expenditures are forecast to be considerably higher for the period 2025–2030, primarily as a result of the Major Projects proposed in Hydro's 2025 Build Application[29] and other planned Major Projects to invest in asset renewal. This schedule excludes detailed information related to any Major Projects which are currently ongoing and/or within the 2026–2030 capital plan. Information on the expenditures related to Hydro's Major Projects is included in Schedule 8 to this application. At this time, Hydro's five-year capital plan also excludes any future application by Hydro for the long-term supply for Southern Labrador, as Hydro is currently reviewing, studying, and implementing ways to ensure that Charlottetown, Pinsent's Arm, and the other

[27] The values included for Major Projects represent a portfolio of project estimates generally considered class 3 AACE classifications. The "Authorized Cost" for each estimate includes management reserve, contingency, escalation, interest during construction and the base cost estimate.
[28] Anticipated expenditures for Major Projects are included from 2025 onwards as reflected in Schedule 8, app. A.
[29] "2025 Build Application – Bay d'Espoir Unit 8 and Avalon Combustion Turbine," Newfoundland and Labrador Hydro, March 21, 2025.

communities in the region receive safe, reliable service now, and long-term. This work is underway, and intended to supplement the data Hydro has previously developed for its application.[30]

In the 2024 Resource Adequacy Plan,[31] Hydro recommended the Minimum Investment Expansion Plan that meets reliability while balancing cost and environmental considerations. The preferred, least-cost, environmentally-responsible resource options under this recommendation are a combustion turbine with renewable fuel capabilities on the Avalon Peninsula ("Avalon CT"), and Bay d'Espoir Unit 8. Hydro subsequently applied for these projects in the 2025 Build Application, which is currently under review before the Board.[32] In addition to the Avalon CT and Bay d'Espoir Unit 8 projects which are driven by system growth, Hydro is also currently undertaking or planning to undertake several renewal projects to extend the life of assets in Bay d'Espoir, including: Penstock 1 Life Extension,[33] Unit 7 Life Extension,[34] and the planned Life Extensions of Penstocks 2 and 3.

These Major Projects account for approximately $2.1 billion of Hydro's planned capital expenditures for the period 2025–2030.[35]

Chart 2 demonstrates the trend in capital expenditures from 2015 to 2030, excluding Major Projects.

[30] For further information, please refer to "Newfoundland and Labrador Hydro's 2021 Capital Budget Supplemental Application for Approval of the Construction of Hydro's Long-Term Supply Plan for Southern Labrador – Update," Newfoundland and Labrador Hydro, June 25, 2025.
[31] "2024 Resource Adequacy Plan – An Update to the Reliability and Resource Adequacy Study," Newfoundland and Labrador Hydro, rev. August 26, 2024 (originally filed July 9, 2024).
[32] In Board Order No. P.U. 17(2025), the Board approved Hydro's application to proceed with $47.4 million of early execution work for the Avalon CT and Bay d'Espoir Unit 8 projects. Board approval of the Early Execution Application will mitigate risks associated with supply chain delays and market pressures to allow for project continuity through year-end 2025, while the Board and parties consider the 2025 Build Application.
[33] As approved in Board Order Nos. P.U. 6(2023) and P.U. 26(2024).
[34] "Life Extension Application – Bay d'Espoir Unit 7," Newfoundland and Labrador Hydro, June 20, 2025.
[35] For additional detail on Hydro's planned capital expenditures for the period 2026–2030 relating to Major Projects, please refer to Schedule 8 of this application.

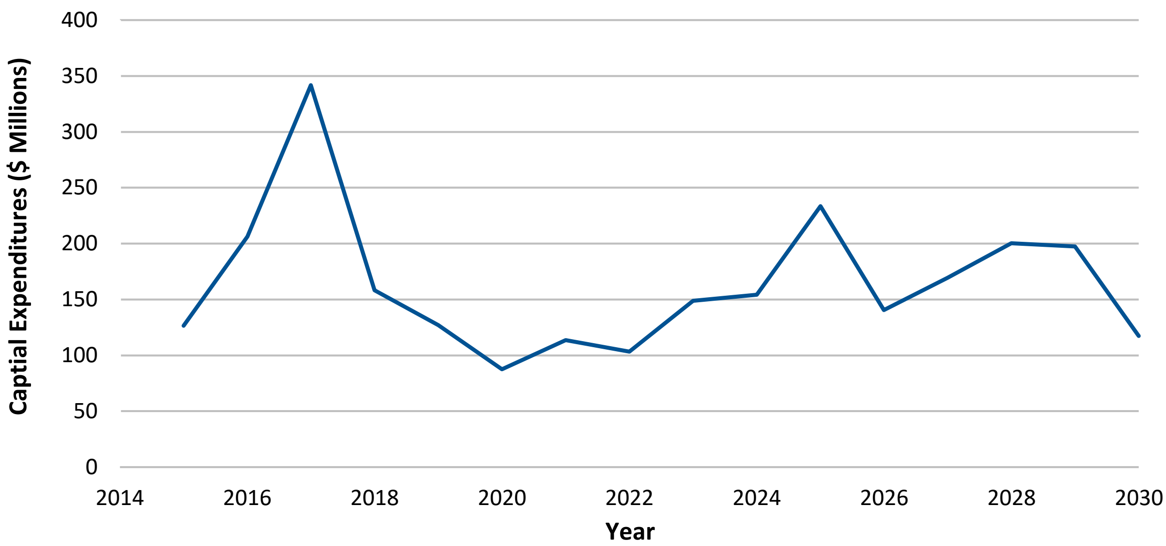

Chart 2: Historical, Budget, and Forecast Capital Expenditures, excluding Major Projects

Further discussion of Hydro's planned capital expenditures for the period 2026–2030 is provided in Schedule 2 of this application.

3.0 2025 Capital Plan Execution

Hydro's approved capital projects and programs continue to advance through stages of planning, design, procurement, and construction in 2025. Typically, most of Hydro's planned capital construction activities occur in the second, third, and fourth quarters of each year. Additionally, throughout the year, certain unplanned capital work, known as "break-in work," may arise and need to be addressed, which could affect the amount of planned work that can be completed.

With a large and complex capital program, some degree of carryover is to be expected and is managed through established project management practices that incorporate continual improvement methodologies. This carryover can be strategic, such as deferring projects due to changes in timing requirements, or due to external factors like supply chain disruptions or internal challenges in scheduling resources. Hydro assesses the risk of one-year delays during annual planning and uses project change management to mitigate impacts.

Hydro is closely monitoring the execution of its 2025 capital plan and will continue to prioritize work to maximize system reliability in advance of the 2025–2026 winter operating season. Any projects or programs with identified carryover will be reflected in Hydro's 2025 Capital Expenditures and Carryover Report.[36]

Schedule 5 of this application contains the 2025 Capital Expenditures Overview report as of May 31, 2025, which details forecast expenditures and variances. As required by the Guidelines, explanations will be provided for projects and programs with variances exceeding 10% and $100,000 at year-end, as part of Hydro's Capital Expenditures and Carryover Report.

4.0 Reliability

Hydro is classified as a Region 2 (Urban/Rural) utility by Electricity Canada ("EC"). For benchmarking against similar utilities, Hydro has provided EC Region 2 SAIDI[37] and SAIFI[38] averages.

4.1 Utility Reliability

Reliability of service is integral to Hydro's mandate, with the majority of expenditures being partially related to maintaining or improving reliability. As such, the End Consumer Performance Index was developed to measure the reliability of service to all end consumers of electricity in the province that are supplied by Hydro, other than Hydro's Industrial customers. The measure is a combination of Hydro's Service Continuity data and Newfoundland Power Inc.'s ("Newfoundland Power") Service Continuity data for outages related to loss of supply due to events on Hydro's transmission system. Therefore, the SAIDI and SAIFI data provided for End Consumers are measures of the duration and frequency of service interruptions experienced as a result of Hydro system events. Hydro does not track End Consumer metrics for the Island and Labrador separately.[39]

Service Continuity measures the reliability of service to consumers supplied directly by Hydro-owned distribution. Whereas EC Region 2 consists of utilities with a mix of rural and urban customers, Hydro's distribution customers are widely dispersed geographically, being primarily located in rural and/or remote areas; for this reason, Hydro's reliability metrics for Service Continuity are comparatively higher

[36] To be filed with the Board on or before April 1, 2026.
[37] System Average Interruption Duration Index ("SAIDI") is a reliability key performance indicator for distribution service, measuring service continuity in terms of the average cumulative duration of outages per customer served during the year.
[38] System Average Interruption Frequency Index ("SAIFI") is a reliability key performance indicator for distribution service, measuring the average cumulative number of sustained interruptions per customer per year.
[39] As Hydro is the only utility serving Labrador, Hydro's Service Continuity metrics are equivalent to its End Consumer metrics in this region.

than the EC Region 2 average. This is consistent with Hydro's efforts to balance reliability and cost. Hydro notes that its historical reliability trends have been relatively flat over the period studied. This is reflective of Hydro's overall capital investment strategy, as renewal-driven capital investment makes up nearly two-thirds of Hydro's proposed 2026 capital budget.

Hydro establishes End Consumer and Service Continuity SAIDI and SAIFI targets each year through the development of a five-year average.

4.1.1 Hydro System

Chart 3 and Chart 4 provide Hydro's End Consumer and Service Continuity SAIFI with and without major events included compared to the EC Region 2 average.

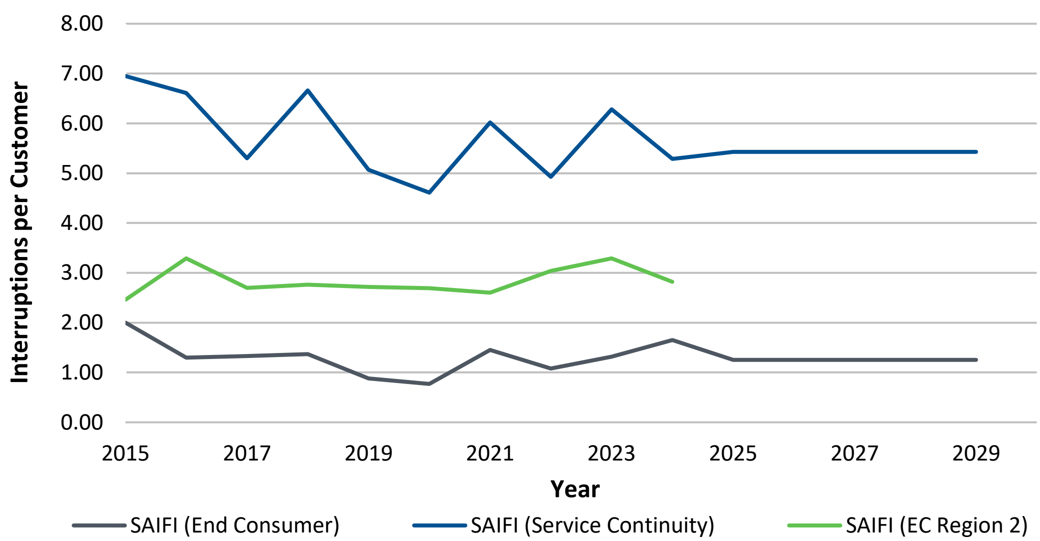

Chart 3: SAIFI Excluding Major Events

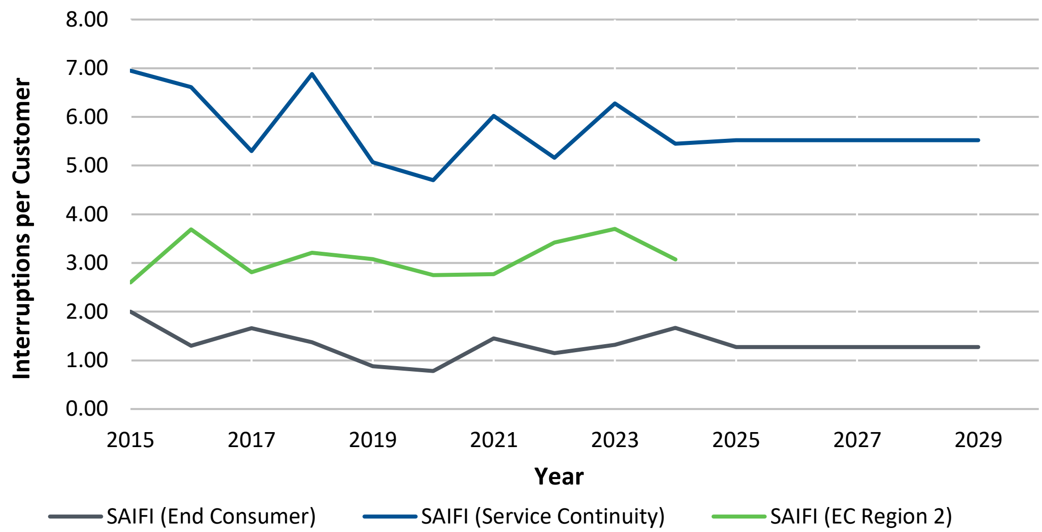

Chart 4: SAIFI Including Major Events

1 Chart 5 and Chart 6 provide Hydro's End Consumer and Service Continuity SAIDI with and without major events included compared to the EC Region 2 average.

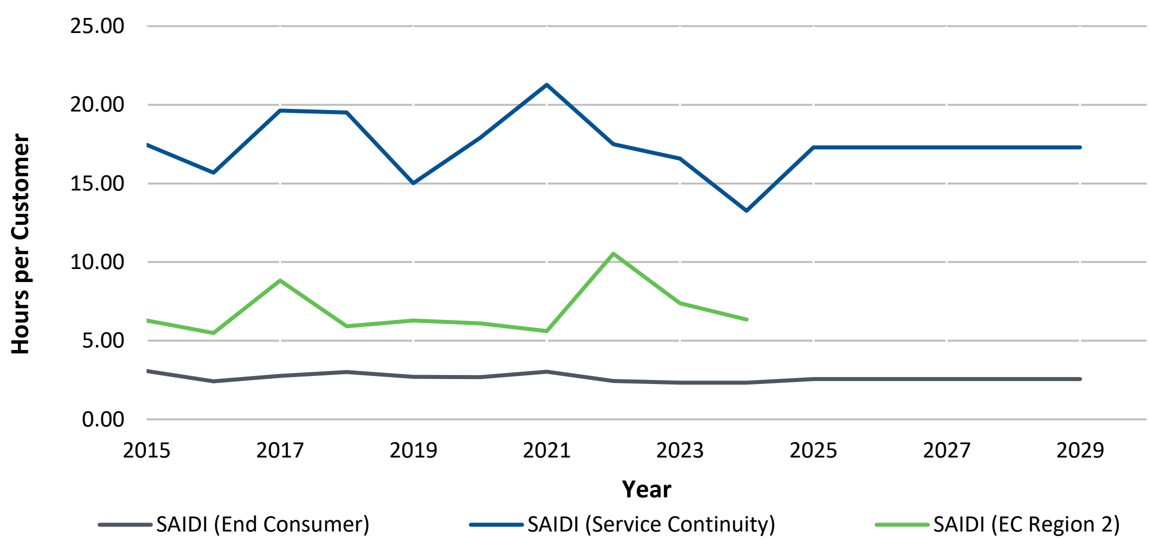

Chart 5: SAIDI Excluding Major Events

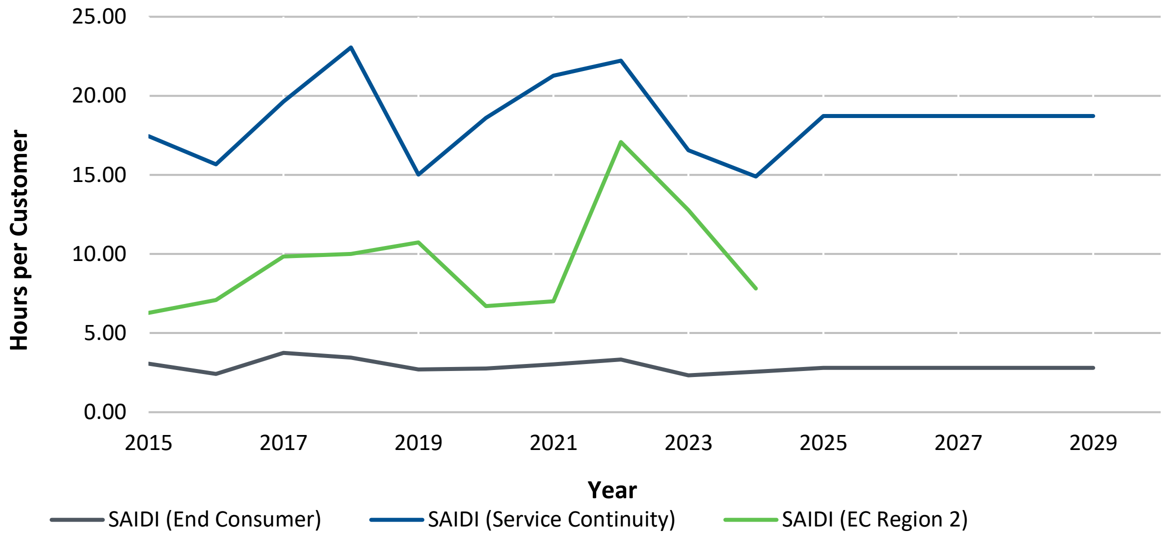

Chart 6: SAIDI Including Major Events

4.1.2 Island

Chart 7 and Chart 8 provide Hydro's Service Continuity SAIFI with and without major events included compared to the EC Region 2 average, for the Island portion of the province.[40]

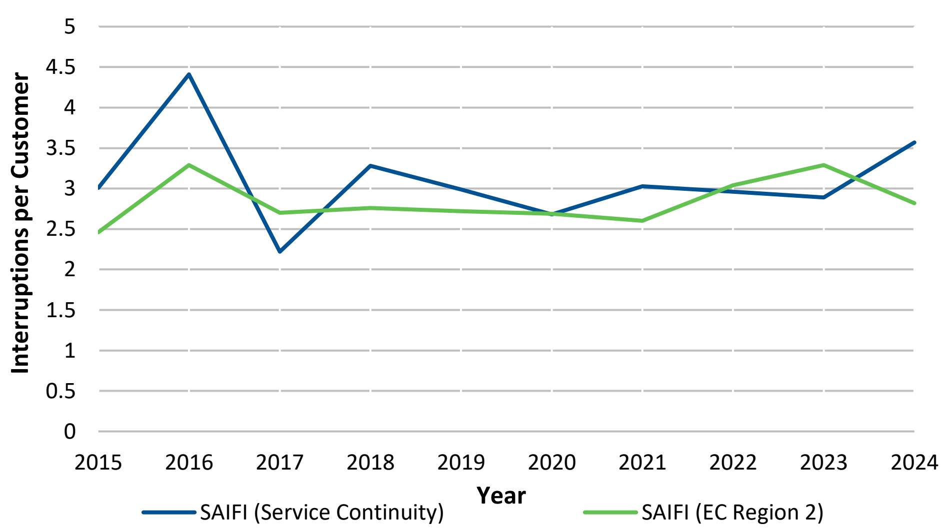

Chart 7: SAIFI Excluding Major Events – Island

[40] Statistics for Island region are based on total customer count.

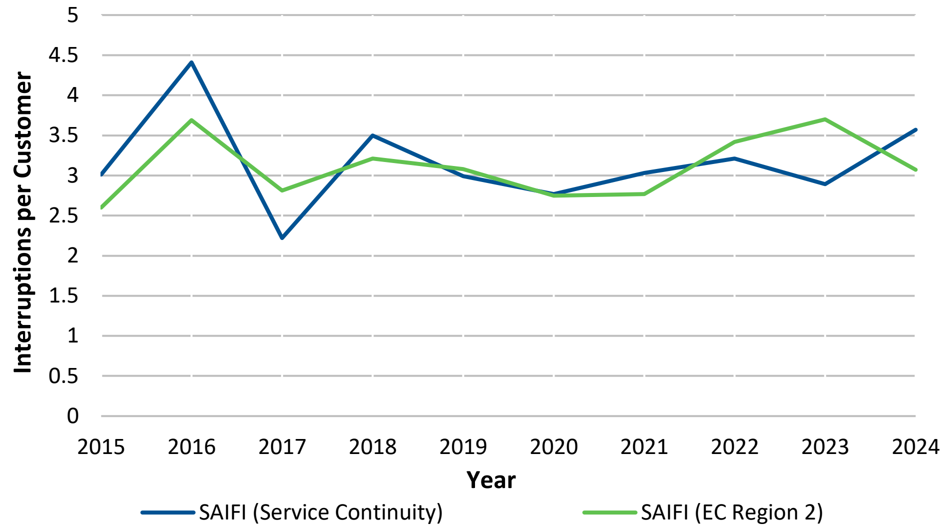

Chart 8: SAIFI Including Major Events – Island

1 Chart 9 and Chart 10 provide Hydro's Service Continuity SAIDI with and without major events included
2 compared to the EC Region 2 average, for the Island portion of the province. [41]

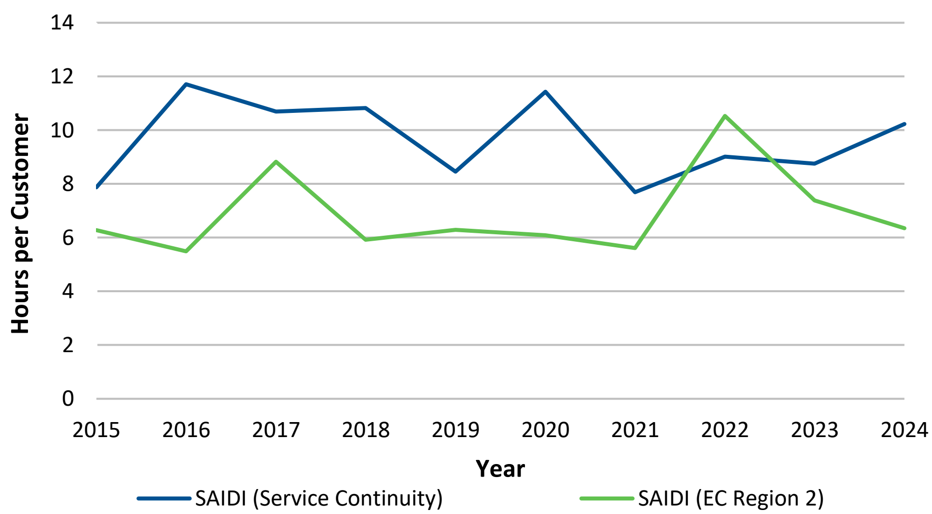

Chart 9: SAIDI Excluding Major Events – Island

[41] *Supra* f.n. 40

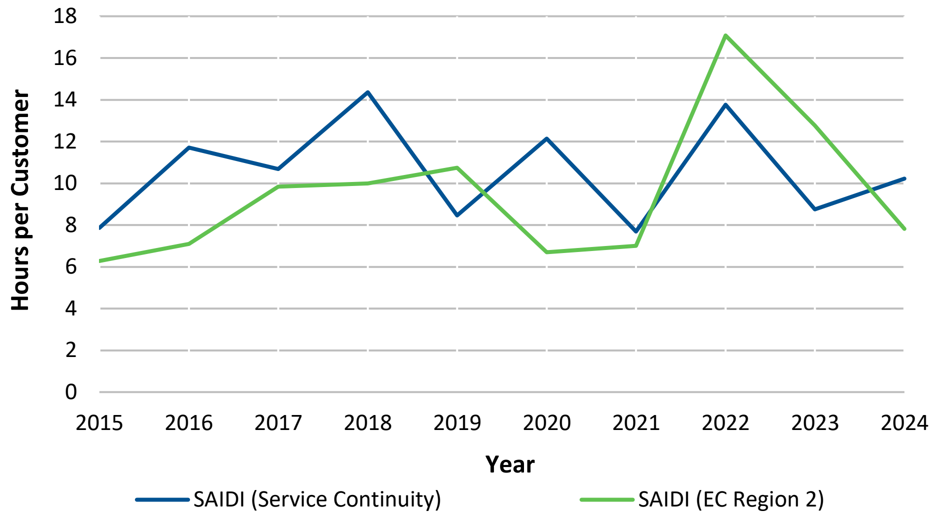

Chart 10: SAIDI Including Major Events – Island

4.1.3 Labrador

Chart 11 and Chart 12 provide Hydro's Service Continuity SAIFI with and without major events included compared to the EC Region 2 average, for Labrador.[42]

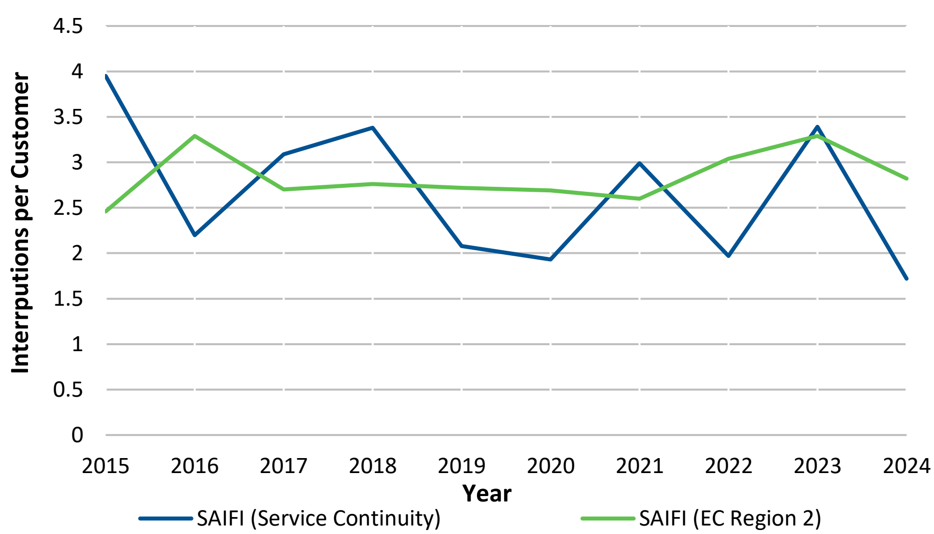

Chart 11: SAIFI Excluding Major Events – Labrador

[42] Statistics for Labrador region are based on total customer count.

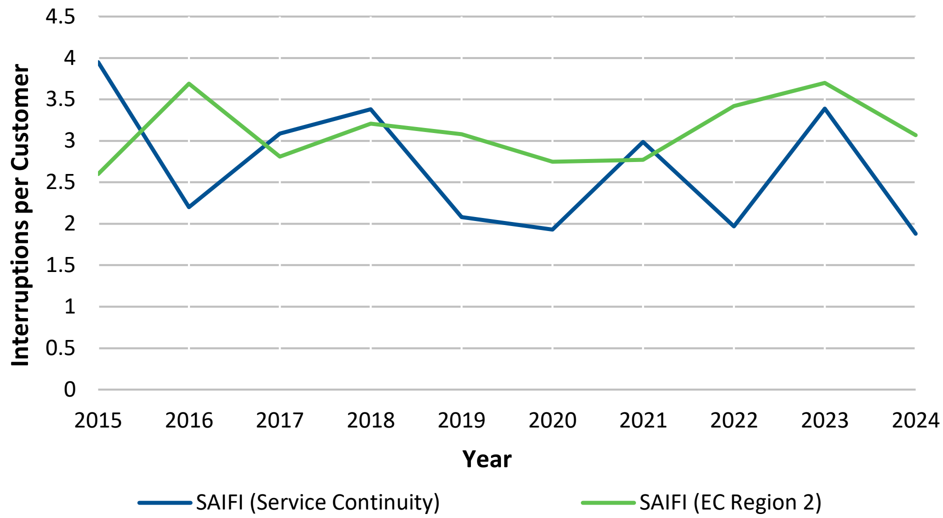

Chart 12: SAIFI Including Major Events – Labrador

1 Chart 13 and Chart 14 provide Hydro's Service Continuity SAIDI with and without major events
2 compared to the EC Region 2 average, for Labrador.[43]

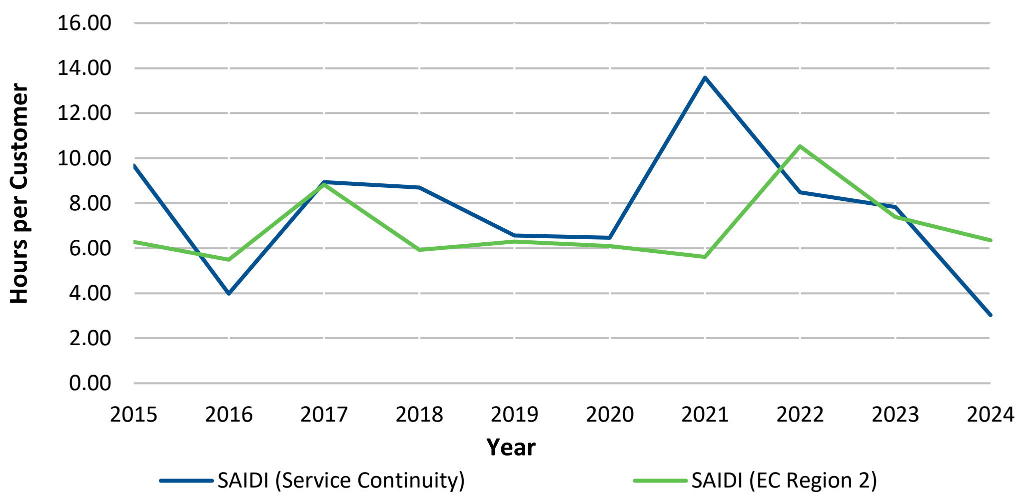

Chart 13: SAIDI Excluding Major Events – Labrador

[43] *Supra* f.n. 42

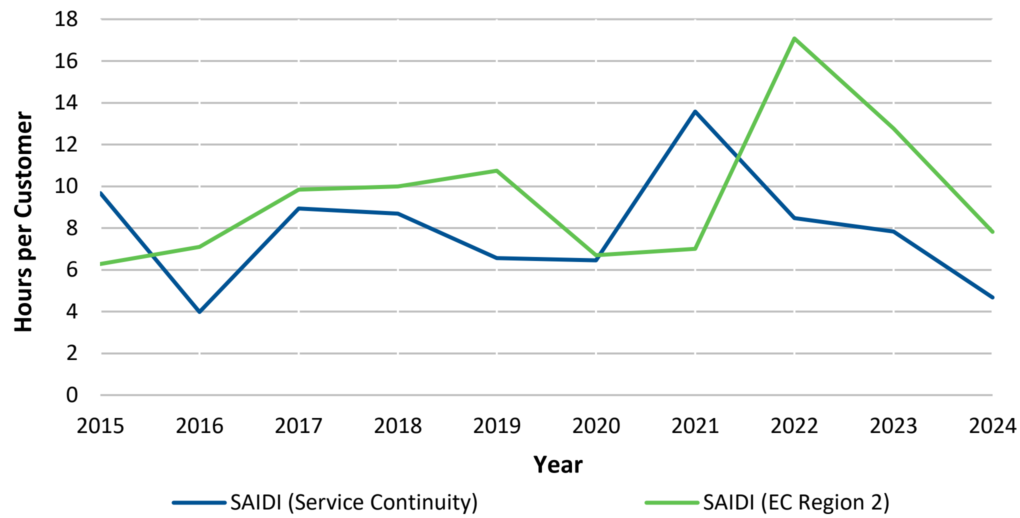

Chart 14: SAIDI Including Major Events – Labrador

4.2 Worst Performing Feeders

Hydro tracks its worst-performing feeders by SAIDI, SAIFI, and CHI[44] independently. Table 3, Table 4, and Table 5 present data related to Hydro's worst-performing feeders for each of these metrics, respectively, along with Hydro's average feeder SAIDI, SAIFI, and CHI, exclusive of contributions upstream from distribution feeders.[45] When considering service enhancement projects to address the worst-performing feeders, Hydro prioritizes feeders based on five-year average reliability indices. These metrics are used independently of each other and are intended to identify trending reliability issues. Hydro then uses condition assessment information to validate the issues identified through the indices to finalize the scope of work required to effectively upgrade the system. Finally, the criticality of the system is reviewed with respect to the number of dependent systems that rely on the reliability of the infrastructure in question.

In the 2026 CBA, Hydro is proposing a project to improve the reliability performance of L'Anse-au-Loup Line 1 ("LAL-L1"), based on the feeder's SAIDI, SAIFI, and CHI performance, as well as its condition. Hydro notes that there are other feeders shown on the SAIDI, SAIFI, and CHI lists that are higher or close in priority to the ranking for LAL-L1. These feeders have been excluded from the selection process for

[44] Customer Hours of Interruption ("CHI"). Hydro's Average CHI represents the average number of CHI per feeder. It is calculated by dividing the number of total customer outage hours by the number of distribution feeders.
[45] Data provided is as of December 31, 2023. The next assessment on Hydro's distribution feeders will be completed in 2026.

2026 capital work as they either have capital projects planned, issues which are being corrected under other programs, such as vegetation management, or field inspections did not indicate a root cause, and additional investigation is ongoing. Additionally, there is an ongoing upgrade to LAL-L2, which is interconnected with LAL-L1, to improve reliability. For more detailed information, please refer to the Project Number 4 proposal included in Volume II, Schedule 7.

Table 3: Worst Performing Feeders Sorted by SAIDI (Five-Year Average)

Rank	Feeder	SAIDI
1	Black Tickle, Line 1	21.81
2	Farewell Head, Line 1	15.34
3	Bottom Waters, Line 1	13.50
4	Jackson's Arm, Line 2	13.05
5	Fleur-de-Lys, Line 1	11.36
6	Barachoix, Line 1	10.83
7	English Harbour, Line 1	10.01
8	L'Anse-au-Loup, Line 2	8.84
9	Barachoix, Line 4	8.76
10	St. Anthony, Line 1	8.59
	Hydro Average	3.84

Table 4: Worst Performing Feeders Sorted by SAIFI (Five-Year Average)

Rank	Feeder	SAIFI
1	Happy Valley, Line 15	3.63
2	Bottom Waters, Line 1	3.43
3	L'Anse-au-Loup, Line 2	3.38
4	L'Anse-au-Loup, Line 1	3.18
5	English Harbour, Line 1	3.11
6	Barachoix, Line 4	2.92
7	Happy Valley, Line 7	2.87
8	Barachoix, Line 1	2.71
9	Happy Valley, Line 6	2.66
10	St. Anthony, Line 1	2.58
	Hydro Average	1.55

Table 5: Worst Performing Feeders Sorted by CHI (Five-Year Average)

Rank	Feeder	CHI
1	English Harbour, Line 1	8,039
2	Happy Valley, Line 7	7,972
3	Barachoix, Line 4	7,108
4	Barachoix, Line 1	6,106
5	St. Anthony, Line 1	5,617
6	L'Anse-au-Loup, Line 2	5,434
7	Bottom Waters, Line 1	4,878
8	Kings Point, Line 1	4,203
9	Jackson's Arm, Line 2	3,824
10	Farewell Head, Line 1	3,729
	Hydro Average	1,121

5.0 2026 Plan Considerations

5.1 Program and Project Evaluation

5.1.1 Proposal Deferral, Cancellation, Additions, and Advancement

Prior to proposing capital programs and projects for inclusion in the CBA, Hydro considers whether the investment can be deferred in light of the condition of the asset and its criticality to the system. Where deferral of a program or project is determined to be low risk, that option is selected in an effort to balance the cost impact to customers with the level of reliability required.

A number of the capital projects proposed are required to address safety concerns or to comply with regulatory and legislative requirements; therefore, deferral is not appropriate. For example, the existing power line technology ("PLX") system has reached the end of its life and is no longer being supported by the manufacturer. As such, Hydro is unable to purchase replacement PLX meters to integrate into its residential and commercial PLX system. Additionally, Hydro's meter stock has been depleted due to the number of meter failures; meters are no longer available for replacements should they be required. To defer such projects to future years would place Hydro at risk of not meeting legislative requirements. Failure to replace meters that are due to be replaced may result in inaccurate customer billings and/or monetary penalties, as per the requirements under the *Electricity and Gas Inspection Act and Regulations.* Additionally, deferral is not appropriate for projects that are required due to system growth, as it would compromise Hydro's ability to meet its peak load requirements and ensure reliable service.

As part of its assessment of alternatives, and as required by the Guidelines, Hydro considered deferral for each program or project contained in the 2026 CBA. The specific proposals detail the reason(s) for deferral not being the preferred option. In the interest of balancing cost and reliability, Hydro has carefully considered its capital investment portfolio for 2026 to ensure its proposed programs and projects represent an achievable level of execution success, and contain those which are most critical to supporting the safe, reliable operation of Hydro's system in an environmentally responsible manner. In doing so, Hydro has deferred or cancelled over 30 projects in preparing its 2026 CBA, which corresponds to an estimated 15,000 internal engineering hours and over $18.5 million[46] in capital investment in 2026.

A list of deferred proposals that were originally planned to commence in 2026 is provided in Table 6.[47] The reasons for deferral of these proposals vary and may include additional analysis required to assess alternatives, consideration of resource and outage availability, and assessment of risk associated with deferral.

[46] This number was derived from Class 5 estimates, and the true amount of deferred investment is likely higher. Note that this total does not include proposals which have been cancelled due to scopes being included under other capital projects.
[47] Hydro currently tracks proposal deferrals, but does not track the deferral of individual scope elements within programs or projects.

Table 6: Deferred 2026 Capital Proposals

Deferred Proposal	2026 Deferred Cost ($000)
Replace Switchgear Synchronous Condensers 1 and 2 (2026–2027) – Wabush Terminal Station	50.0
Refurbish Stage I & II Cooling Water Sumps (2026–2027) – Holyrood	3,507.9
Install Breaker Failure Protection (2026–2027) – Western Avalon	116.0
Refurbish Office Energy Efficiency and HVAC[48] (2026–2027) – Deer Lake	100.0
Upgrade Transformer Paralleling (2026–2027) – Stony Brook and Sunnyside	64.0
Install Fire Barriers between T10 and T12, T10 and T11 (2026–2027) – Bay d'Espoir	220.4
Repair Self-Supporting Foundation (2026–2027) – TL212	50.0
Install Secondary Station Service Supply (2026–2028) – Holyrood	103.1
Overhaul Unit 2 (2026) – Cat Arm	1,062.3
Install Fire Break around Camp Boggy Complex (2026) – Bay d'Espoir	250.0
Replace Annunciator Panel (2026–2027) – Upper Salmon	150.0
Inspect Stack Liners and Replace Aviation Lights (2026) - Holyrood	360.0
Replace Vibration System (2026) - Stephenville	200.0
Install Fire Protection in 230 kV Stations (2026–2027) – Bottom Brook	68.4
Install New Station Service Feed (2026–2028) – Berry Hill	69.3
Upgrade Data Alarm Systems (2026–2027) – Springdale and Indian River	34.0
Replace Switchgear (2026-2027) – Grand Falls	130.0
Perform Distribution Equipment SCADA Additions (2026–2027)	31.7
Replace T1 (2026–2028) – Burgeo	312.2
Construct Pole Storage Ramps (2026–2030) – Labrador	250.0
Replace Diesel Shop Building (2026–2027) – Bishop's Falls	1,422.0
Install Electric Vehicle Chargers (2026–2027) – Hydro Sites	51.6
Perform Accessibility Improvements (2026–2029)	450.0
Refurbish Windows (2026–2029) – Hydro Place[49]	1,279.3
Install Plant Heating System (2026–2028) – Holyrood	4,887.3
Replace Air Compressor 1 (2026–2027) – Holyrood	310.1
Refurbish Structure (2026–2029) – Salmon River Spillway	649.3
Total Deferred 2026 Capital Proposals	**16,178.9**

Occasionally, Hydro cancels projects that had previously been identified in Hydro's capital plans. Reasons for cancellation vary, but may include projects that are no longer required due to changes in system operations, scopes merged with other capital projects, or projects for which non-capital alternatives have been identified. Hydro will also occasionally cancel a project, or a portion of a project,

[48] Heating, Ventilation, and Air Conditioning ("HVAC").
[49] Hydro has deferred the broader window refurbishment project; however, there is a budget of $296,600 included in the Perform Facilities Refurbishment program to replace windows that require immediate repair that cannot be deferred.

following Board approval if the justification, scope, or cost of a project has changed materially and is no longer required or requires additional consideration before re-proposing.

A list of projects and programs originally planned for 2026 that have been fully cancelled is provided in Table 7. Proposals which have been cancelled due to scopes being included under other capital projects are provided in Table 8.

Table 7: Cancelled 2026 Capital Proposals

Cancelled Proposal	2026 Cancelled Cost ($000)
Rehabilitate Intake Decks 1–3 (2026–2028) – Bay d'Espoir	55.0
Replace Circuit Breaker Reclosing Controllers (2026–2027) – Deer Lake	100.0
Additions for Load Growth – Isolated Generation Stations (2026)	939.2
Overhaul Major Feedwater Valves and Actuators – Unit 2 (2026) – Holyrood	300.0
Replace Tank Farm Steam Piping and Complete Level 2 Condition Assessment of Fuel Piping (2026) – Holyrood	473.0
Upgrade DCS Obsolete Components (2026–2027) – Holyrood	458.0
Total Cancelled 2026 Capital Proposals	**2,325.2**

Table 8: Cancelled 2026 Capital Proposals – Scope Re-allocation

Cancelled Proposal	2026 Cost ($000)
Refurbish Building Envelopes (2026–2027) – Holyrood[50]	750.0
Perform Building Refurbishments (2026–2027)[51]	750.0
Additions for Load Growth – Distribution System (2026)	793.3
Perform Level 2 Condition Assessment & Upgrades – Cranes and Hoists (2026) – Holyrood	150.0
Overhaul Turbine Valves – Unit 2 (2026) – Holyrood	4,251.8
Total Cost Re-allocation	**6,695.1**

Hydro occasionally includes projects or programs in its capital budget that had previously been identified in a future year. Reasons for advancement may include urgency due to faster-than-anticipated condition deterioration or optimization of outage schedules and resources. However, Hydro has not advanced any projects or programs for 2026.

[50] Re-allocated to Perform Facilities Refurbishment Program (2026).
[51] Re-allocated to Perform Facilities Refurbishment Program (2026).

Hydro aims to capture its planned expenditures in its five-year capital plan submitted annually with its CBA; however, projects or programs not previously identified may be included as a result of changing system conditions and newly identified requirements driven by system growth or assessment of existing assets.

The majority of capital additions in 2026, as listed in Table 9, are in relation to Information Systems ("IS") expenditures, which, as a result of the amalgamation of Nalcor Energy and Hydro, are now subject to regulatory oversight.[52] Some existing program scopes related to IS expenditures in the 2026 CBA, such as personal computers and cybersecurity, have expanded due to a larger number of applicable assets included as a result of amalgamation. Other expenditures were added as separate programs or projects.

Costs associated with the IS capital expenditures are recovered in accordance with the Intercompany Transactions Costing Guidelines.[53] Hydro is cognizant of the importance of ensuring that non-regulated and regulated costs are allocated to individual lines of business appropriately and that customers are not inappropriately incurring costs related to the capital expenditures of non-regulated assets or non-regulated operating costs. Through the administration of costs via its Intercompany Transactions Costing Guidelines, Hydro will continue to ensure that customers will only be charged for the recovery of the portion of costs related to the provision of service to the regulated business.

[52] The inclusion of IS assets in capital budget applications has resulted in six proposal additions for 2026.

[53] As reported in "Report on Amalgamation Activities," Newfoundland and Labrador Hydro, rev. April 17, 2025 (originally filed April 15, 2025), Hydro has engaged a third party to complete a review of its Intercompany Transactions Costing Guidelines. Hydro will provide a copy of the expert report to the Board once finalized.

Table 9: 2026 Capital Proposal Additions

Added Proposal	2026 Additional Cost ($000)
Widen Right of Way (2026–2028) – Gros Morne National Park	1,220.0
Perform Facilities Refurbishments (2026)[54]	3,027.9
Perform Software Upgrades and Minor Enhancements – Information Technology (2026–2027)	649.9
Upgrade Core IT Infrastructure (2026–2027)	871.6
Migrate Legacy Applications (2026)	611.0
Replace GRID Application (2026–2027)	134.9
Rollout Document Control System (2026)	607.3
Implement Safety Audits and Inspections System (2026)	304.7
Upgrade Distribution System (2026–2027) – Wiltondale	408.7
Perform Dam Infrastructure Refurbishments (2026)	500.0
Procure Accommodations (2026) – Makkovik	684.7
Total 2026 Capital Proposal Additions	**9,020.7**

5.1.2 Capital Proposals

Maintaining Hydro's systems in a reliable operating condition requires planned maintenance, rehabilitation of existing assets, and replacement of assets that have reached the end of their useful lives. Replacement of assets may also occur to reduce life-cycle costs, improve operational characteristics, increase capacity for load growth, address violations of reliability criteria, improve productivity, and/or increase efficiency.

In determining whether a capital proposal is appropriate, Hydro gives consideration to:

- Safety, environmental, or reliability risk and degree of expected mitigation;
- System performance and reliability metrics;
- Hydro's long-term asset management strategy;
- Regulatory and legislative compliance;
- Load growth and system planning criteria;
- Hydro's experience with the assets, including the condition and performance of the assets;

[54] Includes facilities-related scope reallocations presented in Table 8.

- Ongoing operating and maintenance costs;
- Opportunities for cost efficiencies; and
- Changes to operating conditions.

For those proposals that relate to the replacement of assets, Hydro bases such decisions on three broad categories of replacement criteria, as follows:

1) Time and Condition-Based: hours of operation and condition, for example, diesel generators (100,000 hours of operation for 1800 rpm units) and vehicles (combination of years and kilometres for some classes);

2) Condition-Based: in-situ condition of the assets, for example, decay in transmission line wood poles; and

1) Technical Assessment-Based: an evaluation of reliability, performance, condition, costs, and other factors, such as the inspection of fuel tanks and subsequent upgrade, where required.

5.2 Reassessment of Planned Capital Expenditures

Beginning in 2021 with its filing of the 2022 CBA, Hydro began undertaking a thorough review of its previously approved multi-year projects to identify opportunities for budget refinement for ongoing projects or programs.[55] Hydro has continued this exercise in preparing its 2026 CBA. Hydro recognizes the magnitude of the 2026 proposed capital expenditures in the sensitive customer environment. In the interest of balancing cost and reliability, Hydro has carefully considered its capital investment portfolio for 2026 to ensure its proposed programs and projects represent an achievable level of execution success and contain those which are most critical to supporting the safe, reliable operation of Hydro’s system in an environmentally responsible manner. There have been over 30 projects deferred or cancelled as part of this exercise, resulting in an over $18.5 million reduction in the overall capital budget in 2026.[56]

[55] Please refer to Section 2.0 of Schedule 5 to this application.
[56] A list of the programs and projects which were deferred or cancelled for the 2026 CBA are provided in Section 5.1.1.

5.3 Estimate Accuracy

Estimates for Hydro's capital projects and programs are developed primarily by Hydro's engineering staff, with support from engineering consultants as required. In developing estimates for capital expenditures, Hydro completes front-end engineering design to define project scope and identify project constraints, and utilizes historical project expenditures and experience, and vendor and contractor quotes, to develop project costing.

Capital budget estimates and actual expenditures may differ for a number of reasons, including but not limited to:

- Differences in quoted and actual tendered material and contract pricing;
- Changes in market conditions (e.g., tariffs, inflationary pressure, supply chain disruptions); and
- Refinement of project scope.

In accordance with estimating best practices, Hydro includes contingency[57] within its project budgets based on the level of confidence in individual component costs, resulting in project contingencies generally ranging from 10% to 15%.[58]

To determine the accuracy range of Hydro's capital estimates, in 2023, Hydro completed a statistical analysis of project variances based on available data for projects proposed and completed since 2014.[59] Hydro's analysis has determined that its average variance is -4%,[60] with a standard deviation of approximately +/-38%. Therefore, Hydro's expected estimated accuracy range is approximately +30%/-40%.

[57] The AACE defines a contingency as "an amount added to an estimate to allow for items, conditions, or events for which the state, occurrence, or effect is uncertain and that experience shows will likely result, in the aggregate, in additional costs. Typically estimated using statistical analysis or judgment based on past asset or project experience."
[58] Prior to the 2019 CBA, Hydro generally included 20% contingency in its capital budget estimates.
[59] Variance is equal to the project/program budget minus project/program actual expenditure for projects completed from 2014 to 2022, inclusive.
[60] Programs or projects with a negative variance greater than 75% are excluded from analysis, as these generally reflect cancelled scopes and are not an indication of estimate accuracy.

1 # 6.0 2026 Capital Budget

2 The 2026 CBA contains 116 projects and programs,[61] as outlined in Appendix A. The total planned 2026
3 capital expenditure for which Hydro is seeking approval in its 2026 CBA is $131.6 million.[62] A breakdown
4 and analysis of key drivers are provided in the charts herein.

5 Chart 15 shows the 2026 capital budget summary by major asset category.

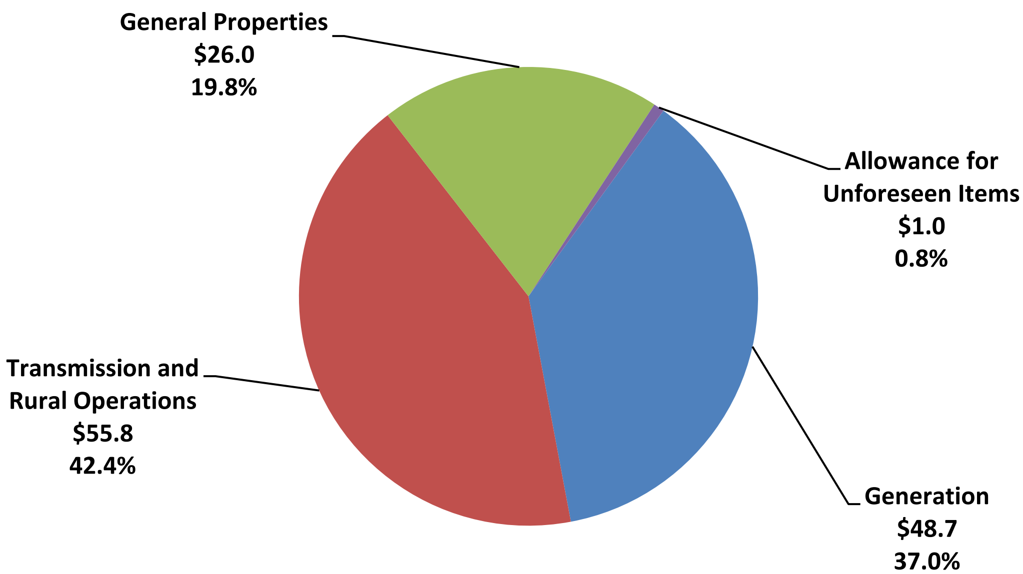

Chart 15: 2026 Capital Budget Summary by Major Asset Category ($ Millions)[63]

6 The majority of 2026 expenditures are in the areas of Generation and Transmission and Rural Operation
7 ("TRO"). This is primarily a reflection of projects to maintain the safe and reliable operation of the
8 Holyrood TGS, and the continuation of Hydro's asset renewal projects and programs, particularly to
9 address aging hydraulic plant, terminal station, distribution and infrastructure.

[61] Including projects less than $750,000.
[62] The 2026 CBA also includes front-end engineering and design expenditures, necessary to support the development of proposals, on a number of projects. Hydro will not capitalize such costs related to a project if the project does not receive Board approval.
[63] Numbers may not add due to rounding.

The discussion of proposed capital expenditures herein is primarily organized by investment classification, with a discussion of the asset categories and specific projects or programs driving investment within each investment classification.

Chart 16 shows the 2026 capital budget summary by investment classification.

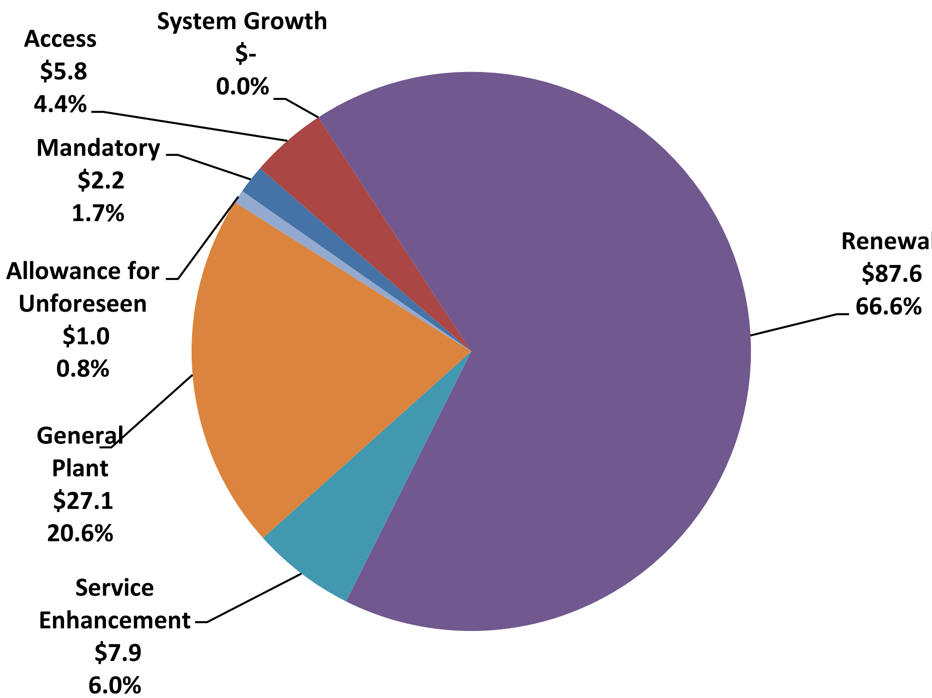

Chart 16: 2026 Capital Budget Summary by Investment Classification ($ Millions)[64,65]

The majority of Hydro's expenditures relate to asset renewal, consistent with Hydro's capital investment strategy and is reflective of both the age of Hydro's assets as well as the mix of asset type, and General Plant, driven primarily by the continuation of Hydro's projects to purchase mobile equipment and for renewal of light- and heavy-duty vehicles.

6.1 Renewal

Programs and projects classified as "Renewal" are those that are required to replace and/or refurbish system assets to maintain the ability to provide customers with their current electricity services. As

[64] Numbers may not add due to rounding.
[65] Hydro has not proposed any System Growth expenditures within the 2026 CBA. All planned 2026 expenditures related to System Growth are considered Major Projects and more information is provided in Schedule 8 of this application.

Hydro's assets age, its capital investment strategy aims largely to sustain current system-level reliability by renewal-driven capital investment; therefore, expenditures in this area make up the majority of its capital budget projections, consistent with previous years. Hydro's proposed renewal expenditures account for about two-thirds of Hydro's total proposed 2026 capital investment, totalling $87.6 million. Hydro's proposed 2026 renewal investment by asset category is provided in Chart 17.

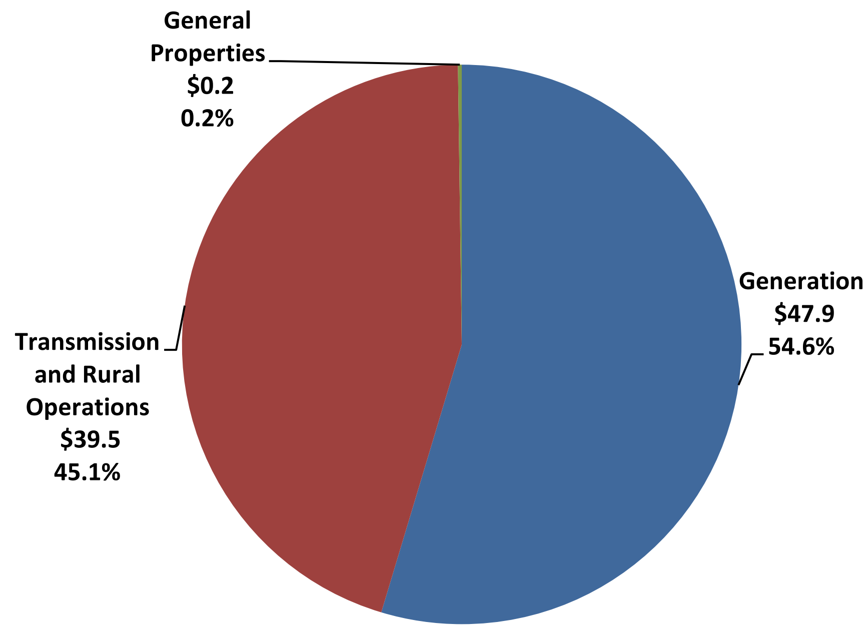

Chart 17: 2026 Renewal Investment by Asset Category ($ Millions)[66]

6.1.1 Generation

Generation renewal investment for 2026 is comprised of investments in Hydro's hydraulic plant, thermal plant, and combustion turbine assets. Hydro's proposed generation-related renewal expenditures account for over half of its total proposed 2026 renewal expenditures, totalling $47.9 million.

Thermal plant renewal associated with sustaining capital investment at the Holyrood TGS accounts for $25.4 million in 2026. As Hydro expects continued operation of all three units at the Holyrood TGS during the Bridging Period, until its capacity can be adequately replaced, to ensure reliable operation for customers, capital expenditures for this facility to operate as a generator continue to be required. The

[66] Numbers may not add due to rounding.

investment prescribed in this application reflects that which is necessary and prudent to meet this commitment. Key renewal expenditures for thermal plant assets include overhaul of the Unit 2 turbine valves and generator, and continuation of the "Perform Boiler Condition Assessment and Miscellaneous Upgrades Project" and "Thermal In-Service Failures Program."[67]

Hydro's regulated capital program is responsible for sustaining capital investment in Hydro's six hydroelectric generating facilities, totalling approximately 960 MW of installed capacity. As such, considerable resources must be allocated to ensure safe, reliable output at these plants. Hydraulic plant renewal accounts for $20.7 million of Hydro's overall proposed capital expenditures for 2026. Key drivers of hydraulic generation renewal investment include the continuation of the projects to rewind the generator stator at the Hinds Lake Hydroelectric Generating Station and refurbish Intake 2 at Bay d'Espoir, along with the "Overhaul Hydraulic Units Project" and "Hydraulic In-Service Failures Program."[68]

The remainder of Hydro's generation assets consists of four combustion turbines. These assets account for $1.9 million of renewal-related expenditures in 2026, and include work to maintain the reliable operation of the Hardwoods GT, replace fuel storage tanks at the Happy Valley Gas Turbine, and continuation of the "Gas Turbine In-Service Failures Program."

6.1.2 Transmission and Rural Operations

Hydro maintains over 4,400 kilometres of transmission lines and 69 terminal stations for the Island and Labrador Interconnected Systems, as well as distribution and isolated generation assets that service almost 40,000 customers in Newfoundland and Labrador. As such, much like generation activities, TRO require considerable capital expenditures to maintain these assets. Approximately 45%, or $39.5 million, of Hydro's total proposed 2026 renewal expenditures are allocated to this category.

Hydro's TRO renewal expenditures planned for 2026 are driven primarily by the continuation of its asset renewal projects and programs, such as "Wood Pole Line Management" and "Distribution System In-Service Failures, Miscellaneous Upgrades and Street Lights."

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[67] Further discussion of Hydro's thermal plant investments for 2026 is provided in the Holyrood Thermal Generating Station Overview, included as Schedule 3 of this application.
[68] Further discussion of Hydro's investments in the Bay d'Espoir Hydroelectric Generating Station for 2026 is provided in the Bay d'Espoir Hydroelectric Generating Station Overview, included as Schedule 4 of this application.

Hydro's 2026 TRO expenditures also include the continuation of programs and projects for renewal of distribution assets, as well as programs to renew isolated generation assets, including diesel genset replacements and overhauls.

Hydro is also proposing the continuation of its programs to address in-service failures of transmission, distribution, diesel, and terminal station assets.

6.2 General Plant

Programs and projects classified as "General Plant" are those related to Hydro's assets that are not part of its generation, transmission, and distribution system. These largely include systems such as water and sewer, fire protection, general maintenance and renovations, property assets such as buildings and roads, and human resource or employee service needs. Hydro's proposed general plant expenditures of $27.1 million account for approximately 21% of Hydro's proposed 2026 capital program. Key drivers of investment are detailed below, with a breakdown of Hydro's proposed 2026 general plant investment by asset category provided in Chart 18.

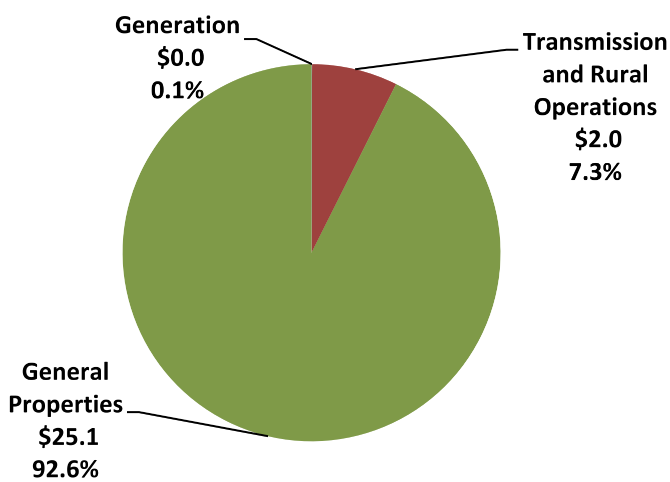

Chart 18: 2026 General Plant Investment by Asset Category ($ Millions)[69]

6.2.1 General Properties

Key drivers of general properties-related investment in 2026 include Hydro's telecontrol and information systems assets, which account for nearly 50% of the planned spend in this area. Telecontrol

[69] Generation expenditures in 2026 total $16,800.

expenditures include the refurbishment of meteorological stations, replacement of radio links and teleprotection equipment, and Hydro's programs to replace battery banks and network communications equipment. Information System expenditures include the continuation of programs and projects to upgrade software, cybersecurity, and hardware infrastructure, including personal computers.[70] Updates to these systems and assets are crucial to protect against external threats, as well as ensuring access to the necessary tools and software to support the management of the operation of the electrical system.

The remainder of Hydro's proposed 2026 general properties investment primarily includes Hydro's transportation and properties assets. Transportation expenditures include the continuation of Hydro's light- and heavy-duty vehicle programs, which ensure vehicles are safe and fully operational. Properties-related expenditures in 2026 primarily include the new program to perform facilities refurbishments, intended to restore their condition, ensure adherence to regulatory requirements, and extend the service life of its facilities.

6.2.2 Transmission and Rural Operations

Key drivers of general plant-related investments within TRO are new and previously approved projects predominantly relating to the refurbishment of buildings and critical safety systems supporting these operational areas.

TRO-related general plant investment includes Hydro's projects and programs to replace mobile equipment and the continuation of projects previously approved, such as installing fire protection at the Come By Chance Terminal Station.

6.3 System Growth

Programs and projects classified as "System Growth" are those required to modify Hydro's system to meet forecast changes in customer electricity resource requirements. In its 2026 CBA, Hydro has not proposed any capital expenditures classified as system growth. All of Hydro's system growth expenditures in 2026 are related to Major Projects - please refer to Schedule 8 for further information.

[70] IS expenditures within the 2026 CBA have increased as a result of amalgamation, as discussed in Section 5.1.1.

6.4 Service Enhancement

Programs and projects classified as "Service Enhancement" are those which modify Hydro's system to meet system operations requirements in a more efficient and/or effective manner, including those which improve safety or environmental compliance. In 2026, $7.9 million, or about 6%, of planned capital expenditures are related to service enhancement. Hydro's proposed 2026 service enhancements investment by asset category is provided in Chart 19.

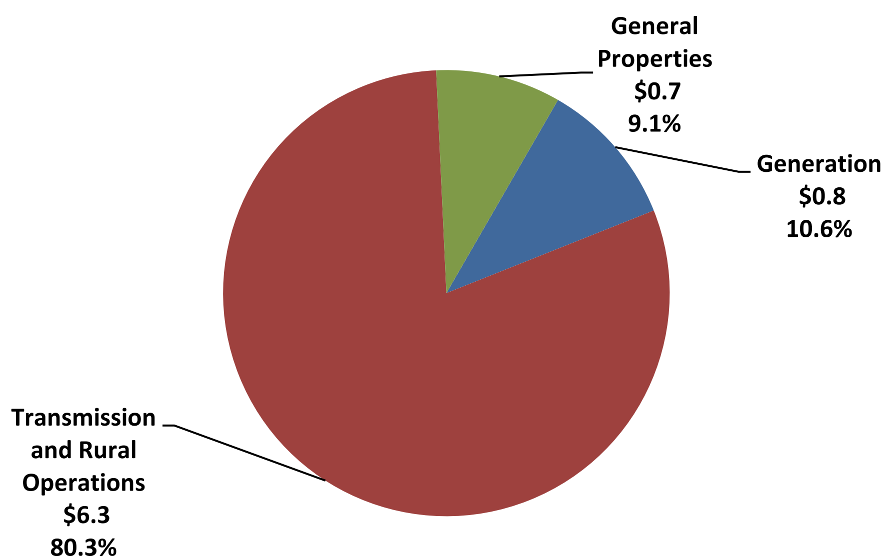

Chart 19: 2026 Service Enhancement Investment by Asset Category ($ Millions)[71]

Primary drivers of service enhancement investment in 2026 include the continuation of Hydro's projects to upgrade its worst-performing distribution feeders.

6.5 Access

Projects and programs classified as "Access" are those required to meet Hydro's obligation to provide customers with access to electricity services. The proposed access capital expenditures for 2026 are primarily associated with Hydro's "Provide Service Extensions Program," under which Hydro executes routine service extensions to new customers who require interconnection to the local distribution system, or customer requests to relocate services, and a new project to upgrade the distribution system in Wiltondale. Hydro's proposed access capital expenditures are within the TRO asset category and

[71] Numbers may not add due to rounding.

account for approximately 4% of Hydro's total proposed 2026 capital investment, totalling $5.8 million in 2026.

6.6 Mandatory

Mandatory projects are those prescribed by a governing body, such as legislative requirements or orders issued by the Board. While these projects are critical, the projected amount required to complete mandatory projects for the upcoming year is minimal, amounting to approximately 2% of Hydro's proposed capital investment. In this CBA, mandatory projects are within the TRO asset category and include Hydro's project to upgrade its obsolete PLX metering system in Labrador East, and the continuation of Hydro's program to purchase meters and metering equipment.

6.7 Specifically Assigned Assets for Industrial Customers

A portion of Hydro's asset base is specifically assigned to Industrial customers on the Island and in Labrador. These customers have complex, highly specified needs, making Hydro a key component to their success.

Hydro's 2026 CBA includes the following projects with scopes specifically assigned to industrial customers:

- Continuation of Hydro's "Replace Protective Relays Program (2025–2026)," with replacement of protective relays for Transformer T1 and T2 in the Come By Chance Terminal Station ("CBCTS"), specifically assigned to Braya Renewable Fuels ("Braya"). The total estimated specifically assigned costs for Braya in 2026 is approximately $412,200.
- Continuation of Hydro's "Renew Circuit Breakers Program (2025-2026)" and "Replace Disconnects Program (2025-2026)," with assets specifically assigned to Tacora Resources Inc. ("Tacora"), including the replacement of B4L34 and B4L34-1 in the Wabush Terminal Station ("WABTS"), and a portion of the "Renew Circuit Breakers Program (2026–2028)" for the replacement of B4L35. The total estimated specifically assigned costs for Tacora in 2026 is $732,100.
- Continuation of Hydro's "Renew Circuit Breakers Program (2026-2028)" to refurbish B2L64 in the Buchans Terminal Station ("BUCTS"), specifically assigned to Teck Resources Limited ("Teck"), and a portion of Hydro's "Wood Pole Line Management (2026)" program for inspection

of wood poles on TL264. The total estimated specifically assigned costs for Teck in 2026 is $348,100.

- A portion of Hydro's "Renew Circuit Breakers Program (2026–2028)" and "Replace Protective Relays Program (2026-2027)," with assets specifically assigned to the Iron Ore Company of Canada ("IOC") to replace breaker B4L6 and L6 line protection. The total estimated specifically assigned costs for IOC in 2026 is $39,400.

Asset renewals within Hydro's Five-Year Capital Plan (2026–2030) specifically assigned to industrial customers are detailed in Table 10.

Table 10: Specifically Assigned Capital Work

Customer	Specifically Assigned Work	In-Service Year	Program or Project	2026 Specifically Assigned Cost ($000)	Beyond 2026 Specifically Assigned Cost ($000)	Total Remaining Contribution
Braya	CBCTS T1 Protection Relay Replacement	2026	Replace Protective Relays (2025–2026)	$206.1	-	$206.1
Braya	CBCTS T2 Protection Relay Replacement	2026	Replace Protective Relays (2025–2026)	$206.1	-	$206.1
Tacora	WABTS B4L34 Replacement	2026	Renew Circuit Breakers (2025–2026)	$635.8	-	$635.8
Teck	BUCTS B2L64 Overhaul	2026	Renew Circuit Breakers (2025–2026)	$65.9	-	$65.9
Teck	TL264 Wood Pole Inspections	2026	Wood Pole Line Management (2026)	$282.2	TBD[72]	$282.2
Tacora	WABTS B4L34-1 Replacement	2026	Replace Disconnects (2025–2026)	$71.4	-	$71.4
Tacora	WABTS B4L35 Replacement	2027	Renew Circuit Breakers (2026–2027)	$24.9	$680.3	$705.2
IOC	WABTS L6 Protection	2027	Replace Protective Relays (2026–2028)	$14.5	$481.9	$496.4
IOC	WABTS B4L6 Replacement	2027	Renew Circuit Breakers (2026–2028)	$24.9	$680.3	$705.2

[72] Refurbishment scope to be determined by inspection.

6.8 Leasing Costs

There are no capital leasing costs contained in the 2026 CBA.

6.9 Rate Impact Summary

On a *pro-forma* basis, Hydro's 2026 and 2027 total regulated revenue requirement is estimated to increase by approximately $4.0 million and $16.7 million,[73] respectively, as a result of the capital programs and projects proposed for 2026. Such a revenue requirement increase would represent an increase of 0.6% and 2.6% in 2026 and 2027, respectively, relative to Hydro's 2019 Test Year. This assumes the deferral of $2.3 million of depreciation associated with 2026 capital projects in the Holyrood TGS Accelerated Depreciation Deferral in 2026[74] whereas, it is assumed that 2027 is a test year that includes $6.8 million accelerated depreciation on 2026 Holyrood TGS capital projects.

The total forecast revenue requirement impact from the 2026 capital budget for rural areas is approximately $2.4 million in 2027. Based upon the 2019 Test Year Cost of Service Revenue to Cost ratios, it is estimated that rural customers would contribute $0.9 million towards this increase, with the remainder allocated to the rural deficit and primarily included in Hydro's wholesale rates charged to Newfoundland Power.

Hydro's projected rate impacts as a result of programs and projects proposed in the 2026 CBA, by system, are detailed in Table 11. As a result of the finalization of the Government's rate mitigation plan, announced on May 16, 2024, rate increases at the wholesale level on the Island Interconnected System will be limited to target domestic rate increases of 2.25% annually, attributable to Hydro's costs, up to and including 2030, regardless of the increase in revenue requirement.

[73] These amounts do not reflect any reduction that may occur as a result of asset retirements or potential changes to operating and maintenance charges.
[74] Due to the extension of the Holyrood TGS through the Bridging Period, Hydro submitted an application to the Board to extend the Holyrood Accelerated Depreciation Deferral Account. The extension of the account and related amendments were approved in Board Order No. P.U. 1(2024). Hydro was also directed to file a report on the account in its next general rate application.

Table 11: Projected Wholesale Rate Impact by System (%)

System	2026	2027
Island Interconnected System	0.6	2.7
Labrador Interconnected – Rural	0.8	2.2
Labrador Industrial – Regulated[75]	2.0	5.3
Labrador Industrial – Total Billings	0.2	0.5

Hydro's ten-year historical Island Interconnected Wholesale Electricity Rate and Labrador Interconnected Electricity Rate for the years 2015–2024 are presented in Chart 20.

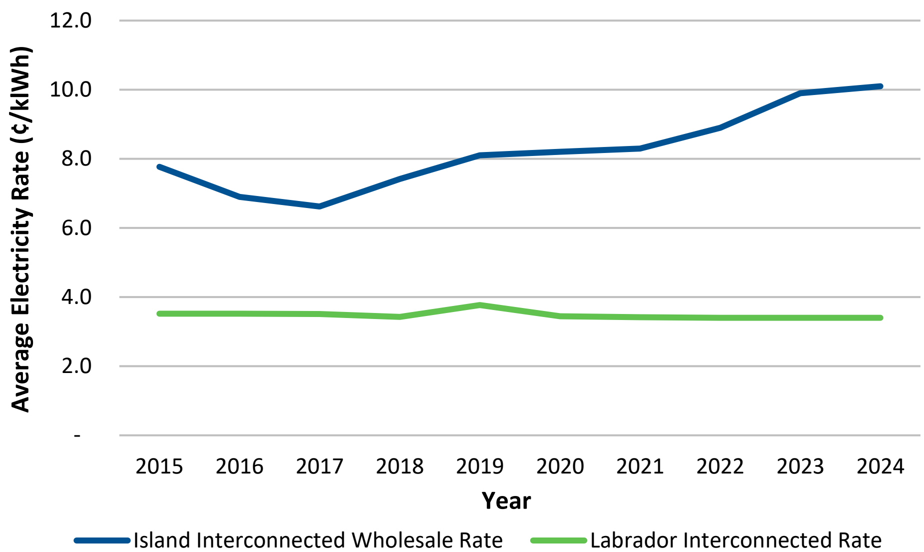

Chart 20: Ten-Year Historical Electricity Rates (¢/kWh)

7.0 Risk Evaluation and Ranking

7.1 Prioritization and Ranking

Hydro's prioritization process includes two primary steps—an initial review of proposed programs and projects to critically evaluate scope and need, followed by a prioritization of programs and projects through Hydro's matrix model.[76] Within the Guidelines, the Board has provided guidance for evaluating

[75] Labrador Industrial – Regulated represents the estimated percentage impact on the regulated demand rate charged to Labrador Industrial customers, whereas Labrador Industrial – Total Billings represents the estimated percentage impact on the overall total bill charged to Labrador Industrial customers.
[76] Hydro's Corporate Risk Assessment Matrix is aligned with the ISO 31000 Risk Management Standard, in accordance with the Guidelines.

risk and mitigation, as well as prioritization.[77] The matrix model scores programs and projects based on reliability, safety, or environmental risk, based on a judgment of the probability of a given risk materializing. Hydro's Capital Risk Assessment Matrix is provided in Appendix G.

Hydro assessed risks pre- and post-implementation of the capital investments proposed in the 2026 CBA, and has calculated the risk mitigation as the difference between pre- and post-implementation risk. For projects with undefined scope, such as in-service failure projects, Hydro assumes an average level of likelihood and impact based on the historical execution experience of these programs. Hydro has also calculated the risk mitigated per $1 million of expenditure for each program or project. Appendix G provides the prioritization of programs and projects proposed in the 2026 CBA by risk mitigated per $1 million and also includes a prioritization of programs and projects proposed on the basis of risk mitigated.

8.0 Conclusion

Hydro is requesting approval for $131.6 million of capital investment in its 2026 CBA, driven primarily by the need for increased investment in asset renewal, and increasing costs associated with a period of sustained high inflation in recent years. Hydro's capital investment strategy aims largely to sustain current system-level reliability by undertaking renewal-driven capital investment. When supported by least-cost and risk evaluation, Hydro's capital investment strategy proposes targeted, service enhancement investments to address specific issues impacting system-level or localized reliability.

In the interest of balancing cost and reliability, Hydro has carefully considered its capital investment portfolio for its 2026 CBA to ensure its proposed programs and projects represent those that are necessary to ensure safe, reliable operation of the electrical system in an environmentally responsible manner, and ensure an achievable level of execution success. In doing so, Hydro has deferred or cancelled over 30 projects in preparing its 2026 CBA, which corresponds to an estimated 15,000 internal engineering hours and over $18.5 million[78] in capital investment in 2026.[79]

[77] Hydro is unable to provide a prioritization of projects and programs by reliability improvement per dollar spent, as the relationship between individual assets and system reliability is often not a direct relationship, and is also often complex.
[78] This number was derived from Class 5 estimates, and the true amount of deferred investment is likely higher. Note that this total does not include proposals which have been cancelled due to scopes being included under other capital projects.
[79] A list of the programs and projects which were deferred or cancelled for the 2026 CBA is provided in Section 5.1.1.

While Hydro's expenditures will increase, in part, due to the infrastructure required to meet growing electricity needs, the impacts on customers will be limited as a result of the Government's rate mitigation plan,[80] therefore, the increase will not create an undue burden on customers.

The proposals presented within this application align with Hydro's mandate to provide safe, reliable and least-cost service in an environmentally responsible manner and support Hydro's focus to maintain the level of reliability expected while ensuring prudent and reasonable expenditures. Hydro believes that all of the expenditures proposed in its 2026 CBA are prudent and necessary for the safe and reliable operation of the electrical system.

[80] Through to and including 2030, the Government has committed to target domestic rate increases limited to 2.25% annually. In addition, the Government has committed publicly to rate mitigation post-2030.

Appendix A

2026 Capital Budget by Investment Classification, Major and Minor Category, Materiality, and Programs and Projects

Newfoundland and Labrador Hydro
2026 Capital Budget Application
Summary by Investment Classification[1]
($000)

	2025 and Prior Years	2026	Future Years	Total
Access	-	5,810.6	952.7	**6,763.3**
Allowance for Unforeseen	-	1,000.0	-	**1,000.0**
General Plant	13,028.2	27,088.5	18,254.4	**58,371.1**
Mandatory	446.2	2,172.8	980.1	**3,599.1**
Renewal	10,960.0	87,623.2	29,733.1	**128,316.3**
Service Enhancement	4,077.2	7,868.0	13,600.1	**25,545.3**
System Growth	7,039.6	-	3,960.1	**10,999.7**
Total Capital Budget	**35,551.2**	**131,563.1**	**67,480.5**	**234,594.8**

[1] Numbers may not add due to rounding.

Newfoundland and Labrador Hydro
2026 Capital Budget Application
Summary by Major and Minor Asset Category[1]
($000)

	2025 and Prior Years	2026	Future Years	Total
Allowance for Unforeseen Items				
Allowance for Unforeseen Items	-	1,000.0	-	**1,000.0**
Total Allowance for Unforeseen Items	**-**	**1,000.0**	**-**	**1,000.0**
General Properties				
Administration	-	688.1	-	**688.1**
Information Systems	978.3	6,967.2	1,984.0	**9,929.5**
Telecontrol	448.3	5,415.8	3,447.3	**9,311.4**
Tools and Equipment	-	1,849.4	-	**1,849.4**
Transportation	8,342.5	6,880.8	6,688.7	**21,912.0**
Properties	368.0	4,191.4	1,791.0	**6,350.4**
Total General Properties	**10,137.1**	**25,992.7**	**13,911.0**	**50,040.8**
Generation				
Gas Turbines	73.0	1,868.5	638.7	**2,580.2**
Hydraulic Plant	5,783.8	21,459.3	2,196.3	**29,439.4**
Thermal Plant	1,190.8	25,408.4	1,088.1	**27,687.3**
Total Generation	**7,047.6**	**48,736.2**	**3,923.1**	**59,706.9**
Transmission and Rural Operations				
Distribution	2,678.9	17,374.5	10,070.4	**30,123.8**
Generation	1,432.0	8,807.6	4,086.4	**14,326.0**
Metering	963.2	2,462.5	980.1	**4,405.8**
Terminal Stations	9,571.7	17,138.9	14,511.6	**41,222.2**
Tools and Equipment	2,839.4	1,448.4	6,541.3	**10,829.1**
Transmission	881.3	8,602.3	13,456.6	**22,940.2**
Total Transmission and Rural Operations	**18,366.5**	**55,834.2**	**49,646.4**	**123,847.1**
Total Capital Budget	**35,551.2**	**131,563.1**	**67,480.5**	**234,594.8**

[1] Numbers may not add due to rounding.

Newfoundland and Labrador Hydro
2026 Capital Budget Application
Summary by Materiality[1]
($000)

	2025 and Prior Years	2026	Future Years	Total
Over $5 Million				
Access	-	5,401.9	-	**5,401.9**
General Plant	8,342.5	2,809.2	3,147.2	**14,298.9**
Renewal	5,651.4	40,988.9	12,087.6	**58,727.9**
Service Enhancement	2,678.9	3,677.4	2,529.8	**8,886.1**
System Growth	7,039.6	-	3,960.1	**10,999.7**
Over $5 Million Total	**23,712.4**	**52,877.4**	**21,724.7**	**98,314.5**
$1 Million to $5 Million				
Access	-	408.7	952.7	**1,361.4**
Allowance for Unforeseen	-	1,000.0	-	**1,000.0**
General Plant	1,973.6	15,500.7	13,094.1	**30,568.4**
Mandatory	-	1,188.8	980.1	**2,168.9**
Renewal	4,533.5	38,746.8	15,855.3	**59,135.6**
Service Enhancement	881.3	2,582.5	9,963.3	**13,427.1**
$1 Million to $5 Million Total	**7,388.4**	**59,427.5**	**40,845.5**	**107,661.4**
$750,000 to $1 Million				
General Plant	865.8	1,056.8	524.4	**2,447.0**
Renewal	-	817.0	-	**817.0**
Service Enhancement	517.0	289.7	-	**806.7**
$750,000 to $1 Million Total	**1,382.8**	**2,163.5**	**524.4**	**4,070.7**
Under $750,000				
General Plant	1,846.3	7,721.8	1,488.7	**11,056.8**
Mandatory	446.2	984.0	-	**1,430.2**
Renewal	775.1	7,070.5	1,790.2	**9,635.8**
Service Enhancement	-	1,318.4	1,107.0	**2,425.4**
Under $750,000 Total	**3,067.6**	**17,094.7**	**4,385.9**	**24,548.2**
Total Capital Budget	**35,551.2**	**131,563.1**	**67,480.5**	**234,594.8**

[1] Numbers may not add due to rounding.

Newfoundland and Labrador Hydro
2026 Capital Budget Application
Summary by Program or Project[1]
($000)

	2025 and Prior Years	2026	Future Years	Total
Program				
Access	-	5,401.9	-	**5,401.9**
Allowance for Unforeseen	-	1,000.0	-	**1,000.0**
General Plant	10,968.5	17,324.2	9,931.5	**38,224.2**
Mandatory	446.2	984.0	-	**1,430.2**
Renewal	3,446.0	41,006.9	13,040.3	**57,493.2**
Service Enhancement	2,678.9	4,093.5	2,529.8	**9,302.2**
Program Total	**17,539.6**	**69,810.5**	**25,501.6**	**112,851.7**
Project				
Access	-	408.7	952.7	**1,361.4**
General Plant	2,059.7	9,764.3	8,322.9	**20,146.9**
Mandatory	-	1,188.8	980.1	**2,168.9**
Renewal	7,514.0	46,616.3	16,692.8	**70,823.1**
Service Enhancement	1,398.3	3,774.5	11,070.3	**16,243.1**
System Growth	7,039.6	-	3,960.1	**10,999.7**
Project Total	**18,011.6**	**61,752.6**	**41,978.9**	**121,743.1**
Total Capital Budget	**35,551.2**	**131,563.1**	**67,480.5**	**234,594.8**

[1] Numbers may not add due to rounding.

Newfoundland and Labrador Hydro
2026 Capital Budget Application
Detailed Breakdown By Investment Classification[1]
($000)

	2025 and Prior Years	2026	Future Years	Total
Access				
Provide Service Extensions (2026)	-	5,401.9	-	**5,401.9**
Upgrade Distribution System (2026–2027) - Wiltondale	-	408.7	952.7	**1,361.4**
Access Total	**-**	**5,810.6**	**952.7**	**6,763.3**
Allowance for Unforeseen				
Allowance for Unforeseen Items (2026)	-	1,000.0	-	**1,000.0**
Allowance for Unforeseen Total	**-**	**1,000.0**	**-**	**1,000.0**
General Plant				
Replace Light- and Heavy-Duty Vehicles (2024–2026)	5,627.9	1,133.4	-	**6,761.3**
Purchase 50' Material Handler Aerial Device on Tracked Unit (2024–2026) - Happy Valley Goose Bay	865.8	7.1	-	**872.9**
Replace Light- and Heavy-Duty Vehicles (2025–2027)	2,714.6	1,675.8	3,147.2	**7,537.6**
Replace Mobile Equipment (2025–2027)	1,973.6	54.6	2,619.4	**4,647.6**
Upgrade Work Protection Code Application (2025–2026)	452.0	256.6	-	**708.6**
Replace GPS Clocks (2025–2026)	448.3	132.4	-	**580.7**
Install Electric Vehicle Chargers (2025–2026) - Hydro Sites	368.0	288.2	-	**656.2**
Upgrade Energy Management System (2025–2026)	284.4	188.5	-	**472.9**
Implement SCADA Points Application (2025–2026)	241.9	143.4	-	**385.3**
Install Fire Protection - 230 kV Stations (2025–2026) - Come by Chance	51.7	534.5	-	**586.2**
Perform Facilities Refurbishments (2026)	-	3,027.9	-	**3,027.9**
Replace Light-Duty Vehicles (2026–2027)	-	2,547.5	548.6	**3,096.1**
Purchase Tools and Equipment (2026)	-	1,849.4	-	**1,849.4**
Replace Heavy-Duty Vehicles (2026–2028)	-	1,524.1	2,992.9	**4,517.0**
Replace Light-Duty Mobile Equipment (2026)	-	1,212.9	-	**1,212.9**
Purchase Personal Computers (2026)	-	1,115.7	-	**1,115.7**
Replace Network Communications Equipment (2026–2027)	-	1,038.4	99.0	**1,137.4**
Replace Teleprotection Equipment (2026–2028)	-	964.4	535.4	**1,499.8**
Upgrade Core IT Infrastructure (2026–2027)	-	871.6	522.9	**1,394.5**
Upgrade Core OT Infrastructure (2026)	-	799.6	-	**799.6**
Procure Accommodations (2026) - Makkovik	-	684.7	-	**684.7**
Perform Software Upgrades and Minor Enhancements - Information Technology (2026–2027)	-	649.9	1,097.2	**1,747.1**
Migrate Legacy Applications (2026)	-	611.0	-	**611.0**
Rollout Document Control System (2026)	-	607.3	-	**607.3**
Refurbish Meteorological Stations - Phase 2 (2026–2027)	-	528.1	167.4	**695.5**
Replace Radio Link to Hydraulic Control Structure (2026–2027) - Ebbegunbaeg	-	470.5	756.8	**1,227.3**
Install CCTV Systems (2026)	-	450.2	-	**450.2**
Modify Office Buildings and Procure Furniture, Fixtures, & Equipment (2026)	-	447.5	-	**447.5**
Update Cybersecurity Infrastructure (2026)	-	413.3	-	**413.3**
Backup Critical Control Systems (2026) - Holyrood	-	329.4	-	**329.4**
Replace UPS System - Back Up Control Center (2026) - Holyrood	-	322.8	-	**322.8**
Purchase Mobile Devices (2026)	-	315.9	-	**315.9**
Implement Safety Audits and Inspections System (2026)	-	304.7	-	**304.7**
Replace Peripheral Infrastructure (2026)	-	278.5	-	**278.5**
Perform Software Upgrades and Minor Enhancements - Operational Technology (2026)	-	262.8	-	**262.8**
Upgrade Remote Terminal Units (2026)	-	252.2	-	**252.2**
Replace 48 V Battery Banks and Chargers (2026–2027)	-	250.1	524.4	**774.5**
Replace Heavy-Duty Mobile Equipment (2026–2028)	-	173.8	3,921.9	**4,095.7**
Replace GRID Application (2026–2027)	-	134.9	363.9	**498.8**
Telecommunications In-Service Failures (2026)	-	123.6	-	**123.6**
Replace Back-up Generators at Microwave Repeater Sites (2026–2027)	-	94.5	391.3	**485.8**
Replace Walkway to Toe of Dam (2026–2027) - Paradise River	-	16.8	566.1	**582.9**
General Plant Total	**13,028.2**	**27,088.5**	**18,254.4**	**58,371.1**
Mandatory				
Purchase Meters and Metering Equipment (2025–2026)	446.2	278.4	-	**724.6**
Upgrade PLX Metering System (2026–2028) - Labrador East	-	1,188.8	980.1	**2,168.9**
Purchase Meters and Metering Equipment (2026)	-	705.6	-	**705.6**
Mandatory Total	**446.2**	**2,172.8**	**980.1**	**3,599.1**

Newfoundland and Labrador Hydro
2026 Capital Budget Application
Detailed Breakdown By Investment Classification[1]
($000)

	2025 and Prior Years	2026	Future Years	Total
Renewal				
Replace Diesel Gensets (2024–2025)	1,013.8	2,404.7	-	**3,418.5**
Rewind Stator (2025–2026) - Hinds Lake	5,233.2	9,695.5	-	**14,928.7**
Refurbish Marine Terminal (2025–2026) - Holyrood	1,190.8	1,295.6	-	**2,486.4**
Upgrade Power Transformers (2025–2026)	811.9	1,173.9	-	**1,985.8**
Replace Protective Relays (2025–2026)	668.6	2,282.6	-	**2,951.2**
Replace Diesel Gensets (2025–2027)	418.2	1,719.0	4,086.4	**6,223.6**
Refurbish Intake 2 (2025–2026) - Bay d'Espoir	284.4	3,069.4	-	**3,353.8**
Replace Emergency Diesel Genset (2025–2027) - Cat Arm	266.2	1,221.1	113.9	**1,601.2**
Upgrade Data Alarm Systems (2025–2026) - Hardwoods	184.0	188.7	-	**372.7**
Install Breaker Failure Protection (2025–2027) - Holyrood	177.8	320.9	166.5	**665.2**
Replace Disconnects (2025–2026)	145.3	1,245.5	-	**1,390.8**
Renew Circuit Breakers (2025–2026)	129.7	2,531.3	-	**2,661.0**
Replace Terminal Station Battery Banks and Chargers (2025–2026)	123.2	315.3	-	**438.5**
Replace Instrument Transformers (2025–2026)	112.5	356.4	-	**468.9**
Replace Circuit Breaker Reclosing Controllers (2025–2026) - Cow Head and Massey Drive	104.6	164.3	-	**268.9**
Replace 250 Vdc Battery Bank (2025–2026) - Stephenville	73.0	296.9	-	**369.9**
Perform Major Inspection - Synchronous Condenser 2 (2025–2026) - Wabush	22.8	1,249.0	-	**1,271.8**
Perform Boiler Condition Assessment and Miscellaneous Upgrades (2026) - Holyrood	-	9,600.0	-	**9,600.0**
Overhaul Turbine Valves and Generator - Unit 2 (2026) - Holyrood	-	6,969.6	-	**6,969.6**
Wood Pole Line Management (2026)	-	6,313.7	-	**6,313.7**
Distribution System In-Service Failures, Miscellaneous Upgrades and Street Lights (2026)	-	6,114.9	-	**6,114.9**
Thermal In-Service Failures (2026)	-	3,823.7	-	**3,823.7**
Terminal Station In-Service Failures (2026)	-	3,291.8	-	**3,291.8**
Hydraulic In-Service Failures (2026)	-	2,660.3	-	**2,660.3**
Overhaul Major Pumps (2026) - Holyrood	-	2,388.6	-	**2,388.6**
Overhaul Diesel Units (2026)	-	2,353.7	-	**2,353.7**
Overhaul Hydraulic Units (2026)	-	2,023.6	-	**2,023.6**
Upgrade Power Transformers (2026–2027)	-	1,705.0	401.8	**2,106.8**
Renew Distribution Feeders (2026–2027)	-	1,015.3	3,053.0	**4,068.3**
Replace Fuel Storage Tank (2026) - McCallum	-	1,008.4	-	**1,008.4**
Diesel In-Service Failures (2026)	-	817.0	-	**817.0**
Replace Fuel Storage Tanks (2026) - Happy Valley	-	696.4	-	**696.4**
Perform Level 2 Condition Assessment - North Salmon Spillway (2026) - Upper Salmon	-	636.5	-	**636.5**
Replace Protective Relays (2026–2027)	-	616.0	1,969.8	**2,585.8**
Perform Level 2 Condition Assessment - Condenser and Condenser Tubes (2026–2027) - Holyrood	-	577.3	51.7	**629.0**
L23/24 Steel-Tower Transmission Line Renewal (2026–2029)	-	576.2	8,001.2	**8,577.4**
Refurbish Water Treatment Systems (2026–2027) - Holyrood	-	524.5	936.3	**1,460.8**
Inspect Fuel Storage Tanks (2026) - Rigolet	-	504.8	-	**504.8**
Gas Turbine In-Service Failures (2026)	-	500.1	-	**500.1**
Perform Dam Infrastructure Refurbishments (2026)	-	500.0	-	**500.0**
Replace Instrument Transformers (2026–2027)	-	371.2	196.1	**567.3**
Replace Terminal Station Battery Banks and Chargers (2026–2027)	-	326.1	236.7	**562.8**
Upgrade Spherical Valve Controls (2026–2029) - Bay d'Espoir	-	314.9	1,038.2	**1,353.1**
Perform Level 2 Condition Assessment - Penstock 4 (2026) - Bay d'Espoir	-	237.2	-	**237.2**
Replace Parts of Stage 1: 129 Vdc Batteries and Battery Chargers (2026–2027) - Holyrood	-	229.1	100.1	**329.2**
Perform Level 2 Condition Assessment - Penstock (2026) - Hinds Lake	-	209.6	-	**209.6**
Replace Roof (2026–2027) - Hopedale	-	190.6	1,791.0	**1,981.6**
Renew Circuit Breakers (2026–2028)	-	188.2	4,225.7	**4,413.9**
Transmission In-Service Failures (2026)	-	183.4	-	**183.4**
Replace Disconnects (2026–2028)	-	169.1	2,325.6	**2,494.7**
Replace Battery Bank (2026–2027) - Granite Canal	-	138.8	44.2	**183.0**
Replace 125Vdc Battery Bank (2026–2027) - Hardwoods	-	108.9	37.8	**146.7**
Replace dc Fuel Pump (2026–2027) - Hardwoods	-	90.4	58.4	**148.8**
Replace Air Dryer (2026–2027) - Hardwoods	-	75.2	198.0	**273.2**
Perform Major Inspection - Synchronous Condenser 1 (2026–2027) - Wabush Terminal Station	-	43.0	700.7	**743.7**
Renewal Total	**10,960.0**	**87,623.2**	**29,733.1**	**128,316.3**

Newfoundland and Labrador Hydro
2026 Capital Budget Application
Detailed Breakdown By Investment Classification[1]
($000)

	2025 and Prior Years	2026	Future Years	Total
Service Enhancement				
Automate Bulk Metering (2024–2026)	517.0	289.7	-	**806.7**
Upgrade Worst-Performing Distribution Feeders (2025–2027)	2,678.9	3,677.4	2,529.8	**8,886.1**
Install Mid Span Structures - TL220 (2025–2026)	881.3	229.3	-	**1,110.6**
Widen Right of Way (2026–2028) - Gros Morne National Park	-	1,220.0	1,443.7	**2,663.7**
Upgrade Worst-Performing Distribution Feeders (2026–2027)	-	756.3	3,534.9	**4,291.2**
Replace Expansion Joint and Rock Scaling (2026–2027) - Paradise River	-	516.9	230.4	**747.3**
Install Intelligent Electronic Devices Management Software (2026–2028)	-	297.2	973.0	**1,270.2**
Remove Safety Hazards (2026)	-	240.6	-	**240.6**
Upgrade Excitation System (2026–2027) - Paradise River	-	218.7	203.5	**422.2**
Perform Minor Telecommunications Enhancements (2026)	-	175.5	-	**175.5**
Upgrade Cooling (2026–2027) - Hardwoods	-	100.6	344.5	**445.1**
Relocate Section of Line (2026–2028) - TL220	-	79.7	4,011.7	**4,091.4**
Upgrade Terminal Station for Mobile Substation (2026–2027) - St. Anthony Diesel	-	66.1	328.6	**394.7**
Service Enhancement Total	**4,077.2**	**7,868.0**	**13,600.1**	**25,545.3**
System Growth				
Additions for Load Growth - Upgrade Transformer Capacity (2023–2024) - Jean Lake Terminal Station	7,039.6	-	3,960.1	**10,999.7**
System Growth Total	**7,039.6**	**-**	**3,960.1**	**10,999.7**
Total Capital Budget	**35,551.2**	**131,563.1**	**67,480.5**	**234,594.8**

[1] Numbers may not add due to rounding.

Newfoundland and Labrador Hydro
2026 Capital Budget Application
Detailed Breakdown By Major and Minor Asset Category[1]
($000)

	2025 and Prior Years	2026	Future Years	Total
Allowance for Unforeseen Items				
Allowance for Unforeseen Items (2026)	-	1,000.0	-	**1,000.0**
Total Allowance for Unforeseen Items	**-**	**1,000.0**	**-**	**1,000.0**
General Properties				
Administration				
Modify Office Buildings and Procure Furniture, Fixtures, & Equipment (2026)	-	447.5	-	**447.5**
Remove Safety Hazards (2026)	-	240.6	-	**240.6**
Subtotal Administration	**-**	**688.1**	**-**	**688.1**
Information Systems				
Upgrade Work Protection Code Application (2025–2026)	452.0	256.6	-	**708.6**
Upgrade Energy Management System (2025–2026)	284.4	188.5	-	**472.9**
Implement SCADA Points Application (2025–2026)	241.9	143.4	-	**385.3**
Purchase Personal Computers (2026)	-	1,115.7	-	**1,115.7**
Upgrade Core IT Infrastructure (2026–2027)	-	871.6	522.9	**1,394.5**
Upgrade Core OT Infrastructure (2026)	-	799.6	-	**799.6**
Perform Software Upgrades and Minor Enhancements - Information Technology (2026–2027)	-	649.9	1,097.2	**1,747.1**
Migrate Legacy Applications (2026)	-	611.0	-	**611.0**
Rollout Document Control System (2026)	-	607.3	-	**607.3**
Update Cybersecurity Infrastructure (2026)	-	413.3	-	**413.3**
Backup Critical Control Systems (2026) - Holyrood	-	329.4	-	**329.4**
Implement Safety Audits and Inspections System (2026)	-	304.7	-	**304.7**
Replace Peripheral Infrastructure (2026)	-	278.5	-	**278.5**
Perform Software Upgrades and Minor Enhancements - Operational Technology (2026)	-	262.8	-	**262.8**
Replace GRID Application (2026–2027)	-	134.9	363.9	**498.8**
Subtotal Information Systems	**978.3**	**6,967.2**	**1,984.0**	**9,929.5**
Properties				
Install Electric Vehicle Chargers (2025–2026) - Hydro Sites	368.0	288.2	-	**656.2**
Perform Facilities Refurbishments (2026)	-	3,027.9	-	**3,027.9**
Procure Accommodations (2026) - Makkovik	-	684.7	-	**684.7**
Replace Roof (2026–2027) - Hopedale	-	190.6	1,791.0	**1,981.6**
Subtotal Properties	**368.0**	**4,191.4**	**1,791.0**	**6,350.4**
Telecontrol				
Replace GPS Clocks (2025–2026)	448.3	132.4	-	**580.7**
Replace Network Communications Equipment (2026–2027)	-	1,038.4	99.0	**1,137.4**
Replace Teleprotection Equipment (2026–2028)	-	964.4	535.4	**1,499.8**
Refurbish Meteorological Stations - Phase 2 (2026–2027)	-	528.1	167.4	**695.5**
Replace Radio Link to Hydraulic Control Structure (2026–2027) - Ebbegnbaeg	-	470.5	756.8	**1,227.3**
Install CCTV Systems (2026)	-	450.2	-	**450.2**
Replace UPS System - Back Up Control Center (2026) - Holyrood	-	322.8	-	**322.8**
Purchase Mobile Devices (2026)	-	315.9	-	**315.9**
Install Intelligent Electronic Devices Management Software (2026–2028)	-	297.2	973.0	**1,270.2**
Upgrade Remote Terminal Units (2026)	-	252.2	-	**252.2**
Replace 48 V Battery Banks and Chargers (2026–2027)	-	250.1	524.4	**774.5**
Perform Minor Telecommunications Enhancements (2026)	-	175.5	-	**175.5**
Telecommunications In-Service Failures (2026)	-	123.6	-	**123.6**
Replace Back-up Generators at Microwave Repeater Sites (2026–2027)	-	94.5	391.3	**485.8**
Subtotal Telecontrol	**448.3**	**5,415.8**	**3,447.3**	**9,311.4**
Tools and Equipment				
Purchase Tools and Equipment (2026)	-	1,849.4	-	**1,849.4**
Subtotal Tools and Equipment	**-**	**1,849.4**	**-**	**1,849.4**
Transportation				
Replace Light- and Heavy-Duty Vehicles (2024–2026)	5,627.9	1,133.4	-	**6,761.3**
Replace Light- and Heavy-Duty Vehicles (2025–2027)	2,714.6	1,675.8	3,147.2	**7,537.6**
Replace Light-Duty Vehicles (2026–2027)	-	2,547.5	548.6	**3,096.1**
Replace Heavy-Duty Vehicles (2026–2028)	-	1,524.1	2,992.9	**4,517.0**
Subtotal Transportation	**8,342.5**	**6,880.8**	**6,688.7**	**21,912.0**
Total General Properties	**10,137.1**	**25,992.7**	**13,911.0**	**50,040.8**

Newfoundland and Labrador Hydro
2026 Capital Budget Application
Detailed Breakdown By Major and Minor Asset Category[1]
($000)

	2025 and Prior Years	2026	Future Years	Total
Generation				
Gas Turbines				
Replace 250 Vdc Battery Bank (2025–2026) - Stephenville	73.0	296.9	-	**369.9**
Replace Fuel Storage Tanks (2026) - Happy Valley	-	696.4	-	**696.4**
Gas Turbine In-Service Failures (2026)	-	500.1	-	**500.1**
Replace 125VDC Battery Bank (2026–2027) - Hardwoods	-	108.9	37.8	**146.7**
Upgrade Cooling (2026–2027) - Hardwoods	-	100.6	344.5	**445.1**
Replace DC Fuel Pump (2026–2027) - Hardwoods	-	90.4	58.4	**148.8**
Replace Air Dryer (2026–2027) - Hardwoods	-	75.2	198.0	**273.2**
Subtotal Gas Turbines	**73.0**	**1,868.5**	**638.7**	**2,580.2**
Hydraulic Plant				
Rewind Stator (2025–2026) - Hinds Lake	5,233.2	9,695.5	-	**14,928.7**
Refurbish Intake 2 (2025–2026) - Bay d'Espoir	284.4	3,069.4	-	**3,353.8**
Replace Emergency Diesel Genset (2025–2027) - Cat Arm	266.2	1,221.1	113.9	**1,601.2**
Hydraulic In-Service Failures (2026)	-	2,660.3	-	**2,660.3**
Overhaul Hydraulic Units (2026)	-	2,023.6	-	**2,023.6**
Perform Level 2 Condition Assessment - North Salmon Spillway (2026) - Upper Salmon	-	636.5	-	**636.5**
Replace Expansion Joint and Rock Scaling (2026–2027) - Paradise River	-	516.9	230.4	**747.3**
Perform Dam Infrastructure Refurbishments (2026)	-	500.0	-	**500.0**
Upgrade Spherical Valve Controls (2026–2029) - Bay d'Espoir	-	314.9	1,038.2	**1,353.1**
Perform Level 2 Condition Assessment - Penstock 4 (2026) - Bay d'Espoir	-	237.2	-	**237.2**
Upgrade Excitation System (2026–2027) - Paradise River	-	218.7	203.5	**422.2**
Perform Level 2 Condition Assessment - Penstock (2026) - Hinds Lake	-	209.6	-	**209.6**
Replace Battery Bank (2026–2027) - Granite Canal	-	138.8	44.2	**183.0**
Replace Walkway to Toe of Dam (2026–2027) - Paradise River	-	16.8	566.1	**582.9**
Subtotal Hydraulic Plant	**5,783.8**	**21,459.3**	**2,196.3**	**29,439.4**
Thermal Plant				
Refurbish Marine Terminal (2025–2026) - Holyrood	1,190.8	1,295.6	-	**2,486.4**
Perform Boiler Condition Assessment and Miscellaneous Upgrades (2026) - Holyrood	-	9,600.0	-	**9,600.0**
Overhaul Turbine Valves and Generator - Unit 2 (2026) - Holyrood	-	6,969.6	-	**6,969.6**
Thermal In-Service Failures (2026)	-	3,823.7	-	**3,823.7**
Overhaul Major Pumps (2026) - Holyrood	-	2,388.6	-	**2,388.6**
Perform Level 2 Condition Assessment - Condenser and Condenser Tubes (2026–2027) - Holyrood	-	577.3	51.7	**629.0**
Refurbish Water Treatment Systems (2026–2027) - Holyrood	-	524.5	936.3	**1,460.8**
Replace Parts of Stage 1: 129 Vdc Batteries and Battery Chargers (2026–2027) - Holyrood	-	229.1	100.1	**329.2**
Subtotal Thermal Plant	**1,190.8**	**25,408.4**	**1,088.1**	**27,687.3**
Total Generation	**7,047.6**	**48,736.2**	**3,923.1**	**59,706.9**
Transmission and Rural Operations				
Distribution				
Upgrade Worst-Performing Distribution Feeders (2025–2027)	2,678.9	3,677.4	2,529.8	**8,886.1**
Distribution System In-Service Failures, Miscellaneous Upgrades and Street Lights (2026)	-	6,114.9	-	**6,114.9**
Provide Service Extensions (2026)	-	5,401.9	-	**5,401.9**
Renew Distribution Feeders (2026–2027)	-	1,015.3	3,053.0	**4,068.3**
Upgrade Worst-Performing Distribution Feeders (2026–2027)	-	756.3	3,534.9	**4,291.2**
Upgrade Distribution System (2026–2027) - Wiltondale	-	408.7	952.7	**1,361.4**
Subtotal Distribution	**2,678.9**	**17,374.5**	**10,070.4**	**30,123.8**
Generation				
Replace Diesel Gensets (2024–2025)	1,013.8	2,404.7	-	**3,418.5**
Replace Diesel Gensets (2025–2027)	418.2	1,719.0	4,086.4	**6,223.6**
Overhaul Diesel Units (2026)	-	2,353.7	-	**2,353.7**
Replace Fuel Storage Tank (2026) - McCallum	-	1,008.4	-	**1,008.4**
Diesel In-Service Failures (2026)	-	817.0	-	**817.0**
Inspect Fuel Storage Tanks (2026) - Rigolet	-	504.8	-	**504.8**
Subtotal Generation	**1,432.0**	**8,807.6**	**4,086.4**	**14,326.0**
Metering				
Automate Bulk Metering (2024–2026)	517.0	289.7	-	**806.7**
Purchase Meters and Metering Equipment (2025–2026)	446.2	278.4	-	**724.6**
Upgrade PLX Metering System (2026–2028) - Labrador East	-	1,188.8	980.1	**2,168.9**
Purchase Meters and Metering Equipment (2026)	-	705.6	-	**705.6**
Subtotal Metering	**963.2**	**2,462.5**	**980.1**	**4,405.8**

Newfoundland and Labrador Hydro
2026 Capital Budget Application
Detailed Breakdown By Major and Minor Asset Category[1]
($000)

	2025 and Prior Years	2026	Future Years	Total
Terminal Stations				
Additions for Load Growth - Upgrade Transformer Capacity (2023–2024) - Jean Lake Terminal Station	7,039.6	-	3,960.1	**10,999.7**
Upgrade Power Transformers (2025–2026)	811.9	1,173.9	-	**1,985.8**
Replace Protective Relays (2025–2026)	668.6	2,282.6	-	**2,951.2**
Upgrade Data Alarm Systems (2025–2026) - Hardwoods	184.0	188.7	-	**372.7**
Install Breaker Failure Protection (2025–2027) - Holyrood	177.8	320.9	166.5	**665.2**
Replace Disconnects (2025–2026)	145.3	1,245.5	-	**1,390.8**
Renew Circuit Breakers (2025–2026)	129.7	2,531.3	-	**2,661.0**
Replace Terminal Station Battery Banks and Chargers (2025–2026)	123.2	315.3	-	**438.5**
Replace Instrument Transformers (2025–2026)	112.5	356.4	-	**468.9**
Replace Circuit Breaker Reclosing Controllers (2025–2026) - Cow Head and Massey Drive	104.6	164.3	-	**268.9**
Install Fire Protection - 230 kV Stations (2025–2026) - Come by Chance	51.7	534.5	-	**586.2**
Perform Major Inspection - Synchronous Condenser 2 (2025–2026) - Wabush	22.8	1,249.0	-	**1,271.8**
Terminal Station In-Service Failures (2026)	-	3,291.8	-	**3,291.8**
Upgrade Power Transformers (2026–2027)	-	1,705.0	401.8	**2,106.8**
Replace Protective Relays (2026–2027)	-	616.0	1,969.8	**2,585.8**
Replace Instrument Transformers (2026–2027)	-	371.2	196.1	**567.3**
Replace Terminal Station Battery Banks and Chargers (2026–2027)	-	326.1	236.7	**562.8**
Renew Circuit Breakers (2026–2028)	-	188.2	4,225.7	**4,413.9**
Replace Disconnects (2026–2028)	-	169.1	2,325.6	**2,494.7**
Upgrade Terminal Station for Mobile Substation (2026–2027) - St. Anthony Diesel	-	66.1	328.6	**394.7**
Perform Major Inspection - Synchronous Condenser 1 (2026–2027) - Wabush Terminal Station	-	43.0	700.7	**743.7**
Subtotal Terminal Stations	**9,571.7**	**17,138.9**	**14,511.6**	**41,222.2**
Tools and Equipment				
Purchase 50' Material Handler Aerial Device on Tracked Unit (2024–2026) - Happy Valley Goose Bay	865.8	7.1	-	**872.9**
Replace Mobile Equipment (2025–2027)	1,973.6	54.6	2,619.4	**4,647.6**
Replace Light-Duty Mobile Equipment (2026)	-	1,212.9	-	**1,212.9**
Replace Heavy-Duty Mobile Equipment (2026–2028)	-	173.8	3,921.9	**4,095.7**
Subtotal Tools and Equipment	**2,839.4**	**1,448.4**	**6,541.3**	**10,829.1**
Transmission				
Install Mid Span Structures - TL220 (2025–2026)	881.3	229.3	-	**1,110.6**
Wood Pole Line Management (2026)	-	6,313.7	-	**6,313.7**
Widen Right of Way (2026–2028) - Gros Morne National Park	-	1,220.0	1,443.7	**2,663.7**
L23/24 Steel-Tower Transmission Line Renewal (2026–2029)	-	576.2	8,001.2	**8,577.4**
Transmission In-Service Failures (2026)	-	183.4	-	**183.4**
Relocate Section of Line (2026–2028) - TL220	-	79.7	4,011.7	**4,091.4**
Subtotal Transmission	**881.3**	**8,602.3**	**13,456.6**	**22,940.2**
Total Transmission and Rural Operations	**18,366.5**	**55,834.2**	**49,646.4**	**123,847.1**
Total Capital Budget	**35,551.2**	**131,563.1**	**67,480.5**	**234,594.8**

[1] Numbers may not add due to rounding.

Appendix B

2026 Capital Budget by Single- and Multi-Year Programs and Projects

Newfoundland and Labrador Hydro
2026 Capital Budget Application
Single- and Multi-Year Programs and Projects[1]
($000)

	2026
Single-Year	**71,766.3**
Access	5,401.9
Allowance for Unforeseen	1,000.0
General Plant	13,409.4
Mandatory	705.6
Renewal	50,833.3
Service Enhancement	416.1
System Growth	-
Single-Year Total	**71,766.3**
Multi-Year (2026) Expenditures	
Multi-Year Projects Commencing in 2022	-
Multi-Year Projects Commencing in 2023	-
Multi-Year Projects Commencing in 2024	3,834.9
Multi-Year Projects Commencing in 2025	34,584.6
Multi-Year Projects Commencing in 2026	21,377.4
Multi-Year (2026) Expenditures Total	**59,796.8**
Total 2026 Capital Budget	**131,563.1**

[1] Numbers may not add due to rounding.

Newfoundland and Labrador Hydro
2026 Capital Budget Application
Single-Year Programs and Projects[1]
($000)

	2026
Access	
Provide Service Extensions (2026)	5,401.9
Access Total	**5,401.9**
Allowance for Unforeseen	
Allowance for Unforeseen Items (2026)	1,000.0
Allowance for Unforeseen Total	**1,000.0**
General Plant	
Perform Facilities Refurbishments (2026)	3,027.9
Purchase Tools and Equipment (2026)	1,849.4
Replace Light-Duty Mobile Equipment (2026)	1,212.9
Purchase Personal Computers (2026)	1,115.7
Upgrade Core OT Infrastructure (2026)	799.6
Procure Accommodations (2026) - Makkovik	684.7
Migrate Legacy Applications (2026)	611.0
Rollout Document Control System (2026)	607.3
Install CCTV Systems (2026)	450.2
Modify Office Buildings and Procure Furniture, Fixtures, & Equipment (2026)	447.5
Update Cybersecurity Infrastructure (2026)	413.3
Backup Critical Control Systems (2026) - Holyrood	329.4
Replace UPS System - Back Up Control Center (2026) - Holyrood	322.8
Purchase Mobile Devices (2026)	315.9
Implement Safety Audits and Inspections System (2026)	304.7
Replace Peripheral Infrastructure (2026)	278.5
Perform Software Upgrades and Minor Enhancements - Operational Technology (2026)	262.8
Upgrade Remote Terminal Units (2026)	252.2
Telecommunications In-Service Failures (2026)	123.6
General Plant Total	**13,409.4**
Mandatory	
Purchase Meters and Metering Equipment (2026)	705.6
Mandatory Total	**705.6**
Renewal	
Perform Boiler Condition Assessment and Miscellaneous Upgrades (2026) - Holyrood	9,600.0
Overhaul Turbine Valves and Generator - Unit 2 (2026) - Holyrood	6,969.6
Wood Pole Line Management (2026)	6,313.7
Distribution System In-Service Failures, Miscellaneous Upgrades and Street Lights (2026)	6,114.9
Thermal In-Service Failures (2026)	3,823.7
Terminal Station In-Service Failures (2026)	3,291.8
Hydraulic In-Service Failures (2026)	2,660.3
Overhaul Major Pumps (2026) - Holyrood	2,388.6
Overhaul Diesel Units (2026)	2,353.7
Overhaul Hydraulic Units (2026)	2,023.6
Replace Fuel Storage Tank (2026) - McCallum	1,008.4
Diesel In-Service Failures (2026)	817.0

Newfoundland and Labrador Hydro
2026 Capital Budget Application
Single-Year Programs and Projects[1]
($000)

	2026
Replace Fuel Storage Tanks (2026) - Happy Valley	696.4
Perform Level 2 Condition Assessment - North Salmon Spillway (2026) - Upper Salmon	636.5
Inspect Fuel Storage Tanks (2026) - Rigolet	504.8
Gas Turbine In-Service Failures (2026)	500.1
Perform Dam Infrastructure Refurbishments (2026)	500.0
Perform Level 2 Condition Assessment - Penstock 4 (2026) - Bay d'Espoir	237.2
Perform Level 2 Condition Assessment - Penstock (2026) - Hinds Lake	209.6
Transmission In-Service Failures (2026)	183.4
Renewal Total	**50,833.3**
Service Enhancement	
Remove Safety Hazards (2026)	240.6
Perform Minor Telecommunications Enhancements (2026)	175.5
Service Enhancement Total	**416.1**
Total Single-Year Programs and Projects	**71,766.3**

[1] Numbers may not add due to rounding.

Newfoundland and Labrador Hydro
2026 Capital Budget Application
Multi-Year Programs and Projects[1]
($000)

	2025 and Prior Years	2026	2027	2028	2029	2030	Sum of Total With Prior Year
Multi-Year Programs and Projects Commencing in 2023							
System Growth							
Additions for Load Growth - Upgrade Transformer Capacity (2023–2024)							
-Jean Lake Terminal Station	7,039.6	-	1,335.1	2,625.0	-	-	**10,999.7**
Subtotal System Growth	**7,039.6**	**-**	**1,335.1**	**2,625.0**	**-**	**-**	**10,999.7**
Total Multi-Year Programs and Projects Commencing in 2023	**7,039.6**	**-**	**1,335.1**	**2,625.0**	**-**	**-**	**10,999.7**
Multi-Year Programs and Projects Commencing in 2024							
General Plant							
Replace Light- and Heavy-Duty Vehicles (2024–2026)	5,627.9	1,133.4	-	-	-	-	**6,761.3**
Purchase 50' Material Handler Aerial Device on Tracked Unit (2024–2026)							
- Happy Valley Goose Bay	865.8	7.1	-	-	-	-	**872.9**
Subtotal General Plant	**6,493.7**	**1,140.5**	**-**	**-**	**-**	**-**	**7,634.2**
Renewal							
Replace Diesel Gensets (2024–2025)	1,013.8	2,404.7	-	-	-	-	**3,418.5**
Subtotal Renewal	**1,013.8**	**2,404.7**	**-**	**-**	**-**	**-**	**3,418.5**
Service Enhancement							
Automate Bulk Metering (2024–2026)	517.0	289.7	-	-	-	-	**806.7**
Subtotal Service Enhancement	**517.0**	**289.7**	**-**	**-**	**-**	**-**	**806.7**
Total Multi-Year Programs and Projects Commencing in 2024	**8,024.5**	**3,834.9**	**-**	**-**	**-**	**-**	**11,859.4**
Multi-Year Programs and Projects Commencing in 2025							
General Plant							
Replace Light- and Heavy-Duty Vehicles (2025–2027)	2,714.6	1,675.8	3,147.2	-	-	-	**7,537.6**
Replace Mobile Equipment (2025–2027)	1,973.6	54.6	2,619.4	-	-	-	**4,647.6**
Upgrade Work Protection Code Application (2025–2026)	452.0	256.6	-	-	-	-	**708.6**
Install Electric Vehicle Chargers (2025–2026) - Hydro Sites	368.0	288.2	-	-	-	-	**656.2**
Install Fire Protection - 230 kV Stations (2025–2026) - Come by Chance	51.7	534.5	-	-	-	-	**586.2**
Replace GPS Clocks (2025–2026)	448.3	132.4	-	-	-	-	**580.7**
Upgrade Energy Management System (2025–2026)	284.4	188.5	-	-	-	-	**472.9**
Implement SCADA Points Application (2025–2026)	241.9	143.4	-	-	-	-	**385.3**
Subtotal General Plant	**6,534.5**	**3,274.0**	**5,766.6**	**-**	**-**	**-**	**15,575.1**
Mandatory							
Purchase Meters and Metering Equipment (2025–2026)	446.2	278.4	-	-	-	-	**724.6**
Subtotal Mandatory	**446.2**	**278.4**	**-**	**-**	**-**	**-**	**724.6**
Renewal							
Rewind Stator (2025–2026) - Hinds Lake	5,233.2	9,695.5	-	-	-	-	**14,928.7**
Replace Diesel Gensets (2025–2027)	418.2	1,719.0	4,086.4	-	-	-	**6,223.6**
Refurbish Intake 2 (2025–2026) - Bay d'Espoir	284.4	3,069.4	-	-	-	-	**3,353.8**
Replace Protective Relays (2025–2026)	668.6	2,282.6	-	-	-	-	**2,951.2**
Renew Circuit Breakers (2025–2026)	129.7	2,531.3	-	-	-	-	**2,661.0**
Refurbish Marine Terminal (2025–2026) - Holyrood	1,190.8	1,295.6	-	-	-	-	**2,486.4**
Upgrade Power Transformers (2025–2026)	811.9	1,173.9	-	-	-	-	**1,985.8**
Replace Emergency Diesel Genset (2025–2027) - Cat Arm	266.2	1,221.1	113.9	-	-	-	**1,601.2**
Replace Disconnects (2025–2026)	145.3	1,245.5	-	-	-	-	**1,390.8**
Perform Major Inspection - Synchronous Condenser 2 (2025–2026) - Wabush	22.8	1,249.0	-	-	-	-	**1,271.8**
Install Breaker Failure Protection (2025–2027) - Holyrood	177.8	320.9	166.5	-	-	-	**665.2**
Replace Instrument Transformers (2025–2026)	112.5	356.4	-	-	-	-	**468.9**
Replace Terminal Station Battery Banks and Chargers (2025–2026)	123.2	315.3	-	-	-	-	**438.5**
Upgrade Data Alarm Systems (2025–2026) - Hardwoods	184.0	188.7	-	-	-	-	**372.7**
Replace 250 Vdc Battery Bank (2025–2026) - Stephenville	73.0	296.9	-	-	-	-	**369.9**
Replace Circuit Breaker Reclosing Controllers (2025–2026) - Cow Head and Massey Drive	104.6	164.3	-	-	-	-	**268.9**
Subtotal Renewal	**9,946.2**	**27,125.4**	**4,366.8**	**-**	**-**	**-**	**41,438.4**
Service Enhancement							
Upgrade Worst-Performing Distribution Feeders (2025–2027)	2,678.9	3,677.4	2,529.8	-	-	-	**8,886.1**
Install Mid Span Structures - TL220 (2025–2026)	881.3	229.3	-	-	-	-	**1,110.6**
Subtotal Service Enhancement	**3,560.2**	**3,906.7**	**2,529.8**	**-**	**-**	**-**	**9,996.7**
Total Multi-Year Programs and Projects Commencing in 2025	**20,487.1**	**34,584.6**	**12,663.2**	**-**	**-**	**-**	**67,734.9**
Multi-Year Programs and Projects Commencing in 2026							
Access							
Upgrade Distribution System (2026–2027) - Wiltondale	-	408.7	952.7	-	-	-	**1,361.4**
Subtotal Access	**-**	**408.7**	**952.7**	**-**	**-**	**-**	**1,361.4**
General Plant							
Replace Heavy-Duty Vehicles (2026–2028)	-	1,524.1	788.5	2,204.4	-	-	**4,517.0**
Replace Heavy-Duty Mobile Equipment (2026–2028)	-	173.8	1,809.7	2,112.2	-	-	**4,095.7**
Replace Light-Duty Vehicles (2026–2027)	-	2,547.5	548.6	-	-	-	**3,096.1**
Perform Software Upgrades and Minor Enhancements - Information Technology (2026–2027)	-	649.9	1,097.2	-	-	-	**1,747.1**
Replace Teleprotection Equipment (2026–2028)	-	964.4	310.6	224.8	-	-	**1,499.8**
Upgrade Core IT Infrastructure (2026–2027)	-	871.6	522.9	-	-	-	**1,394.5**
Replace Radio Link to Hydraulic Control Structure (2026–2027) - Ebbegunbaeg	-	470.5	756.8	-	-	-	**1,227.3**
Replace Network Communications Equipment (2026–2027)	-	1,038.4	99.0	-	-	-	**1,137.4**
Replace 48 V Battery Banks and Chargers (2026–2027)	-	250.1	524.4	-	-	-	**774.5**
Refurbish Meteorological Stations - Phase 2 (2026–2027)	-	528.1	167.4	-	-	-	**695.5**
Replace Walkway to Toe of Dam (2026–2027) - Paradise River	-	16.8	566.1	-	-	-	**582.9**
Replace GRID Application (2026–2027)	-	134.9	363.9	-	-	-	**498.8**
Replace Back-up Generators at Microwave Repeater Sites (2026–2027)	-	94.5	391.3	-	-	-	**485.8**
Subtotal General Plant	**-**	**9,264.6**	**7,946.4**	**4,541.4**	**-**	**-**	**21,752.4**

Newfoundland and Labrador Hydro
2026 Capital Budget Application
Multi-Year Programs and Projects[1]
($000)

	2025 and Prior Years	2026	2027	2028	2029	2030	Sum of Total With Prior Year
Mandatory							
Upgrade PLX Metering System (2026–2028) - Labrador East	-	1,188.8	485.8	494.3	-	-	**2,168.9**
Subtotal Mandatory	**-**	**1,188.8**	**485.8**	**494.3**	**-**	**-**	**2,168.9**
Renewal							
L23/24 Steel-Tower Transmission Line Renewal (2026–2029)	-	576.2	2,735.3	2,539.1	2,726.8	-	**8,577.4**
Renew Circuit Breakers (2026–2028)	-	188.2	2,250.1	1,975.6	-	-	**4,413.9**
Renew Distribution Feeders (2026–2027)	-	1,015.3	3,053.0	-	-	-	**4,068.3**
Replace Protective Relays (2026–2027)	-	616.0	1,969.8	-	-	-	**2,585.8**
Replace Disconnects (2026–2028)	-	169.1	1,694.0	631.6	-	-	**2,494.7**
Upgrade Power Transformers (2026–2027)	-	1,705.0	401.8	-	-	-	**2,106.8**
Replace Roof (2026–2027) - Hopedale	-	190.6	1,791.0	-	-	-	**1,981.6**
Refurbish Water Treatment Systems (2026–2027) - Holyrood	-	524.5	936.3	-	-	-	**1,460.8**
Upgrade Spherical Valve Controls (2026–2029) - Bay d'Espoir	-	314.9	219.6	358.3	460.3	-	**1,353.1**
Perform Major Inspection - Synchronous Condenser 1 (2026–2027) - Wabush Terminal Station	-	43.0	700.7	-	-	-	**743.7**
Perform Level 2 Condition Assessment - Condenser and Condenser Tubes (2026–2027) -	-	577.3	51.7	-	-	-	**629.0**
Replace Instrument Transformers (2026–2027]	-	371.2	196.1	-	-	-	**567.3**
Replace Terminal Station Battery Banks and Chargers (2026–2027)	-	326.1	236.7	-	-	-	**562.8**
Replace Parts of Stage 1: 129 Vdc Batteries and Battery Chargers (2026–2027) - Holyrood	-	229.1	100.1	-	-	-	**329.2**
Replace Air Dryer (2026–2027) - Hardwoods	-	75.2	198.0	-	-	-	**273.2**
Replace Battery Bank (2026–2027) - Granite Canal	-	138.8	44.2	-	-	-	**183.0**
Replace dc Fuel Pump (2026–2027) - Hardwoods	-	90.4	58.4	-	-	-	**148.8**
Replace 125Vdc Battery Bank (2026–2027) - Hardwoods	-	108.9	37.8	-	-	-	**146.7**
Subtotal Renewal	**-**	**7,259.8**	**16,674.6**	**5,504.6**	**3,187.1**	**-**	**32,626.1**
Service Enhancement							
Upgrade Worst-Performing Distribution Feeders (2026–2027)	-	756.3	3,534.9	-	-	-	**4,291.2**
Relocate Section of Line (2026–2028) - TL220	-	79.7	2,970.7	1,041.0	-	-	**4,091.4**
Widen Right of Way (2026–2028) - Gros Morne National Park	-	1,220.0	655.8	787.9	-	-	**2,663.7**
Install Intelligent Electronic Devices Management Software (2026–2028)	-	297.2	675.4	297.6	-	-	**1,270.2**
Replace Expansion Joint and Rock Scaling (2026–2027) - Paradise River	-	516.9	230.4	-	-	-	**747.3**
Upgrade Cooling (2026–2027) - Hardwoods	-	100.6	344.5	-	-	-	**445.1**
Upgrade Excitation System (2026–2027) - Paradise River	-	218.7	203.5	-	-	-	**422.2**
Upgrade Terminal Station for Mobile Substation (2026–2027) - St. Anthony Diesel	-	66.1	328.6	-	-	-	**394.7**
Subtotal Service Enhancement	**-**	**3,255.5**	**8,943.8**	**2,126.5**	**-**	**-**	**14,325.8**
Total Multi-Year Programs and Projects Commencing in 2026	**-**	**21,377.4**	**35,003.3**	**12,666.8**	**3,187.1**	**-**	**72,234.6**
Total Multi-Year Programs and Projects	**35,551.2**	**59,796.8**	**49,001.6**	**15,291.8**	**3,187.1**	**-**	**162,828.5**

[1] Numbers may not add due to rounding.

Appendix C

2026 Capital Budget by Materiality – Programs and Projects over $5 Million

Newfoundland and Labrador Hydro
2026 Capital Budget Application
By Materiality – Programs and Projects Over $5 Million[1]
($000)

	2025 and Prior Years	2026	Future Years	Total
Access				
Provide Service Extensions (2026)	-	5,401.9	-	**5,401.9**
Access Total	**-**	**5,401.9**	**-**	**5,401.9**
General Plant				
Replace Light- and Heavy-Duty Vehicles (2025–2027)	2,714.6	1,675.8	3,147.2	**7,537.6**
Replace Light- and Heavy-Duty Vehicles (2024–2026)	5,627.9	1,133.4	-	**6,761.3**
General Plant Total	**8,342.5**	**2,809.2**	**3,147.2**	**14,298.9**
Renewal				
Rewind Stator (2025–2026) - Hinds Lake	5,233.2	9,695.5	-	**14,928.7**
Perform Boiler Condition Assessment and Miscellaneous Upgrades (2026) - Holyrood	-	9,600.0	-	**9,600.0**
L23/24 Steel-Tower Transmission Line Renewal (2026–2029)	-	576.2	8,001.2	**8,577.4**
Overhaul Turbine Valves and Generator - Unit 2 (2026) - Holyrood	-	6,969.6	-	**6,969.6**
Wood Pole Line Management (2026)	-	6,313.7	-	**6,313.7**
Replace Diesel Gensets (2025–2027)	418.2	1,719.0	4,086.4	**6,223.6**
Distribution System In-Service Failures, Miscellaneous Upgrades and Street Lights (2026)	-	6,114.9	-	**6,114.9**
Renewal Total	**5,651.4**	**40,988.9**	**12,087.6**	**58,727.9**
Service Enhancement				
Upgrade Worst-Performing Distribution Feeders (2025–2027)	2,678.9	3,677.4	2,529.8	**8,886.1**
Service Enhancement Total	**2,678.9**	**3,677.4**	**2,529.8**	**8,886.1**
System Growth				
Additions for Load Growth - Upgrade Transformer Capacity (2023–2024) - Jean Lake Terminal Station	7,039.6	-	3,960.1	**10,999.7**
System Growth Total	**7,039.6**	**-**	**3,960.1**	**10,999.7**
Total Programs and Projects Over $5 Million	**23,712.4**	**52,877.4**	**21,724.7**	**98,314.5**

[1] Numbers may not add due to rounding.

Appendix D

2026 Capital Budget by Materiality –
Programs and Projects over $1 Million to $5 Million

Newfoundland and Labrador Hydro
2026 Capital Budget Application
By Materiality – Programs and Projects Over $1 Million to $5 Million[1]
($000)

	2025 and Prior Years	2026	Future Years	Total
Access				
Upgrade Distribution System (2026–2027) - Wiltondale	-	408.7	952.7	**1,361.4**
Access Total	**-**	**408.7**	**952.7**	**1,361.4**
Allowance for Unforeseen				
Allowance for Unforeseen Items (2026)	-	1,000.0	-	**1,000.0**
Allowance for Unforeseen Total	**-**	**1,000.0**	**-**	**1,000.0**
General Plant				
Replace Mobile Equipment (2025–2027)	1,973.6	54.6	2,619.4	**4,647.6**
Replace Heavy-Duty Vehicles (2026–2028)	-	1,524.1	2,992.9	**4,517.0**
Replace Heavy-Duty Mobile Equipment (2026–2028)	-	173.8	3,921.9	**4,095.7**
Replace Light-Duty Vehicles (2026–2027)	-	2,547.5	548.6	**3,096.1**
Perform Facilities Refurbishments (2026)	-	3,027.9	-	**3,027.9**
Purchase Tools and Equipment (2026)	-	1,849.4	-	**1,849.4**
Perform Software Upgrades and Minor Enhancements - Information Technology (2026–2027)	-	649.9	1,097.2	**1,747.1**
Replace Teleprotection Equipment (2026–2028)	-	964.4	535.4	**1,499.8**
Upgrade Core IT Infrastructure (2026–2027)	-	871.6	522.9	**1,394.5**
Replace Radio Link to Hydraulic Control Structure (2026–2027) - Ebbegunbaeg	-	470.5	756.8	**1,227.3**
Replace Light-Duty Mobile Equipment (2026)	-	1,212.9	-	**1,212.9**
Replace Network Communications Equipment (2026–2027)	-	1,038.4	99.0	**1,137.4**
Purchase Personal Computers (2026)	-	1,115.7	-	**1,115.7**
General Plant Total	**1,973.6**	**15,500.7**	**13,094.1**	**30,568.4**
Mandatory				
Upgrade PLX Metering System (2026–2028) - Labrador East	-	1,188.8	980.1	**2,168.9**
Mandatory Total	**-**	**1,188.8**	**980.1**	**2,168.9**
Renewal				
Renew Circuit Breakers (2026–2028)	-	188.2	4,225.7	**4,413.9**
Renew Distribution Feeders (2026–2027)	-	1,015.3	3,053.0	**4,068.3**
Thermal In-Service Failures (2026)	-	3,823.7	-	**3,823.7**
Replace Diesel Gensets (2024–2025)	1,013.8	2,404.7	-	**3,418.5**
Refurbish Intake 2 (2025–2026) - Bay d'Espoir	284.4	3,069.4	-	**3,353.8**
Terminal Station In-Service Failures (2026)	-	3,291.8	-	**3,291.8**
Replace Protective Relays (2025–2026)	668.6	2,282.6	-	**2,951.2**
Renew Circuit Breakers (2025–2026)	129.7	2,531.3	-	**2,661.0**
Hydraulic In-Service Failures (2026)	-	2,660.3	-	**2,660.3**
Replace Protective Relays (2026–2027)	-	616.0	1,969.8	**2,585.8**
Replace Disconnects (2026–2028)	-	169.1	2,325.6	**2,494.7**
Refurbish Marine Terminal (2025–2026) - Holyrood	1,190.8	1,295.6	-	**2,486.4**
Overhaul Major Pumps (2026) - Holyrood	-	2,388.6	-	**2,388.6**
Overhaul Diesel Units (2026)	-	2,353.7	-	**2,353.7**
Upgrade Power Transformers (2026–2027)	-	1,705.0	401.8	**2,106.8**
Overhaul Hydraulic Units (2026)	-	2,023.6	-	**2,023.6**
Upgrade Power Transformers (2025–2026)	811.9	1,173.9	-	**1,985.8**
Replace Roof (2026–2027) - Hopedale	-	190.6	1,791.0	**1,981.6**
Replace Emergency Diesel Genset (2025–2027) - Cat Arm	266.2	1,221.1	113.9	**1,601.2**
Refurbish Water Treatment Systems (2026–2027) - Holyrood	-	524.5	936.3	**1,460.8**
Replace Disconnects (2025–2026)	145.3	1,245.5	-	**1,390.8**
Upgrade Spherical Valve Controls (2026–2029) - Bay d'Espoir	-	314.9	1,038.2	**1,353.1**
Perform Major Inspection - Synchronous Condenser 2 (2025–2026) - Wabush	22.8	1,249.0	-	**1,271.8**
Replace Fuel Storage Tank (2026) - McCallum	-	1,008.4	-	**1,008.4**
Renewal Total	**4,533.5**	**38,746.8**	**15,855.3**	**59,135.6**
Service Enhancement				
Upgrade Worst-Performing Distribution Feeders (2026–2027)	-	756.3	3,534.9	**4,291.2**
Relocate Section of Line (2026–2028) - TL220	-	79.7	4,011.7	**4,091.4**
Widen Right of Way (2026–2028) - Gros Morne National Park	-	1,220.0	1,443.7	**2,663.7**
Install Intelligent Electronic Devices Management Software (2026–2028)	-	297.2	973.0	**1,270.2**
Install Mid Span Structures - TL220 (2025–2026)	881.3	229.3	-	**1,110.6**
Service Enhancement Total	**881.3**	**2,582.5**	**9,963.3**	**13,427.1**
Total Programs and Projects $1 Million to $5 Million	**7,388.4**	**59,427.5**	**40,845.5**	**107,661.4**

[1] Numbers may not add due to rounding.

Appendix E

2026 Capital Budget by Materiality –
Programs and Projects $750,000 to $1 Million

Newfoundland and Labrador Hydro
2026 Capital Budget Application
By Materiality – Programs and Projects $750,000 to $1 Million[1]
($000)

	2025 and Prior Years	2026	Future Years	Total
General Plant				
Purchase 50' Material Handler Aerial Device on Tracked Unit (2024–2026) - Happy Valley Goose Bay	865.8	7.1	-	**872.9**
Upgrade Core OT Infrastructure (2026)	-	799.6	-	**799.6**
Replace 48 V Battery Banks and Chargers (2026–2027)	-	250.1	524.4	**774.5**
General Plant Total	**865.8**	**1,056.8**	**524.4**	**2,447.0**
Renewal				
Diesel In-Service Failures (2026)	-	817.0	-	**817.0**
Renewal Total	**-**	**817.0**	**-**	**817.0**
Service Enhancement				
Automate Bulk Metering (2024–2026)	517.0	289.7	-	**806.7**
Service Enhancement Total	**517.0**	**289.7**	**-**	**806.7**
Total Programs and Projects $750,000 to $1 Million	**1,382.8**	**2,163.5**	**524.4**	**4,070.7**

[1] Numbers may not add due to rounding.

Appendix F

Terminal Station Asset Management Strategy – 2025 Update

Terminal Station Asset Management Strategy

2025 Update

newfoundland labrador hydro

Contents

1.0 Introduction

Newfoundland and Labrador Hydro's ("Hydro") Terminal Station Asset Management Strategy describes Hydro's Terminal Station Asset Management System and programs for planned capital work (i.e., replacements and upgrades) on terminal station infrastructure.

Hydro's Terminal Station Asset Management System governs the life cycle of its terminal station assets. This system monitors, maintains, refurbishes, replaces, and disposes of assets to provide safe, reliable electrical power in an environmentally responsible manner at the lowest possible cost. This system allows the asset managers to establish consistent practices for equipment specifications, placement, maintenance, refurbishment, replacement, and disposal for terminal station assets, such as breakers, transformers, grounding systems, buildings, and sites. These practices ensure consistency in the monitoring, assessments, and action justifications for asset-sustaining projects' capital refurbishment and replacement. Hydro established programs that enact these practices for groupings or sub-groupings of assets (e.g., high-voltage switch replacements).

This report provides information as to the assets involved and an overview of each asset program. It is divided into sections each of which describes an infrastructure asset class, including the high-level function and/or construction of the equipment in that asset class and the associated capital program, including eligibility criteria (a combination of age, usage, condition, and reliability improvement). Hydro will provide an update to its Terminal Station Asset Management Strategy in its annual capital budget applications.

2.0 Background

2.1 Hydro's Terminal Stations

Hydro has 69 terminal stations throughout Newfoundland and Labrador. Terminal stations play a critical role in the transmission and distribution of electricity. Terminal stations contain electrical equipment, such as transformers, circuit breakers, instrument transformers, disconnect switches, and associated protection and control relays and equipment required to protect, control, and operate Hydro's electrical grid. Terminal stations act as transition points within the transmission system and interface points with the lower voltage distribution and generation systems.

2.2 Terminal Station Infrastructure

Terminal stations contain the following infrastructure, which is described throughout this report:

- Transformers;
- Circuit breakers;
- Instrument transformers;
- Disconnect, bypass, and ground switches;
- Surge arresters;
- Grounding;
- Buswork;
- Steel structures and foundations;
- Insulators;
- Control buildings;
- Protection and control relays;
- Yards, fences, and access roads;
- Battery banks;
- Lighting; and
- Synchronous condensers.

Many of Hydro's terminal stations were constructed in the 1960s. Annual capital commitment is needed to sustain terminal station assets to ensure that Hydro can continue to provide customers with reliable electrical service.

3.0 Asset Management Programs

3.1 Electrical Equipment

3.1.1 High-Voltage Instrument Transformer Replacements

3.1.1.1 Introduction

Protection, control, and metering devices, such as protective relaying, power quality monitors, and kilowatt-hour meters used in generation and transmission systems are not manufactured to handle the currents and voltages inherent to those systems. Measurement of the electricity's currents and voltages is provided to these devices through a current transformer and a potential transformer, respectively (Figure 1), known collectively as instrument transformers.

A high-voltage instrument transformer consists of insulated electrical primary and secondary winding, a tank, and bushing components. The insulation system involves the use of insulating oil- or dry-type insulation and a high-voltage porcelain bushing that allows the safe connection of the winding, which is enclosed in a steel tank, to high-voltage conductors. Hydro has approximately 900 individual high-voltage instrument transformers within the Island and Labrador Interconnected Systems.

Figure 1: 69 kV Current Transformer (left) and Potential Transformer (right)

3.1.1.2 Program Description and Justification

Hydro manages its planned budgeted instrument transformer replacements in four categories:

1) Condition;
2) Age;
3) Additions for protective relay upgrades; and
4) Exclusions.

<u>Condition</u>

Deterioration or damage to the various instrument transformer components can result in the failure of the unit to provide accurate measurements to metering, protection, and control devices, which may affect the safe and reliable operation of the generation and transmission systems. Failure could also result in an oil spill. In some situations, pieces of the instrument transformer may be forcibly projected, resulting in a safety risk for personnel in the area or damage to other infrastructure.

Damage to an instrument transformer normally results from vandalism, impacts from catastrophically failed equipment, or accidental contact with mobile equipment. Upon such incidents, Hydro assesses the electrical and physical integrity of the instrument transformer to determine if replacement is required.

Hydro monitors instrument transformers for physical and electrical deterioration by conducting regular visual inspections of the units as part of its Terminal Station Inspection Program as well as regularly scheduled terminal station infrared inspections and electrical insulation testing.

Physical deterioration involves conditions such as oil leaks, rusting, or small chips and cracks in the insulation. An example of rusting on a potential transformer tank is provided in Figure 2.

Figure 2: Rusting Potential Transformer

Electrical deterioration is identified by conducting power factor testing at intervals that are used to establish the rate and level of insulation degradation. Hydro uses Doble Engineering Company to assist with the assessment of the test results, where required. Hydro's asset management personnel continuously review the unit deterioration information and determine when corrective maintenance or unit replacement is required.

Hydro conducts minor corrective maintenance on its instrument transformers, such as painting and small bushing chip treatment. As external services to economically undertake major corrective maintenance or unit refurbishments are non-existent, units requiring major corrective maintenance or refurbishments are replaced.

Age

To reduce the risk of in-service failures and minimize service interruptions, Hydro targets the replacement of instrument transformers at 40 years. According to original equipment manufacturers, the recommended life of an instrument transformer is approximately 30 to 40 years. From 2018–2024, 45% of failed instrument transformers were at least 30 years old at the time of failure.

Additions for Protective Relay Upgrade

Some protective relay upgrades require one or more additional instrument transformers for the upgrade to conform to Hydro's Protection and Control Engineering Standards. The installation of these additional instrument transformers is typically coordinated with the associated protective relay upgrade such that both the protective relay upgrade and the additional instrument transformer(s) are installed at the same time.

Exclusions

Modern-day circuit breaker technology has current transformers embedded in the circuit breaker bushings. As a result, where possible, external current transformers will be displaced by bushing current transformers as circuit breakers are replaced; therefore, current transformers are not included in this program.

3.1.2 High-Voltage Switch Replacements

3.1.2.1 Introduction

High-voltage switches are used to isolate equipment for maintenance activities or for system operation and control (disconnect switches). Switches are also used to bypass equipment to prevent customer outages while work is being performed on the equipment. Disconnect switches are an important part of Hydro's "Work Protection Code Book,"[1] as they provide a visible air gap (i.e., visible isolation) for utility workers. Proper operation of disconnect switches is essential for a safe work environment and reliable operation.

The basic components of a disconnect switch are the blade assembly, insulators, switch base, and operating mechanism. The blade assembly is the current-carrying component in the switch and the operating mechanism moves it to open and close the switch. Insulators are made of porcelain and insulate the switch base and operating mechanism from the current-carrying components. The switch base is mounted to a metal frame support structure and supports the insulators. The operating mechanism is operated either manually (by using a handle at ground level to open and close the blade) or by a motor-operated device (in which case the switch is known as a motor-operated disconnect). A disconnect and its associated components are shown in Figure 3.

[1] As per "Work Protection Code Book," Newfoundland and Labrador Hydro, 2020, p. 12,
"A Work Protection is a guarantee;
- that an isolated, or isolated and de-energized condition has been established for work, and
- will continue to exist, except for authorized test."

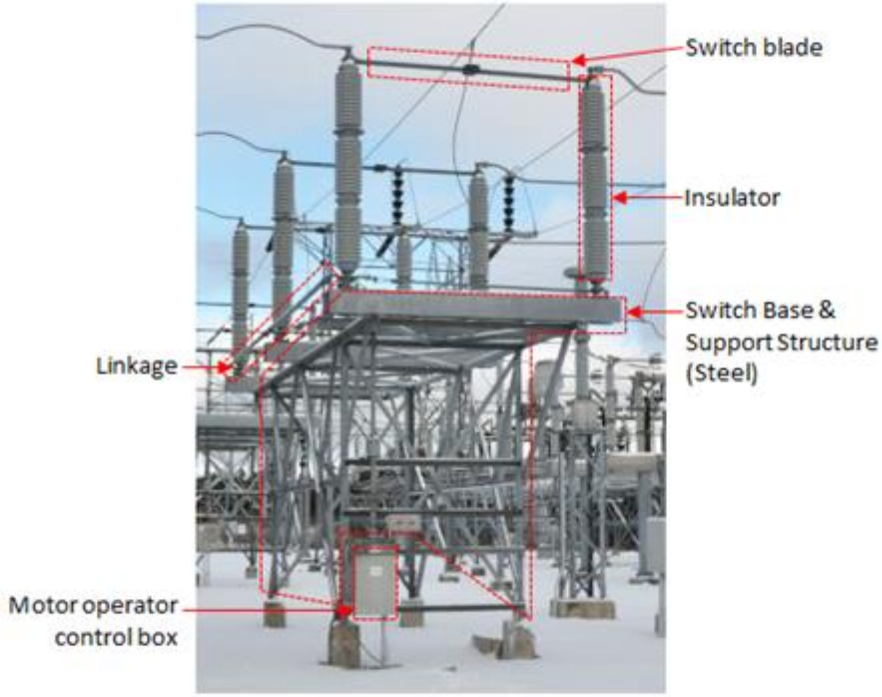

Figure 3: Various Components of a High-Voltage Disconnect Switch

Hydro monitors the condition of its switches by conducting regular visual inspections of the units as part of its Terminal Station and Infrared Inspection Programs and by reviewing reports from the JDE E1 work order system or staff who operate the switch. These reports outline problems such as inoperable mechanical linkages, misalignment of switch blades, broken insulators, and the seizing of moving parts. Asset management personnel determine the timing of corrective maintenance or switch replacement. If the required parts are available, repairs are undertaken as part of ongoing maintenance. Switches that meet one of the following criteria are planned for replacement:

- Operating deficiencies and reached a service life of 50 years;
- No replacement parts available due to obsolescence, damage beyond repair, or cannot be economically repaired and do not require immediate replacement; or
- Reached a service life of 60 years.

Figure 4 shows an example of a badly damaged disconnect switch.

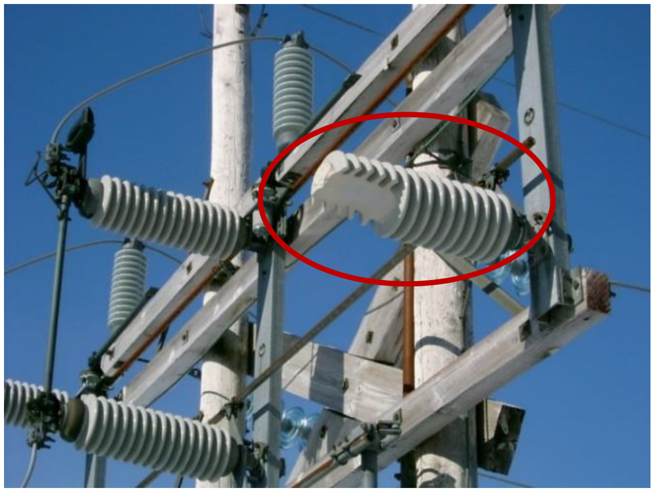

Figure 4: Broken Insulator on 69 kV Disconnect Switch

3.1.3 Surge Arrester Replacement

Surge arresters (also known as lightning arresters) are used on critical terminal station equipment to protect that equipment from voltage due to lightning, extreme system operating voltages, and switching transients, collectively called "overvoltages." In these situations, voltage at the equipment can rise to levels that could damage the equipment's insulation. The surge arresters act to maintain the voltages within acceptable levels. Without surge arresters, equipment insulation could be damaged and faults could result during overvoltages. Hydro typically has surge arresters installed on the high-voltage and low-voltage sides of power transformers rated 46 kV and above.

Figure 5 shows the arresters on a 230 kV power transformer.

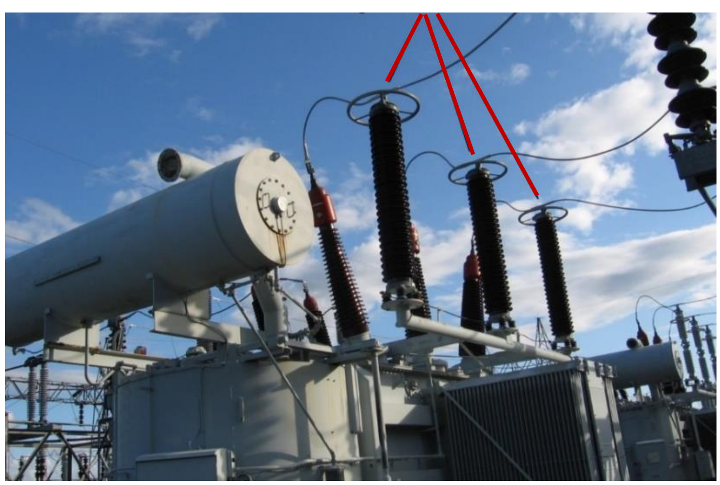

Figure 5: Western Avalon Terminal Station Transformer T3 230 kV Surge Arresters

Surge arresters can fail because of the cumulative effects of prolonged or multiple overvoltages. When a surge arrester fails, it is not repairable and must be replaced immediately otherwise the major equipment may be exposed to damaging overvoltages. Older arrester designs have a higher incidence of failure than the newer designs.

Hydro's Surge Arrester Asset Management Program replaces surge arresters based on the following criteria:

- Removal of gapped-type arresters with zinc oxide design due to enhanced performance;
- Replacement of units due to a condition identified through visual inspections for chips or cracks or through electrical testing, such as power factor testing;
- If failures occur on a given transformer, all arresters on both the high and low side are considered for replacement either immediately or in a planned fashion; and
- If transformers are being planned for maintenance or other capital work, consideration is given to changing aged arresters on a common outage. To reduce the risk of in-service failures and minimize service interruptions, Hydro targets replacement at 40 years of age.

3.1.4 Insulator Replacement

Insulators provide electrical insulation between energized equipment and ground. When an insulator fails and a fault occurs, a safety hazard and/or customer outage(s) may occur.

Insulators consist of insulating material, such as glass and porcelain, and metallic end fittings to attach the insulator to the structure and the conductor. The metallic hardware is mated with the porcelain or glass insulator using cement. There are different styles of insulators; an example of a station post insulator is shown in Figure 6.

Terminal stations contain post-type, cap and pin-top type, multi-cone type, and suspension-type insulators.

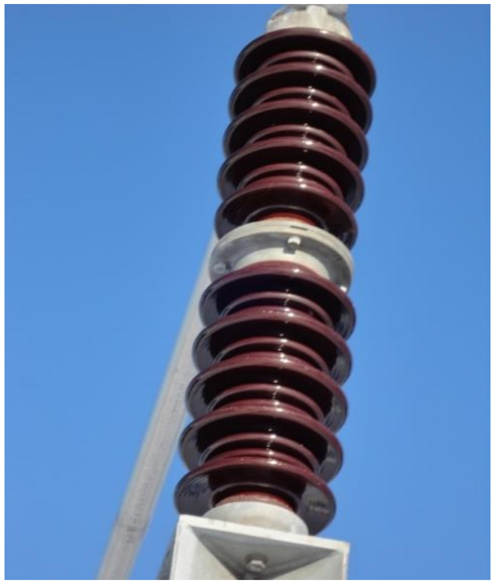

Figure 6: Multi-Cone Type Insulator Prone to Failure due to Cement Growth

For insulators using porcelain, cement is used in mating the porcelain and metallic hardware. Some older insulators have been damaged by a phenomenon known as cement growth, a common problem in the utility industry. In such situations, water is absorbed into the concrete during freeze/thaw cycles causing swelling of the cement thereby placing stress upon the porcelain. Over time, the increasing pressure caused by cement growth will crack or break the porcelain, resulting in insulator failure. In such situations, this porcelain may fall, presenting a safety hazard to crews or damaging equipment below. In addition, faults resulting in outages to customers often occur when insulator failure leads to flashover. To eliminate this problem, insulator manufacturers have identified and researched cement growth problems and improved cement quality.

Hydro carries out detailed insulator surveys by geographical area, identifying any known insulator types prone to failure due to cement growth and replacing these insulators as part of this program.

3.1.5 Grounding Refurbishment and Upgrades

The grounding system in a terminal station or distribution substation consists of copper wire used in the ground grid under the station, gradient control mats for high-voltage switches, and bonding wiring connecting the structure and equipment metal components to the ground grid, an example of which is shown in Figure 7. In the event of a ground fault, electrical potential differences will exist in the grounding system. If the grounding system is inadequate or deteriorated, these differences, known as step and touch potentials, may be hazardous to personnel. Effective station grounding reduces these potentials to eliminate the hazard.

Figure 7: Typical Grounding Connection on Terminal Station Fence

To determine whether grounding upgrades are required, Hydro performs a step and touch potential analysis of the terminal station or distribution substation. Step and touch potential analysis involves the gathering of field data and conducting an analysis to determine if ground grid modifications are required to eliminate the step and touch potential hazards. This engineering is conducted in accordance with the Institute of Electrical and Electronics Engineers ("IEEE") Standard 80-2000.[2] Grounding systems with hazardous step and/or touch potentials are upgraded by adding additional equipment bonding, gradient control mats, or copper wire to the station grounding grid. In the case where the terminal station grounding infrastructure has deteriorated with age or is damaged due to accidental contact or vandalism, the grounding system is refurbished by repairing damage or replacing missing infrastructure. Upgrades and refurbishments are made in accordance with Hydro's Terminal Station Grounding Standard.

3.1.6 Power Transformer Upgrades and Refurbishment

3.1.6.1 Introduction

Power transformers are a critical component of the power system. Transformers allow the cost-effective production, transmission, and distribution of electricity by converting the electricity to an appropriate

[2] Institute of Electrical and Electronics Engineers. (2000). 80-2000, *IEEE Guide for Safety in AC Substation Grounding*.

voltage for each segment of the electrical system and allow for economic construction and operation of the electrical system.

Hydro has 118 power transformers and three oil-filled shunt reactors 46 kV and above, as well as several station service transformers at voltages lower than 46 kV.

The basic components of a power transformer are:

- A transformer steel tank containing the metal core and paper-insulated windings, oil (which is part of the insulating system), and a gasket system (which keeps the oil from getting into the environment);
- Bushings mounted to the top of the transformer tank (which connects the windings to the external electrical conductors);
- Radiators and cooling fans (which remove heat for the transformer's internal components);
- On-Load Tap Changer (which is a device attached internally or externally through which transformer voltages are maintained at acceptable levels); and
- Protective devices to ensure the safe operation of the transformer, such as gas detector relays, oil level and temperature relays, and gauges.

A 75 MVA, 230/66 kV power transformer at the Hardwoods Terminal Station is provided in Figure 8.

Figure 8: Power Transformer

3.1.6.2 Program Description and Justification

Transformers are expensive components of the electrical system. Similar to many North American utilities, Hydro is working to maximize and extend the life of its transformers by regularly assessing their condition, executing regularly scheduled maintenance and testing, and undertaking refurbishment or corrective actions, as required. Transformers regularly undergo visual inspection as part of Hydro's Terminal Station Inspection Program and scheduled preventive maintenance and testing, to identify concerns regarding the following transformer conditions:

- Insulating oil and paper deterioration;
- Oil moisture content;
- Oil leaks;
- Tank, radiators, and other component rusting/corrosion;
- Tap changer component wear or damage;
- Damaged/deteriorated bushings;
- Failure of the protective devices; and
- Cooling fan failures.

Details on the assessment procedures and corrective action for each of these concerns are provided herein.

Transformer Oil Deterioration

The insulating oil in a transformer and its tap changer diverter switch is a critical component of the insulation system. Normal operation of a transformer will cause its oil to deteriorate. Deterioration results from several causes such as heating, internal arcing of electrical components, or ingress of water moisture into the transformer. Deterioration of the oil will affect its function in the insulation system and may damage its paper component. Unacceptable levels of deterioration can affect the reliable operation of the transformer. To ensure the oil in a transformer is of an acceptable quality, Hydro has an Oil Monitoring Program, in which an oil sample is obtained annually from each transformer and analyzed by a professional laboratory to determine the level of deterioration. If an unacceptable level of deterioration is present, required corrective action is identified by asset management personnel. This action entails either the refurbishment of the oil, to improve its quality, or the replacement of the oil. Oil that is PCB-contaminated (i.e., >2 ppm PCB) and whose refurbishment requires oil reclamation will be replaced.

Moisture Content

Oil samples are also analyzed to determine their moisture content. Moisture in a power transformer may be residual moisture or may result from the ingress of atmospheric moisture. Oil and insulating paper with high moisture content have a reduced dielectric strength, and therefore its performance as an electrical insulator is diminished. To address transformers with high moisture content, Hydro will either install an online molecular sieve dry-out system (which circulates and dries the transformer oil without requiring an equipment outage) or perform a hot oil dry-out (which circulates and dries the transformer oil and requires an equipment outage).

Oil Leaks and Corrosion

Transformer oil leaks are an environmental hazard. As oil is part of the insulation system, unchecked leaks can affect the safe and reliable operation of a transformer. Leaks can be caused by a number of factors, including failed gaskets or severe corrosion of radiators, tank piping, and other steel components. Transformers are visually inspected for leaks as part of the regularly scheduled Terminal Station Inspection Program and assessed by asset management personnel to determine the level of corrective action. Minor action (such as small repairs, patching, and minor painting) is undertaken as part of maintenance. Work requiring major refurbishments and replacements (such as radiator or bushing replacements, gasket replacements, and tank rusting refurbishment) are undertaken under this program.

On-Load Tap Changer

On-load tap changer diverter switches, which are externally mounted on the tank, adjust the voltage by changing the electrical connection point of the transformer winding. This involves moving parts that are subject to wear and damage. Additionally, in older, non-vacuum designed diverter switches, arcing occurs during the movement, leading to deterioration of the insulating oil. This wear and deterioration can lead to the failure of the tap changer. Oil testing techniques have been developed by professional laboratories that provide assessments of the condition of the parts and oil. Oil samples are obtained annually from each on-load tap changer to perform a Tap Changer Activity Signature Analysis. This analysis provides a condition assessment of the tap changer oil and components. Hydro typically implements the laboratory's sampling interval recommendations. This ranges from continued or increased annual sampling, planned refurbishment, immediate removal from service, inspection, and repair. The latter two activities are covered by this project. Another component covered by this project is the correction of leaking seals between tap changer diverter switches and the transformer main tank. Currently Hydro has several transformers that show low levels of combustible gases (such as acetylene), due to gases migrating from the tap changer diverter switch compartment to the main tank.

Bushings

In addition to the aforementioned leaking bushings, Hydro must also address bushings with degraded electrical properties. As part of transformer preventive maintenance, Hydro performs power factor testing on bushings every six years. When power factor test results indicate unacceptable electrical degradation, bushings are scheduled for replacement.

Protective Devices and Cooling Fans

Protective devices and cooling fans are tested during visual inspections and preventive maintenance; they are replaced when they fail to operate as designed or their condition warrants replacement. In addition, cooling fans are added where additional cooling is required due to increased loads.

Online Oil Analysis

In addition to oil quality, Dissolved Gas Analysis (“DGA”) is performed on oil. DGA analyzes the levels of dissolved gases in oil, which provides insight into the condition of the transformer insulation. The presence of gases can indicate if the transformer has been subjected to fault conditions or overheating or if there is internal arcing or partial discharge occurring in the windings. The annual oil sample test can only provide an analysis of transformer condition at the time when the sample is taken. In 2015, as part of this program, Hydro began installing online dissolved gas monitoring on Generator Step-Up (“GSU”) transformers, to allow real-time, continuous monitoring of dissolved gases in oil. This continuously monitors the transformer and provides early fault detection. Continuous data is also a useful tool for personnel to use to trend gases to help schedule repairs or replacements before in-service failures, improving the overall reliability of the Island Interconnected System. Continuous monitoring enables Hydro to reduce unplanned outages and lessen the probability of equipment in-service failure.

This program was extended to non-GSU transformers in 2017, with online DGA being installed on critical power transformers on the Island Interconnected System. The factors used to determine the criticality score were submitted to the Board of Commissioners of Public Utilities (“Board”) on June 2, 2014.[3] Hydro has identified 49 transformers for installation of online DGA devices between 2019 and 2026.

3.1.7 Circuit Breaker Refurbishment and Replacements

The circuit breaker is a critical component of the power system. Located in a terminal station, each circuit breaker performs switching actions to complete, maintain, and interrupt current flow under normal or fault conditions. The reliable operation of circuit breakers through their fast response and complete interruption of current flow is essential for the protection and stability of the power system. The failure of a breaker to operate as designed may affect the reliability and safety of the electrical system resulting in the failure of other equipment and the occurrence of an outage affecting more end users. Hydro has over 230 terminal station circuit breakers in service with a voltage rating of 46 kV or greater.

Currently, Hydro maintains two different types of high-voltage circuit breakers, examples of which are provided in Figure 9:

1) Oil Circuit Breakers (“OCB”): Use oil to interrupt currents. OCBs rated at 66 kV and above are planned for replacement after 40 years of service. However, as they come due, a further condition assessment will be completed to determine if life extension can be achieved through refurbishment.
2) Sulphur Hexafluoride (“SF_6”) Circuit Breakers: Use SF_6 gas to interrupt current. The installation of these breakers started in 1979 and continues for all new installations.

Figure 9: Oil Circuit Breakers (Left) and SF_6 Circuit Breakers (Right)

[3] “Report to the Board of Commissioners of Public Utilities Regarding Work to be Performed on Transformers,” Newfoundland and Labrador Hydro, June 2, 2014.

As presented in the 2016 Capital Budget Application ("CBA"), SF_6 circuit breakers rated at 138 kV and above require refurbishment after 20 years of service. In 2018, Hydro added that 66 kV-rated breakers also require refurbishment after 20 years. Replacement of SF_6 circuit breakers rated at 66 kV and above will be planned after 40 years of service; however, as SF_6 circuit breakers come due, a further condition assessment will be completed to determine if life extension can be achieved through refurbishment. Some SF_6 circuit breakers may require replacement before the 40-year service life period based on their condition and operational history.

Circuit breakers that are an obsolete model will be planned for replacement after 40 years of service.

3.1.8 Station Service Refurbishment and Upgrades

The power required to operate various terminal stations and distribution substations, collectively referred to as "station" equipment and infrastructure, is provided by the Station Service System. The Station Service System provides ac and dc power to operate the equipment in a station.

The alternating current ("ac") station service is generally supplied by one or more transformers in the station. Due to their criticality, 230 kV terminal stations have a redundant station service feed, fed either through a redundant transformer tertiary (supplied from Newfoundland Power Inc.'s ("Newfoundland Power") electrical system where available) or by a diesel generator. Common ac station service loads are:

- Transformer cooling fans;
- Anti-condensation heaters;
- Station lighting;
- Control building HVAC;[4]
- Control building lighting;
- Air compressors; and
- Battery chargers.

[4] Heating, ventilation, and air conditioning ("HVAC").

The direct current ("dc") station service is supplied by a battery bank that is charged from the ac station service. The dc station service provides power to critical devices in the station and is designed to allow operation of the station in the event of an ac station service failure. Hydro's dc station service system is a 125 V system in the majority of the stations with some lower voltage stations and telecommunications equipment having 48 V systems. Common dc station service loads are:

- Circuit breaker trip and close circuits and charging motors;
- Protection relays;
- Emergency lighting;
- Disconnect switch motor operators for local/remote operation; and
- Telecommunications equipment.

As terminal station equipment is replaced, added, or upgraded, the ac and dc station service loads may increase. Upon the installation of new equipment in the terminal station, Hydro carries out a station service study to determine the loading on the station service system. If the new station service loads exceed the design load of the system, upgrades (such as cable, circuit breaker panel, splitter, and transfer switch replacements) or additions are required. Replacement of station service transformers is not included in this program, as they are addressed separately in the CBA under the Upgrade Power Transformers project, if required.

3.1.9 Battery Banks and Chargers

3.1.9.1 Introduction

Battery banks and their chargers supply dc power to critical station infrastructure such as circuit breakers, protection and control relays, disconnect switch motor operators, and telecontrol equipment. Battery banks are designed to provide a minimum of eight hours of auxiliary power to critical infrastructure in the event of a loss of ac station service supply. The majority of Hydro's battery banks consist of lead-acid flooded-cell type batteries, whose capacity deteriorates over time. An example of a 125 Vdc terminal station battery bank is provided in Figure 10.

3.1.9.2 Program Description and Justification

Currently, Hydro completes discharge testing on criticality A and B battery banks after 10 years, then every 5 years for flooded cell, and every 2 years for valve regulated. Replacements will be planned if the battery bank's capacity has fallen to 80% or less of its rated capacity. Due to the critical nature of battery banks, flooded cell batteries are replaced after 20 years, valve-regulated lead-acid batteries are replaced after 10 years, and battery chargers are replaced after 20 years.

Figure 10: 125 Vdc Terminal Station Battery Bank

3.1.10 Install Breaker Bypass Switches

High-voltage circuit breakers, with their associated protection and control equipment, are used to control the flow of electrical current to ensure safe and reliable operation of the electrical system. When a breaker is removed from service for maintenance, troubleshooting, refurbishment, or replacement, an alternate electrical path must be implemented to avoid customer outages. On radial systems,[5] this alternate path is accomplished using a bypass switch as shown in Figure 11. When closed, the bypass switch allows electricity to flow around the breaker, allowing the breaker to be safely de-energized, while maintaining service continuity.

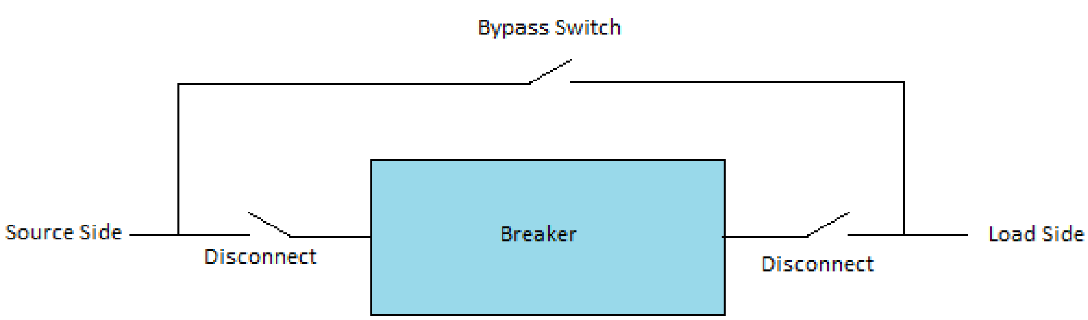

Figure 11: Example of Bypass Switch Installation

[5] A radial system is an electrical network that has only one electrical path between the source and the load.

Table 1 lists the five radial systems, servicing multiple customers, where breakers are installed without bypass switches. To ensure service continuity during breaker downtime, Hydro is considering the installation of a breaker bypass for those listed in Table 1.

Table 1: Circuit Breakers without Bypass Switches

Location	Customers Affected
Bottom Waters L60T1	2,253 Bottom Waters area customers
Buchans B2T1	665 Buchans area Newfoundland Power customers and Duck Pond Mine
Howley B1T2	773 Hampden and Jackson's Arm area customers 665 Newfoundland Power Howley area customers
Peter's Barren B1L41	1,900 Great Northern Peninsula customers north of Daniel's Harbor
South Brook L22T1	2340 South Brook area customers

In 2018, Hydro put a hold on this program and is looking at only doing this work when other major terminal station work is planned or if there is a low-cost solution. Doyles B1L15 had a low-cost bypass installed in the first quarter of 2020 through an In-Service Failure project to facilitate the topping up of an ongoing leak in breaker B1L15.

3.1.11 Replace Station Lighting

Terminal station lighting is essential to provide adequate illumination for a safe working environment and to deter theft and vandalism in terminal stations. Hydro utilizes a variety of lighting technologies and configurations, depending on the application and vintage of the lighting system. Over time, exposure to the elements can cause physical deterioration, such as corrosion as shown in Figure 12 and Figure 13, leading to moisture ingress, which impacts the function of the lighting system. In addition, some legacy lighting technologies have become obsolete.

Under this program, Hydro will replace deteriorated lighting systems as they become unable to provide adequate illumination of the terminal station and have become obsolete or beyond repair. Hydro will replace legacy lighting systems with modern, efficient lighting technologies whenever possible.

Figure 12: Corroded Ballast Requiring Replacement

Figure 13: Light Fixture Showing Perforations due to Corrosion, Enabling Moisture Ingress

3.1.12 Synchronous Condensers

Hydro maintains two dedicated synchronous condensers located at the Wabush Terminal Station. Each synchronous condenser undergoes major and minor inspections on a three-year rotating cycle, with minor inspections performed in both year one and year two of the cycle and a major inspection performed in year three. Each involves a standard list of checks, tests, and general maintenance as well as any additional items that have been identified for follow-up based on the results of previous inspections.

The minor inspections involve function testing, vibration checks, lube oil system maintenance, oil sampling, disassembly and inspection of the top half of bearings, clearance checks, electrical tests, visual inspections, cleaning, and general maintenance (including replacement of various gaskets, filters and hardware).

The major inspections expand on the same activities performed under the minor inspections by also including rotor and stator inspection, disassembly and inspection of the bottom half of the bearings, and replacement of the thrust bearings.

3.2 Civil Works and Buildings

3.2.1 Equipment Foundations

Reinforced concrete foundations support high-voltage equipment and structures in Hydro's terminal stations. The majority of these structures formed part of the original station construction and support critical terminal station equipment and buswork.

The service life of galvanized steel structures varies depending on the operating environment but can exceed 100 years, outliving the foundations on which they are built. A number of the foundations in Hydro terminal stations have deteriorated significantly due to repeated exposure to damaging freeze/thaw cycles, weathering, and age, leading to concerns over their integrity. Examples of degraded structure foundations are shown in Figure 14 and Figure 15.

Figure 14: Structure B1T1 Bottom Brook Terminal Station

Figure 15: Structure L01L37-1 Western Avalon Terminal Station

To ensure foundations perform as per the original design intent, severely deteriorated concrete foundations must be refurbished or replaced. Failure to complete repairs could result in a catastrophic failure, causing outages or personal injury. Hydro has carried out engineering inspections of all 230 kV stations and identified foundations requiring repairs. Hydro also performs visual inspections of foundations every 120 days during regular terminal station inspections. Foundations identified for repair are addressed under this program.

3.2.2 Fire Protection

Hydro’s terminal station control buildings contain combustible materials. As these facilities are unattended, a fire could spread, causing severe damage to protection and control wiring and equipment, which would cause extended and widespread outages. Restoring a terminal station severely damaged by fire to normal operation could take months.

To protect the control cabinets, cables, and any other critical equipment from being destroyed by a fire without damaging sensitive electronic equipment and wiring, Hydro is installing fire suppression systems in its 230 kV terminal stations.

In the 2014 CBA project Install Fire Protection Upgrades – Holyrood [6,7] and the 2016 CBA project Install Fire Protection in 230 kV Stations – Bay d'Espoir,[8,9] Hydro received approval to install fire protection in the Holyrood and Bay d'Espoir Terminal Stations, respectively. Due to their criticality, Hydro intends to continue its program to install fire suppression systems in all 230 kV terminal stations.

3.2.3 Control Buildings

Terminal station control buildings contain critical station infrastructure, such as protection, control, and monitoring equipment, telecontrol equipment, station service equipment, and compressed air systems. Many control buildings also contain office, breakroom, and washroom facilities for use by Hydro crews when working in the station. As the equipment in control buildings is critical to the function of the terminal station, Hydro must ensure the structural integrity, weather-tightness, and security of its control buildings. While addressing these issues, Hydro also ensures that building auxiliaries (such as electrical, plumbing, and HVAC systems) function properly, to ensure reliable and safe operation and use of the terminal station and the control building.

Typical refurbishment activities for control buildings involve the replacement of the roof membrane (Figure 16), siding, and doors (Figure 17) and may also include the replacement of electrical equipment (such as distribution panels, transfer switches, or low-voltage disconnects), plumbing (such as water service entries and internal plumbing), and HVAC (such as intake and exhaust fans, louvers, heaters, and air conditioning equipment).

Based on building conditions, Hydro proposes the refurbishment or replacement projects for the standalone control building, as required.

[6] "2014 Capital Budget Application," Newfoundland and Labrador Hydro, August 5, 2013, vol. I, sec. D, p. D-76.
[7] Approved in Board Order No. P.U. 42(2013).
[8] "2016 Capital Budget Application," Newfoundland and Labrador Hydro, July 31, 2015, vol. III, tab 26.
[9] Approved in Board Order No. P.U. 33(2015).

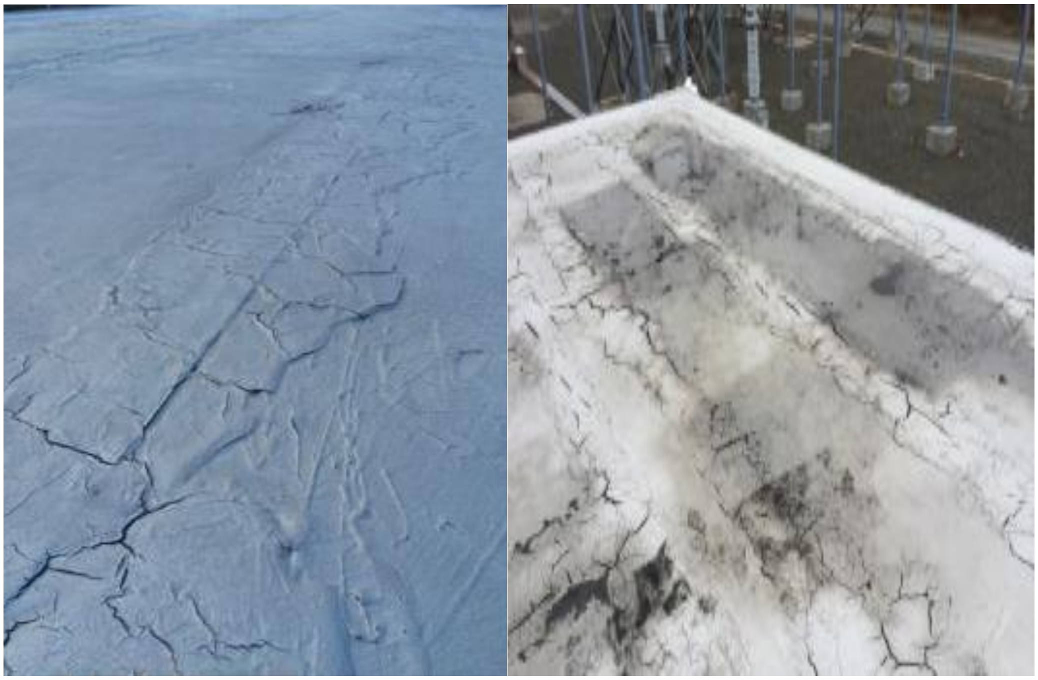

Figure 16: Terminal Station Control Buildings Showing Cracking and Deterioration of the Roof Membrane System

Figure 17: Building Exterior Cladding and Exterior Doorways Displaying Severe Rusting and Deterioration

3.3 Protection, Control, and Monitoring

3.3.1 Protection and Control Upgrades and Refurbishment

3.3.1.1 Introduction

The terminal station protection and control system automatically monitors, analyzes, and causes action by other equipment (such as breakers) to ensure the safe, reliable operation of the electrical system or to initiate action when system operators issue a command. The protection and control system also indicates and allows for the recording of system conditions and alarms for analysis. Hydro carries out capital work on various protection and control equipment, including:

- Protective relays;
- Breaker failure protection;
- Circuit breaker reclosing controllers;
- Tap changer controls;
- Data alarm systems;
- Digital fault recorders ("DFR"); and
- Cables and panels.

3.3.1.2 Program Description and Justification

Electromechanical and Solid State Protective Relay Replacement

Protective relays monitor and analyze the operational conditions of the electrical system. When a relay identifies unacceptable operating conditions (e.g., a fault), it will initiate an action to isolate the source of the condition by commanding high-voltage equipment (e.g., breakers) to operate. Protective relays play a crucial role in maintaining system stability and preventing hazardous conditions from damaging electrical equipment or harming personnel.

Older obsolete relays existing on Hydro's system are the electromechanical and older solid-state types, which lack features such as data storage and event recording capability. Modern digital multifunction relays are used to replace these older style relays, as they have increased setting flexibility, fault disturbance monitoring, communications capability, and metering functionality and offer greater dependability and security, enhancing system reliability. Digital and electromechanical relays are shown in Figure 18.

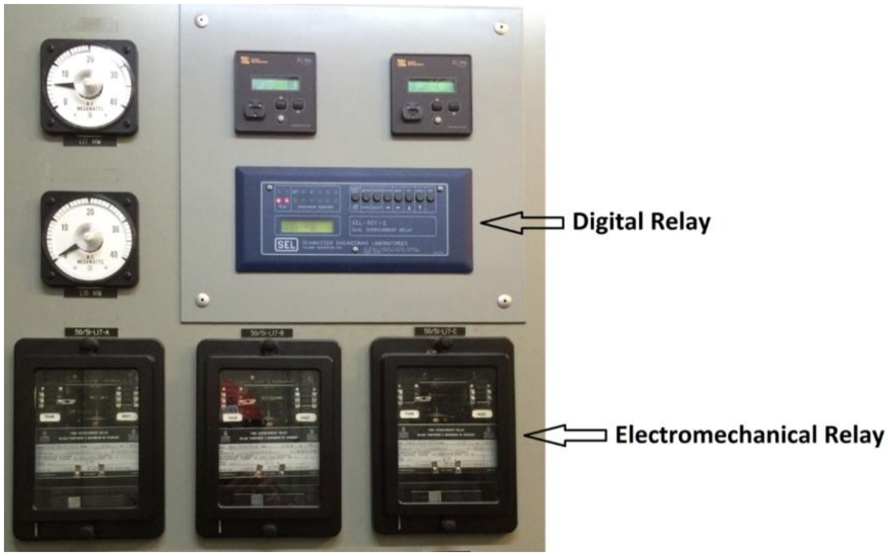

Figure 18: Digital and Electromechanical Relays

It is stated that "Hydro also plans to review its existing transformer, bus and line protections in an effort to develop plans for future implementation of modern digital relays with data storage and fault recording capabilities."[10] To fulfill this commitment, Hydro completed the following:

- A review of all transformer, bus, and line protection on 230 kV, 138 kV, and 69 kV systems, including data storage and fault recording capabilities; and
- A plan to replace all existing electromechanical transformer, bus, timer, and line protection relays with modern digital relays. Priority was given to the 230 kV relay, as Phase 1, with 138 kV and 69 kV to follow.

Hydro will continue to execute the replacement of 230 kV electromechanical and obsolete solid-state generator, transformer, line, and bus relays with modern digital multifunction relays, which began in 2016 under the Replace Protective Relays project.[11] Additionally, Hydro installed redundant multifunction transformer protection relays in 2016 for transformers rated above 10 MVA.[12] Under this program, Hydro will continue to install these upgrades.

[10] "Report to the Board of Commissioners of Public Utilities Related to Alarms, Event Recording Devices, and Digital Relays," Newfoundland and Labrador Hydro, August 1, 2014, sec. 3.1, p. 7/26–28.
[11] "2016 Capital Budget Application," Newfoundland and Labrador Hydro, July 31, 2015, vol. III, tab 19.
[12] In line with Section 1 of Hydro's "NL Hydro Protection & Control Standard – Transformer Protection," included as Attachment 1 to its response to request for information CA-NLH-037, filed as part of the 2016 CBA proceeding.

Furthermore, Hydro plans to replace protection relays in the Wabush Terminal Station on 46 kV feeders. Each replacement is currently planned to coincide with the replacement of the circuit breaker associated with that protection.

Breaker Failure Protection

Protective relaying is designed to trip a breaker during fault conditions to remove the fault from the electrical system to minimize equipment outages and maintain system stability and safe, reliable operation. When a breaker does not properly isolate a fault, other breakers will be commanded to trip to isolate the fault. This will result in larger outages but will ensure isolation of the original fault in time to minimize damage to equipment and minimize impact to the system. The failure of a breaker to isolate a fault when commanded is called a breaker failure.

Prior to 2014, breaker failure protection was implemented only in Hydro's 230 kV terminal stations. In 2014, Hydro completed a review of breaker failure protection in 66 kV and 138 kV terminal stations. Hydro also developed a protection and control standard, "Application of Breaker Failure Relaying," calling for breaker failure protection on transmission breakers rated at 66 kV and above. From this review, Hydro identified 20 terminal stations requiring breaker failure protection.

As part of Hydro's 2016 CBA, Hydro proposed and received Board approval for the installation of breaker failure protection in three terminal stations.[13,14] Hydro will continue its plan to execute the installation of breaker failure protection in the remaining terminal stations. Hydro has also identified concerns with the reliability of legacy breaker failure in 230 kV stations and will be replacing, as necessary, under this program.

Tap Changer Paralleling Control Replacement

Tap changer paralleling controls are designed to:

- Ensure the load bus voltage is regulated, as prescribed by the setting;
- Minimize the current that circulates between the transformers, as would be due to the tap changers operating on inappropriate tap positions; and

[13] "2016 Capital Budget Application," Newfoundland and Labrador Hydro, July 31, 2015, vol. I, sec. D, p. D-388.
[14] Approved in Board Order No. P.U. 33(2015).

- Ensure the controller operates correctly in multiple transformer applications regardless of system configuration changes or station breaker operations and resultant station configuration changes.

Current tap changer controls are of similar vintage as the power transformers, dating back to the late 1960s, and require replacement. Recent feedback from the tap changer paralleling control supplier indicated older equipment has capacitors that will dry out over time resulting in control issues. It was recommended that the same controller model be applied to all transformers to optimize tap-changing control. The control issues described by the supplier have been seen by Hydro staff at numerous sites.

Hydro began replacing tap changer paralleling controls in 2019 at the Western Avalon Terminal Station.

Equipment Alarm Upgrades

Alarms inform the Energy Control Centre (“ECC”) and operating personnel that equipment and relaying require attention. These alarms are communicated to the ECC and/or displayed locally on the station annunciator as shown in Figure 19.

Figure 19: Annunciator Commonly Found in Hydro Terminal Stations

Hydro’s review of alarms, event recording devices, and digital relays found that by providing more detailed alarm schemes, the ECC and local operators are able to troubleshoot system events more accurately and quickly; as such, Hydro plans to continue installing improved data alarm management in 230 kV terminal stations whose existing data alarm management includes grouped alarms.

Hydro's internal study identified required increases to alarm detail to the ECC for five 230 kV terminal stations assessed - Stony Brook, Holyrood, Sunnyside, Oxen Pond, and Massey Drive. Hydro proposed and received approval to implement the proposed upgrades at the Stony Brook Terminal Station as part of the 2016 CBA Upgrade Data Alarm Systems project.[15,16] Hydro will continue its plan to install improved data alarm management with the remaining stations being addressed in future CBAs.

Deterioration of an annunciator can result in the failure of individual alarms or the whole unit, which may negatively affect the safe and reliable operation of the generation and transmission systems. For this reason, Hydro also replaces deteriorated obsolete annunciators.

Digital Fault Recorders

DFR record analog electrical data (such as voltage, frequency, and current) and digital relay contact positions at a high resolution to allow Hydro to determine the cause and location of an electrical fault. This data allows Hydro to restore service in a timely manner, address system configurations and settings to mitigate the impact of future faults, and improve the protection of critical electrical infrastructure. Hydro has DFRs deployed in several stations and has a program to install DFRs in areas where Hydro does not have sufficient DFR coverage to allow the analysis of faults.

Protection and Control Cable and Panel Modifications

This program will cover protection and control panels and wiring that may require alteration, replacement, or addition to existing wiring due to deterioration from environment conditions, accidental damage, or the modification/addition of protection and control equipment.

[15] "2016 Capital Budget Application," Newfoundland and Labrador Hydro, July 31, 2015, vol. I, sec. D, p. D-374.
[16] Approved in, Board Order No. P.U. 33(2015).

Appendix G

Risk Evaluation Matrix

Impact	Safety	Environment	System Reliability					
						General Plant and Business Continuity		
			Generation	Transmission and Terminals	Distribution	Buildings and Land	Tools and Equipment	Electronic Devices, Software, Telecontrol and Cyber Security (Including IT/OT/IS)
Very High (5)	• Fatality or injury causing permanent disability	• Regulatory non-compliance resulting in shut down of all operations for extended period • Major impact of extended duration requiring full-scale response • Damage will be evident for more than 10 years • Observed effect observed beyond a 10-km radius from Hydro property	• Loss of generation totalling 100 MW or greater • Loss of multiple prime power diesel generating units • Incident occurs between December and February on the Island or between October and April in Labrador • Total loss of control of generating units by the Energy Control Centre • Total loss of hydraulic control structure	• Non-redundant equipment serving an industrial customer or Newfoundland Power urban area • Non-redundant equipment interconnecting generation to the Island or Labrador Interconnected Systems • Non-redundant 230 kV or supporting equipment	• Impact to an entire region (e.g., Avalon Peninsula Newfoundland Power customers) • Restoration time >36 hours or rotating outages for >36 hours	• Building unsafe to enter • Damage to equipment inside a building leading to a business or service interruption of key infrastructure/critical assets (including IT/OT/IS) at multiple critical sites concurrently, or suspension of all operations for any amount of time • Inability to access assets due to the condition of land	• Inability to utilize tools or equipment, leading to a business or service interruption of key infrastructure/critical assets (including IT/OT/IS) at multiple critical sites concurrently	• Service interruption of multiple critical services (infrastructure and applications) concurrently or the suspension of all operations for any amount of time • Complete loss of electrical system stability • Cyber security threat event with multiple severe adverse effects on multiple organizational operations, assets, individuals, customers, or other organizations • Interruption to multiple non-critical services (infrastructure or applications) concurrently or suspension of non-critical operations for >50% of users
High (4)	• Safety event involving a lost-time injury	• Regulatory non-compliance with stop work orders issued • Extended clean-up effort required • Damage will be evident for next 5–10 years • Observed effect within a 10-km radius from Hydro property	• Loss of generation totaling 75 MW or greater • Loss of a prime power diesel generating unit • Incident occurs between April and November on the Island or between May and September in Labrador • Partial loss of control of a hydraulic control structure • Loss of control of a terminal station or non-staffed generating station by the Energy Control Centre	• Redundant equipment serving industrial customers or Newfoundland Power urban area • Redundant equipment interconnecting generation to the Island or Labrador Interconnected Systems • Redundant 230 kV or supporting equipment	• Impact on remote island community or other Newfoundland Power urban areas (St. John's Metro, Grand Falls, Gander, Corner Brook, >5,000 customers) • Restoration time is 24–36 hours or rotating outages for 24–36 hours	• Damage to equipment inside a building leading to a business or service interruption of key infrastructure/critical assets (including IT/OT/IS) at a single critical location with an outage length 24–36 hours, or rotating outages 24–36 hours • Inability to access assets by ground due to condition of land	• Inability to utilize tools or equipment, leading to a business or service interruption of key infrastructure/critical assets (including IT/OT/IS) at a critical site	• Service interruption of a single critical service (infrastructure or application) resulting in the loss of control/visibility of assets by the Energy Control Centre, impacts to the electricity system, or the inability to perform a critical function of the business • High impact on electrical system stability • Cyber security threat event with a severe adverse effect on organizational operations, assets, individuals, customers, or other organizations • Interruption to a critical service (infrastructure or application) where non-critical functions cannot be performed and 150–300 users are impacted
Moderate (3)	• Injury leading to a medical treatment incident	• Regulatory non-compliance Identified by government inspector, resulting in administrative penalty • Reportable with some cleanup measures • Temporary damage • Observed effect on/directly adjacent to Hydro property (within 500-m radius)	• Loss of generation totaling 50 MW to 75 MW • Incident occurs between November and March on the Island or between September and April in Labrador	• Redundant 138 kV or supporting equipment • Non-redundant 66 kV/69 kV class or supporting equipment	• Impact to 1,000–5,000 customers • Restoration time of 12–24 hours	• Damage to equipment inside a building leading to a business or service interruption of infrastructure/assets (including IT/OT/IS) at multiple non-critical locations or a single critical location causing a disruption in performance levels between 12 and 24 hours, without suspending operations • Access to assets by ground leads to greater than a 12–24 hour delay in arrival	• Inability to utilize tools or equipment, leading to a business or service interruption of infrastructure/assets (including IT/OT/IS) at a non-critical site for 72–96 hours	• Service interruption of a single critical service (Infrastructure or application) resulting in an indirect impact to the Energy Control Centre, the electricity system, or a critical business function is compromised • Medium impact on electrical system stability • Cyber security event where the organization can safely perform primary functions at a reduced capacity • Interruption to non-critical service (infrastructure or application) where non-critical functions cannot be performed and between 50 and 150 users are impacted
Low (2)	• Injury requiring first aid treatment	• Regulatory non-compliance addressed by internal improvement initiatives • Reportable with limited clean-up measures • Non-permanent damage • Observed effect on Hydro property only	• Loss of generation totaling 25 MW to 50 MW • Incident occurs between May and October on the Island or between June and August in Labrador	• Redundant 138 kV or supporting equipment • Non-redundant 66 kV/69 kV class or supporting equipment	• Impact to 100–1,000 customers • Restoration time <8 hours	• Damage to equipment inside a building leading to a business or service interruption of non-critical infrastructure/assets or of critical infrastructure/assets that is restorable in 4–12 hours without disruption to performance levels • Access to assets by ground leading to 4–12 hour delay in arrival	• Inability to utilize tools or equipment, leading to a business or service interruption of infrastructure/assets (including IT/OT/IS) at a non-critical site for 48–72 hours	• Service interruption to a single critical service (infrastructure or application) with no impact on the Energy Control Centre or the electricity system but a critical business function is compromised • Low impact on electrical system stability • Cyber security event where the organization can safely perform primary functions • Interruption to non-critical service (Infrastructure or application) with non-critical function compromised for >50 users
Very Low (1)	• Injury not requiring first aid, no absence from work	• No regulatory compliance concern • Not reportable with no cleanup measures • No observed effect on Hydro property or adjacent properties	• Loss of generation up to 25 MW • Incident occurs between June and September on the Island or between July and August in Labrador	• Redundant 66 kV/69 kV class or supporting equipment	• Impact to <100 customers • Restoration time <4 hours	• Damage to equipment inside a building leading to a business or service interruption that is not noticed outside of the operational area monitoring the impacted system • Access to assets by ground leads to a 1–4 hour delay in arrival	• Inability to utilize tools or equipment, leading to a business or service interruption of infrastructure/assets (including IT/OT/IS) at a non-critical site for 24–48 hours	• Service interruption to a single critical service (infrastructure or application) with no impact on the Energy Control Centre, the electricity system, or any critical business functions • No impact on electrical system stability • Cyber security event where there are no impacts to the electricity system or any business functions • Interruption to Non-critical service (infrastructure or application) with little to no impact on users

Newfoundland and Labrador Hydro
2026 Capital Budget Application
Risk Mitigated

	Risk Mitigated
General Plant	
Procure Accommodations (2026) - Makkovik	17
Upgrade Core IT Infrastructure (2026–2027)	16
Backup Critical Control Systems (2026) - Holyrood	15
Replace Network Communications Equipment (2026–2027)	12
Perform Facilities Refurbishments (2026)	12
Replace 48 V Battery Banks and Chargers (2026–2027)	12
Upgrade Remote Terminal Units (2026)	12
Upgrade Core OT Infrastructure (2026)	10
Replace Teleprotection Equipment (2026–2028)	10
Migrate Legacy Applications (2026)	10
Telecommunications In-Service Failures (2026)	9
Replace Heavy-Duty Vehicles (2026–2028)	9
Refurbish Meteorological Stations - Phase 2 (2026–2027)	9
Replace Light-Duty Vehicles (2026–2027)	9
Rollout Document Control System (2026)	9
Replace Light-Duty Mobile Equipment (2026)	9
Replace Heavy-Duty Mobile Equipment (2026–2028)	9
Purchase Tools and Equipment (2026)	8
Implement Safety Audits and Inspections System (2026)	8
Perform Software Upgrades and Minor Enhancements - Information Technology (2026–2027)	8
Replace Back-up Generators at Microwave Repeater Sites (2026–2027)	8
Update Cybersecurity Infrastructure (2026)	8
Replace UPS System - Back Up Control Center (2026) - Holyrood	8
Install CCTV Systems (2026)	8
Replace Walkway to Toe of Dam (2026–2027) - Paradise River	8
Replace Radio Link to Hydraulic Control Structure (2026–2027) - Ebbegnbaeg	8
Perform Software Upgrades and Minor Enhancements - Operational Technology (2026)	8
Replace GRID Application (2026–2027)	8
Purchase Personal Computers (2026)	6
Purchase Mobile Devices (2026)	6
Replace Peripheral Infrastructure (2026)	6
Modify Office Buildings and Procure Furniture, Fixtures, & Equipment (2026)	6
Renewal	
Overhaul Turbine Valves and Generator - Unit 2 (2026) - Holyrood	15
Perform Boiler Condition Assessment and Miscellaneous Upgrades (2026) - Holyrood	15
L23/24 Steel-Tower Transmission Line Renewal (2026–2029)	15
Distribution System In-Service Failures, Miscellaneous Upgrades and Street Lights (2026)	14
Replace Fuel Storage Tank (2026) - McCallum	14
Hydraulic In-Service Failures (2026)	12
Gas Turbine In-Service Failures (2026)	12
Wood Pole Line Management (2026)	12
Terminal Station In-Service Failures (2026)	12
Transmission In-Service Failures (2026)	12
Thermal In-Service Failures (2026)	12
Overhaul Hydraulic Units (2026)	12
Overhaul Major Pumps (2026) - Holyrood	12

Newfoundland and Labrador Hydro
2026 Capital Budget Application
Risk Mitigated

	Risk Mitigated
Diesel In-Service Failures (2026)	12
Upgrade Power Transformers (2026–2027)	10
Perform Major Inspection - Synchronous Condenser 1 (2026–2027) - Wabush Terminal Station	10
Perform Level 2 Condition Assessment - Penstock 4 (2026) - Bay d'Espoir	10
Replace Disconnects (2026–2028)	10
Refurbish Water Treatment Systems (2026–2027) - Holyrood	10
Perform Level 2 Condition Assessment - Condenser and Condenser Tubes (2026–2027) - Holyrood	10
Upgrade Spherical Valve Controls (2026–2029) - Bay d'Espoir	10
Replace Terminal Station Battery Banks and Chargers (2026–2027)	10
Replace Parts of Stage 1: 129 Vdc Batteries and Battery Chargers (2026–2027) - Holyrood	10
Overhaul Diesel Units (2026)	8
Replace Fuel Storage Tanks (2026) - Happy Valley	8
Replace Roof (2026–2027) - Hopedale	8
Replace Air Dryer (2026–2027) - Hardwoods	8
Replace 125VDC Battery Bank (2026–2027) - Hardwoods	8
Renew Distribution Feeders (2026–2027)	6
Renew Circuit Breakers (2026–2028)	6
Inspect Fuel Storage Tanks (2026) - Rigolet	5
Replace Battery Bank (2026–2027) - Granite Canal	5
Replace DC Fuel Pump (2026–2027) - Hardwoods	5
Perform Dam Infrastructure Refurbishments (2026)	5
Replace Protective Relays (2026–2027)	4
Perform Level 2 Condition Assessment - North Salmon Spillway (2026) - Upper Salmon	4
Perform Level 2 Condition Assessment - Penstock (2026) - Hinds Lake	4
Replace Instrument Transformers (2026–2027)	4
Service Enhancement	
Widen Right of Way (2026–2028) - Gros Morne National Park	20
Replace Expansion Joint and Rock Scaling (2026–2027) - Paradise River	15
Perform Minor Telecommunications Enhancements (2026)	12
Relocate Section of Line (2026–2028) - TL220	12
Remove Safety Hazards (2026)	12
Upgrade Cooling (2026–2027) - Hardwoods	12
Upgrade Worst-Performing Distribution Feeders (2026–2027)	9
Install Intelligent Electronic Devices Management Software (2026–2028)	8
Upgrade Excitation System (2026–2027) - Paradise River	6
Upgrade Terminal Station for Mobile Substation (2026–2027) - St. Anthony Diesel	5

Newfoundland and Labrador Hydro
2026 Capital Budget Application
Risk Mitigated per $1 Million

	Risk Mitigated Per $1 Million
General Plant	
Telecommunications In-Service Failures (2026)	72.8
Upgrade Remote Terminal Units (2026)	47.6
Backup Critical Control Systems (2026) - Holyrood	45.5
Perform Software Upgrades and Minor Enhancements - Operational Technology (2026)	30.4
Implement Safety Audits and Inspections System (2026)	26.3
Procure Accommodations (2026) - Makkovik	24.8
Replace UPS System - Back Up Control Center (2026) - Holyrood	24.8
Replace Peripheral Infrastructure (2026)	21.5
Update Cybersecurity Infrastructure (2026)	19.4
Purchase Mobile Devices (2026)	19.0
Install CCTV Systems (2026)	17.8
Replace Back-up Generators at Microwave Repeater Sites (2026–2027)	16.5
Migrate Legacy Applications (2026)	16.4
Replace GRID Application (2026–2027)	16.0
Replace 48 V Battery Banks and Chargers (2026–2027)	15.5
Rollout Document Control System (2026)	14.8
Replace Walkway to Toe of Dam (2026–2027) - Paradise River	13.7
Modify Office Buildings and Procure Furniture, Fixtures, & Equipment (2026)	13.4
Refurbish Meteorological Stations - Phase 2 (2026–2027)	12.9
Upgrade Core OT Infrastructure (2026)	12.5
Upgrade Core IT Infrastructure (2026–2027)	11.5
Replace Network Communications Equipment (2026–2027)	10.6
Replace Light-Duty Mobile Equipment (2026)	7.4
Replace Teleprotection Equipment (2026–2028)	6.7
Replace Radio Link to Hydraulic Control Structure (2026–2027) - Ebbegunbaeg	6.5
Purchase Personal Computers (2026)	5.4
Perform Software Upgrades and Minor Enhancements - Information Technology (2026–2027)	4.6
Purchase Tools and Equipment (2026)	4.3
Perform Facilities Refurbishments (2026)	4.0
Replace Light-Duty Vehicles (2026–2027)	2.9
Replace Heavy-Duty Mobile Equipment (2026–2028)	2.2
Replace Heavy-Duty Vehicles (2026–2028)	2.0
Renewal	
Transmission In-Service Failures (2026)	65.4
Replace 125VDC Battery Bank (2026–2027) - Hardwoods	54.5
Perform Level 2 Condition Assessment - Penstock 4 (2026) - Bay d'Espoir	42.2
Replace DC Fuel Pump (2026–2027) - Hardwoods	33.6
Replace Parts of Stage 1: 129 Vdc Batteries and Battery Chargers (2026–2027) - Holyrood	30.4
Replace Air Dryer (2026–2027) - Hardwoods	29.3
Replace Battery Bank (2026–2027) - Granite Canal	27.3
Gas Turbine In-Service Failures (2026)	24.0
Perform Level 2 Condition Assessment - Penstock (2026) - Hinds Lake	19.1
Replace Terminal Station Battery Banks and Chargers (2026–2027)	17.8
Perform Level 2 Condition Assessment - Condenser and Condenser Tubes (2026–2027) - Holyrood	15.9
Diesel In-Service Failures (2026)	14.7
Replace Fuel Storage Tank (2026) - McCallum	13.9

Newfoundland and Labrador Hydro
2026 Capital Budget Application
Risk Mitigated per $1 Million

	Risk Mitigated Per $1 Million
Perform Major Inspection - Synchronous Condenser 1 (2026–2027) - Wabush Terminal Station	13.4
Replace Fuel Storage Tanks (2026) - Happy Valley	11.5
Perform Dam Infrastructure Refurbishments (2026)	10.0
Inspect Fuel Storage Tanks (2026) - Rigolet	9.9
Upgrade Spherical Valve Controls (2026–2029) - Bay d'Espoir	7.4
Replace Instrument Transformers (2026–2027)	7.1
Refurbish Water Treatment Systems (2026–2027) - Holyrood	6.8
Perform Level 2 Condition Assessment - North Salmon Spillway (2026) - Upper Salmon	6.3
Overhaul Hydraulic Units (2026)	5.9
Overhaul Major Pumps (2026) - Holyrood	5.0
Upgrade Power Transformers (2026–2027)	4.7
Hydraulic In-Service Failures (2026)	4.5
Replace Roof (2026–2027) - Hopedale	4.0
Replace Disconnects (2026–2028)	4.0
Terminal Station In-Service Failures (2026)	3.6
Overhaul Diesel Units (2026)	3.4
Thermal In-Service Failures (2026)	3.1
Distribution System In-Service Failures, Miscellaneous Upgrades and Street Lights (2026)	2.3
Overhaul Turbine Valves and Generator - Unit 2 (2026) - Holyrood	2.2
Wood Pole Line Management (2026)	1.9
L23/24 Steel-Tower Transmission Line Renewal (2026–2029)	1.7
Perform Boiler Condition Assessment and Miscellaneous Upgrades (2026) - Holyrood	1.6
Replace Protective Relays (2026–2027)	1.5
Renew Distribution Feeders (2026–2027)	1.5
Renew Circuit Breakers (2026–2028)	1.4
Service Enhancement	
Perform Minor Telecommunications Enhancements (2026)	68.4
Remove Safety Hazards (2026)	49.9
Upgrade Cooling (2026–2027) - Hardwoods	27.0
Replace Expansion Joint and Rock Scaling (2026–2027) - Paradise River	20.1
Upgrade Excitation System (2026–2027) - Paradise River	14.2
Upgrade Terminal Station for Mobile Substation (2026–2027) - St. Anthony Diesel	12.7
Widen Right of Way (2026–2028) - Gros Morne National Park	7.5
Install Intelligent Electronic Devices Management Software (2026–2028)	6.3
Relocate Section of Line (2026–2028) - TL220	2.9
Upgrade Worst-Performing Distribution Feeders (2026–2027)	2.1

Sch 2: Five-Year Capital Plan

Schedule 2

Five-Year Capital Plan (2026–2030)

2026 Capital Budget Application

Five-Year Capital Plan (2026–2030)

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1.0 Introduction

In Board Order No. P.U. 30(2007), the Board of Commissioners of Public Utilities ("Board") directed Newfoundland and Labrador Hydro ("Hydro") to file a five-year capital expenditure plan, commencing with the 2009 Capital Budget Application ("CBA"). The Board indicated the plan should focus on strategic spending priorities over the five-year period, identify changing circumstances and set out alternative approaches under consideration.[1]

Hydro's five-year capital plan, provided as Appendix A to this Schedule, was developed consistent with its investment philosophy to invest responsibly in the electrical system to the benefit of its customers.[2] The five-year capital plan includes details on the costs and timing of forecast asset replacements and refurbishments. The five-year plan is revised considering evolving asset management practices, asset condition information, operational and system requirements, as well as operating environment factors. Recognizing major investment requirements in the five-year capital plan, Hydro continues to take deliberate actions to achieve a lower level of capital investment, where appropriate. As such, Hydro's 2026–2030 Five-Year Capital Plan reflects the capital investments necessary to maintain infrastructure and provide safe, reliable, least-cost electricity for customers, while aiming to balance cost, reliability, and environmental impacts.

Total projected spending each year has increased due to the proposed infrastructure required to increase generation capacity to meet evolving electricity needs. These are made up of Major Projects[3] required to respond to a rapidly changing energy landscape. As per the findings of the 2024 Resource Adequacy Plan, these investments include the installation of a Combustion Turbine ("CT") with renewable fuel capabilities on the Avalon Peninsula ("Avalon CT"), Unit 8 at the Bay d'Espoir Hydroelectric Generating Station ("Bay d'Espoir"), and up to 400 MW of wind energy. The 2024 Resource Adequacy Plan provides further details on the projected utility needs in the province and Hydro's plans to meet this demand.

[1] Board Order No. P.U. 30(2007), p. 5/37–42.
[2] Hydro has also provided a ten-year summary of Capital Expenditures from 2021–2030 as Appendix B to this Schedule.
[3] For this document, the term 'Major Project' is generally used to describe regulated projects and programs with an anticipated cost of $50 million or greater under the accountability of Hydro's Major Projects department.

In this report, Hydro has provided a discussion of the major drivers of expenditure in each of the investment classifications, including a discussion of shifts in spending priorities and the circumstances for such shifts, where applicable.

2.0 Five-Year Plan Overview

Hydro's five-year plan reflects an investment of approximately $2.80 billion in plant and equipment over the 2026–2030 period, including $1.97 billion related to Major Projects, and $3.09 million related to investment with up-front contributions (e.g., specifically assigned assets). The average total annual capital expenditure is approximately $559.4 million when major project additions are included, or $165.0 million excluding these additions. Chart 1 outlines the total anticipated capital spend per year for 2026–2030, which reflects the system growth and renewal-driven capital related to Major Projects. Chart 2 identifies the projects for 2026–2030, excluding Major Projects, which are primarily required for renewal-driven and general plant-related capital.

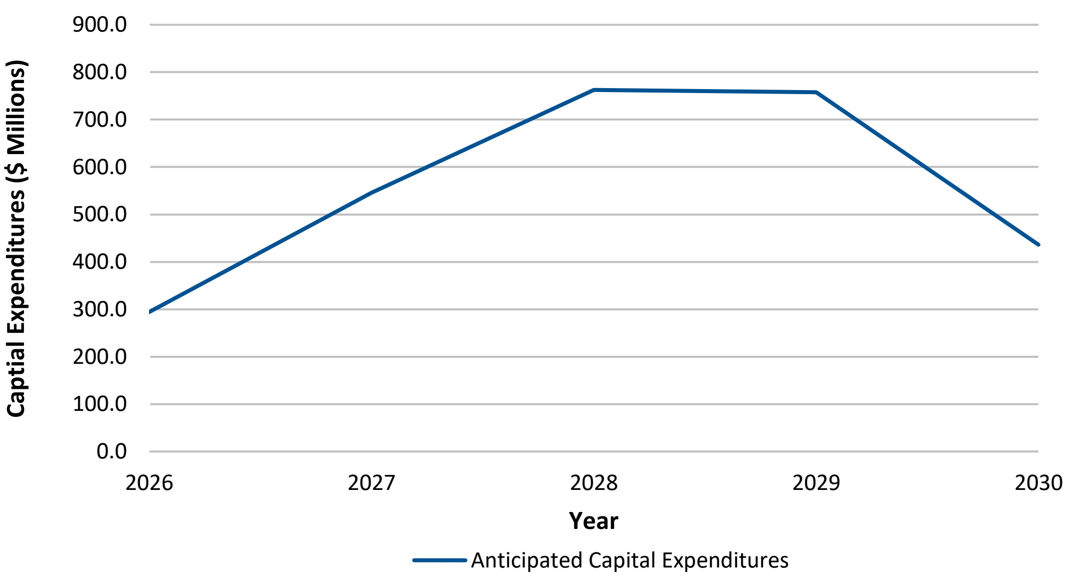

Chart 1: Total Anticipated Capital Expenditures (2026–2030), including Major Projects[4]

[4] The Major Projects values represent a portfolio of project estimates generally considered Association for the Advancement of Cost Engineering Class 3 classifications. The "Authorized Cost" for each estimate includes management reserve, contingency, escalation, interest during construction and the base cost estimate.

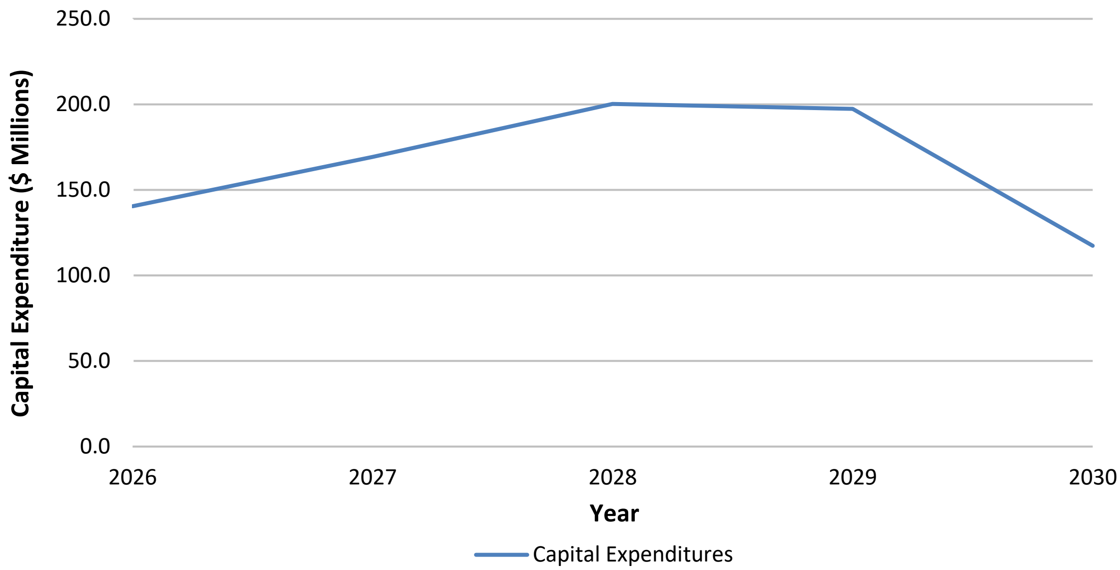

Chart 2: Total Planned Capital Expenditures (2026–2030), excluding Major Projects

This report excludes detailed information related to any Major Projects which are currently ongoing and/or within the 2026–2030 Five-Year Capital Plan. Information on the expenditures related to Hydro's Major Projects is included in Schedule 8 to this application.

Renewal expenditures within the 2026 CBA are largely driven by the age of Hydro's assets. The majority of Hydro's installed assets, including the hydroelectric installation at Bay d'Espoir, the Holyrood Thermal Generating Station ("Holyrood TGS"), the Stephenville Gas Turbine ("Stephenville GT"), the Hardwoods Gas Turbine ("Hardwoods GT"), and much of Hydro's transmission and distribution systems, are more than 40–50 years old and require prudent sustaining capital investment to ensure their continued safe and reliable operation. Renewal-driven capital investments include a refurbishment of Hydro's Upper Salmon Turbine and Generator and the Salmon River Spillway Structure. Other expenditures in the 2026–2030 Five-Year Capital Plan include general plant and service enhancement projects, and renewal of assets specifically assigned to Industrial customers ($3.09 million).[5]

[5] Excluding federal government contributions for ultra-fast direct current fast chargers.

Hydro has recommended that all three Holyrood TGS units and the Hardwoods GT and Stephenville GT are to remain available through the Bridging Period[6] while Hydro seeks to develop new long-term sources of supply. In 2021, Hydro engaged Hatch Ltd. ("Hatch") to complete an assessment of the condition of the Holyrood TGS assets and a study of the long-term viability of the Holyrood TGS as a generating facility.[7] A refresh of this study to evaluate the continued extension of the Holyrood TGS beyond the current retirement period was completed by Hatch in late 2024 and helped inform Hydro's 2026–2035 capital planning.[8] Hydro's planned thermal generation capital expenditures for the period 2026–2030 reflect the findings of both studies and include projects for the renewal of assets at the Holyrood TGS.

In the 2024 Resource Adequacy Plan, Hydro recommended its Minimum Investment Required Expansion Plan as a foundational first step toward meeting expected customer demand and recognized the need for continued decision-making to meet the expected case, or reference case. Hydro's expansion plan to meet the incremental requirements for the reference case will be included in the 2026 Resource Adequacy Plan. Future build applications that may occur as a result of the 2026 Resource Adequacy Plan will be incorporated into Hydro's five-year capital plan, consistent with the outcomes of the *Reliability and Resource Adequacy Study Review* at that time. Hydro is cognizant of the significant investment that would be required to implement additional generation, and therefore will seek opportunities to reduce or defer other capital expenditures in its five-year plan where appropriate and when associated risks can be acceptably mitigated.

3.0 Investment Drivers

In accordance with the provisional CBA Guidelines[9] and continuing its approach initially presented in the 2023 CBA, Hydro has provided a discussion of significant expenditures within each investment classification. This approach allows Hydro to focus its analysis and discussion of planned expenditures to highlight major drivers of investment across its assets. Hydro recognizes that segmentation by asset

[6] Hydro considers the Bridging Period to be from the present to 2030, or until such time that sufficient alternative generation is commissioned, adequate performance of the Labrador-Island Link is proven, and generation reserves are met. During the Bridging period, the system would reply primarily on existing sources of generation capacity to maintain reliability while new generation capacity is being built. The primary, readily available supply options in this period are extending the retirements of the Holyrood TGS, Stephenville GT and the Hardwoods GT until their capacities can be adequately replaced.
[7] "*Reliability and Resource Adequacy Study Review* – Assessment to Determine the Potential Long-Term Viability of the Holyrood Thermal Generating Station," Newfoundland and Labrador Hydro, March 31, 2022, att. 2.
[8] "*Reliability and Resource Adequacy Study Review* – Holyrood Thermal Generating Station Capital Plan Refresh," Newfoundland and Labrador Hydro, March 7, 2025, att. 1.
[9] "Capital Budget Application Guidelines (Provisional)," Board of Commissioners of Public Utilities, January 2022.

category also provides valuable insight into its strategy and the drivers of planned investment in its assets, particularly in the context of asset renewal; therefore, where appropriate, Hydro has provided a discussion of significant planned expenditures by asset category within investment classifications.

Hydro's five-year planned expenditures, including Major Projects for the period 2026–2030, segmented by investment classification, are presented in Chart 3. Chart 4 represents Hydro's five-year planned expenditures excluding Major Projects.

The drivers of investment and any shifts in spending priorities are provided herein, segmented by investment classification.

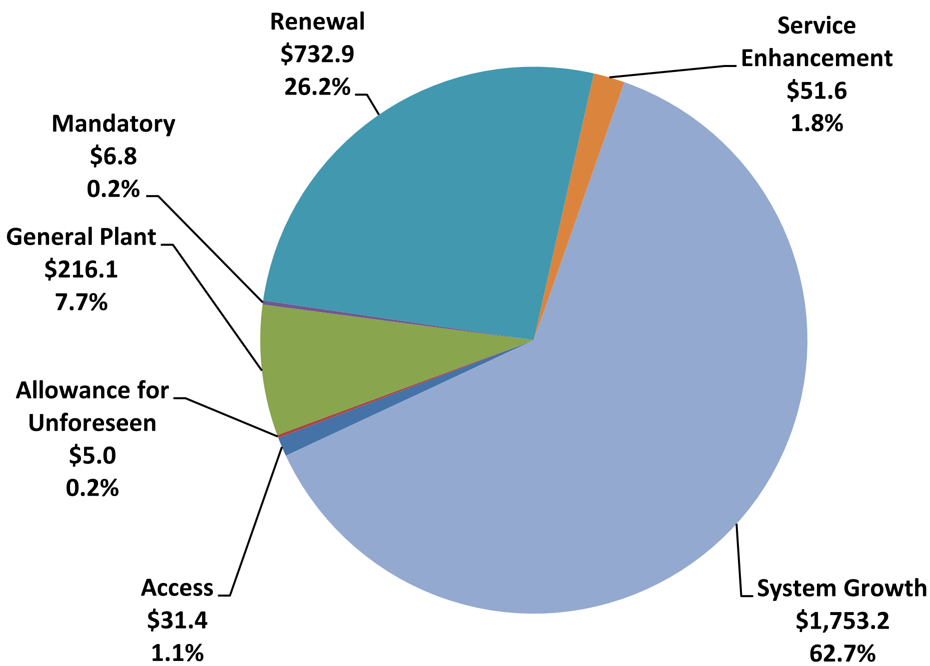

Chart 3: Five-Year Anticipated Capital Expenditures by Investment Classification, including Major Projects (2026–2030)[10]
($ Millions)

[10] The Major Projects values represent a portfolio of project estimates generally considered Association for the Advancement of Cost Engineering Class 3 classifications. The "Authorized Cost" for each estimate includes management reserve, contingency, escalation, interest during construction and the base cost estimate.

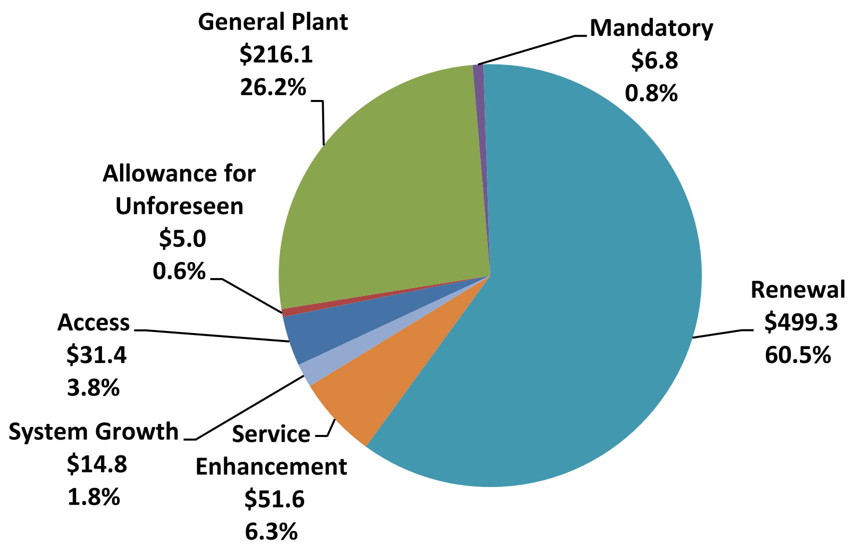

Chart 4: Five-Year Planned Capital Expenditures by Investment Classification, excluding Major Projects (2026–2030)
($ Millions)

This schedule excludes detailed information related to any Major Projects which are currently ongoing and/or within the 2026–2030 capital plan. Information on the expenditures related to Hydro's Major Projects is included in Schedule 8 to this application. At this time, Hydro's five-year capital plan also excludes any future application by Hydro for the long-term supply for Southern Labrador, as Hydro is currently reviewing, studying, and implementing ways to ensure that Charlottetown, Pinsent's Arm, and the other communities in the region receive safe, reliable service now, and long-term. This work is underway, intended to supplement the data Hydro has previously developed for its application.[11]

3.1 System Renewal

Projects and programs classified as "renewal" are those that are required to replace and/or refurbish system assets to maintain the ability to provide customers with their current electricity services. Renewal expenditures are critical to ensuring Hydro's ability to sustain its assets and to continue to safely and reliably provide the level of service required to its customers.

[11] For further information, please refer to "Newfoundland and Labrador Hydro's 2021 Capital Budget Supplemental Application for Approval of the Construction of Hydro's Long-Term Supply Plan for Southern Labrador – Update," Newfoundland and Labrador Hydro, June 25, 2025.

Asset renewal comprises approximately $499.3 million, or 60.5%, of Hydro's planned capital expenditures for the next five years. Hydro's planned renewal expenditures for the period 2026–2030, excluding Major Projects, are provided in Chart 5.

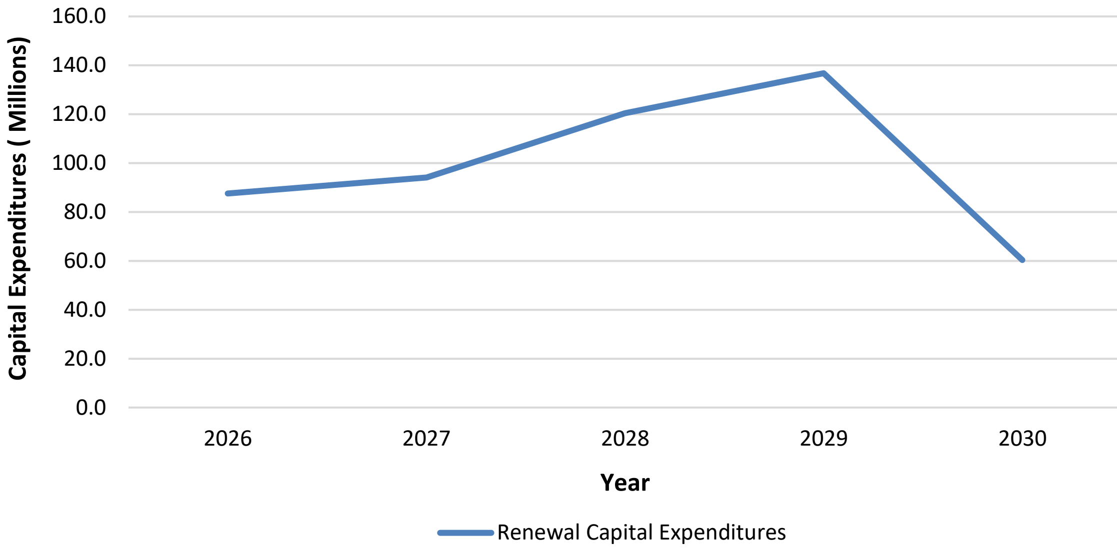

Chart 5: Planned Renewal Capital Expenditures (2026–2030)

Excluding the impact of Hydro's anticipated renewal expenditures related to Major Projects,[12] Hydro's planned renewal expenditures increase year over year until 2029, then decrease in 2030. This coincides with the planned work associated with the refurbishment work in Upper Salmon and Salmon River Spillway, as well as the diesel plant replacement in Rigolet.

Hydro's total planned renewal expenditures for the period 2026–2030, organized by major asset category, are provided in Chart 6.

[12] Hydro's Major Projects planned capital expenditures within this investment class are outlined in Appendix A of Schedule 8.

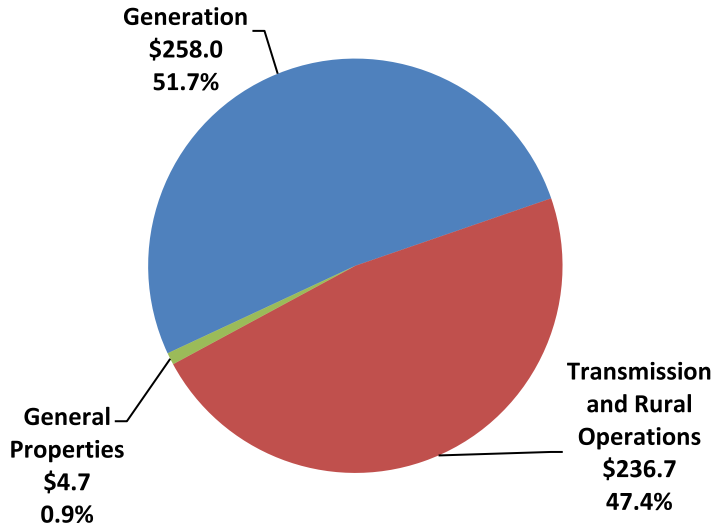

Chart 6: Five-Year Planned Renewal Expenditures by Asset Category (2026–2030) ($ Millions)[13]

Generation renewal-driven investment is forecast to total $258.0 million over the next five years. The requirement to invest sustaining capital in generation facilities has been increasing as parts of Hydro's generating facilities approached or surpassed their normal expected service lives. Primary drivers for these projects are the end-of-service lives for equipment and deterioration, causing reductions in reliability or performance. Hydro's five-year capital plan also includes investment in projects required for the renewal of Holyrood TGS assets. Hydro's planned renewal expenditures related to Holyrood TGS assets peak in 2026, primarily due to planned expenditures associated with the projects to overhaul the Unit 2 generator and turbine valves and the boiler condition assessment, and decrease thereafter, as expected. Further discussion of Hydro's planned expenditures for the Holyrood TGS is provided in the Holyrood Thermal Generating Station Overview – Future Operation and Capital Expenditure Requirements, which is provided as Schedule 3 to this Application.

[13] Numbers may not add due to rounding.

The primary drivers of planned generation renewal investment in Hydro's five-year capital plan are as follows:

- Renewal of Hydraulic Generating Assets – required to renew aging or deteriorating assets associated with Hydro's Hydraulic Generating Assets, including dams and hydraulic structures, unit, turbine, and generator overhauls, and replacement of aging or deteriorating ancillary equipment. In particular, refurbishment of the structure at the Salmon River Spillway and refurbishment of the generator and turbine at the Upper Salmon station, both planned to commence in 2027;
- Renewal of Thermal Generating Assets – required to sustain reliable operation of the Holyrood TGS until 2030, or until such time that sufficient alternative generation is commissioned, adequate performance of the Labrador-Island Link is proven, and generation reserves are met. In particular, annual performance of boiler condition assessments and overhaul of turbine valves on Units 1, 2, and 3, with one unit overhaul planned to commence each year from 2027 through 2029; and
- Renewal of CT Assets – in particular, a major overhaul of the Holyrood CT is required on the basis of turbine operating hours, planned to commence in 2027.

Renewal-driven investments also include the In-Service Failures Program in all years, which is an allotment of funds to be used in the event that immediate refurbishment or replacement must be completed due to the occurrence of an actual failure, the identification of an incipient failure, or the determination of faster-than-anticipated equipment deterioration.[14]

Transmission and Rural Operations ("TRO") renewal-driven investment is forecast to be $236.7 million over the next five years. TRO renewal investment is largely driven by Hydro's asset renewal programs, such as its Wood Pole Line Management and Diesel Unit Replacement and Overhaul programs, which are required for the reliable operation of aging assets.

[14] Work will not be completed under this program if it is more appropriate for it to be executed as allowance for unforeseen or through a capital budget supplemental project.

The primary drivers of planned TRO renewal investment in Hydro’s five-year capital plan are as follows:

- Replacement of the diesel plant in Rigolet, planned to commence in 2028, due to the facility having reached the end of its useful life and maximum spatial capacity;
- Renewal of terminal station assets, which is comprised of the continuation of multiple programs to renew aging or deteriorated terminal station assets;
- Hydro’s Wood Pole Line Management Program, required for renewal of wood pole transmission lines;
- Hydro’s Diesel Unit Replacement and Overhaul programs, required to maintain the reliable operation of Hydro’s diesel generating stations and maintain customer demand;
- Renewal of distribution feeders through Hydro’s Renew Distribution Feeders projects; and
- Renewal of steel-tower transmission lines, required to address deficiencies identified by inspection, with two transmission lines currently planned for renewal over the next five years.

3.2 General Plant

Projects and programs classified as “general plant” are those related to Hydro’s assets that are not part of its generation, transmission, and distribution system. Investment in general plant is required to renew assets that support Hydro’s operations, such as transportation, properties, information systems, and telecommunications infrastructure.

General plant totals approximately $216.1 million, or 26.2% of Hydro’s planned capital expenditures for the next five years. Hydro’s planned general plant expenditures for the period 2026–2030 are provided in Chart 7.

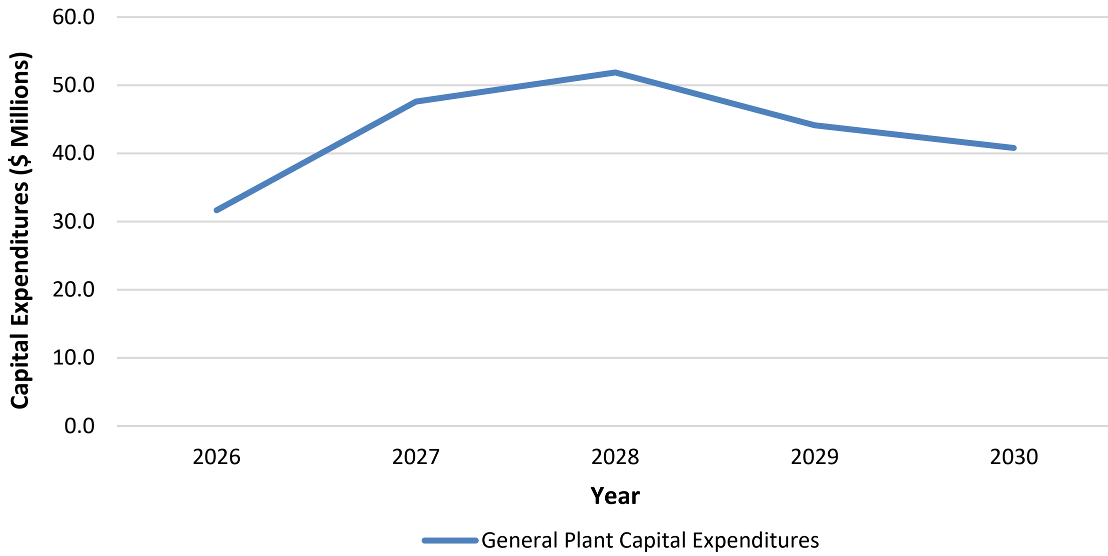

Chart 7: Planned General Plant Capital Expenditures (2026–2030)

1 Hydro's planned general plant expenditures steadily increase to a peak in 2028, then decline in 2029 and
2 2030. The peak in 2028 is primarily associated with the installation of a plant heating system at the
3 Holyrood TGS, which is planned to commence in 2027.[15]

4 Hydro's total planned general plant expenditures for the period 2026–2030, organized by major asset
5 category, are provided in Chart 8.

[15] Project timing is subject to change, but a project is currently planned for submission in the 2027 CBA.

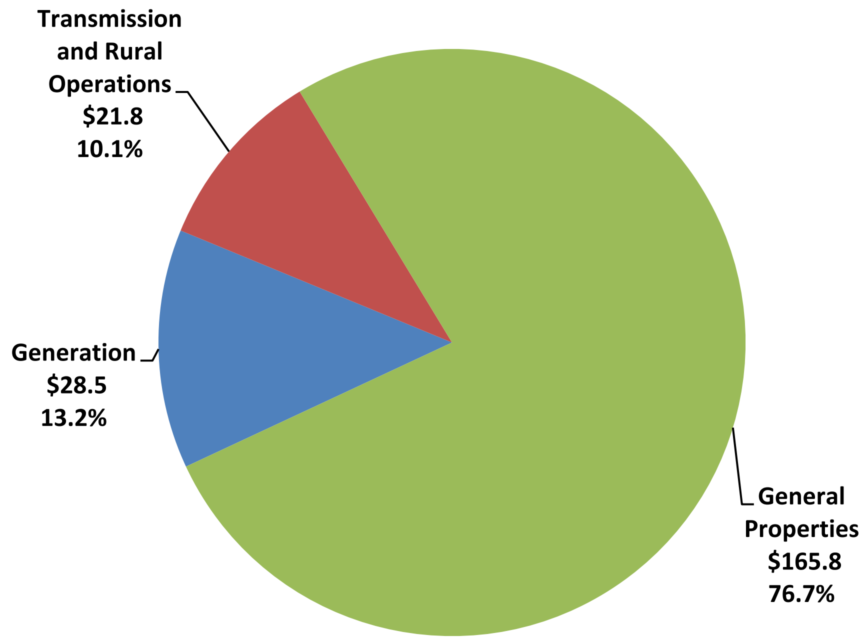

Chart 8: Five-Year Planned General Plant Expenditures by Asset Category (2026–2030) ($ Millions)

The primary drivers of general plant investment in Hydro's five-year capital plan are as follows:

- The Replace Light-Duty Vehicle programs and Replace Heavy-Duty Vehicles projects, which continue to experience higher than average vehicle expenditures resulting from global supply chain challenges and increased inflation, and are required to renew Hydro's fleet of light- and heavy-duty vehicles that support the operation and maintenance of its assets;
- Addition and expansion of projects and programs as a result of amalgamation[16] to renew information systems infrastructure, such as software, cybersecurity, and information technology infrastructure, personal computers, and mobile devices;
- Projects and programs to renew telecontrol infrastructure, including microwave radio systems, fibre-optic infrastructure, mobile devices, security, and other communications infrastructure; and

[16] Please refer to Section 5.1.1 of Schedule 1 for further discussion.

- Facilities refurbishment investment required for Hydro's properties, intended to restore their condition, ensure adherence to regulatory requirements, and extend the service life of its facilities. This is reflected in the implementation of a new program, Perform Facilities Refurbishment.

3.3 Service Enhancement

Projects and programs classified as "service enhancement" are those that modify Hydro's system to meet system operations requirements in a more efficient and/or effective manner, including those that improve safety or environmental compliance. Hydro undertakes service enhancement investments to address known issues that impact Hydro's ability to reliably and safely serve its customers efficiently and effectively.

Service enhancement accounts for approximately $51.6 million, or 6.3%, of Hydro's planned capital expenditures for the next five years, excluding Major Projects and Hydro's plan for the long-term supply for Southern Labrador. Hydro's planned service enhancement expenditures for the period 2026–2030 are provided in Chart 9.

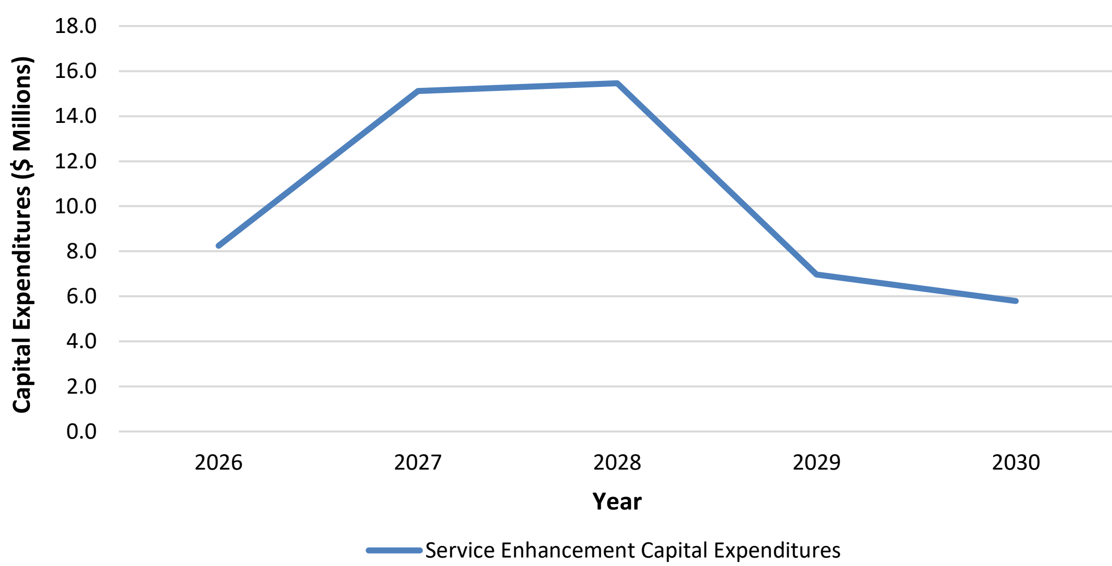

Chart 9: Planned Service Enhancement Capital Expenditures (2026–2030)

Hydro's planned service enhancement expenditures for 2026–2030 peak in 2027 and 2028, and trend downwards for the remainder of the period; this is primarily due to expenditures associated with the purchase of a spare generator step–up ("GSU") transformer.

Hydro's total planned service enhancement expenditures for the period 2026–2030, organized by major asset category, are provided in Chart 10.

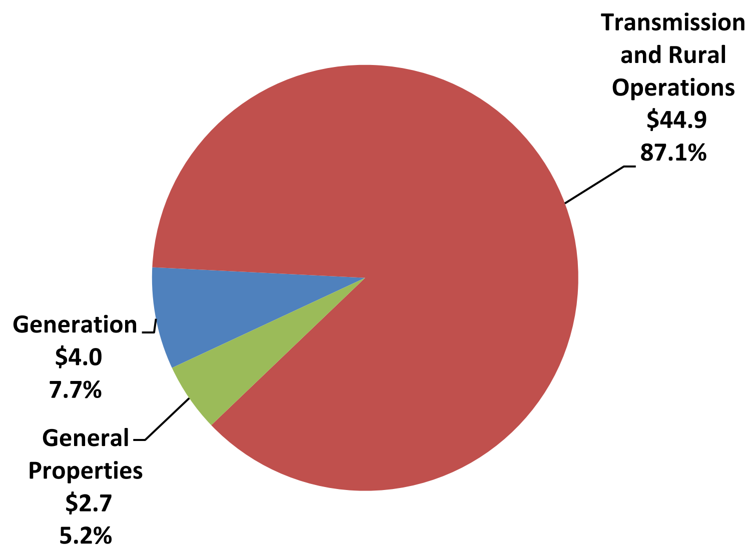

Chart 10: Five-Year Planned Service Enhancement Expenditures by Asset Category (2026–2030) ($ Millions)

The primary drivers of planned service enhancement investment in Hydro's five-year capital plan are related to TRO and are as follows:

- Purchase Spare GSU Transformer, which is designed for use in multiple locations. Further information can be found in Schedule 5 – Capital Expenditures Overview, Section 2.1;
- Hydro's Upgrade of Worst-Performing Distribution Feeders project, which is required to address deficiencies on distribution feeders that perform significantly worse than Hydro's average; and
- Modifications to terminal stations to improve oil and fire containment and to accommodate the interconnection of mobile substations, when required.

3.4 Access

Projects and programs classified as "access" are those required to meet Hydro's obligation to provide customers with access to electricity services. Access-related expenditures account for approximately $31.4 million, or 3.8%, of Hydro's planned capital expenditures for the next five years. Hydro's planned access expenditures for the period 2026–2030 are provided in Chart 11.

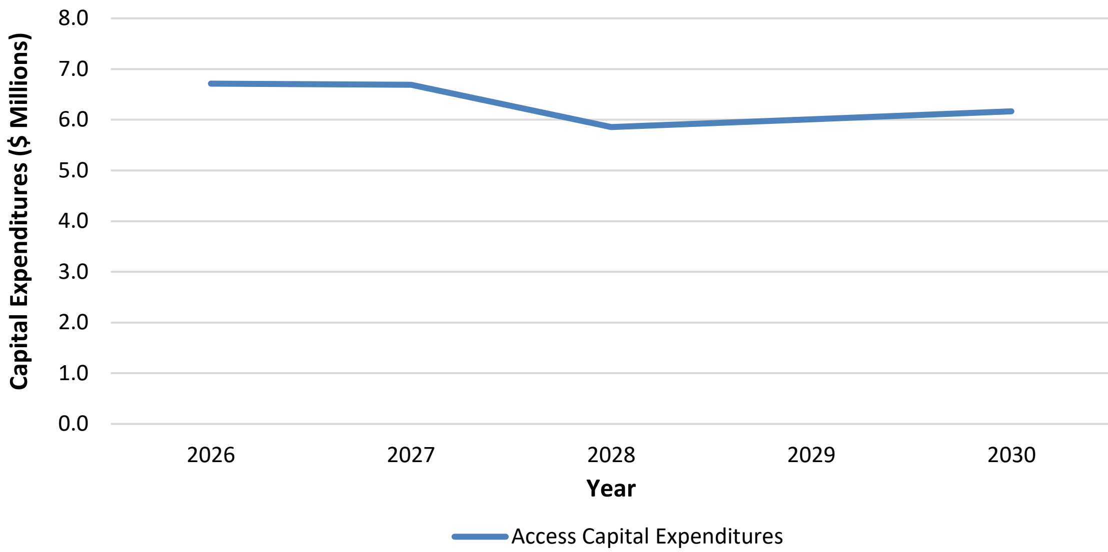

Chart 11: Planned Access Capital Expenditures (2026–2030)

Hydro's planned access-driven expenditures are the highest in 2026 and 2027, with a slight decline in 2028, remaining relatively consistent for the period 2026–2030. This is due to the planned upgrade to the Wiltondale Distribution System and the Interconnection and Integration of the Puffin Wind Inc. Renewable Energy Project, both planned to conclude in 2027. Hydro's five-year plan also reflects the continuation of the Provide Service Extensions program, which is required to provide service extensions to accommodate customers' requests for service.

3.5 System Growth

Projects and programs classified as "system growth" are those that are required to modify Hydro's system to meet forecast changes in customers' electricity resource requirements. System growth, excluding Major Projects, accounts for approximately $14.8 million, or 1.8%, of Hydro's planned capital expenditures for the next five years. Hydro's planned system growth expenditures for the period 2026–2030 are provided in Chart 12.

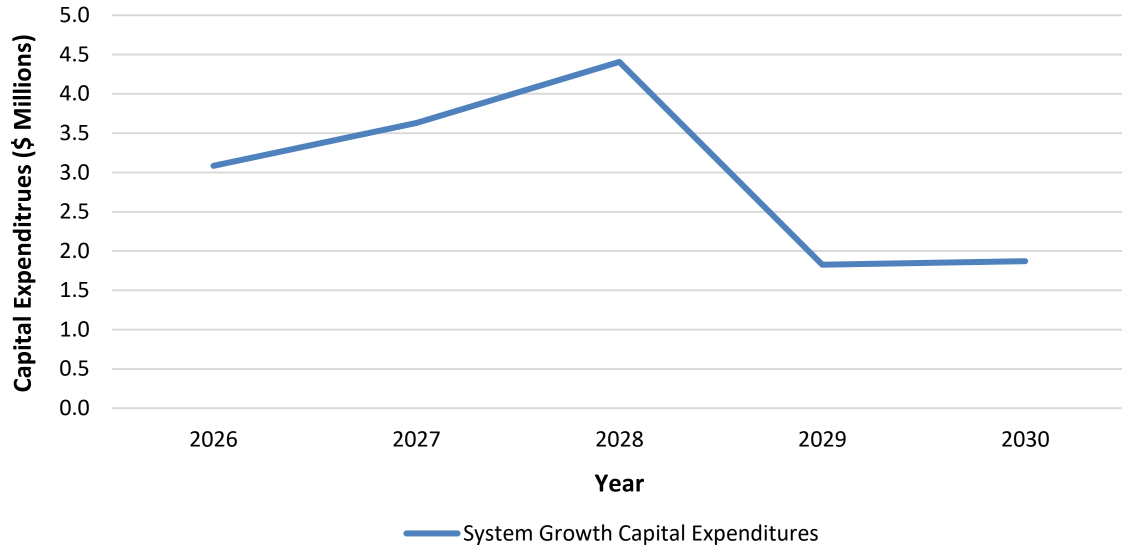

Chart 12: Planned System Growth Capital Expenditures (2026–2030)

Excluding Major Projects, expenditures related to system growth are trending to peak in 2028 and then are forecasted to decline. This coincides with the completion of the transformer capacity upgrade at Jean Lake Terminal Station and the Unit 2065 replacement in Rigolet.

4.0 Conclusion

Hydro's five-year plan reflects an investment of approximately $2.80 billion in plant and equipment over the 2026–2030 period, including $1.97 billion related to Major Projects and $3.09 million related to investment with up-front contributions (e.g., specifically assigned assets).

When Major Projects are excluded, capital expenditures in the five-year plan are primarily driven by investments in asset renewal and general plant, and include investments to support service enhancement, access, and system growth.

Hydro's five-year capital plan is consistent with its investment philosophy to invest responsibly in the electrical system to the benefit of its customers. Hydro has planned and identified projects to balance capital expenditures with customer reliability, safety, and the environment. The five-year capital plan reflects Hydro's continued focus on cost management to minimize impacts to ratepayers while delivering safe and reliable service.

Appendix A

Five-Year Capital Plan by Investment Class, and Major and Minor Asset Category (2026–2030)

Newfoundland and Labrador Hydro
2026 Capital Budget Application
Five-Year Capital Plan - By Investment Class[1]
($000)

	2025 and Prior Years	2026	2027	2028	2029	2030	Total
Access	344.2	6,712.4	6,688.7	5,856.0	6,010.0	6,168.0	**31,779.3**
Allowance for Unforeseen	-	1,000.0	1,000.0	1,000.0	1,000.0	1,000.0	**5,000.0**
General Plant	14,081.9	31,651.2	47,611.9	51,874.7	44,126.2	40,797.3	**230,143.2**
Mandatory	446.2	2,172.8	1,205.3	1,226.4	745.0	1,408.1	**7,203.7**
Renewal	10,960.0	87,623.2	94,137.1	120,439.1	136,754.4	60,340.4	**510,254.2**
Service Enhancement	7,482.7	8,244.0	15,121.3	15,461.7	6,967.3	5,793.2	**59,070.2**
System Growth	7,336.6	3,083.8	3,630.2	4,407.0	1,826.0	1,871.2	**22,154.9**
Total Capital Plan	**40,651.6**	**140,487.4**	**169,394.5**	**200,264.8**	**197,428.9**	**117,378.3**	**865,605.5**

[1] Numbers may not add due to rounding.

Newfoundland and Labrador Hydro
2026 Capital Budget Application
Five-Year Capital Plan - By Investment Classification [1]
($000)

	2025 and Prior Years	2026	2027	2028	2029	2030	Total
Access							
Interconnection and Integration of the Puffin Wind Inc. Renewable Energy Project (2025–2027) - Ramea	344.2	901.8	32.0	-	-	-	**1,278.0**
Provide Service Extensions (2026)	-	5,401.9	-	-	-	-	**5,401.9**
Upgrade Distribution System (2026–2027) - Wiltondale	-	408.7	952.7	-	-	-	**1,361.4**
Provide Service Extensions (2027)	-	-	5,704.0	-	-	-	**5,704.0**
Provide Service Extensions (2028)	-	-	-	5,856.0	-	-	**5,856.0**
Provide Service Extensions (2029)	-	-	-	-	6,010.0	-	**6,010.0**
Provide Service Extensions (2030)	-	-	-	-	-	6,168.0	**6,168.0**
Access Total	**344.2**	**6,712.4**	**6,688.7**	**5,856.0**	**6,010.0**	**6,168.0**	**31,779.3**
Allowance for Unforeseen							
Allowance for Unforeseen Items (2030)	-	-	-	-	-	1,000.0	**1,000.0**
Allowance for Unforeseen Items (2026)	-	1,000.0	-	-	-	-	**1,000.0**
Allowance for Unforeseen Items (2027)	-	-	1,000.0	-	-	-	**1,000.0**
Allowance for Unforeseen Items (2028)	-	-	-	1,000.0	-	-	**1,000.0**
Allowance for Unforeseen Items (2029)	-	-	-	-	1,000.0	-	**1,000.0**
Allowance for Unforeseen Total	**-**	**1,000.0**	**1,000.0**	**1,000.0**	**1,000.0**	**1,000.0**	**5,000.0**
General Plant							
Replace Light- and Heavy-Duty Vehicles (2024–2026)	5,627.9	1,133.4	-	-	-	-	**6,761.3**
Purchase 50' Material Handler Aerial Device on Tracked Unit (2024–2026) - Happy Valley Goose Bay	865.8	7.1	-	-	-	-	**872.9**
Perform Accessibility Upgrades (2030)	-	-	-	-	-	273.7	**273.7**
Replace Light- and Heavy-Duty Vehicles (2025–2027)	2,714.6	1,675.8	3,147.2	-	-	-	**7,537.6**
Replace Mobile Equipment (2025–2027)	1,973.6	54.6	2,619.4	-	-	-	**4,647.6**
Replacement of Reporting Management Tools (2025–2026)	566.0	195.9	-	-	-	-	**761.9**
Upgrade Work Protection Code Application (2025–2026)	452.0	256.6	-	-	-	-	**708.6**
Replace GPS Clocks (2025–2026)	448.3	132.4	-	-	-	-	**580.7**
Microsoft Enterprise Agreement (2025–2027)	426.6	426.6	426.6	-	-	-	**1,279.9**
Install Electric Vehicle Chargers (2025–2026) - Hydro Sites	368.0	288.2	-	-	-	-	**656.2**
Upgrade Energy Management System (2025–2026)	284.4	188.5	-	-	-	-	**472.9**
Implement SCADA Points Application (2025–2026)	241.9	143.4	-	-	-	-	**385.3**
Construction and Installation of Ultra-Fast Electric Vehicle Charging Stations - Phase 2 (2025–2027)	61.0	3,940.2	186.5	-	-	-	**4,187.7**
Install Fire Protection - 230 kV Stations (2025–2026) - Come by Chance	51.7	534.5	-	-	-	-	**586.2**
Perform Facilities Refurbishments (2026)	-	3,027.9	-	-	-	-	**3,027.9**
Replace Light-Duty Vehicles (2026–2027)	-	2,547.5	548.6	-	-	-	**3,096.1**
Purchase Tools and Equipment (2026)	-	1,849.4	-	-	-	-	**1,849.4**
Replace Heavy-Duty Vehicles (2026–2028)	-	1,524.1	788.5	2,204.4	-	-	**4,517.0**
Replace Light-Duty Mobile Equipment (2026)	-	1,212.9	-	-	-	-	**1,212.9**
Purchase Personal Computers (2026)	-	1,115.7	-	-	-	-	**1,115.7**
Replace Network Communications Equipment (2026–2027)	-	1,038.4	99.0	-	-	-	**1,137.4**
Replace Teleprotection Equipment (2026–2028)	-	964.4	310.6	224.8	-	-	**1,499.8**
Upgrade Core IT Infrastructure (2026–2027)	-	871.6	522.9	-	-	-	**1,394.5**
Upgrade Core OT Infrastructure (2026)	-	799.6	-	-	-	-	**799.6**
Procure Accommodations (2026) - Makkovik	-	684.7	-	-	-	-	**684.7**
Perform Software Upgrades and Minor Enhancements - Information Technology (2026–2027)	-	649.9	1,097.2	-	-	-	**1,747.1**
Migrate Legacy Applications (2026)	-	611.0	-	-	-	-	**611.0**
Rollout Document Control System (2026)	-	607.3	-	-	-	-	**607.3**
Refurbish Meteorological Stations - Phase 2 (2026–2027)	-	528.1	167.4	-	-	-	**695.5**
Replace Radio Link to Hydraulic Control Structure (2026–2027) - Ebbegunbaeg	-	470.5	756.8	-	-	-	**1,227.3**
Install CCTV Systems (2026)	-	450.2	-	-	-	-	**450.2**
Modify Office Buildings and Procure Furniture, Fixtures, & Equipment (2026)	-	447.5	-	-	-	-	**447.5**
Update Cybersecurity Infrastructure (2026)	-	413.3	-	-	-	-	**413.3**
Backup Critical Control Systems (2026) - Holyrood	-	329.4	-	-	-	-	**329.4**
Replace UPS System - Back Up Control Center (2026) - Holyrood	-	322.8	-	-	-	-	**322.8**
Purchase Mobile Devices (2026)	-	315.9	-	-	-	-	**315.9**
Implement Safety Audits and Inspections System (2026)	-	304.7	-	-	-	-	**304.7**
Replace Peripheral Infrastructure (2026)	-	278.5	-	-	-	-	**278.5**
Perform Software Upgrades and Minor Enhancements - Operational Technology (2026)	-	262.8	-	-	-	-	**262.8**
Upgrade Remote Terminal Units (2026)	-	252.2	-	-	-	-	**252.2**
Replace 48 V Battery Banks and Chargers (2026–2027)	-	250.1	524.4	-	-	-	**774.5**
Replace Heavy-Duty Mobile Equipment (2026–2028)	-	173.8	1,809.7	2,112.2	-	-	**4,095.7**
Replace GRID Application (2026–2027)	-	134.9	363.9	-	-	-	**498.8**
Telecommunications In-Service Failures (2026)	-	123.6	-	-	-	-	**123.6**
Replace Back-up Generators at Microwave Repeater Sites (2026–2027)	-	94.5	391.3	-	-	-	**485.8**
Replace Walkway to Toe of Dam (2026–2027) - Paradise River	-	16.8	566.1	-	-	-	**582.9**
Modify Office Buildings and Procure Furniture, Fixtures, & Equipment (2030)	-	-	-	-	-	195.4	**195.4**
Perform Facilities Refurbishments (2027)	-	-	5,500.0	-	-	-	**5,500.0**
Install Plant Heating System (2027–2029) - Holyrood	-	-	4,887.3	6,858.9	3,354.9	-	**15,101.1**
Replace Light-Duty Vehicles (2027–2028)	-	-	1,905.0	412.8	-	-	**2,317.8**
Purchase Tools and Equipment (2027)	-	-	1,877.0	-	-	-	**1,877.0**
Replace Diesel Shop Building (2027–2028) - Bishop's Falls	-	-	1,422.0	889.9	-	-	**2,311.9**

Newfoundland and Labrador Hydro
2026 Capital Budget Application
Five-Year Capital Plan - By Investment Classification [1]
($000)

	2025 and Prior Years	2026	2027	2028	2029	2030	Total
Upgrade Core Information Technology Infrastructure (2027)	-	-	1,414.5	-	-	-	**1,414.5**
Refurbish Windows (2027–2030) - Hydro Place	-	-	1,279.3	1,267.2	1,289.8	1,312.8	**5,149.1**
Purchase Personal Computers (2027)	-	-	1,146.3	-	-	-	**1,146.3**
Replace Light-Duty Mobile Equipment (2027)	-	-	1,075.7	-	-	-	**1,075.7**
Replace Network Communications Equipment (2027–2028)	-	-	1,056.0	99.4	-	-	**1,155.4**
Overhaul Unit 2 and Unit 3 Boiler Stop Valves (2027) - Holyrood	-	-	800.0	-	-	-	**800.0**
SWOP Replacement (2027–2028)	-	-	701.0	200.0	-	-	**901.0**
Procure Accommodations (2027) - Labrador	-	-	694.1	-	-	-	**694.1**
Replace Heavy-Duty Vehicles (2027–2028)	-	-	685.8	1,905.0	-	-	**2,590.8**
Update Cybersecurity Infrastructure (2027)	-	-	637.9	-	-	-	**637.9**
Replace Heavy-Duty Mobile Equipment (2027–2029)	-	-	571.5	1,524.0	1,778.0	-	**3,873.5**
Perform Software Upgrades and Minor Enhancements - Information Technology (2027)	-	-	561.2	-	-	-	**561.2**
Migrate Legacy Applications (2027)	-	-	528.5	-	-	-	**528.5**
Resurface Parking Lots and Roads (2027–2028) - Bishop's Falls	-	-	500.0	400.0	-	-	**900.0**
Intake Access Road Realignment (2027) - Bay d'Espoir	-	-	500.0	-	-	-	**500.0**
Install CCTV Systems (2027)	-	-	457.9	-	-	-	**457.9**
Modify Office Buildings and Procure Furniture, Fixtures, & Equipment (2027)	-	-	454.5	-	-	-	**454.5**
Replace Peripheral Infrastructure (2027)	-	-	427.5	-	-	-	**427.5**
Perform Software Upgrades and Minor Enhancements - Operating Technology (2027)	-	-	425.0	-	-	-	**425.0**
Upgrade Core OT Infrastructure (2027)	-	-	375.0	-	-	-	**375.0**
Upgrade Line Depots (2027–2029) - Bay d'Espoir	-	-	373.4	1,710.2	1,726.2	-	**3,809.8**
Install Electric Vehicle Chargers (2027–2028) - Hydro Sites	-	-	337.8	343.7	-	-	**681.4**
Upgrade Energy Management System (2027–2028)	-	-	283.0	184.2	-	-	**467.2**
Perform Accessibility Upgrades (2027)	-	-	259.8	-	-	-	**259.8**
Replace 48 V Battery Banks and Chargers (2027–2028)	-	-	254.2	523.8	-	-	**778.0**
Performance Management (2027–2028)	-	-	250.0	350.0	-	-	**600.0**
Construct Pole Storage Ramps (2027–2030) - Labrador	-	-	250.0	250.0	250.0	250.0	**1,000.0**
Rollout Document Control System (2027)	-	-	200.0	-	-	-	**200.0**
Purchase Mobile Devices (2027)	-	-	183.4	-	-	-	**183.4**
Perform Minor Telecommunications Enhancements (2027)	-	-	177.8	-	-	-	**177.8**
Utiligy Replacement (2027–2030)	-	-	150.0	1,150.0	2,500.0	1,500.0	**5,300.0**
Replace Cisco Call Manager Appliances (2027)	-	-	130.0	-	-	-	**130.0**
Telecommunications In-Service Failures (2027)	-	-	125.5	-	-	-	**125.5**
Implement Recruitment System (2027–2028)	-	-	100.0	550.0	-	-	**650.0**
Clarity Replacement (2027–2028)	-	-	100.0	2,000.0	-	-	**2,100.0**
Replace Power Line Carrier (2027–2028) - TL212	-	-	93.6	681.4	-	-	**775.0**
Replace Powerhouse Roofs (2027–2028) - Hinds Lake	-	-	84.3	735.8	-	-	**820.1**
Rollout HP Content Manager (2027)	-	-	50.0	-	-	-	**50.0**
Replace Light-Duty Vehicles (2030–2031)	-	-	-	-	-	3,397.3	**3,397.3**
Perform Facilities Refurbishments (2028)	-	-	-	5,500.0	-	-	**5,500.0**
Replace Light-Duty Vehicles (2028–2029)	-	-	-	3,048.0	406.4	-	**3,454.4**
Upgrade Core Information Technology Infrastructure (2028)	-	-	-	2,393.7	-	-	**2,393.7**
Purchase Tools and Equipment (2028)	-	-	-	1,910.0	-	-	**1,910.0**
Replace Network Communications Equipment (2028–2029)	-	-	-	1,074.5	101.2	-	**1,175.7**
Replace Light-Duty Mobile Equipment (2028)	-	-	-	1,050.3	-	-	**1,050.3**
Perform Software Upgrades and Minor Enhancements - Information Technology (2028)	-	-	-	748.8	-	-	**748.8**
Procure Accommodations (2028) - Labrador	-	-	-	706.3	-	-	**706.3**
Upgrade Fire System (2028) - Holyrood	-	-	-	700.0	-	-	**700.0**
Update Cybersecurity Infrastructure (2028)	-	-	-	677.3	-	-	**677.3**
Purchase Personal Computers (2028)	-	-	-	597.6	-	-	**597.6**
Replace Heavy-Duty Mobile Equipment (2028–2029)	-	-	-	571.5	762.0	-	**1,333.5**
Migrate Legacy Applications (2028)	-	-	-	554.9	-	-	**554.9**
Perform Software Upgrades and Minor Enhancements - Operating Technology (2028)	-	-	-	525.0	-	-	**525.0**
Refurbish Spillway (2028–2030) - North Salmon Spillway	-	-	-	500.0	1,500.0	1,500.0	**3,500.0**
Microsoft Enterprise Agreement (2028–2030)	-	-	-	470.4	493.9	518.6	**1,482.9**
Install CCTV Systems (2028)	-	-	-	466.0	-	-	**466.0**
Replace Heavy-Duty Vehicles (2028–2029)	-	-	-	457.2	1,803.4	-	**2,260.6**
Upgrade Core OT Infrastructure (2028)	-	-	-	425.0	-	-	**425.0**
Install Electric Vehicle Chargers (2028–2029) - Hydro Sites	-	-	-	354.3	59.2	-	**413.4**
CMDB Implementation (2028)	-	-	-	350.0	-	-	**350.0**
Perform Accessibility Upgrades (2028)	-	-	-	264.4	-	-	**264.4**
Replace 48 V Battery Banks and Chargers (2028–2029)	-	-	-	258.7	533.0	-	**791.7**
Stabalize Powerhouse Slope (2028) - Cat Arm	-	-	-	200.0	-	-	**200.0**
Replace Peripheral Infrastructure (2028)	-	-	-	193.3	-	-	**193.3**
Modify Office Buildings and Procure Furniture, Fixtures, & Equipment (2028)	-	-	-	188.8	-	-	**188.8**
Perform Minor Telecommunications Enhancements (2028)	-	-	-	180.9	-	-	**180.9**
Replace Sewage System (2028) - Bishop's Falls	-	-	-	156.1	-	-	**156.1**
Purchase Mobile Devices (2028)	-	-	-	144.0	-	-	**144.0**
Telecommunications In-Service Failures (2028)	-	-	-	127.7	-	-	**127.7**
Replace Powerhouse 2 Roof (2028–2029) - Bay d'Espoir	-	-	-	100.0	960.0	-	**1,060.0**
Upgrade 600V and 208V Panelboard (2028–2029) - Upper Salmon	-	-	-	100.0	140.0	-	**240.0**

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	2025 and Prior Years	2026	2027	2028	2029	2030	Total
Rollout Document Control System (2028)	-	-	-	100.0	-	-	**100.0**
Refurbish Rip Rap on CD-4 (2028–2029) - Cat Arm Arm	-	-	-	100.0	450.0	-	**550.0**
Rollout HP Content Manager (2028)	-	-	-	52.5	-	-	**52.5**
Replace Septic System - Burnt Dam (2028–2029) - Bay d'Espoir	-	-	-	50.0	125.0	-	**175.0**
Replace Heavy-Duty Vehicles (2030–2031)	-	-	-	-	-	762.0	**762.0**
Perform Facilities Refurbishments (2029)	-	-	-	-	5,500.0	-	**5,500.0**
Replace Light-Duty Vehicles (2029–2030)	-	-	-	-	3,384.6	381.0	**3,765.6**
Purchase Tools and Equipment (2029)	-	-	-	-	1,943.5	-	**1,943.5**
Upgrade Core Information Technology Infrastructure (2029)	-	-	-	-	1,869.0	-	**1,869.0**
Replace Light-Duty Mobile Equipment (2029)	-	-	-	-	1,314.5	-	**1,314.5**
Replace Heavy-Duty Vehicles (2029–2030)	-	-	-	-	1,117.6	3,581.4	**4,699.0**
Replace Network Communications Equipment (2029–2030)	-	-	-	-	1,093.4	103.0	**1,196.3**
Purchase Personal Computers (2029)	-	-	-	-	911.8	-	**911.8**
Purchase Personal Computers (2030)	-	-	-	-	-	814.9	**814.9**
Procure Accommodations (2029) - Labrador	-	-	-	-	718.7	-	**718.7**
Update Cybersecurity Infrastructure (2029)	-	-	-	-	709.5	-	**709.5**
Perform Software Upgrades and Minor Enhancements - Information Technology (2029)	-	-	-	-	643.2	-	**643.2**
Replace Fluorescent Lighting (2029) - Hydro Place	-	-	-	-	529.0	-	**529.0**
Perform Level 2 Condition Assessment - Tubine & Generator (2029) - Cat Arm Arm	-	-	-	-	500.0	-	**500.0**
Install CCTV Systems (2029)	-	-	-	-	474.1	-	**474.1**
Perform Level 2 Condition Assessment - Spillway (2029) - Hinds Lake	-	-	-	-	450.0	-	**450.0**
Perform Software Upgrades and Minor Enhancements - Operating Technology (2029)	-	-	-	-	450.0	-	**450.0**
Renew Property, Grounds and Infrastructure (2029) - St. Anthony, Bishop's Falls, Stephenville, and Whitbourne	-	-	-	-	445.3	-	**445.3**
Upgrade Core OT Infrastructure (2029)	-	-	-	-	425.0	-	**425.0**
Install Electric Vehicle Chargers (2029–2030) - Hydro Sites	-	-	-	-	360.5	60.2	**420.7**
Upgrade Energy Management System (2029–2030)	-	-	-	-	302.8	200.0	**502.8**
Replace Heavy-Duty Mobile Equipment (2029–2030)	-	-	-	-	285.8	1,524.0	**1,809.8**
Perform Accessibility Upgrades (2029)	-	-	-	-	269.0	-	**269.0**
Replace 48 V Battery Banks and Chargers (2029–2030)	-	-	-	-	263.2	542.3	**805.6**
Perform Level 2 Condition Assessment - Intake (2029) - Upper Salmon	-	-	-	-	250.0	-	**250.0**
Purchase Mobile Devices (2029)	-	-	-	-	221.0	-	**221.0**
Replace Sections of Roof and Penetrations - Main Powerhouse (2029–2030) - Holyrood	-	-	-	-	220.6	897.2	**1,117.8**
Perform Level 2 Condition Assessment - Penstock (2029) - Upper Salmon	-	-	-	-	200.0	-	**200.0**
Modify Office Buildings and Procure Furniture, Fixtures, & Equipment (2029)	-	-	-	-	192.1	-	**192.1**
Perform Minor Telecommunications Enhancements (2029)	-	-	-	-	184.1	-	**184.1**
Replace Peripheral Infrastructure (2029)	-	-	-	-	180.1	-	**180.1**
Telecommunications In-Service Failures (2029)	-	-	-	-	130.0	-	**130.0**
Rollout Document Control System (2029)	-	-	-	-	100.0	-	**100.0**
Replace Powerhouse Roof (2029–2030) - Cat Arm	-	-	-	-	100.0	1,500.0	**1,600.0**
Refurbish Rip Rap on SD-2 -West Salmon Dam (2029–2030) - Upper Salmon	-	-	-	-	100.0	900.0	**1,000.0**
Rollout HP Content Manager (2029)	-	-	-	-	55.1	-	**55.1**
Perform Facilities Refurbishments (2030)	-	-	-	-	-	5,500.0	**5,500.0**
Hydraulic In Service Failures (2030)	-	-	-	-	-	2,862.4	**2,862.4**
Purchase Tools and Equipment (2030)	-	-	-	-	-	1,977.7	**1,977.7**
Replace Light-Duty Mobile Equipment (2030)	-	-	-	-	-	1,494.8	**1,494.8**
Replace Network Communications Equipment (2030–2031)	-	-	-	-	-	1,112.6	**1,112.6**
Perform Software Upgrades and Minor Enhancements - Information Technology (2030–2031)	-	-	-	-	-	1,073.6	**1,073.6**
Update Cybersecurity Infrastructure (2030)	-	-	-	-	-	733.3	**733.3**
Procure Accommodations (2030) - Labrador	-	-	-	-	-	731.4	**731.4**
Replace Peripheral Infrastructure (2030)	-	-	-	-	-	512.7	**512.7**
Refurbish Spillway (2030–2032) - West Salmon Spillway	-	-	-	-	-	500.0	**500.0**
Install CCTV Systems (2030)	-	-	-	-	-	482.5	**482.5**
Upgrade Core OT Infrastructure (2030)	-	-	-	-	-	450.0	**450.0**
Upgrade Core Information Technology Infrastructure (2030)	-	-	-	-	-	423.0	**423.0**
Perform Software Upgrades and Minor Enhancements - Operating Technology (2030)	-	-	-	-	-	400.0	**400.0**
Install Electric Vehicle Chargers (2030–2031) - Hydro Sites	-	-	-	-	-	366.8	**366.8**
Replace Heavy-Duty Mobile Equipment (2030–2032)	-	-	-	-	-	317.5	**317.5**
Replace 48 V Battery Banks and Chargers (2030–2031)	-	-	-	-	-	267.9	**267.9**
Purchase Mobile Devices (2030)	-	-	-	-	-	225.0	**225.0**
Perform Level 2 Condition Assessment - Penstock Steel Liner (2030) - Cat Arm Arm	-	-	-	-	-	200.0	**200.0**
Perform Level 2 Condition Assessment - Penstock (2030) - Granite Canal	-	-	-	-	-	200.0	**200.0**
Perform Minor Telecommunications Enhancements (2030)	-	-	-	-	-	187.3	**187.3**
Replace Powerhouse Roofs (2030–2031) - Upper Salmon	-	-	-	-	-	150.0	**150.0**
Telecommunications In-Service Failures (2030)	-	-	-	-	-	132.2	**132.2**

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	2025 and Prior Years	2026	2027	2028	2029	2030	Total
Refurbish Rip Rap on North Cutoff LD-2 & Salmon River Dam LD-2 (2030–2031) - Bay d'Espoir	-	-	-	-	-	100.0	**100.0**
Rollout Document Control System (2030)	-	-	-	-	-	100.0	**100.0**
Rollout HP Content Manager (2030)	-	-	-	-	-	57.9	**57.9**
Replace 2000 Gallon Gasoline Tank (2030–2031) - Cat Arm	-	-	-	-	-	25.0	**25.0**
General Plant Total	**14,081.9**	**31,651.2**	**47,611.9**	**51,874.7**	**44,126.2**	**40,797.3**	**230,143.2**
Mandatory							
Purchase Meters and Metering Equipment (2025–2026)	446.2	278.4	-	-	-	-	**724.6**
Upgrade PLX Metering System (2026–2028) - Labrador East	-	1,188.8	485.8	494.3	-	-	**2,168.9**
Purchase Meters and Metering Equipment (2026)	-	705.6	-	-	-	-	**705.6**
Purchase Meters and Metering Equipment (2027)	-	-	719.5	-	-	-	**719.5**
Purchase Meters and Metering Equipment (2028)	-	-	-	732.1	-	-	**732.1**
Purchase Meters and Metering Equipment (2029)	-	-	-	-	745.0	-	**745.0**
Purchase Meters and Metering Equipment (2030)	-	-	-	-	-	758.1	**758.1**
Inspect Fuel Storage Tanks (2030) - Holyrood	-	-	-	-	-	650.0	**650.0**
Mandatory Total	**446.2**	**2,172.8**	**1,205.3**	**1,226.4**	**745.0**	**1,408.1**	**7,203.7**
Renewal							
Replace Diesel Gensets (2024–2025)	1,013.8	2,404.7	-	-	-	-	**3,418.5**
Rewind Stator (2025–2026) - Hinds Lake	5,233.2	9,695.5	-	-	-	-	**14,928.7**
Refurbish Marine Terminal (2025–2026) - Holyrood	1,190.8	1,295.6	-	-	-	-	**2,486.4**
Upgrade Power Transformers (2025–2026)	811.9	1,173.9	-	-	-	-	**1,985.8**
Replace Protective Relays (2025–2026)	668.6	2,282.6	-	-	-	-	**2,951.2**
Replace Diesel Gensets (2025–2027)	418.2	1,719.0	4,086.4	-	-	-	**6,223.6**
Refurbish Intake 2 (2025–2026) - Bay d'Espoir	284.4	3,069.4	-	-	-	-	**3,353.8**
Replace Emergency Diesel Genset (2025–2027) - Cat Arm	266.2	1,221.1	113.9	-	-	-	**1,601.2**
Upgrade Data Alarm Systems (2025–2026) - Hardwoods	184.0	188.7	-	-	-	-	**372.7**
Install Breaker Failure Protection (2025–2027) - Holyrood	177.8	320.9	166.5	-	-	-	**665.2**
Replace Disconnects (2025–2026)	145.3	1,245.5	-	-	-	-	**1,390.8**
Renew Circuit Breakers (2025–2026)	129.7	2,531.3	-	-	-	-	**2,661.0**
Replace Terminal Station Battery Banks and Chargers (2025–2026)	123.2	315.3	-	-	-	-	**438.5**
Replace Instrument Transformers (2025–2026)	112.5	356.4	-	-	-	-	**468.9**
Replace Circuit Breaker Reclosing Controllers (2025–2026) - Cow Head and Massey Drive	104.6	164.3	-	-	-	-	**268.9**
Replace 250 Vdc Battery Bank (2025–2026) - Stephenville	73.0	296.9	-	-	-	-	**369.9**
Perform Major Inspection - Synchronous Condenser 2 (2025–2026) - Wabush	22.8	1,249.0	-	-	-	-	**1,271.8**
Perform Boiler Condition Assessment and Miscellaneous Upgrades (2026) - Holyrood	-	9,600.0	-	-	-	-	**9,600.0**
Overhaul Turbine Valves and Generator - Unit 2 (2026) - Holyrood	-	6,969.6	-	-	-	-	**6,969.6**
Wood Pole Line Management (2026)	-	6,313.7	-	-	-	-	**6,313.7**
Distribution System In-Service Failures, Miscellaneous Upgrades and Street Lights (2026)	-	6,114.9	-	-	-	-	**6,114.9**
Thermal In-Service Failures (2026)	-	3,823.7	-	-	-	-	**3,823.7**
Terminal Station In-Service Failures (2026)	-	3,291.8	-	-	-	-	**3,291.8**
Hydraulic In-Service Failures (2026)	-	2,660.3	-	-	-	-	**2,660.3**
Overhaul Major Pumps (2026) - Holyrood	-	2,388.6	-	-	-	-	**2,388.6**
Overhaul Diesel Units (2026)	-	2,353.7	-	-	-	-	**2,353.7**
Overhaul Hydraulic Units (2026)	-	2,023.6	-	-	-	-	**2,023.6**
Upgrade Power Transformers (2026–2027)	-	1,705.0	401.8	-	-	-	**2,106.8**
Renew Distribution Feeders (2026–2027)	-	1,015.3	3,053.0	-	-	-	**4,068.3**
Replace Fuel Storage Tank (2026) - McCallum	-	1,008.4	-	-	-	-	**1,008.4**
Diesel In-Service Failures (2026)	-	817.0	-	-	-	-	**817.0**
Replace Fuel Storage Tanks (2026) - Happy Valley	-	696.4	-	-	-	-	**696.4**
Perform Level 2 Condition Assessment - North Salmon Spillway (2026) - Upper Salmon	-	636.5	-	-	-	-	**636.5**
Replace Protective Relays (2026–2027)	-	616.0	1,969.8	-	-	-	**2,585.8**
Perform Level 2 Condition Assessment - Condenser and Condenser Tubes (2026–2027) - Holyrood	-	577.3	51.7	-	-	-	**629.0**
L23/24 Steel-Tower Transmission Line Renewal (2026–2029)	-	576.2	2,735.3	2,539.1	2,726.8	-	**8,577.4**
Refurbish Water Treatment Systems (2026–2027) - Holyrood	-	524.5	936.3	-	-	-	**1,460.8**
Inspect Fuel Storage Tanks (2026) - Rigolet	-	504.8	-	-	-	-	**504.8**
Gas Turbine In-Service Failures (2026)	-	500.1	-	-	-	-	**500.1**
Perform Dam Infrastructure Refurbishments (2026)	-	500.0	-	-	-	-	**500.0**
Replace Instrument Transformers (2026–2027)	-	371.2	196.1	-	-	-	**567.3**
Replace Terminal Station Battery Banks and Chargers (2026–2027)	-	326.1	236.7	-	-	-	**562.8**
Upgrade Spherical Valve Controls (2026–2029) - Bay d'Espoir	-	314.9	219.6	358.3	460.3	-	**1,353.1**
Perform Level 2 Condition Assessment - Penstock 4 (2026) - Bay d'Espoir	-	237.2	-	-	-	-	**237.2**
Replace Parts of Stage 1: 129 Vdc Batteries and Battery Chargers (2026–2027) - Holyrood	-	229.1	100.1	-	-	-	**329.2**
Perform Level 2 Condition Assessment - Penstock (2026) - Hinds Lake	-	209.6	-	-	-	-	**209.6**
Replace Roof (2026–2027) - Hopedale	-	190.6	1,791.0	-	-	-	**1,981.6**
Renew Circuit Breakers (2026–2028)	-	188.2	2,250.1	1,975.6	-	-	**4,413.9**

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	2025 and Prior Years	2026	2027	2028	2029	2030	Total
Transmission In-Service Failures (2026)	-	183.4	-	-	-	-	**183.4**
Replace Disconnects (2026–2028)	-	169.1	1,694.0	631.6	-	-	**2,494.7**
Replace Battery Bank (2026–2027) - Granite Canal	-	138.8	44.2	-	-	-	**183.0**
Replace 125VDC Battery Bank (2026–2027) - Hardwoods	-	108.9	37.8	-	-	-	**146.7**
Replace DC Fuel Pump (2026–2027) - Hardwoods	-	90.4	58.4	-	-	-	**148.8**
Replace Air Dryer (2026–2027) - Hardwoods	-	75.2	198.0	-	-	-	**273.2**
Perform Major Inspection - Synchronous Condenser 1 (2026–2027) - Wabush Terminal Station	-	43.0	700.7	-	-	-	**743.7**
Wood Pole Line Management (2027)	-	-	10,839.0	-	-	-	**10,839.0**
Perform Boiler Condition Assessment and Miscellaneous Upgrades (2027) - Holyrood	-	-	9,600.0	-	-	-	**9,600.0**
Distribution System In-Service Failures and Miscellaneous Upgrades (2027)	-	-	6,239.5	-	-	-	**6,239.5**
Overhaul Turbine Valves - Unit 1 (2027) - Holyrood	-	-	4,000.0	-	-	-	**4,000.0**
Thermal In-Service Failures (2027)	-	-	3,886.3	-	-	-	**3,886.3**
Refurbish Stage I & II Cooling Water Sumps (2027–2028) - Holyrood	-	-	3,507.9	3,549.3	-	-	**7,057.2**
Terminal Station In-Service Failures (2027)	-	-	3,352.5	-	-	-	**3,352.5**
Overhaul Hydraulic Units (2027)	-	-	2,794.7	-	-	-	**2,794.7**
Hydraulic In-Service Failures (2027)	-	-	2,701.8	-	-	-	**2,701.8**
Major Combustion Turbine Overhaul (2027–2029) - Holyrood	-	-	2,500.0	7,500.0	10,000.0	-	**20,000.0**
Overhaul Diesel Units (2027)	-	-	2,388.7	-	-	-	**2,388.7**
Overhaul Generator and Upgrade Online Monitoring - Unit 3 (2027) - Holyrood	-	-	2,295.4	-	-	-	**2,295.4**
Upgrade Rotor (2027–2029) - Holyrood Gas Turbine	-	-	2,000.0	5,000.0	5,000.0	-	**12,000.0**
Refurbish Spherical Valves - Units 1-6 (2027–2032) - Bay d'Espoir	-	-	1,500.0	1,500.0	1,500.0	1,500.0	**6,000.0**
Overhaul Major Pumps and Associated Motors (2027) - Holyrood	-	-	1,440.0	-	-	-	**1,440.0**
Replace Controllers (2027–2030) - Granite Canal	-	-	1,250.0	1,250.0	1,250.0	1,250.0	**5,000.0**
Inspect Fuel Storage Tanks (2027) - Makkovik	-	-	1,100.0	-	-	-	**1,100.0**
Renew Distribution Feeders (2027–2028)	-	-	1,035.1	3,024.7	-	-	**4,059.8**
Replace Protective Relays (2027–2028)	-	-	950.0	1,540.0	-	-	**2,490.0**
Refurbish Aluminum Towers (2027–2028) - TL212	-	-	845.0	860.0	-	-	**1,705.0**
Diesel In-Service Failures (2027)	-	-	837.4	-	-	-	**837.4**
Renew Circuit Breakers (2027–2029)	-	-	678.0	409.0	1,118.0	-	**2,205.0**
Refurbish Structure (2027–2030) - Salmon River Spillway	-	-	649.3	9,757.6	6,112.1	6,363.1	**22,882.1**
Overhaul Marine Terminal Loading Arms (2027) - Holyrood	-	-	550.0	-	-	-	**550.0**
Gas Turbine In-Service Failures (2027)	-	-	513.5	-	-	-	**513.5**
Perform Dam Infrastructure Refurbishments (2027)	-	-	500.0	-	-	-	**500.0**
Major Refurbishment Turbine & Generator (2027–2029) - Upper Salmon	-	-	500.0	15,000.0	20,000.0	-	**35,500.0**
Perform Level 2 Condition Assessment - West Salmon Spillway (2027) - Upper Salmon	-	-	474.6	-	-	-	**474.6**
Replace Diesel Gensets (2027–2028)	-	-	400.0	1,600.0	-	-	**2,000.0**
Perform Level 2 Condition Assessment - Light Oil System (2027) - Holyrood	-	-	400.0	-	-	-	**400.0**
Refurbish Draft Tube Deck - Phase 3 (2027–2029) - Bay d'Espoir	-	-	365.5	728.6	6,994.8	-	**8,088.9**
Replace T1 (2027–2029) - Burgeo	-	-	312.2	501.7	1,825.9	-	**2,639.8**
Replace Air Compressor 1 (2027–2028) - Holyrood	-	-	310.1	980.0	-	-	**1,290.1**
Replace Diesel Gensets (2027–2030) - Burnt Dam	-	-	300.0	900.0	500.0	250.0	**1,950.0**
Refurbish Intake 4 (2027–2028) - Bay d'Espoir	-	-	284.4	3,069.4	-	-	**3,353.8**
Replace Disconnects (2027–2029)	-	-	210.0	367.4	472.4	-	**1,049.8**
Replace Roof (2027–2028) - Cartwright	-	-	200.0	500.0	-	-	**700.0**
Transmission In-Service Failures (2027)	-	-	188.2	-	-	-	**188.2**
Replace Annunciator Panel (2027–2028) Upper Salmon	-	-	169.2	212.6	-	-	**381.8**
Replace Rip Rap on LD-5 (2027) - Salmon River Spillway	-	-	152.2	-	-	-	**152.2**
Perform Level 2 Condition Assessment - Steel Section (2027) - Paradise River	-	-	130.0	-	-	-	**130.0**
Replace Switchgear (2027–2029) - Grand Falls Terminal Station	-	-	130.0	390.0	790.0	-	**1,310.0**
Install Breaker Failure Protection (2027–2028) - Western Avalon	-	-	116.0	234.0	-	-	**350.0**
Replace Instrument Transformers (2027–2028)	-	-	105.7	70.5	-	-	**176.2**
Replace AC Fuel Pumps (2027–2028) - Hardwoods	-	-	100.0	100.0	-	-	**200.0**
Replace Terminal Station Battery Banks and Chargers (2027–2028)	-	-	89.0	59.0	-	-	**148.0**
Upgrade Power Transformers (2027–2028)	-	-	61.6	1,766.9	-	-	**1,828.5**
Replace Circuit Breaker Reclosing Controllers (2027–2028) - Come by Chance	-	-	52.9	81.4	-	-	**134.3**
Replace Vibration System (2027–2028) - Stephenville	-	-	50.0	200.0	-	-	**250.0**
Replace Emergency Diesel (2027–2028) - Burnt Dam	-	-	40.0	40.0	-	-	**80.0**
Perform Boiler Condition Assessment and Miscellaneous Upgrades (2028) - Holyrood	-	-	-	8,500.0	-	-	**8,500.0**
Wood Pole Line Management (2028)	-	-	-	7,051.0	-	-	**7,051.0**
Distribution System In-Service Failures and Miscellaneous Upgrades (2028)	-	-	-	6,406.8	-	-	**6,406.8**
Replace Diesel Plant (2028–2031) - Rigolet	-	-	-	5,000.0	10,000.0	10,000.0	**25,000.0**
Overhaul Turbine Valves - Unit 3 (2028) - Holyrood	-	-	-	4,270.0	-	-	**4,270.0**
Thermal In-Service Failures (2028)	-	-	-	3,975.6	-	-	**3,975.6**
Terminal Station In-service Failures (2028)	-	-	-	3,441.0	-	-	**3,441.0**
Hydraulic In-Service Failures (2028)	-	-	-	2,754.3	-	-	**2,754.3**
Overhaul Diesel Units (2028)	-	-	-	2,443.7	-	-	**2,443.7**
Renew Distribution Feeders (2028–2029)	-	-	-	1,062.9	3,105.8	-	**4,168.6**
Inspect Fuel Storage Tanks (2028) - Black Tickle	-	-	-	1,000.0	-	-	**1,000.0**
Overhaul Major Pumps and Associated Motors (2028) - Holyrood	-	-	-	930.0	-	-	**930.0**
Replace Protective Relays (2028–2029)	-	-	-	880.0	1,430.0	-	**2,310.0**
Diesel In-Service Failures (2028)	-	-	-	856.6	-	-	**856.6**
Renew Circuit Breakers (2028–2030)	-	-	-	836.0	290.0	1,228.0	**2,354.0**
Replace Diesel Gensets (2028–2029)	-	-	-	800.0	3,800.0	-	**4,600.0**
Gas Turbine In-Service Failures (2028)	-	-	-	525.3	-	-	**525.3**
Replace Diesel Shop (2028–2029) - Goose Bay	-	-	-	500.0	1,500.0	-	**2,000.0**
Perform Dam Infrastructure Refurbishments (2028)	-	-	-	500.0	-	-	**500.0**
Replace Instrument Transformers (2028–2029)	-	-	-	268.8	179.2	-	**448.0**

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2026 Capital Budget Application
Five-Year Capital Plan - By Investment Classification[1]
($000)

	2025 and Prior Years	2026	2027	2028	2029	2030	Total
Replace Switchgear Synchronous Condensers 1 and 2 (2028–2029) - Wabush Terminal Station	-	-	-	250.0	1,110.0	-	**1,360.0**
Replace Battery Bank 1 & 2 (2028–2029) - Hinds Lake	-	-	-	200.0	300.0	-	**500.0**
Replace Battery Bank 1 & 2 - Power House 1 (2028–2029) - Bay d'Espoir	-	-	-	200.0	300.0	-	**500.0**
Transmission In-Service Failures (2028)	-	-	-	194.6	-	-	**194.6**
Refurbish Steel Towers (2028–2029) - TL202/TL206	-	-	-	160.0	2,150.0	-	**2,310.0**
Replace Terminal Station Battery Banks and Chargers (2028–2029)	-	-	-	155.0	103.0	-	**258.0**
Replace Disconnects (2028–2030)	-	-	-	148.1	259.2	333.2	**740.5**
Install Breaker Failure Protection (2028–2029) - Hardwoods	-	-	-	133.0	267.0	-	**400.0**
Refurbish Phase 1 Exterior Precast Concrete Panel - Powerhouse 1 (2028–2029) - Bay d'Espoir	-	-	-	100.0	1,459.6	-	**1,559.6**
Perform Major Inspection - Synchronous Condenser 2 (2028–2029) - Wabush Terminal Station	-	-	-	86.0	484.0	-	**570.0**
Upgrade Power Transformers (2028–2029)	-	-	-	59.4	1,241.7	-	**1,301.1**
Replace Circuit Breaker Reclosing Controllers (2028–2029) - HRD B3L18	-	-	-	54.3	83.5	-	**137.8**
Perform Boiler Condition Assessment and Miscellaneous Upgrades (2029) - Holyrood	-	-	-	-	7,000.0	-	**7,000.0**
Distribution System In-Service Failures and Miscellaneous Upgrades (2029)	-	-	-	-	6,578.6	-	**6,578.6**
Wood Pole Line Management (2029)	-	-	-	-	5,156.0	-	**5,156.0**
Overhaul Turbine Valves - Unit 2 (2029) - Holyrood	-	-	-	-	4,500.0	-	**4,500.0**
Thermal In-Service Failures (2029)	-	-	-	-	4,067.1	-	**4,067.1**
Upgrade Exciter and Transformer - Unit 3 (2029) - Holyrood	-	-	-	-	4,000.0	-	**4,000.0**
Terminal Station In-service Failures (2029)	-	-	-	-	3,531.9	-	**3,531.9**
Hydraulic In-Service Failures (2029)	-	-	-	-	2,807.8	-	**2,807.8**
Overhaul Diesel Units (2029)	-	-	-	-	2,499.9	-	**2,499.9**
Overhaul Hydraulic Units (2029)	-	-	-	-	1,750.0	-	**1,750.0**
Inspect Fuel Storage Tanks (2029) - Nain	-	-	-	-	1,200.0	-	**1,200.0**
Renew Distribution Feeders (2029–2030)	-	-	-	-	1,091.4	3,189.0	**4,280.4**
Diesel In-Service Failures (2029)	-	-	-	-	876.3	-	**876.3**
Replace Protective Relays (2029–2030)	-	-	-	-	700.0	1,140.0	**1,840.0**
Renew Circuit Breakers (2029–2031)	-	-	-	-	675.0	987.0	**1,662.0**
Gas Turbine In-Service Failures (2029)	-	-	-	-	537.4	-	**537.4**
Perform Dam Infrastructure Refurbishments (2029)	-	-	-	-	500.0	-	**500.0**
Overhaul Major Pumps and Associated Motors (2029) - Holyrood	-	-	-	-	420.0	-	**420.0**
Replace Diesel Gensets (2029–2030)	-	-	-	-	400.0	1,200.0	**1,600.0**
Replace Fuel Oil Water injection Pumps (2029) - Holyrood	-	-	-	-	300.0	-	**300.0**
Replace Diesel Genset (2029–2031) - Hinds Lake	-	-	-	-	250.0	500.0	**750.0**
Transmission In-Service Failures (2029)	-	-	-	-	201.2	-	**201.2**
Replace Disconnects (2029–2031)	-	-	-	-	180.0	315.1	**495.1**
Install Breaker Failure Protection (2029–2030) - Wabush Terminal Station	-	-	-	-	175.0	355.0	**530.0**
Replace Instrument Transformers (2029–2030)	-	-	-	-	146.8	97.9	**244.7**
Replace Two 129 V Chargers - Stage 2 (2029–2030) - Holyrood	-	-	-	-	100.0	75.0	**175.0**
Replace Terminal Station Battery Banks and Chargers (2029–2030)	-	-	-	-	99.0	66.0	**165.0**
Perform Modified Major Inspection - Synchronous Condenser 1 (2029–2030) - Wabush Terminal Station	-	-	-	-	77.0	433.0	**510.0**
Replace Circuit Breaker Reclosing Controllers (2029–2030) - Indian River	-	-	-	-	55.7	85.8	**141.4**
Upgrade Power Transformers (2029–2030)	-	-	-	-	48.1	420.0	**468.1**
Upgrade Data Alarm Systems (2029–2030) - Springdale	-	-	-	-	17.0	31.0	**48.0**
Wood Pole Line Management (2030)	-	-	-	-	-	8,629.0	**8,629.0**
Distribution System In-Service Failures and Miscellaneous Upgrades (2030)	-	-	-	-	-	6,755.0	**6,755.0**
Terminal Station In-service Failures (2030)	-	-	-	-	-	3,625.2	**3,625.2**
Overhaul Diesel Units (2030)	-	-	-	-	-	2,557.4	**2,557.4**
Renew Distribution Feeders (2030–2031)	-	-	-	-	-	1,120.6	**1,120.6**
Replace Protective Relays (2030–2031)	-	-	-	-	-	990.0	**990.0**
Diesel In-Service Failures (2030)	-	-	-	-	-	896.5	**896.5**
Renew Circuit Breakers (2030–2032)	-	-	-	-	-	856.0	**856.0**
Replace Diesel Gensets (2030–2031)	-	-	-	-	-	800.0	**800.0**
Thermal In-Service Failures (2030)	-	-	-	-	-	700.0	**700.0**
Overhaul Hydraulic Units (2030)	-	-	-	-	-	600.0	**600.0**
Gas Turbine In-Service Failures (2030)	-	-	-	-	-	549.8	**549.8**
Refurbish Turbine (2030–2032) - Hinds Lake	-	-	-	-	-	500.0	**500.0**
Perform Dam Infrastructure Refurbishments (2030)	-	-	-	-	-	500.0	**500.0**
Replace Instrument Transformers (2030–2031)	-	-	-	-	-	279.8	**279.8**
Replace Diesel Genset (2030–2032) - Paradise River	-	-	-	-	-	250.0	**250.0**
Transmission In-Service Failures (2030)	-	-	-	-	-	208.1	**208.1**
Upgrade Data Alarm Systems (2030–2031) - Happy Valley	-	-	-	-	-	183.0	**183.0**
Replace Disconnects (2030–2032)	-	-	-	-	-	180.7	**180.7**
Replace Terminal Station Battery Banks and Chargers (2030–2031)	-	-	-	-	-	134.0	**134.0**
Replace Battery Bank 1 (2030–2031) - Cat Arm	-	-	-	-	-	100.0	**100.0**
Replace Circuit Breaker Reclosing Controllers (2030–2031) - Bear Cove	-	-	-	-	-	57.2	**57.2**
Upgrade Power Transformers (2030–2031)	-	-	-	-	-	49.3	**49.3**
Renewal Total	**10,960.0**	**87,623.2**	**94,137.1**	**120,439.1**	**136,754.4**	**60,340.4**	**510,254.2**

Newfoundland and Labrador Hydro
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Five-Year Capital Plan - By Investment Classification[1]
($000)

	2025 and Prior Years	2026	2027	2028	2029	2030	Total
Service Enhancement							
Purchase Spare Generator Step Up Transformer (2023–2028)	3,160.6	-	2,166.6	6,996.8	-	-	**12,324.0**
Automate Bulk Metering (2024–2026)	517.0	289.7	-	-	-	-	**806.7**
Upgrade Worst-Performing Distribution Feeders (2025–2027)	2,678.9	3,677.4	2,529.8	-	-	-	**8,886.1**
Install Mid Span Structures - TL220 (2025–2026)	881.3	229.3	-	-	-	-	**1,110.6**
Install Carbon Dust Collection System (2025–2026) - Hinds Lake	244.9	376.0	-	-	-	-	**620.9**
Remove Safety Hazards (2030)	-	-	-	-	-	257.3	**257.3**
Widen Right of Way (2026–2028) - Gros Morne National Park	-	1,220.0	655.8	787.9	-	-	**2,663.7**
Upgrade Worst-Performing Distribution Feeders (2026–2027)	-	756.3	3,534.9	-	-	-	**4,291.2**
Replace Expansion Joint and Rock Scaling (2026–2027) - Paradise River	-	516.9	230.4	-	-	-	**747.3**
Install Intelligent Electronic Devices Management Software (2026–2028)	-	297.2	675.4	297.6	-	-	**1,270.2**
Remove Safety Hazards (2026)	-	240.6	-	-	-	-	**240.6**
Upgrade Excitation System (2026–2027) - Paradise River	-	218.7	203.5	-	-	-	**422.2**
Perform Minor Telecommunications Enhancements (2026)	-	175.5	-	-	-	-	**175.5**
Upgrade Cooling (2026–2027) - Hardwoods	-	100.6	344.5	-	-	-	**445.1**
Relocate Section of Line (2026–2028) - TL220	-	79.7	2,970.7	1,041.0	-	-	**4,091.4**
Upgrade Terminal Station for Mobile Substation (2026–2027) - St. Anthony Diesel	-	66.1	328.6	-	-	-	**394.7**
Upgrade Worst-Performing Distribution Feeders (2027–2028)	-	-	773.4	3,514.8	-	-	**4,288.2**
Remove Safety Hazards (2027)	-	-	244.3	-	-	-	**244.3**
Upgrade Gas Turbine Instrumentation (2027–2028) - Holyrood	-	-	200.0	200.0	-	-	**400.0**
Install Secondary Station Service Supply (2027–2029) - Holyrood	-	-	150.0	150.0	700.0	-	**1,000.0**
Upgrade Terminal Station for Mobile Substation (2027–2028) - Glenburnie	-	-	80.5	467.7	-	-	**548.2**
Distribution Equipment SCADA Additions - Phase I (2027–2028)	-	-	32.9	305.6	-	-	**338.5**
Upgrade Worst-Performing Distribution Feeders (2028–2029)	-	-	-	794.2	3,609.0	-	**4,403.2**
Distribution Equipment SCADA Additions - Phase II (2028–2031)	-	-	-	500.0	500.0	500.0	**1,500.0**
Remove Safety Hazards (2028)	-	-	-	248.5	-	-	**248.5**
Upgrade Terminal Station for Mobile Substation (2028–2029) - Roddickton	-	-	-	82.6	480.1	-	**562.7**
Install Low Pressure Compressor, Piping and Controls (2028–2029) - Hinds Lake	-	-	-	75.0	525.0	-	**600.0**
Upgrade Worst-Performing Distribution Feeders (2029–2030)	-	-	-	-	815.5	3,705.8	**4,521.2**
Remove Safety Hazards (2029)	-	-	-	-	252.9	-	**252.9**
Upgrade Terminal Station for Mobile Substation (2029–2030) - Grandy Brook	-	-	-	-	84.8	492.8	**577.5**
Upgrade Worst-Performing Distribution Feeders (2030–2031)	-	-	-	-	-	837.3	**837.3**
Service Enhancement Total	7,482.7	8,244.0	15,121.3	15,461.7	6,967.3	5,793.2	**59,070.2**
System Growth							
Additions for Load Growth - Upgrade Transformer Capacity (2023–2024) - Jean Lake Terminal Station	7,039.6	-	1,335.1	2,625.0	-	-	**10,999.7**
Additions for Load Growth - Unit 2065 Replacement and Fuel Storage Upgrades (2024–2027) - Rigolet	276.4	3,082.9	69.9	-	-	-	**3,429.2**
Additions for Load - Cartwright (2024–2027)	20.6	0.9	486.3	-	-	-	**507.8**
Additions for Load Growth (2027) - Isolated Generation Stations	-	-	945.3	-	-	-	**945.3**
Additions for Load (2027) - Distribution System	-	-	793.6	-	-	-	**793.6**
Additions for Load Growth (2028) - Isolated Generation Stations	-	-	-	967.1	-	-	**967.1**
Additions for Load (2028) - Distribution System	-	-	-	814.9	-	-	**814.9**
Additions for Load Growth (2029) - Isolated Generation Stations	-	-	-	-	989.3	-	**989.3**
Additions for Load (2029) - Distribution System	-	-	-	-	836.8	-	**836.8**
Additions for Load Growth (2030) - Isolated Generation Stations	-	-	-	-	-	1,012.0	**1,012.0**
Additions for Load (2030) - Distribution System	-	-	-	-	-	859.2	**859.2**
System Growth Total	7,336.6	3,083.8	3,630.2	4,407.0	1,826.0	1,871.2	**22,154.9**
Total Capital Plan	**40,651.6**	**140,487.4**	**169,394.5**	**200,264.8**	**197,428.9**	**117,378.3**	**865,605.5**

[1] Numbers may not add due to rounding.

Newfoundland and Labrador Hydro
2026 Capital Budget Application
Five-Year Capital Plan Detailed Breakdown by Major and Minor - Asset Category[1]
($000)

	2025 and Prior Years	2026	2027	2028	2029	2030	Total
Generation							
Gas Turbines							
Replace 250 Vdc Battery Bank (2025–2026) - Stephenville	73.0	296.9	-	-	-	-	**369.9**
Replace Fuel Storage Tanks (2026) - Happy Valley	-	696.4	-	-	-	-	**696.4**
Gas Turbine In-Service Failures (2026)	-	500.1	-	-	-	-	**500.1**
Replace 125Vdc Battery Bank (2026–2027) - Hardwoods	-	108.9	37.8	-	-	-	**146.7**
Upgrade Cooling (2026–2027) - Hardwoods	-	100.6	344.5	-	-	-	**445.1**
Replace dc Fuel Pump (2026–2027) - Hardwoods	-	90.4	58.4	-	-	-	**148.8**
Replace Air Dryer (2026–2027) - Hardwoods	-	75.2	198.0	-	-	-	**273.2**
Major Combustion Turbine Overhaul (2027–2029) - Holyrood	-	-	2,500.0	7,500.0	10,000.0	-	**20,000.0**
Upgrade Rotor (2027–2029) - Holyrood Gas Turbine	-	-	2,000.0	5,000.0	5,000.0	-	**12,000.0**
Gas Turbine In-Service Failures (2027)	-	-	513.5	-	-	-	**513.5**
Upgrade Gas Turbine Instrumentation (2027–2028) - Holyrood	-	-	200.0	200.0	-	-	**400.0**
Install Secondary Station Service Supply (2027–2029) - Holyrood	-	-	150.0	150.0	700.0	-	**1,000.0**
Replace ac Fuel Pumps (2027–2028) - Hardwoods	-	-	100.0	100.0	-	-	**200.0**
Replace Vibration System (2027–2028) - Stephenville	-	-	50.0	200.0	-	-	**250.0**
Gas Turbine In-Service Failures (2028)	-	-	-	525.3	-	-	**525.3**
Gas Turbine In-Service Failures (2029)	-	-	-	-	537.4	-	**537.4**
Replace Fuel Oil Water injection Pumps (2029) - Holyrood	-	-	-	-	300.0	-	**300.0**
Inspect Fuel Storage Tanks (2030) - Holyrood	-	-	-	-	-	650.0	**650.0**
Gas Turbine In-Service Failures (2030)	-	-	-	-	-	549.8	**549.8**
Subtotal Gas Turbines	**73.0**	**1,868.5**	**6,152.2**	**13,675.3**	**16,537.4**	**1,199.8**	**39,506.2**
Hydraulic Plant							
Rewind Stator (2025–2026) - Hinds Lake	5,233.2	9,695.5	-	-	-	-	**14,928.7**
Refurbish Intake 2 (2025–2026) - Bay d'Espoir	284.4	3,069.4	-	-	-	-	**3,353.8**
Replace Emergency Diesel Genset (2025–2027) - Cat Arm	266.2	1,221.1	113.9	-	-	-	**1,601.2**
Install Carbon Dust Collection System (2025–2026) - Hinds Lake	244.9	376.0	-	-	-	-	**620.9**
Hydraulic In-Service Failures (2026)	-	2,660.3	-	-	-	-	**2,660.3**
Overhaul Hydraulic Units (2026)	-	2,023.6	-	-	-	-	**2,023.6**
Perform Level 2 Condition Assessment - North Salmon Spillway (2026) - Upper Salmon	-	636.5	-	-	-	-	**636.5**
Replace Expansion Joint and Rock Scaling (2026–2027) - Paradise River	-	516.9	230.4	-	-	-	**747.3**
Perform Dam Infrastructure Refurbishments (2026)	-	500.0	-	-	-	-	**500.0**
Upgrade Spherical Valve Controls (2026–2029) - Bay d'Espoir	-	314.9	219.6	358.3	460.3	-	**1,353.1**
Perform Level 2 Condition Assessment - Penstock 4 (2026) - Bay d'Espoir	-	237.2	-	-	-	-	**237.2**
Upgrade Excitation System (2026–2027) - Paradise River	-	218.7	203.5	-	-	-	**422.2**
Perform Level 2 Condition Assessment - Penstock (2026) - Hinds Lake	-	209.6	-	-	-	-	**209.6**
Replace Battery Bank (2026–2027) - Granite Canal	-	138.8	44.2	-	-	-	**183.0**
Replace Walkway to Toe of Dam (2026–2027) - Paradise River	-	16.8	566.1	-	-	-	**582.9**
Overhaul Hydraulic Units (2027)	-	-	2,794.7	-	-	-	**2,794.7**
Hydraulic In-Service Failures (2027)	-	-	2,701.8	-	-	-	**2,701.8**
Refurbish Spherical Valves - Units 1-6 (2027–2032) - Bay d'Espoir	-	-	1,500.0	1,500.0	1,500.0	1,500.0	**6,000.0**
Replace Controllers (2027–2030) - Granite Canal	-	-	1,250.0	1,250.0	1,250.0	1,250.0	**5,000.0**
Refurbish Structure (2027–2030) - Salmon River Spillway	-	-	649.3	9,757.6	6,112.1	6,363.1	**22,882.1**
Perform Dam Infrastructure Refurbishments (2027)	-	-	500.0	-	-	-	**500.0**
Major Refurbishment Turbine & Generator (2027–2029) - Upper Salmon	-	-	500.0	15,000.0	20,000.0	-	**35,500.0**
Intake Access Road Realignment (2027) - Bay d'Espoir	-	-	500.0	-	-	-	**500.0**
Perform Level 2 Condition Assessment - West Salmon Spillway (2027) - Upper Salmon	-	-	474.6	-	-	-	**474.6**
Refurbish Draft Tube Deck - Phase 3 (2027–2029) - Bay d'Espoir	-	-	365.5	728.6	6,994.8	-	**8,088.9**
Replace Diesel Gensets (2027–2030) - Burnt Dam	-	-	300.0	900.0	500.0	250.0	**1,950.0**
Refurbish Intake 4 (2027–2028) - Bay d'Espoir	-	-	284.4	3,069.4	-	-	**3,353.8**
Replace Annunciator Panel (2027–2028) Upper Salmon	-	-	169.2	212.6	-	-	**381.8**
Replace Rip Rap on LD-5 (2027) - Salmon River Spillway	-	-	152.2	-	-	-	**152.2**
Perform Level 2 Condition Assessment - Steel Section (2027) - Paradise River	-	-	130.0	-	-	-	**130.0**
Replace Emergency Diesel (2027–2028) - Burnt Dam	-	-	40.0	40.0	-	-	**80.0**
Hydraulic In-Service Failures (2028)	-	-	-	2,754.3	-	-	**2,754.3**
Refurbish Spillway (2028–2030) - North Salmon Spillway	-	-	-	500.0	1,500.0	1,500.0	**3,500.0**
Perform Dam Infrastructure Refurbishments (2028)	-	-	-	500.0	-	-	**500.0**
Replace Battery Bank 1 & 2 - Power House 1 (2028–2029) - Bay d'Espoir	-	-	-	200.0	300.0	-	**500.0**
Stabalize Powerhouse Slope (2028) - Cat Arm	-	-	-	200.0	-	-	**200.0**
Replace Battery Bank 1 & 2 (2028–2029) - Hinds Lake	-	-	-	200.0	300.0	-	**500.0**
Refurbish Rip Rap on CD-4 (2028–2029) - Cat Arm Arm	-	-	-	100.0	450.0	-	**550.0**
Refurbish Phase 1 Exterior Precast Concrete Panel - Powerhouse 1 (2028–2029) - Bay d'Espoir	-	-	-	100.0	1,459.6	-	**1,559.6**
Upgrade 600V and 208V Panelboard (2028–2029) - Upper Salmon	-	-	-	100.0	140.0	-	**240.0**
Install Low Pressure Compressor, Piping and Controls (2028–2029) - Hinds Lake	-	-	-	75.0	525.0	-	**600.0**
Hydraulic In-Service Failures (2029)	-	-	-	-	2,807.8	-	**2,807.8**
Overhaul Hydraulic Units (2029)	-	-	-	-	1,750.0	-	**1,750.0**
Perform Dam Infrastructure Refurbishments (2029)	-	-	-	-	500.0	-	**500.0**
Perform Level 2 Condition Assessment - Tubine & Generator (2029) - Cat Arm Arm	-	-	-	-	500.0	-	**500.0**
Perform Level 2 Condition Assessment - Spillway (2029) - Hinds Lake	-	-	-	-	450.0	-	**450.0**
Replace Diesel Genset (2029–2031) - Hinds Lake	-	-	-	-	250.0	500.0	**750.0**
Perform Level 2 Condition Assessment - Intake (2029) - Upper Salmon	-	-	-	-	250.0	-	**250.0**
Perform Level 2 Condition Assessment - Penstock (2029) - Upper Salmon	-	-	-	-	200.0	-	**200.0**
Refurbish Rip Rap on SD-2 -West Salmon Dam (2029–2030) - Upper Salmon	-	-	-	-	100.0	900.0	**1,000.0**
Hydraulic In Service Failures (2030)	-	-	-	-	-	2,862.4	**2,862.4**
Overhaul Hydraulic Units (2030)	-	-	-	-	-	600.0	**600.0**
Refurbish Turbine (2030–2032) - Hinds Lake	-	-	-	-	-	500.0	**500.0**
Refurbish Spillway (2030–2032) - West Salmon Spillway	-	-	-	-	-	500.0	**500.0**
Perform Dam Infrastructure Refurbishments (2030)	-	-	-	-	-	500.0	**500.0**
Replace Diesel Genset (2030–2032) - Paradise River	-	-	-	-	-	250.0	**250.0**
Perform Level 2 Condition Assessment - Penstock Steel Liner (2030) - Cat Arm Arm	-	-	-	-	-	200.0	**200.0**
Perform Level 2 Condition Assessment - Penstock (2030) - Granite Canal	-	-	-	-	-	200.0	**200.0**
Replace Battery Bank 1 (2030–2031) - Cat Arm	-	-	-	-	-	100.0	**100.0**
Refurbish Rip Rap on North Cutoff LD-2 & Salmon River Dam LD-2 (2030–2031) - Bay d'Espoir	-	-	-	-	-	100.0	**100.0**
Replace 2000 Gallon Gasoline Tank (2030–2031) - Cat Arm	-	-	-	-	-	25.0	**25.0**
Subtotal Hydraulic Plant	**6,028.7**	**21,835.3**	**13,689.4**	**37,545.8**	**48,299.6**	**18,100.5**	**145,499.2**

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Five-Year Capital Plan Detailed Breakdown by Major and Minor - Asset Category[1]
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	2025 and Prior Years	2026	2027	2028	2029	2030	Total
Thermal Plant							
Refurbish Marine Terminal (2025–2026) - Holyrood	1,190.8	1,295.6	-	-	-	-	**2,486.4**
Perform Boiler Condition Assessment and Miscellaneous Upgrades (2026) - Holyrood	-	9,600.0	-	-	-	-	**9,600.0**
Overhaul Turbine Valves and Generator - Unit 2 (2026) - Holyrood	-	6,969.6	-	-	-	-	**6,969.6**
Thermal In-Service Failures (2026)	-	3,823.7	-	-	-	-	**3,823.7**
Overhaul Major Pumps (2026) - Holyrood	-	2,388.6	-	-	-	-	**2,388.6**
Perform Level 2 Condition Assessment - Condenser and Condenser Tubes (2026–2027) - Holyrood	-	577.3	51.7	-	-	-	**629.0**
Refurbish Water Treatment Systems (2026–2027) - Holyrood	-	524.5	936.3	-	-	-	**1,460.8**
Replace Parts of Stage 1: 129 Vdc Batteries and Battery Chargers (2026–2027) - Holyrood	-	229.1	100.1	-	-	-	**329.2**
Perform Boiler Condition Assessment and Miscellaneous Upgrades (2027) - Holyrood	-	-	9,600.0	-	-	-	**9,600.0**
Install Plant Heating System (2027–2029) - Holyrood	-	-	4,887.3	6,858.9	3,354.9	-	**15,101.1**
Overhaul Turbine Valves - Unit 1 (2027) - Holyrood	-	-	4,000.0	-	-	-	**4,000.0**
Thermal In-Service Failures (2027)	-	-	3,886.3	-	-	-	**3,886.3**
Refurbish Stage I & II Cooling Water Sumps (2027–2028) - Holyrood	-	-	3,507.9	3,549.3	-	-	**7,057.2**
Overhaul Generator and Upgrade Online Monitoring - Unit 3 (2027) - Holyrood	-	-	2,295.4	-	-	-	**2,295.4**
Overhaul Major Pumps and Associated Motors (2027) - Holyrood	-	-	1,440.0	-	-	-	**1,440.0**
Overhaul Unit 2 and Unit 3 Boiler Stop Valves (2027) - Holyrood	-	-	800.0	-	-	-	**800.0**
Overhaul Marine Terminal Loading Arms (2027) - Holyrood	-	-	550.0	-	-	-	**550.0**
Perform Level 2 Condition Assessment - Light Oil System (2027) - Holyrood	-	-	400.0	-	-	-	**400.0**
Replace Air Compressor 1 (2027–2028) - Holyrood	-	-	310.1	980.0	-	-	**1,290.1**
Perform Boiler Condition Assessment and Miscellaneous Upgrades (2028) - Holyrood	-	-	-	8,500.0	-	-	**8,500.0**
Overhaul Turbine Valves - Unit 3 (2028) - Holyrood	-	-	-	4,270.0	-	-	**4,270.0**
Thermal In-Service Failures (2028)	-	-	-	3,975.6	-	-	**3,975.6**
Overhaul Major Pumps and Associated Motors (2028) - Holyrood	-	-	-	930.0	-	-	**930.0**
Upgrade Fire System (2028) - Holyrood	-	-	-	700.0	-	-	**700.0**
Perform Boiler Condition Assessment and Miscellaneous Upgrades (2029) - Holyrood	-	-	-	-	7,000.0	-	**7,000.0**
Overhaul Turbine Valves - Unit 2 (2029) - Holyrood	-	-	-	-	4,500.0	-	**4,500.0**
Thermal In-Service Failures (2029)	-	-	-	-	4,067.1	-	**4,067.1**
Upgrade Exciter and Transformer - Unit 3 (2029) - Holyrood	-	-	-	-	4,000.0	-	**4,000.0**
Overhaul Major Pumps and Associated Motors (2029) - Holyrood	-	-	-	-	420.0	-	**420.0**
Replace Two 129 V Chargers - Stage 2 (2029–2030) - Holyrood	-	-	-	-	100.0	75.0	**175.0**
Thermal In-Service Failures (2030)	-	-	-	-	-	700.0	**700.0**
Subtotal Thermal Plant	**1,190.8**	**25,408.4**	**32,765.1**	**29,763.8**	**23,442.0**	**775.0**	**113,345.1**
Total Generation	**7,292.5**	**49,112.2**	**52,606.7**	**80,985.0**	**88,279.0**	**20,075.2**	**298,350.5**
General Properties							
Properties							
Install Electric Vehicle Chargers (2025–2026) - Hydro Sites	368.0	288.2	-	-	-	-	**656.2**
Construction and Installation of Ultra-Fast Electric Vehicle Charging Stations - Phase 2 (2025–2027)	61.0	3,940.2	186.5	-	-	-	**4,187.7**
Perform Facilities Refurbishments (2026)	-	3,027.9	-	-	-	-	**3,027.9**
Procure Accommodations (2026) - Makkovik	-	684.7	-	-	-	-	**684.7**
Replace Roof (2026–2027) - Hopedale	-	190.6	1,791.0	-	-	-	**1,981.6**
Perform Facilities Refurbishments (2027)	-	-	5,500.0	-	-	-	**5,500.0**
Replace Diesel Shop Building (2027–2028) - Bishop's Falls	-	-	1,422.0	889.9	-	-	**2,311.9**
Refurbish Windows (2027–2030) - Hydro Place	-	-	1,279.3	1,267.2	1,289.8	1,312.8	**5,149.1**
Procure Accommodations (2027) - Labrador	-	-	694.1	-	-	-	**694.1**
Resurface Parking Lots and Roads (2027–2028) - Bishop's Falls	-	-	500.0	400.0	-	-	**900.0**
Upgrade Line Depots (2027–2029) - Bay d'Espoir	-	-	373.4	1,710.2	1,726.2	-	**3,809.8**
Install Electric Vehicle Chargers (2027–2028) - Hydro Sites	-	-	337.8	343.7	-	-	**681.4**
Replace Roof (2027–2028) - Cartwright	-	-	200.0	500.0	-	-	**700.0**
Replace Powerhouse Roofs (2027–2028) - Hinds Lake	-	-	84.3	735.8	-	-	**820.1**
Perform Facilities Refurbishments (2028)	-	-	-	5,500.0	-	-	**5,500.0**
Procure Accommodations (2028) - Labrador	-	-	-	706.3	-	-	**706.3**
Replace Diesel Shop (2028–2029) - Goose Bay	-	-	-	500.0	1,500.0	-	**2,000.0**
Install Electric Vehicle Chargers (2028–2029) - Hydro Sites	-	-	-	354.3	59.2	-	**413.4**
Replace Sewage System (2028) - Bishop's Falls	-	-	-	156.1	-	-	**156.1**
Replace Powerhouse 2 Roof (2028–2029) - Bay d'Espoir	-	-	-	100.0	960.0	-	**1,060.0**
Replace Septic System - Burnt Dam (2028–2029) - Bay d'Espoir	-	-	-	50.0	125.0	-	**175.0**
Perform Facilities Refurbishments (2029)	-	-	-	-	5,500.0	-	**5,500.0**
Procure Accommodations (2029) - Labrador	-	-	-	-	718.7	-	**718.7**
Renew Property, Grounds and Infrastructure (2029) - St. Anthony, Bishop's Falls, Stephenville, and Whitbourne	-	-	-	-	445.3	-	**445.3**
Install Electric Vehicle Chargers (2029–2030) - Hydro Sites	-	-	-	-	360.5	60.2	**420.7**
Replace Sections of Roof and Penetrations - Main Powerhouse (2029–2030) - Holyrood	-	-	-	-	220.6	897.2	**1,117.8**
Replace Powerhouse Roof (2029–2030) - Cat Arm	-	-	-	-	100.0	1,500.0	**1,600.0**
Perform Facilities Refurbishments (2030)	-	-	-	-	-	5,500.0	**5,500.0**
Procure Accommodations (2030) - Labrador	-	-	-	-	-	731.4	**731.4**
Install Electric Vehicle Chargers (2030–2031) - Hydro Sites	-	-	-	-	-	366.8	**366.8**
Replace Powerhouse Roofs (2030–2031) - Upper Salmon	-	-	-	-	-	150.0	**150.0**
Subtotal Properties	**429.0**	**8,131.6**	**12,368.4**	**13,213.4**	**13,005.3**	**10,518.4**	**57,666.1**
Transportation							
Replace Light- and Heavy-Duty Vehicles (2024–2026)	5,627.9	1,133.4	-	-	-	-	**6,761.3**
Replace Light- and Heavy-Duty Vehicles (2025–2027)	2,714.6	1,675.8	3,147.2	-	-	-	**7,537.6**
Replace Light-Duty Vehicles (2026–2027)	-	2,547.5	548.6	-	-	-	**3,096.1**
Replace Heavy-Duty Vehicles (2026–2028)	-	1,524.1	788.5	2,204.4	-	-	**4,517.0**
Replace Light-Duty Vehicles (2027–2028)	-	-	1,905.0	412.8	-	-	**2,317.8**
Replace Heavy-Duty Vehicles (2027–2028)	-	-	685.8	1,905.0	-	-	**2,590.8**
Replace Light-Duty Vehicles (2030–2031)	-	-	-	-	-	3,397.3	**3,397.3**

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	2025 and Prior Years	2026	2027	2028	2029	2030	Total
Replace Light-Duty Vehicles (2028–2029)	-	-	-	3,048.0	406.4	-	**3,454.4**
Replace Heavy-Duty Vehicles (2028–2029)	-	-	-	457.2	1,803.4	-	**2,260.6**
Replace Heavy-Duty Vehicles (2030–2031)	-	-	-	-	-	762.0	**762.0**
Replace Light-Duty Vehicles (2029–2030)	-	-	-	-	3,384.6	381.0	**3,765.6**
Replace Heavy-Duty Vehicles (2029–2030)	-	-	-	-	1,117.6	3,581.4	**4,699.0**
Subtotal Transportation	**8,342.5**	**6,880.8**	**7,075.1**	**8,027.4**	**6,712.0**	**8,121.7**	**45,159.4**
Administration							
Perform Accessibility Upgrades (2030)	-	-	-	-	-	273.7	**273.7**
Remove Safety Hazards (2030)	-	-	-	-	-	257.3	**257.3**
Modify Office Buildings and Procure Furniture, Fixtures, & Equipment (2026)	-	447.5	-	-	-	-	**447.5**
Remove Safety Hazards (2026)	-	240.6	-	-	-	-	**240.6**
Modify Office Buildings and Procure Furniture, Fixtures, & Equipment (2030)	-	-	-	-	-	195.4	**195.4**
Modify Office Buildings and Procure Furniture, Fixtures, & Equipment (2027)	-	-	454.5	-	-	-	**454.5**
Perform Accessibility Upgrades (2027)	-	-	259.8	-	-	-	**259.8**
Remove Safety Hazards (2027)	-	-	244.3	-	-	-	**244.3**
Perform Accessibility Upgrades (2028)	-	-	-	264.4	-	-	**264.4**
Remove Safety Hazards (2028)	-	-	-	248.5	-	-	**248.5**
Modify Office Buildings and Procure Furniture, Fixtures, & Equipment (2028)	-	-	-	188.8	-	-	**188.8**
Replace Fluorescent Lighting (2029) - Hydro Place	-	-	-	-	529.0	-	**529.0**
Perform Accessibility Upgrades (2029)	-	-	-	-	269.0	-	**269.0**
Remove Safety Hazards (2029)	-	-	-	-	252.9	-	**252.9**
Modify Office Buildings and Procure Furniture, Fixtures, & Equipment (2029)	-	-	-	-	192.1	-	**192.1**
Subtotal Administration	**-**	**688.1**	**958.5**	**701.7**	**1,243.0**	**726.5**	**4,317.8**
Tools and Equipment							
Purchase Tools and Equipment (2026)	-	1,849.4	-	-	-	-	**1,849.4**
Purchase Tools and Equipment (2027)	-	-	1,877.0	-	-	-	**1,877.0**
Purchase Tools and Equipment (2028)	-	-	-	1,910.0	-	-	**1,910.0**
Purchase Tools and Equipment (2029)	-	-	-	-	1,943.5	-	**1,943.5**
Purchase Tools and Equipment (2030)	-	-	-	-	-	1,977.7	**1,977.7**
Subtotal Tools and Equipment	**-**	**1,849.4**	**1,877.0**	**1,910.0**	**1,943.5**	**1,977.7**	**9,557.6**
Information Systems							
Replacement of Reporting Management Tools (2025–2026)	566.0	195.9	-	-	-	-	**761.9**
Upgrade Work Protection Code Application (2025–2026)	452.0	256.6	-	-	-	-	**708.6**
Microsoft Enterprise Agreement (2025–2027)	426.6	426.6	426.6	-	-	-	**1,279.9**
Upgrade Energy Management System (2025–2026)	284.4	188.5	-	-	-	-	**472.9**
Implement SCADA Points Application (2025–2026)	241.9	143.4	-	-	-	-	**385.3**
Purchase Personal Computers (2026)	-	1,115.7	-	-	-	-	**1,115.7**
Upgrade Core IT Infrastructure (2026–2027)	-	871.6	522.9	-	-	-	**1,394.5**
Upgrade Core OT Infrastructure (2026)	-	799.6	-	-	-	-	**799.6**
Perform Software Upgrades and Minor Enhancements - Information Technology (2026–2027)	-	649.9	1,097.2	-	-	-	**1,747.1**
Migrate Legacy Applications (2026)	-	611.0	-	-	-	-	**611.0**
Rollout Document Control System (2026)	-	607.3	-	-	-	-	**607.3**
Update Cybersecurity Infrastructure (2026)	-	413.3	-	-	-	-	**413.3**
Backup Critical Control Systems (2026) - Holyrood	-	329.4	-	-	-	-	**329.4**
Implement Safety Audits and Inspections System (2026)	-	304.7	-	-	-	-	**304.7**
Replace Peripheral Infrastructure (2026)	-	278.5	-	-	-	-	**278.5**
Perform Software Upgrades and Minor Enhancements - Operational Technology (2026)	-	262.8	-	-	-	-	**262.8**
Replace GRID Application (2026–2027)	-	134.9	363.9	-	-	-	**498.8**
Upgrade Core Information Technology Infrastructure (2027)	-	-	1,414.5	-	-	-	**1,414.5**
Purchase Personal Computers (2027)	-	-	1,146.3	-	-	-	**1,146.3**
SWOP Replacement (2027–2028)	-	-	701.0	200.0	-	-	**901.0**
Update Cybersecurity Infrastructure (2027)	-	-	637.9	-	-	-	**637.9**
Perform Software Upgrades and Minor Enhancements - Information Technology (2027)	-	-	561.2	-	-	-	**561.2**
Migrate Legacy Applications (2027)	-	-	528.5	-	-	-	**528.5**
Replace Peripheral Infrastructure (2027)	-	-	427.5	-	-	-	**427.5**
Perform Software Upgrades and Minor Enhancements - Operating Technology (2027)	-	-	425.0	-	-	-	**425.0**
Upgrade Core OT Infrastructure (2027)	-	-	375.0	-	-	-	**375.0**
Upgrade Energy Management System (2027–2028)	-	-	283.0	184.2	-	-	**467.2**
Performance Management (2027–2028)	-	-	250.0	350.0	-	-	**600.0**
Rollout Document Control System (2027)	-	-	200.0	-	-	-	**200.0**
Utiligy Replacement (2027–2030)	-	-	150.0	1,150.0	2,500.0	1,500.0	**5,300.0**
Clarity Replacement (2027–2028)	-	-	100.0	2,000.0	-	-	**2,100.0**
Implement Recruitment System (2027–2028)	-	-	100.0	550.0	-	-	**650.0**
Rollout HP Content Manager (2027)	-	-	50.0	-	-	-	**50.0**
Upgrade Core Information Technology Infrastructure (2028)	-	-	-	2,393.7	-	-	**2,393.7**
Perform Software Upgrades and Minor Enhancements - Information Technology (2028)	-	-	-	748.8	-	-	**748.8**
Update Cybersecurity Infrastructure (2028)	-	-	-	677.3	-	-	**677.3**
Purchase Personal Computers (2028)	-	-	-	597.6	-	-	**597.6**
Migrate Legacy Applications (2028)	-	-	-	554.9	-	-	**554.9**
Perform Software Upgrades and Minor Enhancements - Operating Technology (2028)	-	-	-	525.0	-	-	**525.0**
Microsoft Enterprise Agreement (2028–2030)	-	-	-	470.4	493.9	518.6	**1,482.9**
Upgrade Core OT Infrastructure (2028)	-	-	-	425.0	-	-	**425.0**
CMDB Implementation (2028)	-	-	-	350.0	-	-	**350.0**
Replace Peripheral Infrastructure (2028)	-	-	-	193.3	-	-	**193.3**
Rollout Document Control System (2028)	-	-	-	100.0	-	-	**100.0**
Rollout HP Content Manager (2028)	-	-	-	52.5	-	-	**52.5**
Upgrade Core Information Technology Infrastructure (2029)	-	-	-	-	1,869.0	-	**1,869.0**
Purchase Personal Computers (2029)	-	-	-	-	911.8	-	**911.8**
Purchase Personal Computers (2030)	-	-	-	-	-	814.9	**814.9**
Update Cybersecurity Infrastructure (2029)	-	-	-	-	709.5	-	**709.5**
Perform Software Upgrades and Minor Enhancements - Information Technology (2029)	-	-	-	-	643.2	-	**643.2**
Perform Software Upgrades and Minor Enhancements - Operating Technology (2029)	-	-	-	-	450.0	-	**450.0**

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Upgrade Core OT Infrastructure (2029)	-	-	-	-	425.0	-	**425.0**
Upgrade Energy Management System (2029–2030)	-	-	-	-	302.8	200.0	**502.8**
Replace Peripheral Infrastructure (2029)	-	-	-	-	180.1	-	**180.1**
Rollout Document Control System (2029)	-	-	-	-	100.0	-	**100.0**
Rollout HP Content Manager (2029)	-	-	-	-	55.1	-	**55.1**
Perform Software Upgrades and Minor Enhancements - Information Technology (2030–2031)	-	-	-	-	-	1,073.6	**1,073.6**
Update Cybersecurity Infrastructure (2030)	-	-	-	-	-	733.3	**733.3**
Replace Peripheral Infrastructure (2030)	-	-	-	-	-	512.7	**512.7**
Upgrade Core OT Infrastructure (2030)	-	-	-	-	-	450.0	**450.0**
Upgrade Core Information Technology Infrastructure (2030)	-	-	-	-	-	423.0	**423.0**
Perform Software Upgrades and Minor Enhancements - Operating Technology (2030)	-	-	-	-	-	400.0	**400.0**
Rollout Document Control System (2030)	-	-	-	-	-	100.0	**100.0**
Rollout HP Content Manager (2030)	-	-	-	-	-	57.9	**57.9**
Subtotal Information Systems	**1,971.0**	**7,589.8**	**9,760.6**	**11,522.7**	**8,640.3**	**6,784.0**	**46,268.3**
Telecontrol							
Replace GPS Clocks (2025–2026)	448.3	132.4	-	-	-	-	**580.7**
Replace Network Communications Equipment (2026–2027)	-	1,038.4	99.0	-	-	-	**1,137.4**
Replace Teleprotection Equipment (2026–2028)	-	964.4	310.6	224.8	-	-	**1,499.8**
Refurbish Meteorological Stations - Phase 2 (2026–2027)	-	528.1	167.4	-	-	-	**695.5**
Replace Radio Link to Hydraulic Control Structure (2026–2027) - Ebbegunbaeg	-	470.5	756.8	-	-	-	**1,227.3**
Install CCTV Systems (2026)	-	450.2	-	-	-	-	**450.2**
Replace UPS System - Back Up Control Center (2026) - Holyrood	-	322.8	-	-	-	-	**322.8**
Purchase Mobile Devices (2026)	-	315.9	-	-	-	-	**315.9**
Install Intelligent Electronic Devices Management Software (2026–2028)	-	297.2	675.4	297.6	-	-	**1,270.2**
Upgrade Remote Terminal Units (2026)	-	252.2	-	-	-	-	**252.2**
Replace 48 V Battery Banks and Chargers (2026–2027)	-	250.1	524.4	-	-	-	**774.5**
Perform Minor Telecommunications Enhancements (2026)	-	175.5	-	-	-	-	**175.5**
Telecommunications In-Service Failures (2026)	-	123.6	-	-	-	-	**123.6**
Replace Back-up Generators at Microwave Repeater Sites (2026–2027)	-	94.5	391.3	-	-	-	**485.8**
Replace Network Communications Equipment (2027–2028)	-	-	1,056.0	99.4	-	-	**1,155.4**
Install CCTV Systems (2027)	-	-	457.9	-	-	-	**457.9**
Replace 48 V Battery Banks and Chargers (2027–2028)	-	-	254.2	523.8	-	-	**778.0**
Purchase Mobile Devices (2027)	-	-	183.4	-	-	-	**183.4**
Perform Minor Telecommunications Enhancements (2027)	-	-	177.8	-	-	-	**177.8**
Replace Cisco Call Manager Appliances (2027)	-	-	130.0	-	-	-	**130.0**
Telecommunications In-Service Failures (2027)	-	-	125.5	-	-	-	**125.5**
Replace Power Line Carrier (2027–2028) - TL212	-	-	93.6	681.4	-	-	**775.0**
Replace Network Communications Equipment (2028–2029)	-	-	-	1,074.5	101.2	-	**1,175.7**
Install CCTV Systems (2028)	-	-	-	466.0	-	-	**466.0**
Replace 48 V Battery Banks and Chargers (2028–2029)	-	-	-	258.7	533.0	-	**791.7**
Perform Minor Telecommunications Enhancements (2028)	-	-	-	180.9	-	-	**180.9**
Purchase Mobile Devices (2028)	-	-	-	144.0	-	-	**144.0**
Telecommunications In-Service Failures (2028)	-	-	-	127.7	-	-	**127.7**
Replace Network Communications Equipment (2029–2030)	-	-	-	-	1,093.4	103.0	**1,196.3**
Replace Network Communications Equipment (2030–2031)	-	-	-	-	-	1,112.6	**1,112.6**
Install CCTV Systems (2030)	-	-	-	-	-	482.5	**482.5**
Replace 48 V Battery Banks and Chargers (2030–2031)	-	-	-	-	-	267.9	**267.9**
Purchase Mobile Devices (2030)	-	-	-	-	-	225.0	**225.0**
Perform Minor Telecommunications Enhancements (2030)	-	-	-	-	-	187.3	**187.3**
Telecommunications In-Service Failures (2030)	-	-	-	-	-	132.2	**132.2**
Subtotal Telecontrol	**448.3**	**5,415.8**	**5,403.3**	**4,078.8**	**2,999.9**	**3,052.7**	**21,398.8**
Total General Properties	**11,190.8**	**30,555.4**	**37,442.9**	**39,453.9**	**34,544.0**	**31,181.0**	**184,368.1**
Transmission and Rural Operations							
Transmission							
Install Mid Span Structures - TL220 (2025–2026)	881.3	229.3	-	-	-	-	**1,110.6**
Wood Pole Line Management (2026)	-	6,313.7	-	-	-	-	**6,313.7**
Widen Right of Way (2026–2028) - Gros Morne National Park	-	1,220.0	655.8	787.9	-	-	**2,663.7**
L23/24 Steel-Tower Transmission Line Renewal (2026–2029)	-	576.2	2,735.3	2,539.1	2,726.8	-	**8,577.4**
Transmission In-Service Failures (2026)	-	183.4	-	-	-	-	**183.4**
Relocate Section of Line (2026–2028) - TL220	-	79.7	2,970.7	1,041.0	-	-	**4,091.4**
Wood Pole Line Management (2027)	-	-	10,839.0	-	-	-	**10,839.0**
Refurbish Aluminum Towers (2027–2028) - TL212	-	-	845.0	860.0	-	-	**1,705.0**
Transmission In-Service Failures (2027)	-	-	188.2	-	-	-	**188.2**
Wood Pole Line Management (2028)	-	-	-	7,051.0	-	-	**7,051.0**
Transmission In-Service Failures (2028)	-	-	-	194.6	-	-	**194.6**
Refurbish Steel Towers (2028–2029) - TL202/TL206	-	-	-	160.0	2,150.0	-	**2,310.0**
Wood Pole Line Management (2029)	-	-	-	-	5,156.0	-	**5,156.0**
Transmission In-Service Failures (2029)	-	-	-	-	201.2	-	**201.2**
Wood Pole Line Management (2030)	-	-	-	-	-	8,629.0	**8,629.0**
Transmission In-Service Failures (2030)	-	-	-	-	-	208.1	**208.1**
Subtotal Transmission	**881.3**	**8,602.3**	**18,234.0**	**12,633.6**	**10,234.0**	**8,837.1**	**59,422.3**
Distribution							
Additions for Load - Cartwright (2024–2027)	20.6	0.9	486.3	-	-	-	**507.8**
Upgrade Worst-Performing Distribution Feeders (2025–2027)	2,678.9	3,677.4	2,529.8	-	-	-	**8,886.1**
Interconnection and Integration of the Puffin Wind Inc. Renewable Energy Project (2025–2027) - Ramea	344.2	901.8	32.0	-	-	-	**1,278.0**
Distribution System In-Service Failures, Miscellaneous Upgrades and Street Lights (2026)	-	6,114.9	-	-	-	-	**6,114.9**
Provide Service Extensions (2026)	-	5,401.9	-	-	-	-	**5,401.9**
Renew Distribution Feeders (2026–2027)	-	1,015.3	3,053.0	-	-	-	**4,068.3**
Upgrade Worst-Performing Distribution Feeders (2026–2027)	-	756.3	3,534.9	-	-	-	**4,291.2**
Upgrade Distribution System (2026–2027) - Wiltondale	-	408.7	952.7	-	-	-	**1,361.4**
Distribution System In-Service Failures and Miscellaneous Upgrades (2027)	-	-	6,239.5	-	-	-	**6,239.5**

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($000)

	2025 and Prior Years	2026	2027	2028	2029	2030	Total
Provide Service Extensions (2027)	-	-	5,704.0	-	-	-	**5,704.0**
Renew Distribution Feeders (2027–2028)	-	-	1,035.1	3,024.7	-	-	**4,059.8**
Additions for Load (2027) - Distribution System	-	-	793.6	-	-	-	**793.6**
Upgrade Worst-Performing Distribution Feeders (2027–2028)	-	-	773.4	3,514.8	-	-	**4,288.2**
Replace T1 (2027–2029) - Burgeo	-	-	312.2	501.7	1,825.9	-	**2,639.8**
Construct Pole Storage Ramps (2027–2030) - Labrador	-	-	250.0	250.0	250.0	250.0	**1,000.0**
Distribution Equipment SCADA Additions - Phase I (2027–2028)	-	-	32.9	305.6	-	-	**338.5**
Distribution System In-Service Failures and Miscellaneous Upgrades (2028)	-	-	-	6,406.8	-	-	**6,406.8**
Provide Service Extensions (2028)	-	-	-	5,856.0	-	-	**5,856.0**
Renew Distribution Feeders (2028–2029)	-	-	-	1,062.9	3,105.8	-	**4,168.6**
Additions for Load (2028) - Distribution System	-	-	-	814.9	-	-	**814.9**
Upgrade Worst-Performing Distribution Feeders (2028–2029)	-	-	-	794.2	3,609.0	-	**4,403.2**
Distribution Equipment SCADA Additions - Phase II (2028–2031)	-	-	-	500.0	500.0	500.0	**1,500.0**
Distribution System In-Service Failures and Miscellaneous Upgrades (2029)	-	-	-	-	6,578.6	-	**6,578.6**
Provide Service Extensions (2029)	-	-	-	-	6,010.0	-	**6,010.0**
Renew Distribution Feeders (2029–2030)	-	-	-	-	1,091.4	3,189.0	**4,280.4**
Additions for Load (2029) - Distribution System	-	-	-	-	836.8	-	**836.8**
Upgrade Worst-Performing Distribution Feeders (2029–2030)	-	-	-	-	815.5	3,705.8	**4,521.2**
Distribution System In-Service Failures and Miscellaneous Upgrades (2030)	-	-	-	-	-	6,755.0	**6,755.0**
Provide Service Extensions (2030)	-	-	-	-	-	6,168.0	**6,168.0**
Renew Distribution Feeders (2030–2031)	-	-	-	-	-	1,120.6	**1,120.6**
Additions for Load (2030) - Distribution System	-	-	-	-	-	859.2	**859.2**
Upgrade Worst-Performing Distribution Feeders (2030–2031)	-	-	-	-	-	837.3	**837.3**
Subtotal Distribution	**3,043.7**	**18,277.2**	**25,729.5**	**23,031.5**	**24,622.8**	**23,384.9**	**118,089.7**
Metering							
Automate Bulk Metering (2024–2026)	517.0	289.7	-	-	-	-	**806.7**
Purchase Meters and Metering Equipment (2025–2026)	446.2	278.4	-	-	-	-	**724.6**
Upgrade PLX Metering System (2026–2028) - Labrador East	-	1,188.8	485.8	494.3	-	-	**2,168.9**
Purchase Meters and Metering Equipment (2026)	-	705.6	-	-	-	-	**705.6**
Purchase Meters and Metering Equipment (2027)	-	-	719.5	-	-	-	**719.5**
Purchase Meters and Metering Equipment (2028)	-	-	-	732.1	-	-	**732.1**
Purchase Meters and Metering Equipment (2029)	-	-	-	-	745.0	-	**745.0**
Purchase Meters and Metering Equipment (2030)	-	-	-	-	-	758.1	**758.1**
Subtotal Metering	**963.2**	**2,462.5**	**1,205.3**	**1,226.4**	**745.0**	**758.1**	**7,360.4**
Tools and Equipment							
Purchase 50' Material Handler Aerial Device on Tracked Unit (2024–2026) - Happy Valley Goose Bay	865.8	7.1	-	-	-	-	**872.9**
Replace Mobile Equipment (2025–2027)	1,973.6	54.6	2,619.4	-	-	-	**4,647.6**
Replace Light-Duty Mobile Equipment (2026)	-	1,212.9	-	-	-	-	**1,212.9**
Replace Heavy-Duty Mobile Equipment (2026–2028)	-	173.8	1,809.7	2,112.2	-	-	**4,095.7**
Replace Light-Duty Mobile Equipment (2027)	-	-	1,075.7	-	-	-	**1,075.7**
Replace Heavy-Duty Mobile Equipment (2027–2029)	-	-	571.5	1,524.0	1,778.0	-	**3,873.5**
Replace Light-Duty Mobile Equipment (2028)	-	-	-	1,050.3	-	-	**1,050.3**
Replace Heavy-Duty Mobile Equipment (2028–2029)	-	-	-	571.5	762.0	-	**1,333.5**
Replace Light-Duty Mobile Equipment (2029)	-	-	-	-	1,314.5	-	**1,314.5**
Replace Heavy-Duty Mobile Equipment (2029–2030)	-	-	-	-	285.8	1,524.0	**1,809.8**
Replace Light-Duty Mobile Equipment (2030)	-	-	-	-	-	1,494.8	**1,494.8**
Replace Heavy-Duty Mobile Equipment (2030–2032)	-	-	-	-	-	317.5	**317.5**
Subtotal Tools and Equipment	**2,839.4**	**1,448.4**	**6,076.3**	**5,258.0**	**4,140.2**	**3,336.3**	**23,098.6**
Terminal Stations							
Additions for Load Growth - Upgrade Transformer Capacity (2023–2024) - Jean Lake Terminal Station	7,039.6	-	1,335.1	2,625.0	-	-	**10,999.7**
Purchase Spare Generator Step Up Transformer (2023–2028)	3,160.6	-	2,166.6	6,996.8	-	-	**12,324.0**
Upgrade Power Transformers (2025–2026)	811.9	1,173.9	-	-	-	-	**1,985.8**
Replace Protective Relays (2025–2026)	668.6	2,282.6	-	-	-	-	**2,951.2**
Upgrade Data Alarm Systems (2025–2026) - Hardwoods	184.0	188.7	-	-	-	-	**372.7**
Install Breaker Failure Protection (2025–2027) - Holyrood	177.8	320.9	166.5	-	-	-	**665.2**
Replace Disconnects (2025–2026)	145.3	1,245.5	-	-	-	-	**1,390.8**
Renew Circuit Breakers (2025–2026)	129.7	2,531.3	-	-	-	-	**2,661.0**
Replace Terminal Station Battery Banks and Chargers (2025–2026)	123.2	315.3	-	-	-	-	**438.5**
Replace Instrument Transformers (2025–2026)	112.5	356.4	-	-	-	-	**468.9**
Replace Circuit Breaker Reclosing Controllers (2025–2026) - Cow Head and Massey Drive	104.6	164.3	-	-	-	-	**268.9**
Install Fire Protection - 230 kV Stations (2025–2026) - Come by Chance	51.7	534.5	-	-	-	-	**586.2**
Perform Major Inspection - Synchronous Condenser 2 (2025–2026) - Wabush	22.8	1,249.0	-	-	-	-	**1,271.8**
Terminal Station In-Service Failures (2027)	-	-	3,352.5	-	-	-	**3,352.5**
Replace Protective Relays (2027–2028)	-	-	950.0	1,540.0	-	-	**2,490.0**
Renew Circuit Breakers (2027–2029)	-	-	678.0	409.0	1,118.0	-	**2,205.0**
Replace Disconnects (2027–2029)	-	-	210.0	367.4	472.4	-	**1,049.8**
Replace Switchgear (2027–2029) - Grand Falls Terminal Station	-	-	130.0	390.0	790.0	-	**1,310.0**
Install Breaker Failure Protection (2027–2028) - Western Avalon	-	-	116.0	234.0	-	-	**350.0**
Replace Instrument Transformers (2027–2028)	-	-	105.7	70.5	-	-	**176.2**
Replace Terminal Station Battery Banks and Chargers (2027–2028)	-	-	89.0	59.0	-	-	**148.0**
Upgrade Terminal Station for Mobile Substation (2027–2028) - Glenburnie	-	-	80.5	467.7	-	-	**548.2**
Upgrade Power Transformers (2027–2028)	-	-	61.6	1,766.9	-	-	**1,828.5**
Replace Circuit Breaker Reclosing Controllers (2027–2028) - Come by Chance	-	-	52.9	81.4	-	-	**134.3**
Terminal Station In-service Failures (2028)	-	-	-	3,441.0	-	-	**3,441.0**
Replace Protective Relays (2028–2029)	-	-	-	880.0	1,430.0	-	**2,310.0**
Renew Circuit Breakers (2028–2030)	-	-	-	836.0	290.0	1,228.0	**2,354.0**
Replace Instrument Transformers (2028–2029)	-	-	-	268.8	179.2	-	**448.0**
Replace Switchgear Synchronous Condensers 1 and 2 (2028–2029) - Wabush Terminal Station	-	-	-	250.0	1,110.0	-	**1,360.0**
Replace Terminal Station Battery Banks and Chargers (2028–2029)	-	-	-	155.0	103.0	-	**258.0**
Replace Disconnects (2028–2030)	-	-	-	148.1	259.2	333.2	**740.5**
Install Breaker Failure Protection (2028–2029) - Hardwoods	-	-	-	133.0	267.0	-	**400.0**
Perform Major Inspection - Synchronous Condenser 2 (2028–2029) - Wabush Terminal Station	-	-	-	86.0	484.0	-	**570.0**

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Five-Year Capital Plan Detailed Breakdown by Major and Minor - Asset Category[1]
($000)

	2025 and Prior Years	2026	2027	2028	2029	2030	Total
Upgrade Terminal Station for Mobile Substation (2028–2029) - Roddickton	-	-	-	82.6	480.1	-	**562.7**
Upgrade Power Transformers (2028–2029)	-	-	-	59.4	1,241.7	-	**1,301.1**
Replace Circuit Breaker Reclosing Controllers (2028–2029) - HRD B3L18	-	-	-	54.3	83.5	-	**137.8**
Terminal Station In-service Failures (2029)	-	-	-	-	3,531.9	-	**3,531.9**
Replace Protective Relays (2029–2030)	-	-	-	-	700.0	1,140.0	**1,840.0**
Renew Circuit Breakers (2029–2031)	-	-	-	-	675.0	987.0	**1,662.0**
Replace Disconnects (2029–2031)	-	-	-	-	180.0	315.1	**495.1**
Install Breaker Failure Protection (2029–2030) - Wabush Terminal Station	-	-	-	-	175.0	355.0	**530.0**
Replace Instrument Transformers (2029–2030)	-	-	-	-	146.8	97.9	**244.7**
Replace Terminal Station Battery Banks and Chargers (2029–2030)	-	-	-	-	99.0	66.0	**165.0**
Upgrade Terminal Station for Mobile Substation (2029–2030) - Grandy Brook	-	-	-	-	84.8	492.8	**577.5**
Perform Modified Major Inspection - Synchronous Condenser 1 (2029–2030) - Wabush Terminal Station	-	-	-	-	77.0	433.0	**510.0**
Replace Circuit Breaker Reclosing Controllers (2029–2030) - Indian River	-	-	-	-	55.7	85.8	**141.4**
Upgrade Power Transformers (2029–2030)	-	-	-	-	48.1	420.0	**468.1**
Upgrade Data Alarm Systems (2029–2030) - Springdale	-	-	-	-	17.0	31.0	**48.0**
Terminal Station In-service Failures (2030)	-	-	-	-	-	3,625.2	**3,625.2**
Replace Protective Relays (2030–2031)	-	-	-	-	-	990.0	**990.0**
Renew Circuit Breakers (2030–2032)	-	-	-	-	-	856.0	**856.0**
Replace Instrument Transformers (2030–2031)	-	-	-	-	-	279.8	**279.8**
Upgrade Data Alarm Systems (2030–2031) - Happy Valley	-	-	-	-	-	183.0	**183.0**
Replace Disconnects (2030–2032)	-	-	-	-	-	180.7	**180.7**
Replace Terminal Station Battery Banks and Chargers (2030–2031)	-	-	-	-	-	134.0	**134.0**
Replace Circuit Breaker Reclosing Controllers (2030–2031) - Bear Cove	-	-	-	-	-	57.2	**57.2**
Upgrade Power Transformers (2030–2031)	-	-	-	-	-	49.3	**49.3**
Subtotal Terminal Stations	**12,732.3**	**17,138.9**	**17,272.1**	**24,009.1**	**14,098.4**	**12,339.9**	**97,590.7**
Generation							
Replace Diesel Gensets (2024–2025)	1,013.8	2,404.7	-	-	-	-	**3,418.5**
Additions for Load Growth - Unit 2065 Replacement and Fuel Storage Upgrades (2024–2027) - Rigolet	276.4	3,082.9	69.9	-	-	-	**3,429.2**
Replace Diesel Gensets (2025–2027)	418.2	1,719.0	4,086.4	-	-	-	**6,223.6**
Overhaul Diesel Units (2026)	-	2,353.7	-	-	-	-	**2,353.7**
Replace Fuel Storage Tank (2026) - McCallum	-	1,008.4	-	-	-	-	**1,008.4**
Diesel In-Service Failures (2026)	-	817.0	-	-	-	-	**817.0**
Inspect Fuel Storage Tanks (2026) - Rigolet	-	504.8	-	-	-	-	**504.8**
Overhaul Diesel Units (2027)	-	-	2,388.7	-	-	-	**2,388.7**
Inspect Fuel Storage Tanks (2027) - Makkovik	-	-	1,100.0	-	-	-	**1,100.0**
Additions for Load Growth (2027) - Isolated Generation Stations	-	-	945.3	-	-	-	**945.3**
Diesel In-Service Failures (2027)	-	-	837.4	-	-	-	**837.4**
Replace Diesel Gensets (2027–2028)	-	-	400.0	1,600.0	-	-	**2,000.0**
Replace Diesel Plant (2028–2031) - Rigolet	-	-	-	5,000.0	10,000.0	10,000.0	**25,000.0**
Overhaul Diesel Units (2028)	-	-	-	2,443.7	-	-	**2,443.7**
Inspect Fuel Storage Tanks (2028) - Black Tickle	-	-	-	1,000.0	-	-	**1,000.0**
Additions for Load Growth (2028) - Isolated Generation Stations	-	-	-	967.1	-	-	**967.1**
Diesel In-Service Failures (2028)	-	-	-	856.6	-	-	**856.6**
Replace Diesel Gensets (2028–2029)	-	-	-	800.0	3,800.0	-	**4,600.0**
Overhaul Diesel Units (2029)	-	-	-	-	2,499.9	-	**2,499.9**
Inspect Fuel Storage Tanks (2029) - Nain	-	-	-	-	1,200.0	-	**1,200.0**
Additions for Load Growth (2029) - Isolated Generation Stations	-	-	-	-	989.3	-	**989.3**
Diesel In-Service Failures (2029)	-	-	-	-	876.3	-	**876.3**
Replace Diesel Gensets (2029–2030)	-	-	-	-	400.0	1,200.0	**1,600.0**
Overhaul Diesel Units (2030)	-	-	-	-	-	2,557.4	**2,557.4**
Additions for Load Growth (2030) - Isolated Generation Stations	-	-	-	-	-	1,012.0	**1,012.0**
Diesel In-Service Failures (2030)	-	-	-	-	-	896.5	**896.5**
Replace Diesel Gensets (2030–2031)	-	-	-	-	-	800.0	**800.0**
Subtotal Generation	**1,708.4**	**11,890.5**	**9,827.7**	**12,667.3**	**19,765.5**	**16,465.9**	**72,325.3**
Total Transmission and Rural Operations	**22,168.3**	**59,819.8**	**78,344.9**	**78,826.0**	**73,605.9**	**65,122.0**	**377,887.0**
Allowance for Unforeseen Items							
Allowance for Unforeseen Items							
Allowance for Unforeseen Items (2030)	-	-	-	-	-	1,000.0	**1,000.0**
Allowance for Unforeseen Items (2026)	-	1,000.0	-	-	-	-	**1,000.0**
Allowance for Unforeseen Items (2027)	-	-	1,000.0	-	-	-	**1,000.0**
Allowance for Unforeseen Items (2028)	-	-	-	1,000.0	-	-	**1,000.0**
Allowance for Unforeseen Items (2029)	-	-	-	-	1,000.0	-	**1,000.0**
Subtotal Allowance for Unforeseen Items	**-**	**1,000.0**	**1,000.0**	**1,000.0**	**1,000.0**	**1,000.0**	**5,000.0**
Total Allowance for Unforeseen Items	**-**	**1,000.0**	**1,000.0**	**1,000.0**	**1,000.0**	**1,000.0**	**5,000.0**
Total Capital Plan	**40,651.6**	**140,487.4**	**169,394.5**	**200,264.8**	**197,428.9**	**117,378.3**	**865,605.5**

[1] Numbers may not add due to rounding.

Appendix B

Capital Expenditures (2021–2030)

Newfoundland and Labrador Hydro
2026 Capital Budget Application
Capital Expenditures 2021–2030[1]
($000)

	Actuals				Budget					
	2021	**2022**	**2023**	**2024**	**2025**	**2026**	**2027**	**2028**	**2029**	**2030**
Access	5,351.7	13,285.5	13,846.8	6,591.2	5,006.7	6,712.4	6,688.7	5,856.0	6,010.0	**6,168.0**
Allowance for Unforeseen	4,006.9	800.9	-	-	1,000.0	1,000.0	1,000.0	1,000.0	1,000.0	**1,000.0**
General Plant	7,010.4	9,133.4	13,183.3	20,563.4	45,083.8	31,651.2	47,611.9	51,874.7	44,126.2	**40,797.3**
Mandatory	228.5	2,264.4	388.7	2,938.0	1,815.3	2,172.8	1,205.3	1,226.4	745.0	**1,408.1**
Renewal	89,450.4	67,942.2	96,149.9	108,105.3	162,915.6	87,623.2	94,137.1	120,439.1	136,754.4	**60,340.4**
Service Enhancement	1,995.5	5,494.0	12,839.9	9,226.3	13,019.5	8,244.0	15,121.3	15,461.7	6,967.3	**5,793.2**
System Growth	5,448.4	4,487.6	12,467.4	6,751.4	4,609.3	3,083.8	3,630.2	4,407.0	1,826.0	**1,871.2**
Total	**113,492.1**	**103,408.2**	**148,876.0**	**154,175.6**	**233,450.2**	**140,487.4**	**169,394.5**	**200,264.8**	**197,428.9**	**117,378.3**

[1] Numbers may not add due to rounding.

Sch 3: Holyrood TGS Overview

Schedule 3

Holyrood Thermal Generating Station Overview

Future Operation and Capital Expenditure Requirements

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Holyrood Thermal Generating Station Overview

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1.0 Background

In the Board of Commissioners of Public Utilities ("Board") Order No P.U. 5(2012), Newfoundland and Labrador Hydro ("Hydro") was directed to file, in conjunction with its 2013 Capital Budget Application ("CBA"), an overview in relation to the proposed capital expenditures for the Holyrood Thermal Generating Station ("Holyrood TGS"). The Board required the overview to include the following:

- An updated outlook regarding anticipated changes in the role of the Holyrood TGS on the system;
- An updated schedule of anticipated changes in the Holyrood TGS operations that may reasonably be expected to have an impact on capital expenditure requirements;
- A summary description of all proposed Holyrood TGS capital projects, including an explanation of how such projects relate to one another and whether such projects may be impacted by decisions yet to be taken regarding the Holyrood TGS's role on the system;
- A summary guide to all internal and external reports filed in support of the capital expenditure proposals, summarizing alternatives considered, and recommendations made; and
- An explanation of the necessity of all proposed capital expenditures in the context of the anticipated changes in the Holyrood TGS operations.

Through 2022, Hydro continued to update and file the Holyrood TGS Overview report annually within its CBAs. In Board Order No. P.U. 2(2023), Hydro was directed to file a more comprehensive report with its 2024 CBA, outlining the planned operation of the facility until the latter of March 31, 2030, or the anticipated conclusion of generation operations at the facility, and including full discussion and analysis of reasonable alternative approaches and reasonable capital costs over the full period. This report provides an update for the 2026 CBA that outlines Hydro's operational outlook, maintenance strategy, and capital plan for 2026–2030.

2.0 Introduction

The Holyrood TGS is currently a critical part of the Island Interconnected System. With three oil-fired generating units providing an installed capacity of 490 MW, the Holyrood TGS can generate up to 40% of the Island's annual energy needs if necessary. Units 1 and 2 were commissioned in 1970 and 1971, respectively, and Unit 3 in 1979. Units 1 and 2 were originally designed to produce 150 MW each and were upgraded to 170 MW in 1988 and 1989, respectively. Unit 3 retains its original configuration and is rated at 150 MW. In 1986, Unit 3 was retrofitted with synchronous condensing capability to provide voltage support on the eastern area of the Island Interconnected System during periods when power generation from this unit is not required.

Figure 1: Holyrood TGS

The three major components of the thermal generating process are the boiler, turbine, and generator, with supporting systems such as fuel oil storage and delivery, controls, and cooling and feedwater supply systems. Through the combustion of No. 6 heavy fuel oil, the power boiler provides high-energy steam to the turbine. The turbine is directly coupled to the generator and provides the rotating energy necessary for the generator to produce rated output power on the Island Interconnected System. The generator itself is pressurized and cooled by hydrogen gas to provide maximum efficiency both in heat transfer and reduced windage losses.[1]

In 2021, Hatch Ltd. ("Hatch") completed its Life Extension Condition Assessment Study ("LECA"),[2] including a capital plan to support the standby operation of the Holyrood TGS to 2030. In 2024, Hatch

[1] Windage losses refer to the losses sustained by a machine due to the resistance offered by air to the rotation of the shaft. Windage losses occur in electric rotating machines such as motors and generators.
[2] "*Reliability and Resource Adequacy Study Review* – Assessment to Determine the Potential Long-Term Viability of the Holyrood Thermal Generating Station," Newfoundland and Labrador Hydro, March 31, 2022, att. 2.

completed a refresh to their capital plan, which also considered operations to 2035 to inform the capital costs of operating beyond 2030, should this be required.[3] Hatch's plans inform Hydro's capital expenditures outlook as discussed in Section 6.0.

3.0 Current Operational Outlook and Schedule

Hydro has recommended that all three Holyrood TGS units and the Hardwoods and Stephenville Gas Turbines are to remain available through the "Bridging Period" while Hydro seeks to develop new long-term sources of supply.[4] This is in accordance with capacity requirements as specified by Hydro in the 2024 Resource Adequacy Plan[5] as part of the *Reliability and Resource Adequacy Study Review* proceeding ("*RRA Study Review*").

The results of the Holyrood TGS LECA provide an indication of the capital asset renewal and maintenance investments that will be required for the continued operation of the Holyrood TGS in the near term. Based on the information provided, Hydro can expect the reasonable operation of the facility through the Bridging Period, with required human resource, capital, and maintenance investments. In 2024, Hydro completed a refresh of the capital plan presented in this condition assessment. The purpose of this refresh was to assess the cost of the operation of Holyrood TGS beyond 2030,[6] to inform supply options in the event that some supply from Holyrood TGS is needed in advance of the commissioning of new generation. This study also refreshed the required capital investments for the continued operation of the Holyrood TGS to 2030 and beyond, as necessary, to aid future analysis.

4.0 Maintenance Strategy through to Decommissioning

Scheduled overhauls of plant equipment are ongoing to support the safe operation and continued availability of assets for generation. Significant changes to Hydro's maintenance strategy between now

[3] "*Reliability and Resource Adequacy Study Review* – Holyrood Thermal Generating Station Capital Plan Refresh," Newfoundland and Labrador Hydro, March 7, 2025, att. 1.
[4] Hydro considers the Bridging Period to be from the present to 2030, or until such time that sufficient alternative generation is commissioned, adequate performance of the Labrador-Island Link ("LIL") is proven, and generation reserves are met. During the Bridging Period, the system would rely primarily on existing sources of generation capacity to maintain reliability while new generation capacity is being built. The primary, readily available supply options in this period are extending the retirements of the Holyrood TGS, Stephenville Gas Turbine and the Hardwoods Gas Turbine until their capacities can be adequately replaced.
[5] "2024 Resource Adequacy Plan – An Update to the Reliability and Resource Adequacy Study," Newfoundland and Labrador Hydro, rev. August 26, 2024 (originally filed July 9, 2024).
[6] As noted in correspondence "*Reliability and Resource Adequacy Study Review* – Planned Reports, Studies and Analyses – Response to Further Comments and Directions," Newfoundland and Labrador Hydro, January 19, 2024, Hatch was requested to assess life extension up to 2035; however, Hydro does not intend to keep Holyrood TGS in operation for this full period.

and the planned retirement date are not anticipated at this time; however, should additional capital costs be identified, diligent consideration will be given to the expenditures prior to application to the Board. Changes in equipment refurbishment intervals may be considered depending on annual operating hours; an extension beyond more typical timeframes may be achieved in some instances, allowing Hydro to reduce costs while maintaining safety and reliability. Advancement of refurbishment intervals may be required in some instances, as necessitated by asset condition.

During post-steam operations, assets with operational synchronous condenser requirements will continue to be optimally maintained.[7] An overview of Hydro's maintenance philosophy for the Holyrood TGS assets is provided in Appendix A to this report.

5.0 Holyrood 2026 Capital Plan Summary

Planned 2026 capital expenditures for the Holyrood TGS include both generation-related and non-generation-related (i.e., synchronous condenser mode) investments. The 2026 capital project proposals were identified considering safety, environment, asset condition, equipment obsolescence, forecast production requirements, and Hydro's commitment to have the Holyrood TGS fully available through the Bridging Period. The projects outlined herein reflect the necessary refurbishment and replacement projects to support the reliability of the Holyrood TGS and the provision of service to customers. In the event of unforeseen failure or unexpected as-found conditions, adjustments or additions may be required beyond the current plan.

Hydro's proposed projects and programs in the 2026 CBA are informed by the original LECA and the 2024 Capital Plan Refresh, supplemented by Hydro's operational experience and updated asset condition information.

[7] Hydro's planning assumptions assume that Holyrood TGS Unit 3 will remain as a synchronous condenser post-steam. Through the *RRA Study Review*, Hydro is evaluating post-steam Avalon synchronous condenser requirements, which will inform the future role of Holyrood TGS Unit 3.

Table 1 provides a summary description of the proposed 2026 capital programs and projects for the Holyrood TGS.

Table 1: Holyrood TGS Programs and Projects Proposed in the 2026 CBA

Requirement	Program/Project (Totals)	Scope Summary	Proposal Location
Generation	Perform Boiler Condition Assessment and Miscellaneous Upgrades (2026) ($9.6 million)	This project is required to complete identified Level 2 Condition Assessments and detailed inspections of high-pressure boiler components and high-energy piping components. The boilers and associated high-energy piping are exposed to multiple aggressive degradation mechanisms and require regular inspection to monitor deterioration rates and plan interventions. This work is essential to ensure the safe and reliable operation of the boilers. The 2026 scope includes work that was identified through prior assessments, such as the replacement of High-Pressure Heater #4 on Unit 1. Replacements and refurbishments identified through the completion of the boiler work, such as the replacement of expansion joints, which are deemed capital in nature, will be included in the scope of this project.	Volume II, Schedule 7, Project 1
Generation	Overhaul Turbine Valves and Generator – Unit 2 (2026) ($7.0 million)	This project is required to complete an overhaul on a three-year cycle for the turbine valves and a six-year cycle for the generator, and is appropriate based on the observations made during previous overhauls. The turbine valve overhaul will consist of dismantling all the control valves, main stop valve, combined reheat stop and intercept valves, extraction non-return valves, and blowdown valve for inspection and detailed measurements. The valves will be refurbished as required through the replacement of damaged parts. An overhaul of the valves is required for safe control and operation of the steam turbine. The generator overhaul will include removal of the generator rotor for detailed condition assessment, electrical testing, and refurbishment of the stator and rotor. A detailed inspection of bearings and other mechanical components, including clearances, dimensional checks, and alignment, will be included.	Volume II, Schedule 7, Project 3
Generation	Thermal In-Service Failures (2026) ($3.8 million)	The purpose of this program is to allow the completion of capital work due to the failure of equipment or the recognition of an incipient failure that cannot wait for the next capital submission cycle. This program also includes the purchase of critical capital spares to reduce downtime and increase availability should a failure of a key component occur.	Volume I, Schedule 7, Program 6
Generation	Overhaul Major Pumps (2026) ($2.4 million)	This project is required to complete the identified inspection and overhaul of the Unit 1 West Boiler Feed Pump, Unit 1 East Cooling Water Pump, Unit 1 South Condensate Extraction Pump, and the Unit 2 South	Volume II, Schedule 7, Project 9

Requirement	Program/Project (Totals)	Scope Summary	Proposal Location
		Condensate Extraction Pump. The 2026 scope of work for the identified pumps includes the disassembly, inspection, refurbishment and replacement of parts, as required, and reassembly and commissioning. The motors that drive the identified pumps will also be overhauled as part of the scope.	
Synchronous Condenser	Refurbish Water Treatment Systems (2026–2027)[8] ($1.5 million)	The scope of this two-year project entails the refurbishment of the water treatment systems at the Holyrood TGS. The Water Treatment Plant ("WTP") and the Wastewater Treatment Plant ("WWTP") are necessary components of the Holyrood TGS. The WTP is required for operation during steam production, and the WWTP, which is required to treat plant wastewater, will be required to process plant run-off and other site wastewater for 25 years post-steam generation. Hydro is proposing to complete the necessary inspection, resin replacement, and out-of-service inspections for the cation, anion, mixed beds, condensate polisher vessels, and batch reactor vessel, and replacement of the inlet piping in the clarifier tank.	Volume II, Schedule 7, Project 16
Generation	Perform Level 2 Condition Assessment – Condenser and Condenser Tubes (2026–2027) ($0.6 million)	This two-year project is required to complete a Level 2 Condition Assessment of the condensers and condenser tubes on each of the three generating units. The assessment of the tubes will include Eddy Current Testing, which is a non-destructive technique used to find damage and overall thinning of the tubes that could lead to an in-service failure. Visual inspection of the steam and water sides of the condensers will also be completed to identify any concerns that may require repair or replacement to ensure continued reliable operation. Assessment work will be completed in year one, and the final report will be received in year two.	Volume II, Schedule 7, Programs and Projects under $750,000
Synchronous Condenser	Replace Parts of Stage 1: 129 Vdc Batteries and Battery Chargers (2026-2027) ($0.3 million)	This two-year project proposes to replace the 129 Vdc battery bank and chargers servicing Unit 1 and Unit 2 at the Holyrood TGS. This equipment provides direct current power to protection and control systems, and other essential back-up equipment, that ensures safe and reliable operation of the thermal units. The battery bank and chargers that are being proposed for replacement will be 20 years old in 2026 and are considered to be at the end of their useful life.	Volume II, Schedule 7, Programs and Projects under $750,000

[8] A portion of the expenditures in this project are also attributed to generation-related expenditures.

Requirement	Program/Project (Totals)	Scope Summary	Proposal Location
Synchronous Condenser	Backup Critical Control Systems (2026) ($0.3 million)	The current method of backup for the Distributed Control System and Burner Management System is not reliable and is a risk to the operation of the station. The proposed solution will leverage existing operational technology infrastructure, with some additional hardware to accommodate Holyrood TGS systems, to allow critical system backups to be completed and stored off-site.	Volume II, Schedule 7, Programs and Projects under $750,000

Table 2 provides a summary description of programs and projects which were previously approved, with planned expenditures in 2026.

Table 2: Previously Approved Holyrood TGS Programs and Projects with Expenditures in the 2026 CBA[9]

	Program/Project (Totals)	Scope Summary
Generation	Refurbish Marine Terminal (2025–2026) ($1.3 million in 2026; $2.5 million total)	This two-year project is to complete a refurbishment of the marine terminal at the Holyrood TGS. The refurbishments include a section of the shoreline boardwalk, gravity fender bumpers, and capstan gearboxes. Level 2 Condition Assessments will be completed on the jetty steel piles, bollards, and gravity fender mechanical linkage arms. The 2026 scope of work includes the replacement of gravity fender No. 2 linkage arms, the refurbishment of fenders 2,3,4,5, and 6, timber bumpers, and a condition assessment of all other fender linkage arms.

Hydro is managing several deteriorating pieces of infrastructure, notably fuel oil storage tanks, to reach end-of-generation life with minimal refurbishment costs. To continue to minimize the investment in assets that are not planned for long-term operation, Hydro worked with a consultant and the regulator to extend the operating life of the fuel oil storage tanks, as is summarized in Table 3. As none of the tanks require an overhaul prior to 2030, there are no projects included in the Holyrood TGS five-year capital plan. Extension of generation requirements beyond 2030 could trigger significant work on the Holyrood TGS fuel oil storage tanks. All three storage tanks, plus the day tank, would require an overhaul prior to 2035 if steam operation continues.

[9] Approved in Board Order No. P.U. 28(2024).

Table 3: Fuel Oil Storage Tank Status

Tank	Status
Fuel Oil Storage Tank 1	This tank is in service after completion of the overhaul in spring 2024. The next overhaul would be required in 2034.
Fuel Oil Storage Tank 2	This tank has been removed from service, and the fuel storage volume has been reduced to a minimum (dead storage). During summer 2025, Hydro will pump out the remainder of the fuel and then clean and inspect the interior of the tank. A least cost evaluation will be completed to determine whether the tank should be demolished or should be reinforced to allow it to continue to stand empty until demolition of the entire tank farm.
Fuel Oil Storage Tank 3	This tank is in service. The next overhaul would be required in 2031.
Fuel Oil Storage Tank 4	This tank is in service after completion of the overhaul in 2024. The next overhaul would be required in 2034.
Day Tank	This tank is in service. The next overhaul would be required in 2033.

Based on current operating assumptions, Hydro has determined that the increased risks related to operating with three tanks are acceptable through the Bridging Period.

Table 4 outlines programs and projects proposed in the 2026 CBA by major system or subsystem and the necessity for generation or synchronous condenser operation.

Table 4: 2026 Program/Project Necessity in the Context of Generation or Synchronous Condenser Operation

Major System or Subsystem	Program/Project	Generation	Synchronous Condenser Operation
Fuel Storage and Delivery	N/A	Required	N/A
Feedwater and Condensate	Overhaul Major Pumps (2026)	Required	N/A
Boiler	Perform Boiler Condition Assessment and Miscellaneous Upgrades (2026)	Required	N/A
Turbine Generator	Overhaul Turbine and Valves and Generator – Unit 2 (2026)	Required	N/A
Cooling Water Systems	Perform Level 2 Condition Assessment – Condenser and Condenser Tubes (2026-2027)	Required	N/A
Buildings and Grounds[10]	N/A	Required	Required
Common Systems	Backup Critical Controls Systems	Required	Required
	Refurbish Marine Terminal	Required	N/A
	Replace Parts of Stage 1: 129 Vdc Batteries and Battery Chargers (2026-2027)	Required	Required
	Thermal In-Service Failures (2026)[11]	Required	Required
	Refurbish Water Treatment Systems (2026-2027)	Required	N/A[12]

6.0 Holyrood TGS 2026–2030 Capital Expenditures Outlook

Capital investment will be necessary from 2026 to 2030 to ensure the continued reliability of supply and maintenance of the level of service required in generation and synchronous condenser operations. Various types of investments and expenditures for the Holyrood TGS are anticipated, including refurbishment, upgrade or replacement of failed or obsolete equipment, and general plant infrastructure. In 2024, Hatch completed a refresh of the capital plan presented in their 2021 condition assessment. This study refreshed the required capital investments for the continued operation of the Holyrood TGS to 2030. Hydro's capital plan for 2026–2030 largely reflects the capital plan provided by Hatch, with modifications to reflect operational plans and limitations.

[10] Included in Perform Facilities Refurbishment (2026) program.
[11] Major system or subsystem is dependent on the type of failure.
[12] While the WTP is not required for post-steam operation, the WWTP is required to remain in service post-steam.

Hydro's planned capital expenditures for the Holyrood TGS for the period 2026–2030, segmented by generation-related and synchronous condenser-related expenditures, are provided in Chart 1.

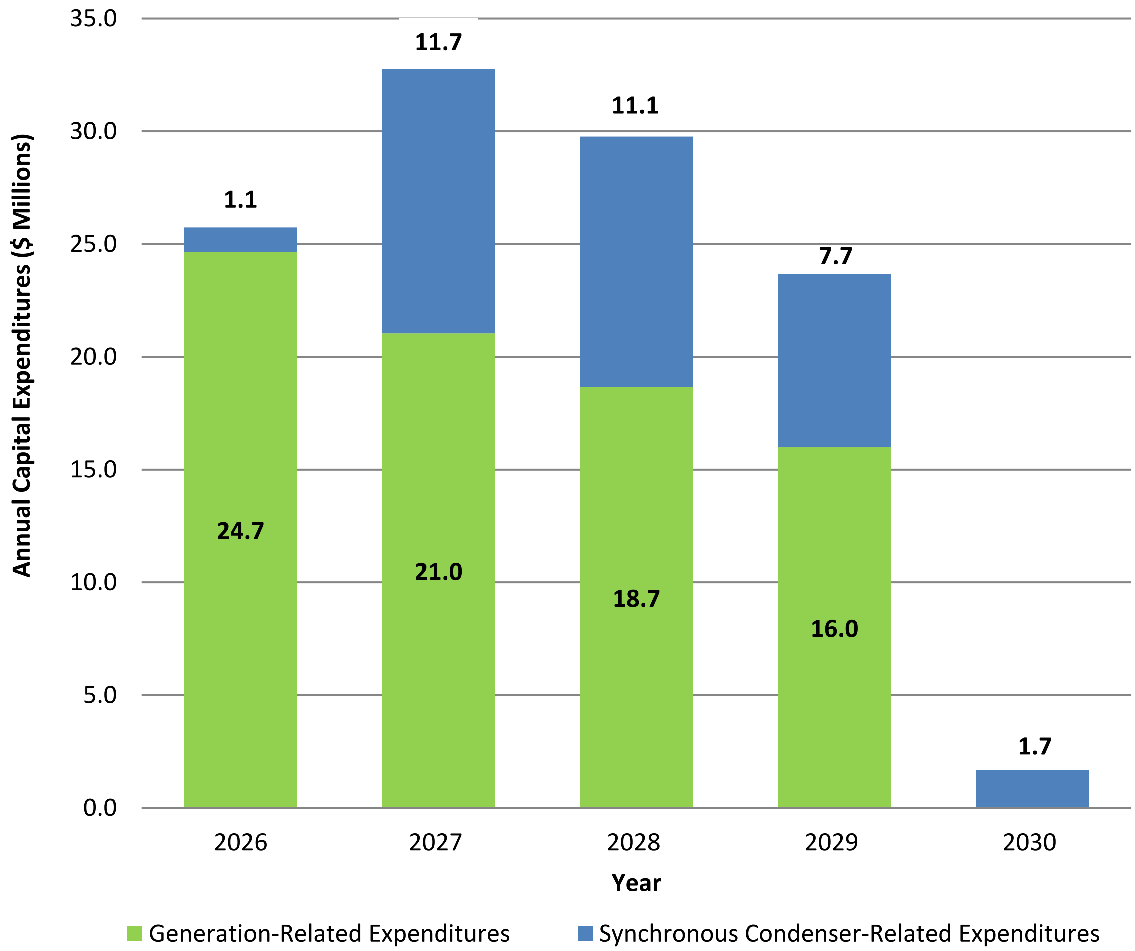

Chart 1: Holyrood TGS Capital Expenditures 2026–2030[13,14,15]

Planned expenditures for the 2026–2030 capital plan period total $113.7 million, of which, $80.4 million is related to generation and $33.3 million is related to synchronous condenser operation. Approximately $61.9 million is associated with the continuation of existing capital programs and routine expenditures, including regularly scheduled overhauls of critical generation equipment, including boilers, turbine

[13] Numbers may not add due to rounding.
[14] Included in the 2026–2029 generation-related expenditures category is an annual average of $3.9 million for thermal in-service failures. Depending on the failure type, a portion of the $3.9 million could be attributed to synchronous condenser-related expenditures. In 2030, the entire thermal in-service failure expenditure of $0.7 million is considered to be synchronous condenser-related.
[15] Expenditures classified as "Synchronous Condenser-Related Expenditures" are also be required for generation.

valves and turbines, generators, and major pumps. Continuation of these programs is essential in maintaining the safe and reliable operation of the thermal units.

In addition to asset renewal, the current five-year capital plan includes the design and implementation of a plant heating solution for the Holyrood TGS, required following the end-of-steam generation at the Holyrood TGS. A source of plant heat is also required in the near term to prevent the possibility of plant freeze-up and severe damage to critical generation equipment, should a circumstance arise where all three boilers at Holyrood TGS are not available simultaneously during cold weather. Hydro is assessing options for plant heating and will submit a project, as required, to address the near-term and long-term needs. The project timing is subject to change, but is currently planned for submission in the 2027 CBA.

A detailed list of planned capital expenditures is provided in Appendix B.

Several assumptions have been made in the creation of the capital plan for the Holyrood TGS. This includes projected scenarios of timelines for the transition of generation capability from the Holyrood TGS to new generation assets, the expected retirement sequence and retirement dates of the thermal generating units at the Holyrood TGS, and other key operational assumptions. These assumptions and the associated capital plan reflect the prudent investment required to ensure safe, cost-effective, and reliable operation of the thermal units until their planned retirement dates.

Assumptions and Constraints:

1) When steam generation is complete at the Holyrood TGS, the site will continue to operate Unit 3 as a synchronous condenser.[16] The Holyrood Combustion Turbine and the black start diesels will also continue to operate. On-site assets, including buildings, which are required to support these functions, will continue to be maintained, as appropriate, beyond the end-of-stream date until no longer required.

2) The plant’s annual operation schedule is assumed to remain consistent with recent operations, with the critical winter period from December 1 to March 31 (“Operating Months”) annually and time available for capital upgrades and maintenance outside of this operating period.

[16] Hydro’s planning assumptions assume that Holyrood TGS Unit 3 will remain as a synchronous condenser post-steam. Through the *RRA Study Review*, Hydro is evaluating post-steam Avalon synchronous condenser requirements, which will inform the future role of Holyrood TGS Unit 3.

3) It is assumed that units will be mostly online during the winter Operating Months, and as such, there will not be a requirement to exercise idle units by starting them and running them up to full load regularly. Hence, this operational plan does not require a change in capital and operating maintenance requirements, which would otherwise be necessitated by increasing the number of stops and starts performed on the units annually.

Years 2025–2030:

Holyrood TGS units will typically be online and staged to meet load requirements, as needed, from mid-October through the March timeframe.[17]

1) Since units are assumed to be mostly online during the operating months, it is assumed there will be no reduction in maintenance philosophy, including preventative maintenance programs, which will not materially change other than continuous improvements through annual reviews completed by Hydro.

2) Staffing levels at Holyrood TGS will remain consistent with the current operation.

3) Units will not be required to start-up faster than the current rate of 24 hours from cold for the first unit, and 30 hours for the second unit. No capital investment will be made to facilitate faster start times or improve standby operation.

4) An alternate source of heat is required to prevent freeze-up of the plant and consequential severe damage to critical generation equipment should all three boilers at Holyrood TGS be unavailable for operation simultaneously during cold weather. This plant heating project is currently planned to be submitted in the 2027 CBA.

5) Current reliability targets, derated adjusted forced outage rate ("DAFOR"),[18] and derated adjusted utilization forced outage probabilities ("DAUFOP")[19] – 20% (as noted in the *RRA Study*

[17] The operation of the Holyrood TGS will be determined in advance of each winter operating season, depending on system conditions at that time.
[18] DAFOR is a metric that measures the percentage of time that a unit or group of units is unable to generate at its maximum continuous rating due to forced outages or unit deratings.
[19] DAUFOP is a metric that measures the percentage of time that a unit or group of units will encounter a forced outage and not be available when required. DAUFOP is a measure primarily used for gas turbines; however, this measure will be applicable to the thermal generating units.

Review)[20] will continue to be maintained. Capital investment will focus on maintaining, but not improving, these levels. Specific investments to improve start-up performance will not be made.

6) The order of unit decommissioning, when appropriate, will be Unit 3 (generating components only), Unit 1, and Unit 2.

7) Three fuel oil storage tanks are required for safe, cost-effective, and reliable operation. The potential to operate Holyrood TGS with two tanks has been studied and is not considered feasible due to fuel capacity and delivery constraints, and logistical and operational challenges associated with two-tank operation.[21]

8) The Unit 3 turbine steam chest crack is being remediated during the planned 2025 turbine major overhaul. The work is being done by the turbine service provider and original equipment manufacturer, Mitsubishi Power.[22]

9) Decommissioning costs are not included in the capital plan and are assumed to be funded by an Asset Retirement Obligation ("ARO") budget. A study on ARO was last completed in 2016 and updated in 2023 to provide updated estimates.

10) The proposed capital projects from the LECA and the refresh of the capital plan that was completed in 2024 will be considered in detail relative to the transition scenarios and assumptions. Changing assumptions and asset conditions will be evaluated and may result in deviations from the capital plan contained within the LECA. Project governance processes will be followed for all proposed projects.

11) Assets not classified as Holyrood TGS assets (i.e., Transmission and Rural Operations ("TRO"), or Telecontrol assets, etc.) are not included in the enclosed capital plan.

Non-critical assets will be monitored and may be allowed to deteriorate where such action does not increase risk to safe and reliable production. Data will be collected from inspections, online monitoring,

[20] Hydro's resource planning model does not differentiate between DAFOR and DAUFOP; rather, it requires the selection of a forced outage rate percentage.
[21] For further details on the risk posed to Holyrood TGS by two-tank operation, please refer to "Application for Approval of Various Supplemental Capital Projects at the Holyrood Thermal Generation," Newfoundland and Labrador Hydro, June 6, 2022, sch. 2, sec. 3.2.
[22] After initiating repairs on the lower steam chest, substantial external cracking was identified. Hydro is assessing information resulting from the planned inspection work, which currently indicates that significant additional work and expenditures will be required to return the unit to reliable service. Hydro will provide an update on the project and the impacts to the unit return to service date in its Winter Readiness reporting.

and formal condition assessments and used to determine the optimal work plan for the assets in light of the changing role of the Holyrood TGS.

6.1 Depreciation Impacts of Holyrood TGS Life Extension

As Hydro expects continued operation of all three units at the Holyrood TGS through the Bridging Period until its capacity can be adequately replaced to ensure reliable operation for customers, capital expenditures for this facility to operate as a generator continue to be required. Depreciation is required to be calculated on an accelerated basis (i.e., monthly depreciation = capital investment ÷ remaining months of service life).[23]

7.0 Holyrood TGS 2025–2034 Operating Expenses

In Board Order No. P.U. 14(2004), Hydro was directed to file a ten-year plan of maintenance expenditures for the Holyrood TGS with its annual CBA until otherwise directed. The identified and expected system equipment maintenance ("SEM") expenditures for the years 2025–2034, inclusive, are provided in Appendix C.

The harsh operating environment, evolving production requirements, timing of replacement generation assets, a shift to synchronous condensing operation and the age of units may trigger revision of the maintenance plan to address unforeseen events. The plan currently reflects Hydro's commitment to have the Holyrood TGS fully available until March 31, 2030, and is based on the assumptions presented in Section 6.0; changes in operational outlook may result in changes in SEM expenses. Although expenses for major overhauls are included in capital, some variability in the annual SEM budget will remain as a result of the complexity of numerous components and integrated systems that form a fossil fuel-fired thermal electric generating system.

The SEM expenditures presented in Appendix C are based on the SEM budget planning information for 2025 and 2026. Future years, beyond 2026, are adjusted to reflect the Holyrood TGS's role using the best available information, including up-to-date maintenance tactics and known restoration and

[23] Due to the extension of the Holyrood TGS through the Bridging Period, Hydro submitted an application to the Board to extend the Holyrood Accelerated Depreciation Deferral Account. The extension of the account and related amendments were approved in Board Order No. P.U. 1(2024). Hydro was also directed to file a report on the account in its next general rate application.

inspection work, to establish a ten-year forecast of the SEM projects for the Holyrood TGS.[24] Actual operation will vary based on the operating requirements of the Holyrood TGS, the results of inspections, and assessments of changing equipment conditions.

8.0 Alternative Approaches

In July 2024, Hydro filed its 2024 Resource Adequacy Plan, which indicated additional generating assets are required to be brought online to: (i) accommodate anticipated load growth on the Island Interconnected System; and (ii) ensure reliable system operation in the event of an extended outage of the Labrador-Island Link. Hydro has completed front-end engineering design for new supply additions and filed an application for additional generation in March 2025.[25] While Hydro is committed to transitioning from Holyrood TGS as a generating facility as soon as reasonably possible, there are no reasonable alternatives that would allow Hydro to transition from generation at Holyrood TGS until new sources of supply are available. Please refer to Section 5.2.3 of Hydro's 2024 Resource Adequacy Plan for further discussion of short-term supply options.

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[24] In the maintenance plan, a single escalation factor of 1.11% per year has been used for 2027–2034 based on an average rate from Hydro's current corporate assumptions.

[25] "2025 Build Application – Bay d'Espoir Unit 8 and Avalon Combustion Turbine," Newfoundland and Labrador Hydro, March 21, 2025.

Appendix A

Holyrood Thermal Generating Station Asset Maintenance Philosophy

Maintenance Philosophy

Maintenance efforts aim to prevent functional failure and extend the operational life of assets, helping to minimize total asset lifecycle cost. The type and amount of maintenance applied is dependent on the criticality of the asset and the impact of failure on service delivery. Hydro seeks to balance the cost of maintenance against the cost of failure and its impact on safe, reliable service when applying maintenance strategies and tactics. There are four main types or categories of maintenance undertaken at the Holyrood TGS: preventive maintenance, corrective maintenance, boiler overhauls, and operating projects.

Preventive Maintenance

Hydro continues to use up-to-date maintenance techniques and practices to maintain plant efficiency, availability, and reliability. These include preventive, predictive, and condition-based maintenance techniques, which are usually referred to by the overall term of “preventive maintenance.” The basic principle underlying this approach to maintenance is timely intervention to prevent imminent or catastrophic failure that may cause a substantial safety exposure, an extended unavailability of the unit or system, or an increase in cost.

Preventive maintenance comprises routine inspections, minor checks, and component replacement at specific time intervals to prevent failures that are known, or reasonably expected, to occur within a definable time or operating hour interval during the life of the equipment (e.g., generator brush wear, air and oil filter replacements). This also includes discarding equipment or components when it is less costly than repairing or refurbishing them.

Predictive maintenance involves routine testing of equipment to determine deterioration rates and initiating and carrying out repairs in a timely manner before a failure occurs (e.g., ultrasonic thickness checks on fluid lines to monitor erosion wear rates and non-destructive testing of boiler and turbine components to determine fatigue, wear or corrosion rates, and remaining life). Predictive maintenance items include such things as boiler and auxiliary equipment annual overhauls, wherein an assessment is made of components or subsystems that are only accessible during these overhauls.

There is also regular or continual monitoring of equipment operating parameters with a comparison of the results with optimum conditions to determine the most economic time to intervene and perform remedial work that is intended to return the equipment to optimum performance levels (e.g., air heater washes, generator winding insulation condition, and oil sampling and testing).

Since 2008, Hydro’s Preventive Maintenance Program has been enhanced to include the extra costs associated with plant cleaning in areas where asbestos and heavy metals have been identified as potential health hazards.

Corrective Maintenance

In addition to the preventive maintenance techniques outlined, there are also corrective maintenance requirements. These include work performed to identify, isolate, and restore equipment, machines or systems to a level in which it can be operated safely and used for its intended purpose. The requirement of corrective maintenance may arise for various reasons, including failure, wear and tear, and harsh environments such as humid or salt-laden air. Examples of corrective maintenance include wear and tear on pumps, pipes, and valves in the main and auxiliary systems.

Boiler Overhauls

Boiler overhauls consist of the maintenance and refurbishment work required to ensure reliable boiler operation for the upcoming season. Boiler overhauls include packages of standard work, defined work, and as-found work. Standard work covers activities that are predictable and required on an annual basis due to normal operation, and wear and tear. Defined work represents planned, specific activities that do not normally occur on an annual basis and addresses issues identified from prior condition inspections and trending. As-found work covers unforeseen issues identified during an ongoing boiler overhaul. In some cases, the nature of defined or as-found work meets the criteria for capitalization; in such cases, it is not included in SEM.

Operating Projects

Operating projects are low-cost repairs and annual inspections that are required to return structures and equipment to their original or near original operability, to maintain structural integrity, improve efficiency, improve availability, and prevent or reduce environmental risks. Such projects include emissions monitoring and testing, and periodic basin cleaning in the Wastewater Treatment Plant.

Appendix B

Planned Capital Expenditures

newfoundland labrador hydro

Newfoundland and Labrador Hydro
2026 Capital Budget Application
Planned Capital Expenditures - Holyrood Thermal Generating Station[1]
($000)

	2025 and Prior Years	2026	2027	2028	2029	2030	Total
Generator							
Perform Boiler Condition Assessment and Miscellaneous Upgrades (2026) - Holyrood	-	9,600.0	-	-	-	-	**9,600.0**
Perform Boiler Condition Assessment and Miscellaneous Upgrades (2027) - Holyrood	-	-	9,600.0	-	-	-	**9,600.0**
Perform Boiler Condition Assessment and Miscellaneous Upgrades (2028) - Holyrood	-	-	-	8,500.0	-	-	**8,500.0**
Perform Boiler Condition Assessment and Miscellaneous Upgrades (2029) - Holyrood	-	-	-	-	7,000.0	-	**7,000.0**
Overhaul Turbine Valves and Generator - Unit 2 (2026) - Holyrood	-	6,969.6	-	-	-	-	**6,969.6**
Overhaul Turbine Valves - Unit 2 (2029) - Holyrood	-	-	-	-	4,500.0	-	**4,500.0**
Overhaul Turbine Valves - Unit 3 (2028) - Holyrood	-	-	-	4,270.0	-	-	**4,270.0**
Thermal In-Service Failures (2029)	-	-	-	-	4,067.1	-	**4,067.1**
Overhaul Turbine Valves - Unit 1 (2027) - Holyrood	-	-	4,000.0	-	-	-	**4,000.0**
Thermal In-Service Failures (2028)	-	-	-	3,975.6	-	-	**3,975.6**
Thermal In-Service Failures (2027)	-	-	3,886.3	-	-	-	**3,886.3**
Thermal In-Service Failures (2026)	-	3,823.7	-	-	-	-	**3,823.7**
Refurbish Marine Terminal (2025-2026) - Holyrood	1,190.8	1,295.6	-	-	-	-	**2,486.5**
Overhaul Major Pumps (2026) - Holyrood	-	2,388.6	-	-	-	-	**2,388.6**
Overhaul Major Pumps and Associated Motors (2027) - Holyrood	-	-	1,440.0	-	-	-	**1,440.0**
Replace Air Compressor 1 (2027-2028) - Holyrood	-	-	310.1	980.0	-	-	**1,290.1**
Overhaul Major Pumps and Associated Motors (2028) - Holyrood	-	-	-	930.0		-	**930.0**
Overhaul Unit 2 and Unit 3 Boiler Stop Valves (2027) - Holyrood	-	-	800.0	-	-	-	**800.0**
Perform Level 2 Condition Assessment - Condenser and Condenser Tubes (2026-2027) - Holyrood	-	577.3	51.7	-	-	-	**629.0**
Overhaul Marine Terminal Loading Arms (2027) - Holyrood	-	-	550.0	-	-	-	**550.0**
Overhaul Major Pumps and Associated Motors (2029) - Holyrood	-	-	-	-	420.0	-	**420.0**
Perform Level 2 Condition Assessment - Light Oil System (2027) - Holyrood	-	-	400.0	-	-	-	**400.0**
Generator Total	**1,190.8**	**24,654.8**	**21,038.1**	**18,655.6**	**15,987.1**	**-**	**81,526.4**
Synchronous Condenser							
Install Plant Heating System (2027-2029) - Holyrood	-	-	4,887.3	6,858.9	3,354.9	-	**15,101.1**
Refurbish Stage I & II Cooling Water Sumps (2027-2028) - Holyrood	-	-	3,507.9	3,549.3	-	-	**7,057.2**
Upgrade Exciter and Transformer - Unit 3 (2029) - Holyrood	-	-	-	-	4,000.0	-	**4,000.0**
Overhaul Generator and Upgrade Online Monitoring - Unit 3 (2027) - Holyrood	-	-	2,295.4	-	-	-	**2,295.4**
Refurbish Water Treatment Systems (2026-2027) - Holyrood	-	524.5	936.3	-	-	-	**1,460.8**
Replace Sections of Roof and Penetrations - Main Powerhouse (2029-2030) - Holyrood	-	-	-	-	220.6	897.2	**1,117.8**
Upgrade Fire System (2028) - Holyrood	-	-	-	700.0	-	-	**700.0**
Thermal In-Service Failures (2030)	-	-	-	-	-	700.0	**700.0**
Backup Critical Control Systems (2026) - Holyrood	-	329.4	-	-	-	-	**329.4**
Replace Parts of Stage 1: 129 Vdc Batteries and Battery Chargers (2026-2027) - Holyrood	-	229.1	100.1	-	-	-	**329.2**
Replace Two 129 V Chargers - Stage 2 (2029-2030) - Holyrood	-	-	-	-	100.0	75.0	**175.0**
Synchronous Condenser Total	**-**	**1,083.0**	**11,727.0**	**11,108.2**	**7,675.5**	**1,672.2**	**33,265.9**
Grand Total	**1,190.8**	**25,737.8**	**32,765.1**	**29,763.8**	**23,662.6**	**1,672.2**	**114,792.3**

[1] Numbers may not add due to rounding.

Appendix C

Ten-Year System Equipment Maintenance Expenditures

Newfoundland and Labrador Hydro
2026 Capital Budget Application
Ten-Year System Equipment Maintenance Expenditures - Holyrood Thermal Generating Station [1]
($000)

	2025	2026	2027	2028	2029	2030	2031	2032	2033	2034
Generating Units										
Materials (inc. Boiler Overhauls)	1,097	1,032	1,037	1,048	1,060	81	82	83	84	84
Lubes, Chems, Gases	12	16	16	16	16	-	-	-	-	-
Contract Labour (inc. Boiler Overhauls)	4,405	4,480	4,502	4,552	4,602	189	191	193	195	195
Generating Units Total	**5,514**	**5,528**	**5,555**	**5,616**	**5,678**	**270**	**273**	**276**	**279**	**279**
Common Equipment										
Materials	492	553	556	562	568	285	288	292	295	295
Tools and Operating Supplies	20	24	24	24	24	14	14	15	15	15
Lubes, Chems, Gases	35	43	43	43	43	8	8	8	9	9
Contract Labour (Service Contracts)	1,959	1,671	1,884	1,905	1,926	476	481	486	491	491
Common Equipment Total	**2,506**	**2,291**	**2,507**	**2,534**	**2,562**	**783**	**792**	**801**	**810**	**810**
Environmental										
Materials	331	332	334	337	341	79	79	80	81	81
Tools and Operating Supplies	6	10	10	10	10	7	7	7	7	7
Lubes, Chems, Gases	359	376	378	382	386	172	174	176	178	178
Contract Labour (Service Contracts)	172	103	104	105	106	277	108	109	111	111
Environmental Total	**868**	**821**	**826**	**835**	**844**	**535**	**369**	**373**	**377**	**377**
Grand Total	**8,887**	**8,640**	**8,889**	**8,985**	**9,084**	**1,588**	**1,434**	**1,450**	**1,466**	**1,467**

[1] Numbers may not add due to rounding.

Sch 4: BDE Projected Capital Expenditures

Schedule 4

Bay d'Espoir Hydroelectric Generating Station

Projected Capital Expenditures (2026–2035)

2026 Capital Budget Application

Bay d'Espoir Hydroelectric Generating Station

Projected Capital Expenditures (2026–2035)

Contents

List of Appendices

1.0 Background

In the Board of Commissioners of Public Utilities ("Board") Order No P.U. 28(2024), Newfoundland and Labrador Hydro ("Hydro") was directed to file, in conjunction with its 2026 Capital Budget Application ("CBA"), a report about the Bay d'Espoir Hydroelectric Generating Station ("Bay d'Espoir" or "BDE"), addressing the capital plan for this facility over the 2026–2035 period. This report provides an operational overview of Bay d'Espoir and its capital plan for the 2026–2035 period.

This report excludes detailed information related to any Major Projects[1] which are currently ongoing or within the 2026-2035 Capital Plan for Bay d'Espoir. Information on the expenditures related to Hydro's Major Projects is included in Schedule 8 to this application.

2.0 Introduction

Bay d'Espoir, shown in Figure 1, is a critical generating asset on the Island Interconnected System, with seven generating units in two powerhouses, providing an installed capacity of 613.4 MW and producing an average of 2,662 GWh[2] of energy each year.

Figure 1: Bay d'Espoir

[1] For this document, the term 'Major Project' is generally used to describe regulated projects and programs with an anticipated cost of $50 million or greater under the accountability of Hydro's Major Projects department.
[2] Using the most recently available five-year average (2020–2024).

The location, total rated generating capacity, and in-service dates for each turbine generating unit are provided in Table 1.

Table 1: Installed Units at Bay d'Espoir

Unit Location	Unit Name	Rating (MW)	In-Service Date
Bay d'Espoir Powerhouse 1	BDE Unit 1	76.5	March 1967
	BDE Unit 2	76.5	June 1967
	BDE Unit 3	76.5	October 1967
	BDE Unit 4	76.5	September 1968
	BDE Unit 5	76.5	February 1970
	BDE Unit 6	76.5	March 1970
Bay d'Espoir Powerhouse 2	BDE Unit 7	154.4	December 1977

Hydro has an Asset Management Program, which governs the life cycle of its hydraulic generation assets, including those located at Bay d'Espoir. This program monitors, maintains, refurbishes, replaces and disposes of assets to provide safe, reliable electrical power in an environmentally responsible manner at the least cost. Within this program, assets are grouped by five asset classifications, including hydraulic generating units, hydraulic structures, reservoirs, site buildings and services, and auxiliary equipment.

For this report, four of the noted asset classifications are to be discussed: Hydro's hydraulic generating units, hydraulic structures, site buildings and services, and auxiliary equipment. As this scope is intended to address Bay d'Espoir itself, the fifth asset classification, reservoirs, is considered to be outside the scope of this report.

The generating unit asset class, which pertains to the seven units located at Bay d'Espoir, consists of:

- Generators;
- Governors;
- Isolated phase buses;

- Spherical valves;[3]
- Turbines;
- Exciters; and
- Metering, monitoring, SCADA,[4] protection and control equipment.

It is noted that assets such as generator step-up transformers and generator circuit breakers are considered external to the generating station and are classified as terminal station assets. As such, details of Hydro's Terminal Station Asset Management System and the life cycle strategy for these assets can be found in Appendix F to Schedule 1 of this application.

In addition to the components included in the hydraulic generating unit asset class listed above, the following components from Hydro's hydraulic structures asset classification are considered essential to the operation of generating unit assets at Bay d'Espoir, as they are responsible for conveying water from the reservoir into the generating unit:

- Gates;
- Penstocks; and
- Surge tanks.

Finally, the reliable operation of Bay d'Espoir cannot be maintained without ensuring the appropriate capital investments are planned and executed on the site buildings and services and auxiliary equipment contained within the station. These asset classifications are comprised of components, including but not limited to powerhouse buildings, site access roads, station service, ancillary AC[5]/DC[6] electrical systems, and service/cooling water systems.

[3] Spherical valves are mainly employed in power plants where more than one generating unit shares a penstock, as is the case in Bay d'Espoir Powerhouse 1, with two units per penstock. As BDE Unit 7 is currently the single unit in Powerhouse 2, it does not have a spherical valve installed.
[4] Supervisory Control and Data Acquisition ("SCADA").
[5] Alternating current ("AC").
[6] Direct Current ("DC").

A functional description and further sub-classification of the infrastructure, equipment and systems within each asset classification is provided in Appendix A.

In recent years, as assets are aging, significant expenditures have been proposed for Bay d'Espoir and it is expected that continued investment in these assets is required to ensure the provision of reliable electrical service. This report will set out the capital plan for Bay d'Espoir, addressing anticipated and potential life extension activities, along with estimated expenditures for the 2026–2035 period. In addition, this report will provide operational context and summarize major refurbishment and replacement work which has already been completed at Bay d'Espoir.

3.0 Operational Overview

With an installed capacity of 613.4 MW, Bay d'Espoir is the largest hydroelectric generating site on the Island. The facility generates an average of 2,662 GWh of energy each year, which represents approximately 41% of Hydro's average annual Island energy sales.

The generating units are operated according to system conditions to balance the system load requirements while maintaining efficient water management strategies and respecting necessary operating conditions as outlined by the asset owners. As such, Bay d'Espoir provides both continuous base-load generation, as well as unit dispatch to meet the higher demand required at system peaks. In addition to providing generation supply, Unit 7, the largest capacity unit at Bay d'Espoir, also provides synchronous condensing capability to provide the necessary voltage support to the Island Interconnected System during periods when power generation from this unit is not required.

The continued reliable operation of assets located at Bay d'Espoir is critical to meet both current customer demand and future system energy requirements. To ensure these assets continue to be managed efficiently, Hydro plans and schedules capital investments to minimize impacts to generation availability while maximizing the useful life of the assets, where practical.

4.0 Asset Management Approach

Hydro has an Asset Management Program which governs its hydraulic assets throughout their lifecycle and aims to anticipate future failures so that refurbishment or replacement can be incorporated into the proposed capital plan at an appropriate time, as outlined in this report. However, there are situations where immediate refurbishment or replacement, which has not been included in a given year in the identified capital plan, has to be undertaken due to the occurrence of an unanticipated failure or the recognition of an incipient failure, to maintain the delivery of safe, reliable electricity at least cost, in an environmentally responsible manner. Situations such as these will be included in Hydraulic Generation In-Service Failures projects through the 2026–2035 period and reported in the annual Capital Expenditures and Carryover Report for that year. Hydro notes that, although projects are set forth in a given year, there may be unforeseen circumstances, such as outage availability, that necessitate a change in scheduled completion. These changes will continue to be monitored and reported internally via established Management of Change processes.

4.1 Condition Assessment Practices

Condition information of hydraulic generation assets is primarily obtained through operating-expensed time-based activities, or through capital-expensed overhauls and refurbishments, which require lengthy planned outages and a greater level of disassembly, with specialized inspections and testing of equipment as well as the detailed inspection of components that may not normally be accessible during operation, as detailed in Appendix A. The information obtained during these inspections is reviewed by Hydro to determine what, if any, corrective action is required and leverage industry professionals, either through the original equipment manufacturer or consultant services, to supplement expertise, when required.

In addition to the routine inspections noted, Hydro may initiate condition assessments of existing equipment as the end of design life is approaching, or asset degradation has become apparent, to determine whether corrective action is necessary, or whether additional information is required to determine what is typically obtained through routine inspections. These condition assessments often involve the engagement of industry professionals who execute the assessment under the direction of

Hydro employees to ensure all necessary information is collected and analyzed to form the basis of future capital project scopes and justifications.

Based on the outcomes of routine inspections, overhauls, and condition assessments, corrective actions may be required immediately or may be executed at a future time. The timing of the corrective actions is determined after considering various factors, including but not limited to reliability, safety, frequency of operation, asset criticality, operating constraints and geographic location.

5.0 Historical Investments

Bay d'Espoir has been providing safe, reliable, and environmentally responsible electricity, consistent with least cost to the people of the province for more than 50 years. Hydro notes that although significant future expenditures are planned, there have been refurbishment and replacement activities ongoing at Bay d'Espoir throughout the life of the assets to ensure continued reliable operation. Overviews outlining major work and upgrades completed[7] on Bay d'Espoir Units 1 to 7 over the past 30 years are provided in Table 2 through Table 8.[8] In addition to the work outlined below, Hydro has a Hydraulic In-Service Failures program to address situations where immediate refurbishment or replacement must be completed due to the occurrence of an actual failure, the identification of an incipient failure, or the determination of faster-than-anticipated equipment deterioration. The expenditures made under this program annually are detailed in Hydro's Capital Expenditures and Carryover Report.[9]

Current and planned forecast expenditures for projects and programs relating to Bay d'Espoir as of May 31, 2025 are provided in the 2025 Capital Expenditures Overview, Appendix A of Schedule 5 to this application.

[7] Completed as of December 31, 2024.
[8] Major work and upgrades include replacements, material upgrades, or work which resulted in asset life extension.
[9] Hydro's most recent Capital Expenditures and Carryover Report is included as Appendix B in Schedule 5 of this application.

Table 2: Major Work and Upgrades for Bay d'Espoir Unit 1

Year	Major Work/Upgrade
2021	Excitation Controls Replaced
2020	Unit Overhaul (PM9) Completed
2019	Slip Ring Replaced
2015	Excitation Transformer Replaced
2015	Auto-Grease System Replaced
2015	Thrust/Guide Bearing Coolers Replaced
2013	Air Gap Monitoring and Continuous Partial Discharge Monitoring Installed
2013	Upgraded Unit Protection
2013	Generator Rotor Poles Refurbished
2013	Stator Rewind
2013	Unit Overhaul (PM9) Completed
2008	Cooling Water Piping Replaced
2003	Spherical Valve Controls Upgrade Unit 1
2000	Generator Bearing Cooling Coil Installation
1999	Turbine Bearing Cooling Coil Installation
1998	Exciter Replacement
1996	Runner Replacement

Table 3: Major Work and Upgrades for Bay d'Espoir Unit 2

Year	Major Work/Upgrade
2021	Excitation Controls Replaced
2019	Slip Ring Replaced
2018	Discharge Ring Machining Completed
2018	Unit Overhaul (PM9) Completed
2015	Excitation Transformer Replaced
2014	Thrust/Guide Bearing Coolers Replaced
2013	Auto-Grease System Replaced
2010	Air Gap Monitoring and Continuous Partial Discharge Monitoring Installed
2010	Upgraded Unit Protection
2010	Rotor Pole Refurbishment
2010	Stator Rewind
2008	Cooling Water Piping Replaced
2002	Spherical Valve Controls Upgrade Unit 2
2000	Generator Bearing Cooling Coil Installation
2000	Turbine Bearing Cooling Coil Installation
1997	Exciter Replacement

Table 4: Major Work and Upgrades for Bay d'Espoir Unit 3

Year	Major Work/Upgrade
2023	Unit Overhaul (PM9) Completed
2021	Excitation Controls Replaced
2019	Slip Ring Replaced
2017	Discharge Ring Machining Completed
2015	Excitation Transformer Replaced
2015	Thrust/Guide Bearing Coolers Replaced
2014	Air Gap Monitoring and Continuous Partial Discharge Monitoring Installed
2014	Upgraded Unit Protection
2014	Rotor Pole Refurbishment
2014	Stator Rewind
2014	Unit Overhaul (PM9) Completed
2013	Auto-Grease System Replaced
2009	Unit Overhaul (PM9) Completed
2009	Cooling Water Piping Replaced
2004	Spherical Valve Controls Upgrade Unit 3
1999	Generator Bearing Cooling Coil Installation
1999	Turbine Bearing Cooling Coil Installation
1997	Exciter Replacement

Table 5: Major Work and Upgrades for Bay d'Espoir Unit 4

Year	Major Work/Upgrade
2022	Unit Overhaul (PM9) Completed
2021	Excitation Controls Replaced
2019	Slip Ring Replaced
2016	Discharge Ring Machining Completed
2016	Unit Overhaul (PM9) Completed
2015	Excitation Transformer Replaced
2015	Auto-Grease System Replaced
2014	Thrust/Guide Bearing Coolers Replaced
2012	Air Gap Monitoring and Continuous Partial Discharge Monitoring Installed
2012	Upgraded Unit Protection
2012	Generator Rotor Poles Refurbished
2012	Stator Rewind
2011	Unit Overhaul (PM9) Completed
2009	Cooling Water Piping Replaced
2001	Spherical Valve Controls Upgrade Unit 4
1998	Exciter Replacement

Table 6: Major Work and Upgrades for Bay d'Espoir Unit 5

Year	Major Work/Upgrade
2021	Excitation Controls Replaced
2021	Air Gap Monitoring and Continuous Partial Discharge Monitoring Installed
2021	Stator Rewind
2021	Unit Overhaul (PM9) Completed
2020	Upgraded Unit Protection
2019	Slip Ring Replaced
2015	Spherical Valve Bypass Valve Replaced
2015	Unit Overhaul (PM9) Completed
2015	Excitation Transformer Replaced
2014	Auto-Grease System Replaced
2010	Cooling Water Piping Replaced
2009	Unit Overhaul (PM9) Completed
2005	Spherical Valve Controls Upgrade Unit 5
2000	Turbine Bearing Cooling Coil Installation
2000	Generator Bearing Cooling Coil Installation
1995	Exciter Replacement

Table 7: Major Work and Upgrades for Bay d'Espoir Unit 6

Year	Major Work/Upgrade
2022	Air Gap Monitoring and Continuous Partial Discharge Monitoring Installed
2022	Stator Rewind
2022	Unit Overhaul (PM9) Completed
2021	Excitation Controls Replaced
2019	Slip Ring Replaced
2018	Upgraded Unit Protection
2016	Unit Overhaul (PM9) Completed
2015	Spare Excitation Transformer Replaced
2014	Auto-Grease System Replaced
2014	Excitation Transformer Replaced
2014	Refurbished Turbine Bearing
2010	Cooling Water Piping Replaced
2010	Unit Overhaul (PM9) Completed
2000	Generator Bearing Cooling Coil Installation
1999	Replace Cooling Water Pump #6
1998	Turbine Bearing Cooling Coil Installation
1995	Exciter Replacement
1995	Runner Replacement

Table 8: Major Work and Upgrades for Bay d'Espoir Unit 7

Year	Major Work/Upgrade
2020	Upgraded Unit Protection
2019	Discharge Ring Machining Completed
2019	Unit Overhaul (PM9) Completed
2016	Vibration Monitoring System Installed
2016	Unit Overhaul (PM9) Completed
2015	Excitation Transformer Replacement
2010	Unit Overhaul (PM9) Completed
2004	Exciter Replacement

In addition to ensuring the continued reliable operation of the generating units at Bay d'Espoir, Hydro has also planned and executed projects to renew and replace assets classified as either hydraulic structures, site buildings and services, or common auxiliary equipment, which are critical to the operation of generating unit assets at Bay d'Espoir. Major work and upgrades for these assets are provided in Table 9.

Table 9: Major Work and Upgrades for Hydraulic Structures, Site Buildings and Services, and Common Auxiliary Equipment

Year	Major Work/Upgrade
2024 – Ongoing	Powerhouse 1 Draft Tube Desk Refurbishment – Phase 2
2021	Intake 3 Refurbishment
2019	Powerhouse 1 Stop Log Refurbishment
2019	Powerhouse 1 Draft Tube Deck Refurbishment – Phase 1
2019	Surge Tank 1 Exterior Coating Refurbishment
2019	Site Facilities Building Constructed
2018 – Present[10]	Penstock 3 Weld Refurbishment
2017 – Present	Penstock 2 Weld Refurbishment
2016 – Present	Penstock 1 Weld Refurbishment
2016	Surge Tank 2 Interior and Exterior Coating Refurbishment
2015	Surge Tank 3 Interior Coating Refurbishment
2015	Powerhouse 2 Battery Bank 2 Replaced
2014	Surge Tank 3 Exterior Coating Refurbishment
2014	Intakes 1, 2, & 3 Control System Upgrade
2012	Powerhouse 2 Battery Bank 1 Replaced
2009	Powerhouse 1 Battery Bank 1 Replaced
2009	Powerhouse 1 Battery Bank 2 Replaced

[10] Hydro conducts annual penstock inspections and completes weld repairs as required.

6.0 Bay d'Espoir Capital Expenditure Outlook Overview

As presented in the previous section, significant life extension work has been completed at Bay d'Espoir to date, with a large portion of the generating unit and supporting assets already being in a refurbished or renewed operating condition. However, ongoing capital investment is necessary throughout the future life of Bay d'Espoir to ensure the continued reliable operation of all assets. It is anticipated that various classifications of investments and expenditures will be required, including refurbishment, upgrade or replacement of failed or obsolete equipment, and general plant infrastructure work. Planned and anticipated capital expenditures for the 2026–2035 period can be separated into two categories: those on the current five-year plan and those residing on Hydro's longer-term capital plan project list.

This report excludes detailed information related to any Major Projects which are currently ongoing or within the 2026–2035 capital plan for Bay d'Espoir. Information on the capital plan for Hydro's Major Projects is included in Schedule 8 to this application.

6.1 Capital Expenditure Outlook 2026–2030

Hydro's five-year capital plan for Bay d'Espoir has been developed consistent with its investment philosophy and includes details on the costs and timing of forecast asset replacements and refurbishments. The five-year plan is revised annually, considering evolving asset management practices, asset condition information, operational and system requirements, as well as operating environment factors. The anticipated five-year plan for assets associated with Bay d'Espoir is provided in Table 10, which includes projects approved in previous years with costs planned for 2026.

Table 10: 2026–2030 Planned Capital Work for Bay d'Espoir ($000)

Project Title	2026	2027	2028	2029	2030
Refurbish Intake 2 (2025-2026) - Bay d'Espoir	3,069.4				
Overhaul Unit 7 (2026) - Bay d'Espoir[11]	1,067.3				
Perform Level 2 Condition Assessment - Penstock 4 (2026) - Bay d'Espoir	237.2				
Upgrade Spherical Valve Controls (2026-2029)	314.9	219.6	358.3	460.3	
Overhaul Units 5 & 6 (2027) - Bay d'Espoir[12]		2,000.0			
Intake Access Road Realignment (2027) - Bay d'Espoir		500.0			
Refurbish Draft Tube Deck - Phase 3 (2027-2029) - Bay d'Espoir		365.5	728.6	6,994.8	
Refurbish Intake 4 (2027-2028) - Bay d'Espoir		284.4	3,069.4		
Refurbish Spherical Valves - Units 1-6 (2027-2032) - Bay d'Espoir		1,500.0	1,500.0	1,500.0	1,500.0
Refurbish Phase 1 Exterior Precast Concrete Panel - Powerhouse 1 (2028-2029) - Bay d'Espoir			100.0	1,459.6	
Replace Battery Bank 1 & 2 Powerhouse 1 (2028-2029) - Bay d'Espoir			200.0	300.0	
Replace Powerhouse 2 Roof (2028) - Bay d'Espoir			100.0	960.0	
Overhaul Units 3 & 4 (2029) - Bay d'Espoir[13]				750.0	
Total – Excluding Major Projects[14]	**4,688.8**	**4,869.5**	**6,056.3**	**12,424.7**	**1,500.0**

Projects identified for 2026 form part of the 2026 CBA, and information about each scope and estimate is provided in Schedule 7 to this application.

Projects proposed for the 2026–2030 period are primarily required for renewal-driven capital, which is largely driven by the age and condition of Bay d'Espoir, resulting in end-of-service life for equipment and deterioration in the condition, causing reduced performance or reliability. This plan, excluding Major Projects, reflects investments of approximately $29.5 million over the 2026–2030 period, which includes $3.1 million of previously approved capital. Hydro's total capital plan for Bay d'Espoir during that period, including capital expenditures associated with Major Projects, is approximately $1.1 billion.[15] The

[11] Included in the Overhaul Hydraulic Units (2026) project.
[12] Included in the Overhaul Hydraulic Units (2027) project.
[13] Included in the Overhaul Hydraulic Units (2029) project.
[14] This total excludes major project expenditures associated with BDE Unit 8 Installation, Unit 7 Life Extension, and the planned Life Extensions of Penstocks 2 and 3.
[15] This total includes Major Project expenditures associated with BDE Unit 8 Installation, Unit 7 Life Extension, and the planned Life Extensions of Penstocks 2 and 3 for the 2026–2030 period.

average annual capital expenditure for Bay d'Espoir in that period is $5.9 million, excluding Major Projects.

As outlined in Section 5.0, with the exception of Unit 7, the generating unit assets at Bay d'Espoir have previously undergone significant life extension activities; thus, the planned expenditures through the 2026–2030 period consist of regularly scheduled overhauls that have expanded scopes to include necessary turbine small component replacements[16] and the addition of a spherical valve overhaul program is required to ensure continued safe, reliable and environmentally responsible operation, given the age of the generation assets. In addition, projects to address the end of service life are planned on assets such as the spherical valve controls, powerhouse roofs, and battery banks.

Considering hydraulic structure assets, planned investments include the continuation of Hydro's efforts to refurbish upstream and downstream assets associated with the intakes and draft tubes, as well as the necessary Level 2 Condition Assessments, which form the basis of future capital expenditures.

6.2 Capital Expenditure Outlook 2031–2035

In addition to a detailed five-year capital plan, Hydro also maintains longer-term asset management plans for Bay d'Espoir. These plans contain both recurring time-based capital interventions, such as six-year unit overhauls, in addition to various stand-alone projects which are forecast to occur in a future year. As these projects are beyond the detailed five-year planning cycle, the exact timing of the proposal to the Board and associated execution schedule is not yet determined. During the annual capital planning cycle, as the five-year plan is updated and adjusted, identified scopes from the longer-term plan are scrutinized and added to the five-year plan, as appropriate. At present, the projects identified for the period of 2031–2035 are outlined in Table 11.

[16] Small component replacements include, but are not limited to, wicket gate greased bushing replacement with greaseless, wicket gate linkage refurbishment and servomotor overhauls.

Table 11: 2031–2035 Planned Capital Work for Bay d'Espoir ($000)[17,18]

Project Title	Estimated Project Costs
Overhaul Units 1 & 2 – Bay d'Espoir	700.0
Overhaul Units 3 & 4 – Bay d'Espoir	700.0
Overhaul Units 5 & 6 – Bay d'Espoir	700.0
Overhaul Unit 7 – Bay d'Espoir	350.0
Penstock 1 Level 2 Condition Assessment – Bay d'Espoir	130.0
Penstock 2 Level 2 Condition Assessment – Bay d'Espoir	130.0
Penstock 3 Level 2 Condition Assessment – Bay d'Espoir	130.0
Penstock 4 Level 2 Condition Assessment – Bay d'Espoir	206.2
Refurbish PH2 Service and Cooling Water Systems – Bay d'Espoir	600.0
Replace Battery Bank 1 Powerhouse 2 – Bay d'Espoir	250.0
Replace Battery Bank 2 Powerhouse 2 – Bay d'Espoir	250.0
Replace Station Service Switchboard PLC – Bay d'Espoir	1,200.0
Rewind Rotor Unit 5 – Bay d'Espoir	5,500.0
Rewind Rotor Unit 6 – Bay d'Espoir	5,500.0
Replace Flow Measuring Devices – Bay d'Espoir	350.0
Data Acquisition and Trend Monitoring System Upgrades – Bay d'Espoir	1,750.0

The identified projects primarily represent time-based capital interventions on the assets, with the addition of the rotor rewinds for Units 5 and 6 as well as refurbishment and replacement activities for auxiliary assets, which are identified as approaching end-of-service life in the 2031–2035 period. Excluding capital expenditures associated with Major Projects, the plan currently reflects an investment of approximately $18.4 million over the 2031–2035 period, with an average annual capital expenditure for Bay d'Espoir of approximately $3.7 million.

Hydro notes that, as cost estimates are refined for future years of the plan, projected expenditures are subject to change. In addition, following the completion of planned and future condition assessments, as well as through ongoing routine maintenance and inspection activities, additional projects may be

[17] Costs in Table 11 are presented in 2025 dollars. Costs will be escalated to the appropriate years when the timeline of execution is determined.
[18] This total excludes any Major Project expenditures associated with BDE Unit 8 Installation and the planned Life Extensions of Penstocks 2 and 3 for the 2031–2035 period. Please refer to Appendix A of Schedule 8 of this application for expenditures related to Major Projects in this time period.

identified and included in the proposed project lists, where appropriate. Such additions will result in increases to the proposed expenditures noted above. Hydro will incorporate any necessary changes to the plan using internally established Management of Change processes.

7.0 Conclusion

Bay d'Espoir is a critical generating asset on the Island Interconnected System that has been providing safe, reliable, environmentally responsible energy consistent with the least cost to the people of the province for over 50 years. To ensure the continued reliable operation of Bay d'Espoir, Hydro has historically planned and executed major work on assets, as required, and continues to utilize its Asset Management Program to complete necessary inspections and assessments to ensure refurbishment or replacement activities can be incorporated into the proposed capital plan at an appropriate time. In the first 50 years of the life of the facility, significant investment has been made to ensure generating assets are maintained and refurbished according to good utility practice; including but not limited to, ongoing six-year turbine and generator overhauls, the completion of turbine runner replacements, generator rewinds and excitation upgrades as well as various other necessary investments.

Looking ahead to the 2026–2035 period, significant investment requirements remain for Bay d'Espoir, with the most significant expenditures being related to Major Projects, the rewinds of Units 5 and 6 rotors, spherical valve refurbishment, and completion of the Intake 2 project. The continuation of ongoing time-based sustaining activities, and refurbishment and replacement of end-of-life assets will also be required through 2035 and beyond. Hydro remains committed to completing regular routine inspections, overhauls, and condition assessments to ensure that the most accurate asset information is available for consideration in the management of the province's power grid.

Appendix A

Full Asset Description

Hydraulic Generating Units

Generator

A generator is an electric rotating machine that transforms mechanical power from a hydraulic turbine into electric power.

Stator Assembly

A stator consists of a core and a frame; it is the stationary part of a machine that serves as both a magnetic circuit and a supporting member. The core is made up of sheets of electrical steel; the sheets, which are 0.35–0.5 mm thick and insulated with varnish, are formed into stacks and fastened in the cast or welded frame. Stator windings fit into slots made in the core. The stator is cooled with surface air coolers, which are heat exchangers that have cooling water flowing through, which cools the hot air blown around the stator.

Rotor Assembly

The rotor consists of a fabricated spider, laminated rim, field poles and windings, a brake ring and collector rings.

Thrust and Guide Bearing

The thrust and guide bearing combination on the generator sustains axial and lateral loading and prevents axial and lateral movement. The bearing consists of a segmented guide bearing, thrust block, rotating ring, segmented spring-supported thrust bearing, base ring, oil reservoir, cooling coils, alarm devices, and a high-pressure oil injection system for start-up (if equipped).

Cooling Water System

The cooling water system supplies water to the thrust and guide bearing cooling coil to cool the oil reservoir. The cooling water also supplies the surface air coolers in the generator to cool the stator and rotor by air circulation within the generator.

Governor

The governor serves to keep the speed of the hydro unit constant in order to maintain the system's frequency of 60 hertz. Any change in load or other operational disturbances will cause the governor to open or close the wicket gates to allow more or less water to maintain the constant speed of the hydro unit.

Governor Speed Generators

Speed control is one of the primary functions of a governor. On mechanical governors, a set of rotating flyballs, opposed by a spring, controls the position of a valve. The valve controls the flow of oil to a servomotor that controls the wicket gates. Any change in speed will cause the valve to be moved off its centered position, making the gates open or close, and changing the unit's speed. Modern electronic governors control the gates by monitoring electronic signals from speed sensors.

Governor Pump

The pump used by the governor to port oil through the governing system.

Governor Piping System

The network of pipes required to deliver the governor oil to the desired location.

Accumulator Tank

An accumulator tank stores oil for the governor system and is pressurized by air.

Servomotor Assembly

The servomotors are hydraulically actuated pistons, controlled by the governor, that move the linkages connected to the wicket gates to allow water regulation to the hydraulic generating unit to maintain a constant speed.

Isolated Phase Bus

Isolated phase bus is the current-carrying conductors used to transmit large currents. For Hydro's generation sites, it is the means used to carry the current from the generators to the step-up transformers. The conductors are individually contained within housings to provide electrical and physical protection and to minimize the possibility of faults.

Disconnect Switch

Disconnect switches are used to electrically isolate the isolated phase bus either for maintenance activities or troubleshooting. Proper operation of these switches is essential for the establishment of a safe work environment and for reliable and secure system operation.

Grounding Switch

Grounding switches are used to provide a safe and secure electrical connection between a piece of equipment and ground. Proper grounding of equipment is essential for the establishment of a safe work environment.

Buswork

Buswork is the current carrying conductors which provide connections for the electrical circuits.

Main Inlet Valve

Main inlet valves are mainly employed in power plants with more than one generating unit sharing a common penstock. When one penstock is used to supply two or more generating units, these valves are installed on each unit to provide isolation from the penstock water supply. This allows the operation of one unit while the other unit is down for maintenance or in standby. Most of Hydro's main inlet valves are of the spherical valve type.

Turbine

A turbine is a rotary machine that converts kinetic energy and potential energy of water into mechanical work. Components of the turbine include:

Runner

Flowing water is directed onto the blades of a turbine runner creating a force on the blades. Since the runner is spinning, the force acts through a distance, which is the definition of work. In this way, energy is transferred from the water flow to the turbine.

Draft Tube

In power turbines, a diffuser tube is installed at the exit of the runner, known as the draft tube.

Guide Bearing

The guide bearing on the turbine sustains lateral loading and prevents lateral movement. The bearing consists of a segmented guide bearing, oil reservoir, cooling coils, and instrumentation to monitor bearing temperature and oil levels within acceptable ranges.

Auto-Greasing System

The auto-greasing system delivers controlled amounts of lubricant to multiple locations on a hydraulic generating unit while the machine is in operation.

Turbine Shaft and Coupling

The turbine shaft is the portion of the hydraulic unit's shaft that is connected to the turbine. The shaft coupling joins the generator shaft to the turbine shaft.

Scroll Case

A spiral-shaped steel intake guiding the flow into the wicket gates located just prior to the turbine.

Headcover Assembly

The headcover is the top stationary part of a hydraulic turbine that encloses the system.

Wicket Gates and Linkages

Adjustable elements that control the flow of water from the scroll case into the turbine passage by the linkages connected to the servomotors.

Excitation

Excitation Transformer

The excitation transformer is a part of the excitation system. It is used to convert the generator terminal voltage to a lower voltage, which supplies the rectifier. The excitation system creates the DC energy for the rotating magnetic field in the generator to enable the conversion of mechanical energy into electrical energy. Without an excitation transformer, a generating unit is not able to produce electricity.

Field Breaker

The field breaker is a circuit breaker used to isolate the power supply between the excitation system and the generator rotor. The field breaker performs switching actions to complete, maintain, and interrupt current flow under normal or fault conditions. The reliable operation of the field breaker through its fast response and complete interruption of current flow is essential for the protection of the excitation system.

Metering, Monitoring, Protection, SCADA and Control

Ground Cubicle

Minimizes fault damage incurred by generators and maintains sufficient fault detection to improve power system reliability.

Auto Control Panel

The auto control panels are where control or monitoring instruments are displayed. This is where operators interface with the generating unit.

Synchronizing Panel

Synchronization panels are mainly designed and used to meet power system requirements. These panels function both manually and with an automatic synchronizing function for one or more generators or breakers. They are widely used in synchronizing generators.

Temperature and Frequency Control Panel

This panel displays the temperature and frequency of the hydro unit.

Time and Frequency Clock

Highly sensitive equipment used to measure the time and frequency of the unit.

Oscillogragh

An oscillogragh is a device for recording oscillations, especially those of an electric current.

Voltage and Megawatt Panel

This panel displays the voltage and megawatt output from the hydro unit.

Recorder

The recorder records the voltage and megawatt readings of the unit.

Control Cables and Junction Boxes

Control cables connect various circuits for the operation of each generator. Junction boxes are also located along cable paths where it is practical to terminate cables from various sources.

Vibration Monitoring System

Hydro Unit Systems

For Hydro units, vibration sensors are mounted on the critical bearings and wired to the plant's computer system or to a dedicated vibration monitoring system. Two alarm levels (soft and trip) are then set to alert the operator that maintenance attention is needed, or in the case of a trip alarm, to shut the machine down to prevent failure.

Handheld Units

Handheld vibration units use magnetic vibration sensors that are directly connected to the equipment to monitor vibration and record data. This data can then be downloaded to a computer for analysis.

Data Acquisition System

This system measures an electrical or physical phenomenon such as voltage, current, temperature, pressure, or sound with a computer. The system consists of sensors, measurement hardware, and a computer with programmable software.

Hydraulic Structure

Substructure

The substructure is the underlying or supporting structure, such as the concrete foundation.

Superstructure

The superstructure is the components of a hydraulic structure that are on top of the substructure. This includes components such as the structural steel, hoists and motors for the gates.

Gates

The structure gates are designed to hold back water. In a spillway, the water is on one side, and the other side is typically dry when the gates are closed. Depending on the function of the particular structure, the gates are opened to move water from one reservoir to another, or to spill water from the reservoir when the water level exceeds the maximum safe level.

Stoplogs/Master Logs

The stoplogs are a set of wooden or steel logs that are put in place by a crane or hoist with the help of a lifting device called the master log. The stop logs act as a temporary measure to isolate the water side of the gate for maintenance.

Gate Hoist

A gate hoist is a device used for lifting or lowering a gate by means of a drum or lift wheel around which a wire rope or chain wraps.

Gate Rollers, Seals, and Embedded Parts

The gate rollers are attached to the gate and roll along the embedded steel in the gains.

Heating Systems

There are three heating systems that can be used in a structure; the first is a gain heater that heats the roller path on the side of the structure and ensures the roller path is free of ice during the winter. Sill heaters heat the bottom of the gate where it sits on the concrete substructure so that the gate does not freeze to the bottom during winter. The other heating system is on the gate itself and is called gate heaters. Gate heaters are used to ensure that ice does not form inside the gate and that the water side of the gate is free of ice during the winter.

Control Systems

Control systems are typically computer systems designed to control gate systems remotely. Some older technology electronic controllers are used for specific, simple control features.

De-Icing Systems

In conjunction with the heating systems, other systems are strategically employed to combat ice around gates. Water uplifters are used to agitate the water close to the surface of the gate to inhibit the formation of ice. Bubbler systems use compressed air to lift warmer water at lower levels in the reservoir to prevent the formation of ice cover or to remove ice build-up on trash racks.

Penstock

A penstock is a channel for conveying water to a turbine, commonly constructed of steel, wood, or rock.

Surge Tank

A surge tank is a tank connected to a penstock carrying reservoir water. It is intended to neutralize sudden changes of pressure in the flow by filling when the pressure increases and emptying when it drops to minimize the effects of water hammer in a penstock.

Heating Systems

The surge tank heating system prevents the stagnant water in the surge tank from freezing in the winter. If the surge tank water freezes, water can't flow freely to avoid water hammer.

Relief Valves

Relief values are an alternative to surge tanks to minimize the effects of water hammer in a penstock. The use of a surge tank or a relief valve is determined during the design stage of a new unit, and it is typically not possible to change the design after initial construction.

Coating Systems

Metal penstocks are coated to protect the steel and welds from corrosion due to the water inside and the elements outside of the penstock or surge tank.

Drainage Systems

Drain pipes are installed under the penstocks in the bedding material to collect any leakage from the penstocks as well as surface water and any leakage from the intakes/dams.

Water Level Systems

Water level systems are located at hydraulic structures to provide information to operations to make informed decisions about water management and other operating conditions.

Reservoirs

Dams and Dykes

Hydro currently operates more than 100 dams, dykes and hydraulic structures on the island of Newfoundland. Hydro dams are constructed to hold back water and raise its level in order to contain water for electricity generation. The majority of Hydro's dams are embankment-type structures, with the highest structure being 63m high.

Power Canals

Power canals are typically a dyke lined canal developed to convey water from one reservoir to another or a reservoir to an intake structure.

Passive Overflow Spillways

Passive overflow spillways are dams which are built to spill water from a reservoir at a specific elevation. Overflow spillways in our Hydro system are constructed of rock fill with steel sheet pile cores, concrete or timber crib.

Control Weirs

Control weirs are low-head concrete overflow spillways which maintain the water elevation upstream of the weir to within a specified range.

Fuse Plugs

Fuse plugs are sections of dams that are constructed of earth materials and designed to fail in a controlled manner without damaging adjacent larger, more critical dams.

Power Tunnels

Power tunnels convey water through rock, from an intake structure to a generating station.

Diversion Tunnels

Diversion tunnels divert water around the work site.

Dam Instrumentation

This instrumentation monitors the dam design criteria. Examples of dam instrumentation include piezometers, inclinometers, survey monuments and anemometers. This condition monitoring instrumentation is used to measure the movement of the dam structure and water content in the dam.

Public Safety Around Dams Control Measures

Public safety risks are determined by completing a risk assessment in accordance with the Canadian Dam Association Guidelines for Public Safety Around Dams. Control measures are then recommended to reduce the risk to the public. These measures include such items as signage, fencing, audible or visual alarms, booms, buoys, operational changes and public education.

Site Buildings and Services

Water Distribution System

A water distribution system is a system for the collection, transmission, treatment, storage and distribution of water from source to site locations.

Piping

The network of pipes required to deliver the site water to the site facilities.

Pumps

The driver of the water from the source is by pumps.

Storage Tanks

Storage tanks hold water to provide a consistent water pressure at site facilities and a volume of water that can be used for firefighting.

Filters

To remove sediment and fine particles from the water filtration systems are used.

Fuel Storage and Distribution System

Fuel Storage and Distribution Systems are site-specific systems to have fuel and distribution methods on site.

Diesel Fuel Tank

Tanks that house diesel fuel only.

Gasoline Fuel Tank

Tanks that house gasoline fuel only.

Jet Fuel Tank

Tanks that house jet fuel only.

Fuel Dispenser and Pumps

Apparatus used to dispense and meter the fuel.

Powerhouse Building

Buildings used to house hydraulic generating units and the auxiliary mechanical and electrical equipment required for the generation of electricity.

Vertical Lift Equipment Doors

Vertical lift doors are large doors that allow access to the powerhouse building for large materials and equipment. The doors are operated manually or electrically by a counterweight arrangement.

Roof

The roof is the structure forming the upper covering of a powerhouse building.

Substructure

The substructure is the underlying concrete support of the powerhouse.

Superstructure

The superstructure is the building that is placed upon the substructure. This includes the concrete and steel that make up the walls of the building.

Service Buildings

Service buildings are any other building on site that supports Hydro's generation of electricity. This includes warehouses, maintenance buildings, training facilities, site accommodations, and security facilities.

Substructure

The substructure is the underlying concrete support of the service building.

Superstructure

The superstructure is the building that is placed upon the substructure.

Septic System

A septic system stores and distributes sewage. This includes a septic tank, septic field and all associated distribution piping.

Garage Doors

A garage door is a large door on a service building that opens either manually or by an electric motor. These are typically overhead doors similar to automotive garages or residential attached garages.

Exhaust Systems (Welding)

Welding exhaust systems are ventilation systems in maintenance buildings that specifically circulate fresh air using ducts and fans in the area to ensure worker safety.

Ventilation Systems

Ventilation systems circulate fresh air using ducts and fans.

Security Systems

A security system detects and issues an alarm due to an intrusion or unauthorized entry. Security systems are also used to prevent unauthorized access to Hydro facilities.

Helicopter Pad ("Helipad")

A helipad is a landing area or platform for helicopters and powered lift aircraft. While helicopters and powered lift aircraft are able to operate on a variety of relatively flat surfaces, a fabricated helipad provides a clearly marked hard surface away from obstacles where such aircraft can land safely.

Site Fencing and Gate Controls

All sites have fencing and or gates with control to maintain site security and public safety.

Parking Lots and Stairways

The parking lots and stairways are areas for staff, contractors and the general public to park vehicles for safe access to Hydro's facilities.

Site and Access Roads

Site and Access Roads are used to allow access to specific locations, such as generating stations, terminal stations, hydroelectric dams, and all Hydro locations.

Drainage

Drainage is the sloping of land to divert water away from a specific area.

Culverts

Culverts allow the passage of water through/under a road.

Bridge

Bridges are structures used to span sections of site roads over a stream, river, valley, canal, or any obstacle preventing access to the site location.

Common Auxiliary Equipment

Station Service

A station service switchboard is an electrical panel used to supply low-voltage power to the critical and auxiliary electrical equipment necessary for the operation of the generating units. The protective devices included within the station service switchboards are required to monitor the flow of electricity and to interrupt this flow, in a selective and timely manner, in the event of an electrical fault.

Station Service Transformers

Station Service Transformers convert electricity from higher voltages to voltages used in the ancillary AC/DC electrical system.

Circuit Breakers

Circuit breakers perform switching actions to complete, maintain, and interrupt current flow under normal or fault conditions. The reliable operation of circuit breakers is essential for the protection of the critical and auxiliary equipment supplied by the station service switchboard.

Disconnects and Switches

Disconnects and switches are used to electrically isolate equipment for maintenance activities or troubleshooting. Proper operation of these switches is essential for the establishment of a safe work environment and for reliable and secure system operation. Faulty and/or malfunctioning disconnects or switches that do not operate properly create a safety hazard.

Grounding Transformers

Grounding transformers are used to provide a ground path for the station service systems. This ground path ensures that the system's neutral is at or near ground potential. The establishment of a suitable ground enables safe operation of a grounded electrical system and allows protective devices (like relays or low-voltage circuit breakers) to detect and isolate line-to-ground faults.

Instrumentation Transformers

Instrument transformers are used to provide inputs to protection, control and metering equipment required for protection of the electrical equipment supplied from the station service system.

Surge Arrestors

Surge arresters provide overvoltage protection of electrical equipment from lightning and switching surges.

Power Cables and Junction Boxes

Cables to connect station service to switchgear and electrical panels, and ancillary equipment. Junction boxes are also located along cable paths where it is practical to terminate cables from various sources.

Ancillary AC/DC Electrical System

Switchgear and Panels

Switchgear and Panels are devices which are used to distribute electricity to cables. This equipment protects the cables and equipment from overload and short circuits.

Power Cables and Junction Boxes

Distributes electricity to equipment

Battery Banks and Chargers

Provides DC electricity for DC powered equipment.

Diesel Standby Generator

A diesel generator is the combination of a diesel engine with an electric to generate electrical energy. Prime-power diesels provide power to sites that are not connected to an interconnected distribution system. Emergency diesels are on standby at various locations within Hydro's system to ensure system reliability.

Engine

This is the diesel engine used to drive the genset.

Generator

The generator converts mechanical energy from the engine to electricity.

Enclosure

Some diesels are located outside and require an enclosure to house the unit away from the weather.

Cranes

Cranes are machines used for moving heavy objects, typically by suspending them from a projecting arm or beam.

Overhead

An overhead crane consists of parallel runways with a traveling bridge spanning the gap. A hoist, the lifting component of a crane, travels along the bridge.

Monorail

A traveling crane suspended from a single rail.

Gantry

Gantry cranes are a type of crane built atop a gantry, which is a structure used to straddle an object or workspace.

Wire Rope

Wire rope is a length of rope made from wires twisted together as strands.

Fire Protection and Detection System

A fire alarm system has a number of devices working together to detect and warn people through visual and audio devices when smoke, fire, carbon monoxide or other emergencies are present.

Transformer Deluge System

A transformer deluge fire sprinkler system is an automated water spray system where the water distribution piping is equipped with open spray nozzles for discharging over a transformer. Deluge systems are connected to a water supply through a deluge valve that is opened by the operation of a smoke or heat detection system.

Fire Panels

A fire alarm control panel, or fire alarm control unit, is the controlling component of a fire alarm system.

Generator Deluge System

A generator deluge fire sprinkler system is an automated water spray system where the water distribution piping is equipped with open spray nozzles for discharging within the generator. Deluge systems are connected to a water supply through a deluge valve that is opened by the operation of a smoke or heat detection system.

Inergen System

Inergen agent is a mixture of three naturally occurring gases: nitrogen, argon, and carbon dioxide. This system releases the Inergen agent when the system is activated and floods the contained room with the agent to extinguish the fire by decreasing the oxygen concentration below levels required to sustain combustion.

Office Sprinkler System

An office space sprinkler system is a system for protecting a building against fire by means of overhead pipes which convey water to heat-activated outlets.

Passive Fire Protection

Passive fire protection is an integral component of the three components of structural fire protection and fire safety in a building. This protection is used to contain fires or slow the spread of fires.

Powerhouse Public Address System

A public address system is an electronic sound amplification and distribution system with a microphone, amplifier and loudspeakers, used to allow a communication within a loud powerhouse.

Compressed Air System

Compressed air is air kept under a pressure that is greater than atmospheric pressure.

Air Receiver Tank

This is the tank where the pressurized air is stored until it is required.

Air Dryer

An air dryer is used for removing water vapor from compressed air. The process of air compression concentrates atmospheric contaminants, including water vapor. This raises the dew point of the compressed air relative to free atmospheric air and leads to condensation within pipes as the compressed air cools downstream of the compressor.

Excessive water in compressed air, in either the liquid or vapor phase, can cause a variety of operational problems for equipment using the compressed air. These include freezing of outdoor air lines, corrosion in piping and equipment, malfunctioning of pneumatic process control instruments, fouling of processes and products, and more.

Compressors

A machine used to supply air at increased pressure.

Service/Cooling Water System

Service or cooling water is the water removing heat from a machine or system.

Pumps

Cooling water pumps distribute the water from the source to the system.

Basket Strainers

Cooling water is sourced from the tailrace or other unfiltered sources, and the basket strainer is a closed vessel with a cleanable screen element designed to remove and retain foreign particles down to 0.001 inch diameter from various flowing fluids

Piping, Valves, and Controls

The piping, valves and controls are required components of the cooling water system.

Domestic Water System

Domestic water use is water used for indoor and outdoor site purposes such as washrooms and kitchens.

Drainage/Unwatering System

This system handles the removal of water from the hydraulic generating unit draft tube for maintenance.

Sump Pumps

The pumping system required to remove the water.

Water Level System

Water level or gauge height or stage is the elevation water in a reservoir.

Air Conditioners

Air conditioners control the temperature in many locations for personnel and equipment. The units also provide humidity control in rooms with sensitive electrical equipment like communication rooms.

Ventilation System

Ventilation systems circulate fresh air using ducts and fans.

PCB[19] Waste Oil and Waste Oil Tanks

These are specifically marked oil tanks that only contain waste oil. Once the tanks are full, a waste disposal company will come to the site to empty the tanks. PCB waste oil has to be disposed of properly outside of the province; this is why there are two types of waste oil storage.

Lube Oil Storage

Lubrication oil storage includes laydown areas for the 200-litre drums that are located at most generating stations, carrying devices for these drums, and smaller storage containers that are used for top-ups when required. The proper storage for lube oil is important to equipment health because a proper container will limit any airborne particulates or any moisture from contaminating the oil.

[19] Polychlorinated biphenyl ("PCB").

Sch 5: 2025 Capital Expenditures Overview

Schedule 5

2025 Capital Expenditures Overview

2026 Capital Budget Application

2025 Capital Expenditures Overview

Contents

List of Appendices

1.0 Variance Explanations

As per the provisional Capital Budget Application ("CBA") Guidelines[1] set forth by the Board of Commissioners of Public Utilities ("Board"), Newfoundland Labrador Hydro ("Hydro") is required to provide a mid-year report on actual capital expenditure variances that exceed the approved total program or project budget by more than 10% and $100,000.

Variance explanations are provided herein for projects and programs that are:

- Budgeted over $750,000 where forecasted expenditures have exceeded the approved budget by more than $100,000 and 10%, on a total project/program basis;
- Budgeted under $750,000 and are forecast to exceed $750,000, on a total project/program basis; or
- Cancelled or where the scope of work has been significantly reduced the scope of work.

As this is a mid-year report, variances are based on focused management and re-forecasting efforts and are subject to change throughout the year as the projects and programs proceed.[2] Actual variances at the completion of each project and program will be discussed in the 2025 Capital Expenditures and Carryover Report[3] when annual expenditures are final. As requested by the Board, a copy of the 2024 Capital Expenditures and Carryover Report[4] is provided as Appendix B to this report.

[1] "Capital Budget Application Guidelines (Provisional)," Board of Commissioners of Public Utilities, January 2022.
[2] The 2025 Capital Projects and Programs Variance Summary for all 2025 programs and projects as of May 31, 2025, is provided as Appendix A.
[3] As per Board Order No. P.U. 28(2024), Hydro's 2025 Capital Expenditures and Carryover Report is to be filed by April 1, 2026.
[4] "Capital Expenditures and Carryover Report for the Year Ended December 31, 2024," Newfoundland and Labrador Hydro, April 1, 2025.

1.1 Renewal

1.1.1 In-Service Failures (2025)[5]

Table 1: Program Variance – In-Service Failures (2025) ($000)

Program	Budget	Expenditures And Forecast	Forecasted Variance
Distribution	6,397.0	6,397.0	-
Thermal	3,900.0	3,900.0	-
Hydraulic	2,000.0	3,315.0	1,315.0
Terminal Station	2,500.0	2,500.0	-
Diesel	800.0	800.0	-
Gas Turbine	500.0	500.0	-
Transmission	184.3	184.3	
Telecommunications	94.1	94.1	-
Total	**16,375.4**	**17,690.4**	**1,315.0**

In-Service Failures programs are one-year programs that include refurbishment and replacement work due to actual failures, the identification of incipient failures, or the determination of faster-than-anticipated equipment deterioration for Hydro's assets. The procurement of capital spares required to support such work is included under the In-Service Failure programs.[6] Budget estimates for In-Service Failure programs are based on historical averages, along with Hydro's experience and engineering judgment. As many of these programs are new or have been introduced in recent years, they have limited historical data; Hydro expects that it may take several years of implementation to determine an appropriate baseline estimate for annual in-service failure expenditures.

The forecasted variance for the Hydraulic In-Service Failures program is primarily attributed to more scopes of work required in 2025 than anticipated at the time of the original budget estimates, and the nature of failures requiring more material expenditure to address. This is primarily associated with the ongoing work to replace the Cat Arm Unit 1 turbine runner with the existing capital spare. A third-party consultant inspected the Cat Arm Unit 1 turbine runner in 2024, after the finalization of the capital

[5] While all but one individual In-Service Failure program did not meet the threshold for reportable variance, all 2025 In-Service Failures programs are listed herein for completeness.
[6] The Distribution System In-Service Failures, Miscellaneous Upgrades, and Street Lights program also includes distribution system upgrades and the installation of light emmiting diode ("LED") street lights.

budget, and concluded that the runner required replacement within 12 months due to progressive wear, damage, and a high number of operating hours.[7]

Further details on material expenditures for In-Service Failure programs will be provided in the 2025 Capital Expenditures and Carryover Report.

1.1.2 Overhaul Unit 1 Turbine Valves and Generator (2024) – Holyrood

Table 2: Program Variance – Overhaul Unit 1 Turbine Valves and Generator (2024) – Holyrood ($000)

Budget	Expenditures and Forecast	Forecasted Variance
5,181.4	11,735.0	6,553.6

This is a one-year program (2024) that carried over and was completed in 2025. The program scope was to overhaul the Holyrood Unit 1 turbine, valves and generator. The valve overhauls consisted of dismantling the control valves, main stop valve, combined re-heat stop and intercept valves, extraction non-return valves, and blowdown valves for inspection and refurbishment or replacement of components as required. The generator overhaul consisted of dismantling the generator end shields, hydrogen seals and bearings, removal of the rotor from the stator, electrical testing of the rotor and stator windings, inspection, and refurbishment or replacement of components as required.

The variance in overall program expenditures and forecast is attributed to unanticipated additional scope required to refurbish the steam turbine. The original program budget was based on historical turbine valve and generator overhaul expenditures. The full extent of refurbishment work can only be determined after the unit is removed from service and disassembled for inspection, during the program execution. In this case, significant additional refurbishment was required.

As part of the Replace Unit 1 and 2 Last Stage Turbine Blades – Holyrood project,[8] the turbine rotor was removed and sent to the original equipment manufacturer ("OEM") facility to replace the last stage turbine blades. While at the facility, inspection revealed extensive damage on the rotor diaphragms

[7] Additional information about the Unit 1 Turbine Runner Replacement – Cat Arm project can be found in "Capital Expenditures and Carryover Report for the Year Ended December 31, 2024," Newfoundland and Labrador Hydro, April 1, 2025, app. B, p. B-4, Table B-4, which is included as Appendix B to this report.
[8] Approved in Board Order No. P.U 12(2023).

and bearing journals, which required refurbishment and replacement of the L-1 (second-last stage) turbine blades. Hydro proceeded with this additional refurbishment work while the turbine rotor was at the OEM's facility and determined that it was most appropriate to execute this scope as part of the Overhaul Unit 1 Turbine Valves and Generator (2024) program, as outlined in the 2024 Capital Budget Application ("CBA"). The additional turbine rotor refurbishment work was completed at the OEM's facility, and the rotor was returned to the Holyrood Thermal Generating Station ("Holyrood TGS") in 2024. Installation and commissioning of the unit continued into 2025. There are no viable alternatives for this program, and Hydro proceeded with execution.

1.1.3 Overhaul Turbine and Valves – Unit 3 (2025) – Holyrood

Table 3: Program Variance – Overhaul Turbine and Valves – Unit 3 (2025) – Holyrood ($000)[9]

Budget	Expenditures and Forecast	Forecasted Variance
15,975.9	21,233.2	5,257.3

This is a one-year program (2025) that commenced in 2025. This program is required to complete an overhaul on a nine-year cycle for the turbines and a three-year cycle for the turbine valves, and is appropriate based on the observations made during previous overhauls. The scope of the 2025 work includes an overhaul of the turbine and valves for Unit 3 and remediation of the crack in the lower steam chest of the turbine.

After initiating repairs on the lower steam chest, substantial external cracking was identified. As a result, Hydro is providing an updated expenditures forecast. Hydro is assessing information resulting from the planned inspection work, which currently indicates that significant additional work and expenditures will be required to return the unit to reliable service. Hydro is completing additional testing to determine how to proceed with this project and the resulting impacts to cost and schedule.

[9] The program forecast provided in Appendix A does not have a variance from the budgeted amount as of May 31, 2025. However, a variance is expected as shown in Table 3, and Hydro is working through its change management processes to document the requirement.

Hydro will provide an update on the project and the impacts to the unit return to service date in its Winter Readiness reporting.

1.1.4 Refurbish Ebbegunbaeg Control Structure

Table 4: Project Variance – Refurbish Ebbegunbaeg Control Structure ($000)

Budget	Expenditures and Forecast	Forecasted Variance
17,679.0	22,126.6	4,447.6

This is a five-year project (2021–2025) that commenced in 2021. The project scope is to refurbish the three water control gates and associated equipment at the Ebbegunbaeg Control Structure.

The forecasted variance in overall project expenditures is attributed to:

- Contract tendered pricing that was higher than what was included in the budget estimate for refurbishment work completed on Gates 1 and 2 in 2023 and 2024, respectively;
- The forecasted cost increase to refurbish Gates 1 and 3 screw hoists and the upstream stoplog gains for all three bays in 2025; and
- Internal engineering, construction management, and project management effort required during construction and commissioning of the work in 2023 and 2024.

There are no viable alternatives to the refurbishment of the Ebbegunbaeg Control Structure and Hydro is proceeding with the project.

1.1.5 Upgrade Power Transformers (2024–2025)

Table 5: Program Variance – Upgrade Power Transformers (2024–2025) ($000)

Budget	Expenditures and Forecast	Forecasted Variance
3,575.9	6,346.5	2,770.6

This is a two-year program (2024–2025) that commenced in 2024. The program scope includes the refurbishment of power transformers at several terminal stations.

The forecasted variance in overall program expenditures is attributed to:

- A higher-than-originally-estimated cost for supplying bushings for the 40-year-old Holyrood Transformer T1, due to a lack of technical drawings;
- Additional transformer refurbishments resulting from deferred work from the Terminal Station Renewal (2023–2024) program, due to:
    - Challenges in sourcing a supplier for new oil dehydrators;
    - Unavailability of equipment outages at the Stephenville Terminal Station; and
    - Lack of access to the mobile substation required for work at Glenburnie and Wiltondale Terminal Stations.
- Additional transformer bushing replacements at Sunnyside and Stephenville Terminal Stations required to comply with federal PCB[10] regulations; and
- Additional refurbishments based on updated asset condition assessments.

1.1.6 Perform Level 2 Condition Assessment - Stage 1 and 2 Cooling Water Sump Structures (2025) – Holyrood

Table 6: Project Variance – Perform Level 2 Condition Assessment – Stage 1 and 2 Cooling Water Sump Structures (2025) – Holyrood ($000)[11,12]

Budget	Expenditures and Forecast	Forecasted Variance
891.9	2,802.2	1,910.2

This is a one-year project (2025) to perform a Level 2 Condition Assessment of the reinforced concrete support beams for the floor structure in the Stage 1 and 2 Cooling Water Sump Structures located in Pumphouse 1 and 2 at the Holyrood TGS. Hydro subsequently identified a significant forecast cost increase as a result of contractor pricing that exceeds the original project budget estimate. As a result, Hydro is providing an updated expenditures forecast. A notification of change to the project budget

[10] Polychlorinated biphenyl ("PCB").
[11] The project forecast provided in Appendix A does not have a variance from the budgeted amount as of May 31, 2025. However, a variance is expected as shown in Table 6 and Hydro is working through its change management processes to document the requirement.
[12] Numbers may not add due to rounding.

was communicated to the Board on June 3, 2025.[13] The Board advised on June 16, 2025[14] that the project should be paused pending further review. Hydro has paused the project and is awaiting further communication from the Board.

1.1.7 Refurbish Surge Tank 1 (2024–2025) – Bay d'Espoir

Table 7: Project Variance – Refurbish Surge Tank 1 (2024–2025) – Bay d'Espoir ($000)[15]

Budget	Expenditures and Forecast	Forecasted Variance
2,287.2	3,848.0	1,560.8

This is a two-year project (2024–2025) that commenced in 2024. This project is required to refurbish Surge Tank 1 at Bay d'Espoir Hydroelectric Generating Station ("Bay d'Espoir") in accordance with the condition assessment completed by the external consultant. The scope of the 2025 work includes refurbishment of the Surge Tank 1 interior.

The forecasted project variance is primarily attributed to higher-than-anticipated contract pricing. Hydro issued an open call for contractor bids to complete the contractor scope. Hydro received one bid, which was materially higher than the estimated contract cost included in the project budget and required work to be completed during the night shift to minimize impacts to the ongoing Penstock 1 refurbishment. As night shift work was considered non-compliant with the open call for bids, Hydro issued a limited call to all registered bidders and two selected bidders. Hydro received one compliant bid from the original bidder, which was lower than the original bid but still materially higher than the estimated contract cost included in the original project budget. In addition to higher contract pricing, a

[13] "Notification of Change to Project Budget – Perform Level 2 Condition Assessment Stage 1 & 2 Cooling Water Sump Structures," Newfoundland and Labrador Hydro, June 3, 2025.
[14] "Newfoundland and Labrador Hydro – 2025 Capital Budget Application as per Board Order No. P.U. 28(2024) – Notification of Change to Project Budget – Perform Level 2 Condition Assessment Stage 1 & 2 Cooling Water Sump Structure – To Parties – Review Schedule," Board of Commissioners of Public Utilities, June 16, 2025.
[15] The project forecast provided in Appendix A does not have a variance from the budgeted amount as of May 31, 2025. However, a variance is expected as shown in Table 7, and Hydro is working through its change management processes to document the requirement.

minor exterior refurbishment scope was identified during execution (approximately $294,000), which is included in the forecasted project budget variance.

1.1.8 Renew Circuit Breakers (2025–2026)

Table 8: Program Variance – Renew Circuit Breakers (2025–2026) ($000)

Budget	Expenditures and Forecast	Forecasted Variance
1,151.4	2,661.0	1,509.6

This program budget has been updated as part of the 2026 CBA. Please refer to Section 2.7 for further discussion.

1.1.9 Hydraulic Generation Refurbishment and Modernization (2022–2023)

Table 9: Program Variance – Hydraulic Generation Refurbishment and Modernization (2022–2023) ($000)

Budget	Expenditures and Forecast	Forecasted Variance
6,759.5	7,722.0	962.5

This is a two-year program (2022–2023) that has carried over into 2025. The program scope is to replace or refurbish failing or failed assets at hydraulic generating facilities, and includes sub-programs for generating units, hydraulic structures, reservoirs, site buildings and services, and common auxiliary systems. All sub-programs were closed in 2023, with the exception of the Draft Tube Deck Substructure Level 2 Condition Assessment - Powerhouse 1 (Units 1 to 6) for Bay d'Espoir, ongoing within the site buildings and services sub-program.

The forecasted variance in overall program expenditures is primarily attributed to the Draft Tube Deck Substructure Level 2 Condition Assessment. Unforeseen challenges in taking the Bay d'Espoir generating units offline to safely complete inspection work resulted in the requirement to schedule the in-water inspections in stages, introducing additional construction costs. Crews were mobilized to site to perform the inspections in 2022 and 2024; however, work was unable to be completed due to unforeseen circumstances,[16] resulting in mobilization, standby, and demobilization contract costs. The unit outages could not be rescheduled to complete the in-water inspections later in 2024. Hydro completed in-water inspections of the draft tube deck substructure for Units 1 to 3 in 2025 and intends to use these results to form assumptions on the condition of Units 4 to 6.

The variance is also attributed to the additional refurbishment work required for the overhaul of Unit 6 at Bay d'Espoir, completed in 2022. More refurbishment work was required for the turbine runner and various components of the generator rotor than anticipated at the time of budget estimate preparation.

1.1.10 Replace Unit 2047 (2021–2023) – Ramea

Table 10: Project Variance – Replace Unit 2047 (2021–2023) – Ramea ($000)

Budget	Expenditures and Forecast	Forecasted Variance
2,436.8	3,318.0	881.2

This is a three-year supplemental project (2021–2023) that has carried over into 2025. The project scope is to replace Unit 2047 in the Ramea Diesel Generating Station with a new 500 kW, 1,800 rpm diesel genset and to replace the associated exhaust stack, radiator, aftercooler, switchgear, and breaker. The scope also includes the installation of fuel coolers and upgrades to some existing protection and control equipment, and the existing cooling system. The new genset and associated new components were installed and placed in service in 2024, and the unit is operable in manual mode. Challenges with the availability of internal protection and control engineering and construction resources resulted in the carryover of a portion of the automation and communications work to 2025.

The forecasted variance in overall project expenditures is primarily attributed to the following activities that were not included in the budget estimate:

- Additional labour and travel costs for internal resources to complete the construction and commissioning activities;

[16] The in-water inspection work was deferred in 2022 as a result of the closure of the Bay d'Espoir Highway; again in 2023 as a result of outage availability; and deferred in 2024 as a result of the unanticipated delay in return to service of Bay d'Espoir unit.

- An external engineering consultant for commissioning of switchgear modifications;
- Replacement of the silencer for the new unit to reduce noise in the surrounding community; and
- Modifications of the powerhouse hydronic heating system and the fire alarm system for compatibility with the new genset.

There are no viable alternatives for this project and Hydro is proceeding with execution.

1.1.11 Perform Major Inspection - Synchronous Condenser 2 (2025–2026) – Wabush

Table 11: Program Variance – Perform Major Inspection – Synchronous Condenser 2 (2025–2026) – Wabush ($000)

Budget	Expenditures and Forecast	Forecasted Variance
595.6	1,271.8	676.2

This program budget is updated as part of the 2026 CBA. Please refer to Section 2.8 for further discussion.

1.1.12 Install Breaker Failure Protection (2023–2024) – Sunnyside

Table 12: Project Variance – Install Breaker Failure Protection (2023–2024) – Sunnyside ($000)

Budget	Expenditures and Forecast	Forecasted Variance
289.7	948.6	658.9

This is a two-year project (2023–2024) that has carried over into 2025. The project scope is to upgrade the 230 kV breaker failure protection at the Sunnyside Terminal Station. The forecasted variance in overall project expenditures is attributed to:

- The addition of breaker failure protection upgrades at Oxen Pond and Massey Drive Terminal Stations, which were partially completed as part of the scope for the Terminal Station Refurbishment and Modernization (2021–2022) program, as approved as part of the 2021 CBA, but could not be fully completed in 2022 due to engineering and construction resource challenges and outage unavailability; and

- Additional effort required to complete the scope due to unforeseen complexity of the work and a high level of turnover of project team resources.

Four of the six breaker failure upgrades at Sunnyside Terminal Station and four of the nine at Oxen Pond remain to be completed in 2025. There are no viable alternatives to this project and Hydro is proceeding with execution.

1.1.13 Replace Protective Relays (2024–2025)

Table 13: Program Variance – Replace Protective Relays (2024–2025) ($000)

Budget	Expenditures and Forecast	Forecasted Variance
3,439.1	4,059.0	619.9

This is a two-year program (2024–2025) that commenced in 2024. The program scope is to replace protection systems at various terminal stations and generating stations.

The forecasted variance in overall program expenditures is attributed to a net increase in the number of protection systems to be replaced. The program scope originally anticipated the replacement of 16 systems. Seven more protection system replacements were added to the program for completion in 2025 as a result of transfers of incomplete scopes from the Terminal Station Renewal (2023–2024) program and Upgrades for the Future Retirement of Stephenville Gas Turbine project, including:

- Granite Canal Generator G1 and Transformer T1 Protection;
- Transmission Line Protection TL237 (Western Avalon and Come By Chance);
- Stephenville Transformer Protection – T3 and GT1;
- Bottom Brook Transformer Protection – T1;
- Bottom Brook Transformer Protection – T3;
- Bottom Brook Transmission Line Protection – TL214; and
- Sunnyside Transformer Protection – T4.

The following work scopes have been deferred from 2025 to 2026 and transferred from this program to the Replace Protective Relays (2025–2026) program:

- Come By Chance Transformer Protection – T1; and
- Come By Chance Transformer Protection T2.[17]

Please refer to Section 2.6 for further discussion.

1.1.14 Replace Intermediate Fuel Storage Tanks (2023–2024) – Nain

Table 14: Project Variance – Replace Intermediate Fuel Storage Tanks (2023–2024) – Nain ($000)

Budget	Expenditures and Forecast	Forecasted Variance
721.1	1,261.7	540.6

This is a two-year project (2023–2024) that has carried over into 2025. The project scope is to increase the intermediate fuel storage system capacity at the Nain Diesel Generating Station by replacing the existing 45,000 L intermediate fuel storage tank with two new 60,000 L intermediate fuel storage tanks. The scope of work includes expanding the plant yard to accommodate the larger tank footprint and modifying the associated mechanical piping and protection, and control systems.

The forecasted variance in overall project expenditures is associated with higher-than-originally-estimated contract pricing for the construction work. Hydro tendered the work in early 2024 but did not award the contract as the tendered pricing significantly exceeded the budget estimate. Opportunities to optimize the design and construction strategy were then considered, and the project estimate and cost benefit analysis of project alternatives were updated. It was confirmed that the chosen alternative to increase the intermediate fuel supply capacity remains the least-cost alternative. The additional time to review the project estimate and alternatives resulted in the project carrying over to 2025. Hydro has incorporated a construction strategy improvement that will eliminate the need for a mobile crane to be brought to the site. The work was re-tendered and awarded and is expected to be completed in 2025.

[17] This work at Come By Chance is specifically assigned to Braya Renewable Fuels ("Braya"), which became non-operational in 2025. Given the uncertainty surrounding the customer's operations in 2025, these protective relay replacements are deferred to 2026. Hydro assessed this deferral as low risk, and the customer was consulted and has no objections to the deferral.

1.1.15 Renew Circuit Breakers (2024–2025)

Table 15: Program Variance – Renew Circuit Breakers (2024–2025) ($000)

Budget	Expenditures and Forecast	Forecasted Variance
2,304.0	2,641.0	337.0

This is a two-year program (2024–2025) that commenced in 2024. The program scope is to refurbish or replace select circuit breakers at a number of terminal stations. The forecasted variance in overall program expenditures is attributed to a net increase in the required number of circuit breaker refurbishments. The program scope previously anticipated the refurbishment of five circuit breakers. As a result of the deferral of some breaker refurbishments from the Circuit Breakers Renewal (2023–2024) program, and some adjustments to the long-term asset plan for some circuit breakers, the planned number of refurbishments has changed to nine. The program scope also anticipates the replacement of three circuit breakers, which have not changed.

1.1.16 Diesel Genset Replacements (2021–2022)

Table 16: Program Variance – Diesel Genset Replacements (2021–2022) ($000)

Budget	Expenditures and Forecast	Forecasted Variance
2,846.8	3,147.7	300.9

This is a two-year program (2021–2022) that has carried over into 2025. The program scope is to replace a diesel genset and upgrade associated mechanical, electrical, and protection and control equipment at the Nain Diesel Generating Station. The program is substantially complete, with most planned assets in service in 2022. A portion of the plant automation work carried over to 2025 due to internal protection and control resources being dedicated to higher-priority work. Work completed in 2024 included installation of communications equipment, field modifications to the main switchgear, and engineering design for modifications to the Generator G4 switchgear. Work carried over to 2025 is the field work to modify the G4 switchgear and updates to the overall plant automation system. The forecasted variance in overall program expenditures is attributed to the costs associated with carrying the program an additional two years and delays associated with resource constraints.

1.1.17 Overhaul Hydraulic Units (2025)

Table 17: Program Variance – Overhaul Hydraulic Units (2025) ($000)[18]

Budget	Expenditures and Forecast	Forecasted Variance
4,972.4	4,315.3	(657.1)

This one-year program (2025) involves a partial dismantling of Bay d'Espoir Units 1 and 2 to inspect, test, clean, refurbish, and replace defective components based on information from the maintenance records for the unit. The inspection includes cleaning and inspecting the rotor and stator assembly, electrical testing on the rotor/stator assembly, calibrating and testing of turbine and generator protection devices, and completing a thorough inspection of the turbine and draft tube. The program includes turbine shut-off spherical valve refurbishment, expansion joint seal refurbishment, repair of shear pin insert holes on the wicket gate linkages, and the removal of the turbine automatic greasing system and replacement of components with a greaseless material.

Hydro is forecasting the expenditures to be less than the budget as a result of a scope change for the Units 1 and 2 turbine shut-off spherical valves. The originally planned overhaul of the two spherical valves was cancelled following a review of risks to the budget, schedule and generating unit availability. During detailed planning of the spherical valve overhaul work in 2025, in consultation with the OEM, a number of technical issues and risks were identified, including:

- The requirement for custom tooling with long lead times;
- The requirement for specialized onsite valve machining resources; and
- Indefinite contingency plans if significant damages were to be discovered on the valves.

Hydro will instead complete spherical valve condition assessments in 2025 as part of this program, to better detail the required refurbishment scope and establish a constructable plan.[19]

[18] The project forecast provided in Appendix A does not have a variance from the budgeted amount as of May 31, 2025. However, there is a variance expected as shown in Table 17 and Hydro is working through its change management processes to document the requirement.
[19] Hydro intends to apply for approval of a separate project to refurbish the six-turbine shut-off spherical valves for Bay d'Espoir Units 1 to 6, as part of a subsequent CBA.

1.2 General Plant

1.2.1 Upgrade Water and Fire Suppression Systems (2023–2024) – Bishop's Falls

Table 18: Project Variance – Upgrade Water and Fire Suppression Systems (2023–2024) – Bishop's Falls ($000)

Budget	Expenditures and Forecast	Forecasted Variance
3,240.0	5,800.0	2,560.0

This is a two-year project (2023–2024) that has carried over into 2025. The project scope is to:

- Install a new water supply line from the town near the Botwood Highway close to the Bishop's Falls Complex;
- Install dedicated domestic water and firewater distribution lines; and
- Upgrade the fire suppression system in the main building of the Bishop's Falls Complex.

The forecasted variance in overall project expenditures is attributed to procurement and construction costs that are higher than the original budget estimate. In particular, it was determined during the engineering design that a new pumphouse building and a backup fire pump generator are required. There are no viable alternatives for this project and Hydro is proceeding with execution. The project has carried over into 2025 due to a longer-than-originally-planned design phase and longer-than-originally-expected lead times for some of the new components.

1.2.2 Replace Light- and Heavy-Duty Vehicles (2024–2026)

Table 19: Program Variance – Replace Light- and Heavy-Duty Vehicles (2024–2026) ($000)

Budget	Expenditures and Forecast	Forecasted Variance
5,636.3	6,761.3	1,125.0

This program budget is updated as part of the 2026 CBA. Please refer to Section 2.3 For further discussion.

1.2.3 Install Ultra-Fast DC Electric Vehicle Chargers (2023–2025) – Supplemental

Table 20: Project Variance – Install Ultra-Fast DC Electric Vehicle Chargers (2023–2025) – Supplemental ($000)

Budget	Expenditures and Forecast	Forecasted Variance
2,059.8	2,779.8	720.0

This is a three-year supplemental project (2023–2025) that commenced in 2023. The project scope is to expand the capacity of the province's Electric Vehicle ("EV") fast charging network in partnership with the Government of Newfoundland and Labrador and the Government of Canada. The forecasted variance in overall project expenditures is attributed to an increase in the planned number of charging stations being installed. The original scope of this project was to procure and install seven ultra-fast direct current EV chargers at five of Hydro's most utilized charging sites along the Trans-Canada Highway. In 2024, additional funding was secured by the Government of Newfoundland and Labrador, and the number of planned new chargers has increased to ten.

1.2.4 Water System Condition Assessment and Upgrades (2023–2024) – Bay d'Espoir

Table 21: Project Variance – Water System Condition Assessment and Upgrades (2023–2024) – Bay d'Espoir ($000)

Budget	Expenditures and Forecast	Forecasted Variance
665.9	1,328.2	662.3

This is a two-year project (2023–2024) that has carried over into 2025. The project scope is to complete improvements to the Bear Brook water supply system at Bay d'Espoir, which includes the replacement of the water storage tank and the relocation of a section of the water line located at Bear Brook Crossing. The project scope also includes a condition assessment of the remaining system components to identify issues and assist with the planning of future capital refurbishment work necessary to maintain system reliability. The project carried over into 2025 due to procurement delays during tendering and the longer-than-anticipated lead time on the new water storage tank.

The forecasted variance in overall project expenditures is primarily attributed to higher-than-originally-estimated contract pricing to procure and install the replacement water storage tank and to relocate the section of water line. In addition, project management and internal labour costs are higher than what was carried in the original budget estimate. Completion of the proposed water supply system improvements is the only viable project alternative, and Hydro is proceeding with execution.

1.2.5 Upgrade SCADA Network (2024)

Table 22: Project Variance – Upgrade SCADA Network (2024) ($000)

Budget	Expenditures and Forecast	Forecasted Variance
402.3	841.9	439.6

This is a one-year project (2024) that carried into 2025. The scope of the project is to upgrade the current Supervisory Control and Data Acquisition (“SCADA”) network to a modern and cyber-secure Ethernet-based operational network, to provide reliable connectivity from the Energy Control Centre to the remote terminal units at terminal stations, generating facilities, and hydraulic control structures.

The overall forecasted variance is attributed to the following factors:

- **Inclusion of the Great Northern Peninsula and Labrador regions**: These areas of the SCADA network were not accounted for in the original estimate but are required as part of the upgrade; additional devices were needed to support the inclusion of these regions.
- **New cybersecurity requirements**: A recently identified requirement to implement firewalls was not included in the initial budget; to allow future firewall maintenance, system redundancy is required, and further infrastructure is necessary.
- **Underestimated engineering and deployment costs**: The engineering and deployment efforts required for this project have proven to exceed that which was estimated.

There are no viable alternatives for this project and Hydro is proceeding with execution.

1.2.6 Replace VHF Radio Systems (2024–2025)

Table 23: Project Variance – Replace VHF Radio Systems (2024–2025) ($000)

Budget	Expenditures and Forecast	Forecasted Variance
1,552.2	1,552.2	-

This is a two-year project (2024–2025) that commenced in 2024. The purpose of the project is to replace the functionality previously provided by the Very High Frequency ("VHF") radio system to allow for a safer and efficient workforce while performing work. Hydro is currently forecasting to remain on budget; however, Hydro is providing an update regarding a change to the scope of work.

Hydro originally proposed to install a combination of mobile and fixed push-to-talk capable satellite phones, as well as a small number of fixed cellular phones. Mobile installations were to include vehicle-mounting kits with vehicle antennas, and fixed installations were to include desk-mounting kits, antennas, cellular boosters, and cabling.

During project planning, Hydro identified alternative solutions that would provide broader service coverage, better data capabilities and higher reliability. Hydro therefore cancelled the original scope to install satellite and cellular services and is implementing the following alternatives:

- Hydro is procuring and installing radios as part of the Government of Newfoundland and Labrador's P25 Provincial Wide Radio System ("PWRS"), a system being used by first responders, including the Royal Canadian Mounted Police, Royal Newfoundland Constabulary, and provincial health and fire services. The PWRS has better coverage and performance compared to cellular service, and there are inter-operations capabilities whereby users can talk on dedicated channels.
- In select fleet vehicles, Hydro is installing Starlink communications systems coupled with Cradle Point routers for a secure path to Hydro Place. These systems allow the connection of existing cellular phones and laptops in remote areas where there is no PWRS or cellular coverage.

1.3 System Growth

1.3.1 Wabush Terminal Station Upgrades (2021–2024)

Table 24: Project Variance – Wabush Terminal Station Upgrades (2021–2024) ($000)

Budget	Expenditures and Forecast	Forecasted Variance
12,678.1	16,120.6	3,442.5

This is a four-year project (2021–2024) that was carried over into 2025. The project scope includes the replacement of Transformers T4 and T5 and the addition of a new Capacitor Bank C3 to support Hydro's ability to provide a firm supply for customers in accordance with the criteria established for the transmission system in Western Labrador. C3 was installed in 2023, and T5 was installed in 2024. The project carried over because of the longer-than-originally expected delivery of two new transformers, resulting in the installation of T5 being delayed from 2023 to 2024 and the installation of T4 being delayed from 2024 to 2025.

The forecasted variance in overall project expenditures is primarily due to higher-than-anticipated contract supply and construction costs for Transformers T4 and T5, as well as capacitor bank C3. Hydro is currently facing market rates for construction services that significantly exceed the estimates prepared during the budget proposal phase, with particularly elevated costs observed for work in the Labrador region.

1.3.2 Additions for Load Growth – Upgrade Transformer Capacity (2023–2024) – Jean Lake Terminal Station

Table 25: Project Variance – Additions for Load Growth – Upgrade Transformer Capacity – Jean Lake Terminal Station ($000)

Budget	Expenditures and Forecast	Forecasted Variance
7,829.3	10,999.7	3,170.4

This project budget is updated as part of the 2026 CBA. Please refer to Section 2.2 for further discussion.

1.4 Access

There are no forecasted reportable variances for projects and programs in the Access investment classification.

1.5 Service Enhancement

1.5.1 Replace Metering System (2022–2024)

Table 26: Project Variance – Replace Metering System (2022–2024) ($000)

Budget	Expenditures and Forecast	Forecasted Variance
5,875.8	9,000.7	3,124.9

This three-year project (2022–2024) has carried over into 2025. The project scope is to replace manually-read meters and TS1 meters with a drive-by automatic meter reading system.[20]

The forecasted variance in overall project expenditures is primarily attributed to contract labour costs necessary to complete the project. The original project plan was to utilize internal resources to complete the installation of the meters; however, the pace of meter replacements was slower than anticipated due to resource constraints. To bring the project to completion in a reasonable timeframe, Hydro hired internal temporary resources to support the project and is utilizing contractors to install approximately 16,000 meters. Also contributing to the forecasted variance, project management and implementation of the associated information systems required additional funding to complete the planned scope of work. Hydro reviewed the cost-benefit analysis of alternatives and confirmed that the solution being implemented remains the least-cost alternative. Additional installation costs are also being incurred where deteriorated meter bases are unsafe for meter installation. Hydro is proceeding with execution and anticipates project completion in 2025.

[20] This project is distinct from the Upgrade PLX Metering System (2026–2028) project proposal in this CBA, which is for the purchase and replacement of meters for Hydro's residential, commercial and industrial customers in the Happy Valley-Goose Bay, Sheshatshiu, and the North West River area that are currently equipped with obsolete PLX technology.

1.5.2 Upgrade Worst-Performing Distribution Feeders (2024–2025)

Table 27: Program Variance – Upgrade Worst-Performing Distribution Feeders (2024–2025) ($000)

Budget	Expenditures and Forecast	Forecasted Variance
3,291.7	4,922.4	1,630.7

This is a two-year program (2024–2025) that commenced in 2024. The program scope program is to refurbish a distribution feeder located in the L'Anse-au-Loup Distribution System, which was prioritized through the examination of reliability performance data and confirmed as requiring upgrades to the existing infrastructure based on condition assessments.

The forecasted variance in overall program expenditures is attributed to a change in scope and the need to provide temporary power generation to minimize customer impact—an element not accounted for in the original budget estimate. Completing the original scope would have required multiple customer outages and the deployment of at least three mobile generators, introducing additional risks such as extended service interruptions and potential environmental hazards from fuel spills.

After assessing the associated costs and risks, alternative solutions were explored. A partial rebuild of the line was identified as the most cost-effective and reliable option. This revised approach reduces the need for temporary generation to a single mobile generator, significantly limiting the number of affected customers and the duration of outages.

Hydro is now proceeding with the execution of this adjusted scope.

1.6 Mandatory

1.6.1 Replace Terminal Station Lighting (2023–2024)

Table 28: Project Variance – Replace Terminal Station Lighting (2023–2024) ($000)

Budget	Expenditures and Forecast	Forecasted Variance
917.4	1,416.3	498.9

This is a two-year project (2023–2024) that has carried over into 2025. The project scope is to replace terminal station service lighting at various sites. The replacement of these lighting systems is required to ensure compliance with federal environmental regulations related to removing equipment containing PCBs by 2025. The lighting systems in these locations are original to these stations and are nearing the end of their service lives. Station lighting is necessary to provide a safe working environment and to act as a deterrent for theft and vandalism.

The forecasted variance in overall project expenditures is attributed to:

- Higher-than-originally-estimated construction, project management, procurement and engineering costs;
- A change in execution strategy for the lighting replacements for Sunnyside, which did not get completed in 2024 due to internal construction resource challenges; that scope is now planned to be completed by a contractor in 2025, which is expected to result in higher expenditures than estimated; and
- Expansion of the project scope to include lighting replacements at Hardwoods Terminal Station and for the generating unit transformer bays at Bay d'Espoir.

There are no viable alternatives for this mandatory project and Hydro is proceeding with execution.

1.7 Allowance for Unforeseen

Hydro did not identify any work to the end of May 2025 that necessitated the use of the Allowance for Unforeseen Items Account.

2.0 Project and Program Budget Updates

Hydro completed a review of the scope, schedule, and cost estimates for multi-year projects and programs continuing in 2026 that were approved as part of the 2025 CBA or supplemental applications. Hydro identified nine previously approved projects and programs where the overall forecast expenditure is higher or lower than the approved estimate, and/or the forecasted annual expenditures in 2026 and beyond are expected to shift. The 2026 portion of the budget for each of these projects and programs is now different than originally presented in the 2025 CBA or applicable supplemental application.

A summary of the original and updated cost estimates as of May 31, 2025, for these projects and programs is provided herein.

2.1 Purchase Spare Generator Step-Up Transformer (2023–2028)

This is a six-year project (2023–2028) that commenced in 2023. The project scope is to purchase a spare 172 MVA-rated Generator Step-Up ("GSU") transformer designed for use in the event of a failure of a GSU transformer at:

- Holyrood TGS;
- Bay d'Espoir;
- Upper Salmon Hydroelectric Generating Station; or
- Granite Canal Hydroelectric Generating Station.

The new transformer was ordered in 2025. The overall budget and year of completion remain unchanged; however, the manufacturer's payment schedule results in changes to the expected annual expenditures, with forecast expenditures shifting to later in the project.

The revised budget estimate is presented in Table 29 and reflects the alignment of the annual forecast to the updated transformer payment schedule.

Table 29: Budget Update – Purchase Spare GSU Transformer (2023–2028) ($000)

	Approved			Estimated			
Project Cost	**2023**	**2024**	**2025**	**2026**	**2027**	**2028**	**Total[21]**
Budget Estimate (2023)[22]	39.6	1,298.9	3,966.7	2,161.7	-	-	**7,466.9**
Revised Budget Estimate (2025)[23]	39.6	1,298.9	1,822.1	3,140.0	687.0	5,336.4	**12,324.0**
Revised Budget Estimate in 2026 CBA	39.6	1,298.9	1,822.1	-	2,166.6	6,996.8	**12,324.0**
Actual Expenditure and Forecast	17.5	51.0	825.6	120.0	4,313.0	6,996.8	**12,324.0**

[21] Numbers may not add due to rounding.
[22] Approved in Board Order No. P.U. 28(2023).
[23] Approved in Board Order No. P.U. 8(2025).

2.2 Additions for Load Growth – Upgrade Transformer Capacity (2023–2024) – Jean Lake Terminal Station

This two-year project (2023–2024) commenced in 2023. The project scope is to complete modifications to the Jean Lake Terminal Station (formerly the Wabush Substation) to ensure a reliable power supply to the Town of Wabush in the event of a failure of the largest transformer, T1.

The project schedule was extended into 2025 and then 2026 as part of the 2024 and 2025 CBAs, respectively. The project is now further extended into 2028. The construction activity for this project can not commence until the completion of the related project titled "Additions for Load – Wabush Substation Upgrades," which is carrying over to 2026 due to delays in the civil design and the delivery of steel materials. The project titled "Additions for Load Growth – Upgrade Transformer Capacity (2023-2024) – Jean Lake Terminal Station" is now planned to be constructed in 2027 and 2028, with some early construction works planned for 2026. There are limited construction windows in Labrador, equipment outage constraints and equipment loading restrictions that necessitate scheduling the construction over multiple years.

The previous budget estimate for this project is insufficient to complete the planned scope of work. Specifically, the previous estimates for the civil and electrical construction and transformer installation contracts are lower than current market rates for work in Labrador, based on experience with similar contracts at the Wabush Terminal Station in 2024 and 2025.

There are no identified viable alternatives for this program. The revised budget estimate is presented in Table 30 and reflects the forecasted cost increase and schedule extension into 2028.

Table 30: Budget Update – Additions for Load Growth – Upgrade Transformer Capacity (2023–2024) – Jean Lake Terminal Station ($000)

Project Cost	2023	Approved 2024	2025	2026	Estimated 2027	2028	Total
Budget Estimate in 2023 CBA	580.0	5,436.1	-	-	-	-	**6,016.1**
Revised Budget Estimate in 2024 CBA	580.0	-	5,436.1	-	-	-	**6,016.1**
Revised Budget Estimate in 2025 CBA	580.0	-	6,459.6	789.7	-	-	**7,829.3**
Revised Budget Estimate in 2026 CBA	580.0	-	6,459.6	-	1,335.1	2,625.0	**10,999.7**
Actual Expenditure and Forecast	52.0	596.8	1,052.9	1,448.0	5,225.0	2,625.0	**10,999.7**

2.3 Replace Light- and Heavy-Duty Vehicles (2024–2026)

This three-year program (2024–2026) commenced in 2024. The program scope is to replace light- and heavy-duty vehicles in accordance with Hydro's replacement criteria and includes accessorizing as required based on the purpose of the vehicle.

The original budget estimate was based on the planned replacement of 30 light-duty vehicles and 8 heavy-duty vehicles. The program scope has been changed to include 8 light-duty vehicles and 1 additional heavy-duty vehicle:

- A need was identified to procure an additional eight light-duty vehicles due to unforeseen in-service failures; the failed vehicles did not merit repair costs, given their age, high usage, and/or condition; and
- One heavy-duty vehicle originally expected to be received as part of the Replace Light- and Heavy-Duty Vehicles (2022–2024) program was added to this 2024-2026 program scope, as the vehicle delivery is delayed by the vendor.

Also impacting the program forecast, Hydro experienced higher-than-estimated tendered pricing for vehicles.

The timing of vehicle deliveries from the vendors has impacted the forecasted annual expenditures. Some light-duty vehicles originally expected to be received in 2025 were received in 2024. Some heavy-duty vehicles originally expected to be received in 2025 have been delayed to 2026.

There are no identified viable alternatives for this program. The revised budget estimate is presented in Table 31 and reflects the forecast cost increase.

Table 31: Budget Update – Replace Light- and Heavy-Duty Vehicles (2024–2026) ($000)

	Approved		Estimated	
Program Cost	**2024**	**2025**	**2026**	**Total**
Budget Estimate in 2024 CBA	1,479.1	4,148.8	8.4	**5,636.3**
Revised Budget Estimate in 2026 CBA[24]	1,479.1	4,148.8	1,133.4	**6,761.3**
Actual Expenditure and Forecast	2,053.8	4,049.1	658.4	**6,761.3**

2.4 Replace Diesel Gensets (2025–2027)

This three-year program (2025–2027) commenced in 2025. The program scope is to:

- Replace Unit 2005 and associated equipment at the L'Anse-au-Loup Diesel Generating Station; and
- Replace Units 2062 and 2067 and associated equipment at the Grey River Diesel Generating Station.

In 2025, operational issues were experienced with a third unit in Grey River (Unit 2026) whereby it was emitting particulates into the air, impacting the surrounding property, houses and residents. Replacement of this unit is required, and the scope was added to this program. The cost of replacing this third unit at Grey River is within the available project contingency and thus does not impact the overall project budget. However, contingency funds originally allocated for 2027 are being advanced to 2026, when it is expected that Unit 2026 will be replaced.

The revised budget estimate is presented in Table 32 and reflects the advancement of the contingency budget from 2027 to 2026.

[24] The revised budget estimate for 2026 is the actual expenditure and forecast for 2024–2026 less the budget previously approved for 2024–2025.

Table 32: Budget Update – Replace Diesel Gensets (2025–2027) ($000)

Program Cost	Approved 2025	Estimated 2026	2027	Total[25]
Budget Estimate in 2025 CBA	418.2	1,286.6	4,518.7	**6,223.6**
Revised Budget Estimate in 2026 CBA[26]	418.2	1,719.0	4,086.4	**6,223.6**
Actual Expenditure and Forecast	451.3	1,685.9	4,086.4	**6,223.6**

2.5 Additions for Load Growth – Unit 2065 Replacement and Fuel Storage Upgrades (2024–2027) – Rigolet

This four-year project (2024–2027) commenced in 2024. The project scope is to replace Unit 2065 at the Rigolet Diesel Generating Plant with a 545 kW rated diesel genset and replace the three existing horizontal fuel storage tanks with larger tanks to increase fuel storage capabilities.

Hydro is advancing the schedule for this project to address the timing of growing electricity needs in the community of Rigolet, specifically to provide electrical service for a new Department of Health and Social Development building. Most of the genset installation activity originally planned for 2027 is now expected to be completed in 2026. Additionally, the fuel storage tank procurement and installation are being advanced from 2026 to 2025. There is no anticipated change to the overall budget.

The revised budget estimate is presented in Table 33 and reflects the advancement of forecasted expenditures.

Table 33: Budget Update – Additions for Load Growth – Unit 2065 Replacement and Fuel Storage Upgrades (2024–2027) – Rigolet ($000)[27]

Project Cost	Approved 2024	2025	Estimated 2026	2027	Total
Budget Estimate (2024)[28]	50.1	226.4	1,604.8	1,548.0	**3,429.2**
Revised Budget Estimate in 2026 CBA[29]	50.1	226.4	3,082.9	69.9	**3,429.2**
Actual Expenditure and Forecast	21.9	1,627.8	1,709.7	69.9	**3,429.2**

[25] Numbers may not add due to rounding.
[26] The revised budget estimate for 2026 is the actual expenditure and forecast for 2025-2026 less the budget previously approved for 2025.
[27] Numbers may not add due to rounding.
[28] Approved in Board Order No. P.U. 25(2024).
[29] The revised budget estimate for 2026 is the actual expenditure and forecast for 2024–2026 less the budget previously approved for 2024–2025.

2.6 Replace Protective Relays (2025–2026)

This two-year program (2025–2026) commenced in 2025. The program scope is to modernize protection systems by replacing electromechanical and obsolete solid-state relays with modern digital relays at various terminal stations and generating stations.

The original budget estimate was based on the planned replacement of ten protection systems. The program scope has been changed to include a net increase of one protection system:

- Protective relay replacements for Come By Chance Transformers T1 and T2, originally planned to be completed as part of the Replace Protective Relays (2024–2025) program, were added to the scope of this 2025–2026 program for planned completion in 2026. This work is specifically assigned to Braya, which temporarily ceased operations in 2025. Given the uncertainty surrounding the customer's operations in 2025, these protective relay replacements have been deferred to 2026 and will now be included in the Replace Protective Relays (2025–2026) program. Hydro assessed this deferral as low risk; the customer was consulted and has no objections to the deferral.
- Protective relay replacement for Oxen Pond Transformer T2 has been deferred from the Replace Protective Relays (2025–2026) program to a future year to align with the planned replacement of circuit breaker B2T2, to take advantage of efficiencies in engineering and construction. The anticipated cost is included in the budget submission for the 2026–2027 Replace Protective Relays Program.

There are no identified viable alternatives for this program. The revised budget estimate is presented in Table 34 and reflects the forecast cost increase.

Table 34: Budget Update – Replace Protective Relays (2025–2026) ($000)

Program Cost	Approved 2025	Estimated 2026	Total
Budget Estimate in 2025 CBA	668.6	2,070.9	**2,739.5**
Revised Budget Estimate in 2026 CBA[30]	668.6	2,282.6	**2,951.2**
Actual Expenditure and Forecast	546.5	2,404.7	**2,951.2**

2.7 Renew Circuit Breakers (2025–2026)

This two-year program (2025–2026) commenced in 2025. The program scope is to refurbish or replace select 69 kV, 138 kV, and 230 kV circuit breakers.

Hydro is forecasting an increase in the planned number of circuit breakers to be replaced under this program. The original budget estimate was based on the replacement of one circuit breaker and the refurbishment of five circuit breakers. Two additional circuit breaker replacements are now planned to be completed in this program:

- Hardwoods Circuit Breaker B8T3: previously scheduled for replacement in 2025 as part of the Renew Circuit Breakers (2024-2025) program, this breaker is now planned for replacement in 2026 to better align with long-term asset planning criteria.
- Howley Circuit Breaker B1L43: previously scheduled for refurbishment in 2025 as part of the Renew Circuit Breakers (2024–2025) program, this breaker will now be replaced in 2026. Replacement is required as the original equipment manufacturer has determined that the operating mechanism is obsolete and unable to be refurbished.

There are no identified viable alternatives for this program. The revised budget estimate is presented in Table 35 and reflects the forecasted cost increase.

[30] The revised budget estimate for 2026 is the actual expenditure and forecast for 2025–2026 less the budget previously approved for 2025.

Table 35: Budget Update – Renew Circuit Breakers (2025–2026) ($000)

Program Cost	Approved 2025	Estimated 2026	Total
Budget Estimate in 2025 CBA	129.7	1,021.7	**1,151.4**
Revised Budget Estimate in 2026 CBA	129.7	2,531.3	**2,661.0**
Actual Expenditure and Forecast	129.7	2,531.3	**2,661.0**

2.8 Perform Major Inspection – Synchronous Condenser 2 (2025–2026) – Wabush

This two-year program (2025–2026) commenced in 2025. The program scope is to perform a major inspection of Wabush Synchronous Condenser 2 (“SC2”) and complete any necessary refurbishment work identified during the inspections.

An unexpected failure of the SC2 rotor poles occurred in January 2025, which required the rotor to be refurbished by the OEM. This scope of work was added to this program and completed in 2025. To take advantage of the unplanned outage resulting from the rotor poles' failure, most of the planned major inspection activity was advanced from 2026 to 2025. The program will remain open in 2026 to complete the remaining inspection activities.

There are no identified viable alternatives for this program. The revised budget estimate is presented in Table 36 and reflects the forecasted cost increase.

Table 36: Budget Update – Perform Major Inspection – Synchronous Condenser 2 (2025–2026) – Wabush ($000)

Program Cost	Approved 2025	Estimated 2026	Total
Budget Estimate in 2025 CBA	22.8	572.8	**595.6**
Revised Budget Estimate in 2026 CBA[31]	22.8	1,249.0	**1,271.8**
Actual Expenditure and Forecast	1,013.2	258.6	**1,271.8**

[31] The revised budget estimate for 2026 is the actual expenditure and forecast for 2025–2026 less the budget previously approved for 2025.

2.9 Upgrade Work Protection Code Application (2025–2026)

This two-year project (2025–2026) commenced in 2025. The project scope is to upgrade Hydro's Work Protection Code ("WPC") application software that allows the safe execution of work, protecting Hydro employees and equipment.

The work to upgrade this application started in 2022 as part of the Software Upgrades and Minor Enhancements (2022) program; however, the work was paused in 2022 when the vendor forecasted significant cost increases. The project scope and justification were re-evaluated, and this separate project was subsequently proposed and approved in the 2025 CBA. The expenditures incurred in 2022 are of value to the new project and remain recorded as Work in Progress ("WIP") until this project is complete. These WIP costs were included as part of the 2025 budget estimate in error, and that portion of the 2025 budget is not required.

Hydro is progressing this project faster than originally expected and is expecting to complete the work in 2025 rather than 2026. This shortened schedule is expected to result in some cost savings. As the WPC application is an operational technology used by operating sites in both the regulated and non-regulated business segments, the project cost will be allocated using Hydro's Intercompany Transactions Costing Guidelines.

The revised budget estimate is presented in Table 37 and reflects the forecasted cost decrease and schedule advancement into 2025.

Table 37: Budget Update – Upgrade WPC Application (2025–2026) ($000)

Project Cost	Approved 2025	Estimated 2026	Total
Budget Estimate in 2025 CBA	452.0	449.4	**901.4**
Revised Budget Estimate in 2026 CBA[32]	452.0	256.6	**708.6**
Actual Expenditure and Forecast	708.6	-	**708.6**

[32] The revised budget estimate for 2026 is the actual expenditure and forecast for 2025–2026 less the budget previously approved for 2025.

Appendix A

Capital Programs and Projects Variance Summary

2025 Capital Expenditures by Investment Classification
As of May 31, 2025
($000)

	Capital Budget									Actual Expenditure and Forecast								Variance			
	A				B	C	D (B+C)	E	F (A+C+E)	G				H	I	J	K (G+H+I+J)	K-F		(H+I)-D	
Investment Classification	**2021**	**2022**	**2023**	**2024**	**Carryover to 2025**	**Budget 2025**	**Revised 2025**	**2026 and Beyond**	**Total**	**2021**	**2022**	**2023**	**2024**	**Actual 2025**	**2025 Forecast Remaining Jun to Dec**	**2026 and Beyond**	**Total**	**Project**		**Annual**	
Access	-	-	-	-	-	5,006.7	5,006.7	933.8	5,940.5	0.0	(0.0)	(0.0)	(0.0)	1,817.1	3,189.6	933.8	5,940.5	-	0.0%	-	0.0%
Allowance for Unforeseen[1]	-	-	-	-	-	1,000.0	1,000.0	-	1,000.0	-	-	-	-	-	1,000.0	-	1,000.0	-	0.0%	-	0.0%
General Plant	-	-	2,119.7	14,419.5	11,463.2	33,030.9	44,494.1	10,298.1	59,868.1	-	-	3,028.1	7,159.8	8,509.1	36,574.7	10,498.7	65,770.3	5,902.2	9.9%	589.6	1.3%
Mandatory	-	-	323.3	685.7	332.1	1,483.2	1,815.3	278.4	2,770.6	-	-	388.7	787.2	1,179.8	635.5	278.4	3,269.5	498.9	18.0%	-	0.0%
Renewal	6,105.1	11,957.7	19,894.3	26,979.9	13,456.8	147,276.4	160,733.2	32,996.9	245,210.4	3,749.3	10,557.4	18,640.7	33,829.3	43,142.5	119,773.1	32,995.4	262,687.7	17,477.4	7.1%	2,182.4	1.4%
Service Enhancement	-	515.6	4,405.2	3,901.9	2,405.1	8,972.0	11,377.0	18,988.0	36,782.6	-	2,264.4	2,010.9	4,362.3	3,337.2	9,682.3	19,935.5	41,592.6	4,810.0	13.1%	1,642.4	14.4%
System Growth	3,488.4	11,496.3	2,264.2	6,894.3	2,945.9	7,001.3	9,947.2	1,276.9	32,421.5	1,094.6	4,265.5	12,467.4	6,751.4	803.6	3,805.7	9,785.2	38,973.5	6,552.1	20.2%	(5,337.9)	-53.7%
Total	**9,593.5**	**23,969.6**	**29,006.7**	**52,881.3**	**30,603.0**	**203,770.5**	**234,373.5**	**64,772.1**	**383,993.7**	**4,843.9**	**17,087.4**	**36,535.8**	**52,890.0**	**58,789.3**	**174,660.8**	**74,427.0**	**419,234.2**	**35,240.6**		**(923.4)**	

[1] As there have been no Allowance for Unforeseen expeditures as of May 31, 2025, a separate summary has not been provided.

2025 Capital Expenditures Summary by Asset Category
As of May 31, 2025
($000)

	Capital Budget									Actual Expenditure and Forecast									Variance			
	A				B	C	D (B+C)	E	F (A+C+E)	G				H	I	J	K (G+H+I+J)	K-F		(H+I)-D	
Asset Category	2021	2022	2023	2024	Carryover to 2025	Budget 2025	Revised 2025	2026 and Beyond	Total	2021	2022	2023	2024	Actual 2025	2025 Forecast Remaining Jun to Dec	2026 and Beyond	Total	Project		Annual	
Administration	-	-	-	984.2	698.2	860.2	1,558.4	-	1,844.4	-	-	-	488.0	849.2	709.2	-	2,046.4	202.0	11.0%	-	0.0%
Allowance for Unforeseen Items	-	-	-	-	-	1,000.0	1,000.0	-	1,000.0	-	-	-	-	-	1,000.0	-	1,000.0	-	0.0%	-	0.0%
Distribution	-	-	-	2,684.5	2,166.7	17,785.9	19,952.5	6,694.4	27,164.8	0.0	(0.0)	(0.0)	517.8	6,849.4	14,733.8	6,694.4	28,795.5	1,630.7	6.0%	1,630.7	8.2%
Gas Turbines	-	-	-	884.3	658.7	2,520.8	3,179.5	296.9	3,702.0	-	-	-	225.6	939.0	2,240.4	296.9	3,702.0	-	0.0%	-	0.0%
Generation	2,868.3	2,944.7	3,629.3	1,563.8	2,626.4	5,305.2	7,931.6	13,794.2	30,105.4	1,552.8	1,545.5	2,487.3	4,149.9	2,519.0	6,939.3	10,890.3	30,084.1	(21.3)	-0.1%	1,526.7	19.2%
Hydraulic Plant	3,236.8	6,208.9	10,151.3	13,639.4	2,966.3	88,141.6	91,107.9	14,099.9	135,477.9	2,196.4	6,966.1	10,014.9	15,203.5	24,154.5	68,526.1	14,099.9	141,161.5	5,683.5	4.2%	1,572.7	1.7%
Information Systems	-	-	234.4	816.9	878.6	7,911.7	8,790.3	1,830.5	10,793.4	-	-	36.3	163.2	1,591.1	7,455.8	1,381.1	10,627.4	(166.0)	-1.5%	256.6	2.9%
Metering	-	515.6	4,365.6	1,297.2	320.2	660.6	980.8	513.7	7,352.7	-	2,264.4	1,993.4	3,820.4	1,106.8	778.8	568.1	10,532.0	3,179.3	43.2%	904.9	92.3%
Properties	-	-	353.7	2,886.3	5,073.7	1,115.8	6,189.4	288.2	4,644.0	-	-	316.2	410.1	1,522.4	4,667.0	288.2	7,204.0	2,560.0	55.1%	-	0.0%
Telecontrol	-	-	-	3,116.8	2,377.2	5,182.3	7,559.5	132.4	8,431.5	-	-	-	1,095.4	2,588.8	5,303.7	132.4	9,120.3	688.8	8.2%	333.0	4.4%
Terminal Stations	3,488.4	14,300.4	8,901.8	12,533.4	10,171.3	24,775.9	34,947.2	18,084.5	82,084.4	1,094.6	6,311.3	19,103.3	10,472.5	6,333.5	21,465.8	30,388.3	95,169.3	13,084.9	15.9%	(7,148.0)	-20.5%
Thermal Plant	-	-	-	6,403.9	859.3	30,265.0	31,124.3	1,295.6	37,964.5	-	-	-	12,098.2	6,784.1	24,340.2	1,295.6	44,518.1	6,553.6	17.3%	-	0.0%
Tools and Equipment	-	-	-	240.9	(346.3)	5,130.7	4,784.4	2,681.1	8,052.7	-	-	-	587.2	939.5	3,844.9	2,681.1	8,052.7	-	0.0%	-	0.0%
Transmission	-	-	-	-	-	5,346.9	5,346.9	229.3	5,576.2	-	-	-	-	1,692.7	3,654.2	229.3	5,576.2	-	0.0%	-	0.0%
Transportation	-	-	1,370.6	5,829.7	2,152.8	7,768.0	9,920.8	4,831.4	19,799.7	-	-	2,584.4	3,658.1	919.3	9,001.5	5,481.4	21,644.7	1,845.0	9.3%	-	0.0%
Total	**9,593.5**	**23,969.6**	**29,006.7**	**52,881.3**	**30,603.0**	**203,770.5**	**234,373.5**	**64,772.1**	**383,993.7**	**4,843.9**	**17,087.4**	**36,535.8**	**52,890.0**	**58,789.3**	**174,660.8**	**74,427.0**	**419,234.2**	**35,240.6**		**(923.4)**	

2025 Capital Expenditures Summary by Year
As of May 31, 2025
($000)

	Capital Budget									Actual Expenditure and Forecast									Variance			
	A				B	C	D (B+C)	E	F (A+C+E)	G				H	I	J	K (G+H+I+J)	K-F		(H+I)-D	
Year	2021	2022	2023	2024	Carryover to 2025	Budget 2025	Revised 2025	2026 and Beyond	Total	2021	2022	2023	2024	Actual 2025	2025 Forecast Remaining Jun to Dec	2026 and Beyond	Total	Project		Annual	
2025	-	-	-	-	-	86,100.3	86,100.3	47,025.9	133,126.2	0.0	(0.0)	(0.0)	(0.0)	16,465.7	72,400.3	48,072.6	136,938.6	3,812.4	2.9%	2,765.7	3.2%
2024	-	-	-	22,497.3	12,796.7	43,579.3	56,376.0	7,793.1	73,869.7	0.0	(0.0)	(0.0)	21,441.2	14,604.7	44,656.9	5,626.6	86,329.4	12,459.7	16.9%	2,885.6	5.1%
2023	-	-	6,956.7	19,849.7	11,133.4	68,624.1	79,757.5	9,953.1	105,383.6	-	-	6,274.6	13,376.8	24,438.3	47,839.7	20,727.8	112,657.1	7,273.5	6.9%	(7,479.5)	-9.4%
2022	-	7,245.8	16,828.7	1,204.8	1,509.6	-	1,509.6	-	25,279.3	-	7,391.0	12,482.4	5,527.0	1,471.6	942.9	-	27,814.8	2,535.5	10.0%	904.9	59.9%
2021	9,593.5	16,723.8	5,221.3	9,329.5	5,163.4	5,466.7	10,630.1	-	46,334.8	4,843.9	9,696.4	17,778.9	12,545.0	1,809.0	8,821.0	-	55,494.3	9,159.4	19.8%	-	0.0%
Total	**9,593.5**	**23,969.6**	**29,006.7**	**52,881.3**	**30,603.0**	**203,770.5**	**234,373.5**	**64,772.1**	**383,993.7**	**4,843.9**	**17,087.4**	**36,535.8**	**52,890.0**	**58,789.3**	**174,660.8**	**74,427.0**	**419,234.2**	**35,240.6**		**(923.4)**	

2025 Capital Expenditures By Investment Classification
As of May 31, 2025
Access
($000)

	Capital Budget									Actual Expenditure and Forecast								Variance			
	A				B	C	D (B+C)	E	F (A+C+E)	G				H	I	J	K (G+H+I+J)	K-F		(H+I)-D	
					Carryover	Budget	Revised	2026 and						Actual	2025 Forecast Remaining	2026 and					
Program/Project	2021	2022	2023	2024	to 2025	2025	2025	Beyond	Total	2021	2022	2023	2024	2025	Jun to Dec	Beyond	Total	Project		Annual	
Interconnection and Intergration of the Puffin Wind Inc. Renewable Energy Project - Supplemental	-	-	-	-	-	344.2	344.2	933.8	1,278.0	-	-	-	-	2.6	341.6	933.8	1,278.0	-	0.0%	-	0.0%
Provide Service Extensions (2025)	-	-	-	-	-	4,662.5	4,662.5	-	4,662.5	0.0	(0.0)	(0.0)	(0.0)	1,814.5	2,848.0	-	4,662.5	-	0.0%	-	0.0%
Total	**-**	**-**	**-**	**-**	**-**	**5,006.7**	**5,006.7**	**933.8**	**5,940.5**	**0.0**	**(0.0)**	**(0.0)**	**(0.0)**	**1,817.1**	**3,189.6**	**933.8**	**5,940.5**	**-**		**-**	

2025 Capital Expenditures By Investment Classification
As of May 31, 2025
General Plant
($000)

	Capital Budget A				B	C	D (B+C)	E	F (A+C+E)	Actual Expenditure and Forecast G				H	I	J	K (G+H+I+J)	Variance K-F		(H+I)-D	
Program/Project	**2021**	**2022**	**2023**	**2024**	**Carryover to 2025**	**Budget 2025**	**Revised 2025**	**2026 and Beyond**	**Total**	**2021**	**2022**	**2023**	**2024**	**Actual 2025**	**2025 Forecast Remaining Jun-Dec**	**2026 and Beyond**	**Total**	**Project**		**Annual**	
Upgrade Water and Fire Suppression Systems (2023-2024) - Bishop's Falls	-	-	353.7	2,886.3	5,073.7	-	5,073.7	-	3,240.0	-	-	316.2	410.1	1,199.3	3,874.4	-	5,800.0	2,560.0	79.0%	-	0.0%
Replace Light- and Heavy-Duty Vehicles (2024-2026)	-	-	-	1,479.1	(99.7)	4,148.8	4,049.1	8.4	5,636.3	-	-	-	2,053.8	291.2	3,757.9	658.4	6,761.3	1,125.0	20.0%	-	0.0%
Install Ultra-Fast DC Electric Vehicle Chargers (2023-2025) – Supplemental	-	-	62.5	1,766.0	1,497.1	231.3	1,728.4	-	2,059.8	-	-	11.2	1,040.2	563.7	1,164.7	-	2,779.8	720.0	35.0%	-	0.0%
Water System Condition Assessment and Upgrades (2023) - Bay d'Espoir	-	-	161.0	504.9	732.8	-	732.8	-	665.9	-	-	91.2	504.2	222.4	510.4	-	1,328.2	662.3	99.5%	-	0.0%
Upgrade SCADA Network (2024)	-	-	-	402.3	109.4	-	109.4	-	402.3	-	-	-	571.7	165.3	104.9	-	841.9	439.6	109.3%	160.8	147.0%
General Property Rehabilitation (2024) - Hydro Place	-	-	-	234.0	146.4	-	146.4	-	234.0	-	-	-	289.6	13.0	133.4	-	436.0	202.0	86.3%	-	0.0%
Replace 48 V Battery Banks and Chargers (2025)	-	-	-	-	-	559.1	559.1	-	559.1	-	-	-	-	74.5	656.8	-	731.3	172.2	30.8%	172.2	30.8%
Nalcor HPCM Rollouts (2023)	-	-	234.4	-	350.9	-	350.9	-	234.4	-	-	36.3	11.0	37.2	313.6	-	398.2	163.9	69.9%	(0.0)	0.0%
Refurbish Control Building (2024-2025) - Grandy Brook and Doyles	-	-	-	109.4	65.3	444.7	510.0	-	554.1	-	-	-	154.1	80.3	429.7	-	664.1	110.0	19.9%	-	0.0%
Replace MDR8000 Microwave Radios (2024-2025)	-	-	-	953.5	747.3	500.3	1,247.6	-	1,453.8	-	-	-	283.3	666.0	581.5	-	1,530.9	77.1	5.3%	-	0.0%
Purchase Tools and Equipment Less than $50,000 (2025) - Labrador Region	-	-	-	-	0.0	283.8	283.8	-	283.8	-	-	-	-	71.9	211.9	-	283.8	0.0	0.0%	-	0.0%
Nalcor Cyber Security (2024)	-	-	-	111.4	95.0	-	95.0	-	111.4	-	-	-	16.4	14.1	80.9	-	111.4	0.0	0.0%	-	0.0%
Modify Office Buildings and Procure Furniture, Fixtures, & Equipment (2025)	-	-	-	-	-	178.5	178.5	-	178.5	-	-	-	-	114.9	63.6	-	178.5	-	0.0%	-	0.0%
Perform Security Improvements (2025)	-	-	-	-	-	160.7	160.7	-	160.7	-	-	-	-	15.8	144.9	-	160.7	-	0.0%	-	0.0%
Purchase Personal Computers (2025)	-	-	-	-	-	575.6	575.6	-	575.6	-	-	-	-	249.1	326.5	-	575.6	-	0.0%	-	0.0%
Replace Peripheral Infrastructure (2025)	-	-	-	-	-	205.4	205.4	-	205.4	-	-	-	-	1.9	203.5	-	205.4	-	0.0%	-	0.0%
Upgrade Core OT Infrastructure (2025)	-	-	-	-	-	674.3	674.3	-	674.3	-	-	-	-	514.8	159.5	-	674.3	-	0.0%	-	0.0%
Update Cyber Security Infrastructure (2025)	-	-	-	-	-	115.6	115.6	-	115.6	-	-	-	-	16.8	98.8	-	115.6	-	0.0%	-	0.0%
Perform Software Upgrades and Minor Enhancements (2025)	-	-	-	-	-	808.7	808.7	-	808.7	-	-	-	-	91.6	717.1	-	808.7	-	0.0%	-	0.0%
Upgrade Energy Management System (2025-2026)	-	-	-	-	-	284.4	284.4	188.5	472.9	-	-	-	-	10.3	274.1	188.5	472.9	-	0.0%	-	0.0%
Implement SCADA Points Application (2025-2026)	-	-	-	-	-	241.9	241.9	143.4	385.3	-	-	-	-	16.3	225.6	143.4	385.3	-	0.0%	-	0.0%
Install Electric Vehicle Chargers (2025-2026) - Hydro Sites	-	-	-	-	-	368.0	368.0	288.2	656.2	-	-	-	-	27.0	341.0	288.2	656.2	-	0.0%	-	0.0%
Replace Network Communications Equipment (2025)	-	-	-	-	-	413.2	413.2	-	413.2	-	-	-	-	92.4	320.8	-	413.2	-	0.0%	-	0.0%
Telecommunications In-Service Failures (2025)	-	-	-	-	-	94.1	94.1	-	94.1	-	-	-	-	19.2	74.9	-	94.1	-	0.0%	-	0.0%
Install CCTV Systems (2025)	-	-	-	-	-	440.1	440.1	-	440.1	-	-	-	-	164.7	275.4	-	440.1	-	0.0%	-	0.0%
Upgrade Remote Terminal Units (2025)	-	-	-	-	-	238.4	238.4	-	238.4	-	-	-	-	65.3	173.1	-	238.4	-	0.0%	-	0.0%
Refurbish Meteorological Stations (2025)	-	-	-	-	-	167.8	167.8	-	167.8	-	-	-	-	60.5	107.3	-	167.8	-	0.0%	-	0.0%
Purchase Mobile Devices (2025)	-	-	-	-	-	160.2	160.2	-	160.2	-	-	-	-	40.7	119.5	-	160.2	-	0.0%	-	0.0%
Replace Interconnect Microwave Radios (2025)	-	-	-	-	-	1,103.0	1,103.0	-	1,103.0	-	-	-	-	73.1	1,029.9	-	1,103.0	-	0.0%	-	0.0%
Replace GPS Clocks (2025-2026)	-	-	-	-	-	448.3	448.3	132.4	580.7	-	-	-	-	152.7	295.6	132.4	580.7	-	0.0%	-	0.0%
Purchase Tools and Equipment (2025) - Telecontrol	-	-	-	-	-	45.3	45.3	-	45.3	-	-	-	-	36.5	8.8	-	45.3	-	0.0%	-	0.0%
Purchase Surveying Software and Equipment (2025)	-	-	-	-	-	316.4	316.4	-	316.4	-	-	-	-	276.0	40.4	-	316.4	-	0.0%	-	0.0%
Replace Light and Heavy-Duty Vehicles (2025-2027)	-	-	-	-	-	2,714.6	2,714.6	4,823.0	7,537.6	-	-	-	-	21.9	2,692.7	4,823.0	7,537.6	-	0.0%	-	0.0%
Install Power Canal Public Safety Boom (2025) - Upper Salmon	-	-	-	-	-	463.8	463.8	-	463.8	-	-	-	-	22.5	441.3	-	463.8	-	0.0%	-	0.0%
Perform Level 2 Condition Assessment - Powerhouse Slope (2025) - Cat Arm	-	-	-	-	-	169.4	169.4	-	169.4	-	-	-	-	25.0	144.4	-	169.4	-	0.0%	-	0.0%
Purchase Tools and Equipment (2025) - Hydraulic Plants	-	-	-	-	-	154.9	154.9	-	154.9	-	-	-	-	69.8	85.1	-	154.9	-	0.0%	-	0.0%
Purchase Tools and Equipment (2025) - Thermal Plants	-	-	-	-	-	127.3	127.3	-	127.3	-	-	-	-	41.3	86.0	-	127.3	-	0.0%	-	0.0%
Purchase Tools and Equipment (2025) - Gas Turbines	-	-	-	-	-	46.6	46.6	-	46.6	-	-	-	-	3.3	43.3	-	46.6	-	0.0%	-	0.0%
Install Fire Protection - 230 kV Stations (2025-2026) - Come by Chance	-	-	-	-	-	51.7	51.7	534.5	586.2	-	-	-	-	7.2	44.5	534.5	586.2	-	0.0%	-	0.0%
Replace Mobile Equipment (2025-2027)	-	-	-	-	-	1,973.6	1,973.6	2,674.0	4,647.6	-	-	-	-	22.5	1,951.1	2,674.0	4,647.6	-	0.0%	-	0.0%
MS Enterprise Agreement	-	-	-	-	-	426.6	426.6	853.3	1,279.9	-	-	-	-	-	426.6	853.3	1,279.9	-	0.0%	-	0.0%
Corporate PC Replacement (2025)	-	-	-	-	-	179.3	179.3	-	179.3	-	-	-	-	110.2	69.1	-	179.3	-	0.0%	-	0.0%
Corporate Cyber Security (2025)	-	-	-	-	-	227.6	227.6	-	227.6	-	-	-	-	-	227.6	-	227.6	-	0.0%	-	0.0%
Corporate Peripheral Replacement (2025)	-	-	-	-	-	154.7	154.7	-	154.7	-	-	-	-	-	154.7	-	154.7	-	0.0%	-	0.0%
Corporate Disaster Recovery Upgrade (2025)	-	-	-	-	-	120.3	120.3	-	120.3	-	-	-	-	-	120.3	-	120.3	-	0.0%	-	0.0%
ArcGIS - Electronic Tailboards (2025)	-	-	-	-	-	250.8	250.8	-	250.8	-	-	-	-	-	250.8	-	250.8	-	0.0%	-	0.0%
ArcGIS Data Architecture (2025)	-	-	-	-	-	323.4	323.4	-	323.4	-	-	-	-	-	323.4	-	323.4	-	0.0%	-	0.0%
Document Control System (2025)	-	-	-	-	-	362.9	362.9	-	362.9	-	-	-	-	27.0	336.0	-	362.9	-	0.0%	-	0.0%
Asset Management Orchestration (2025)	-	-	-	-	-	257.8	257.8	-	257.8	-	-	-	-	13.7	244.1	-	257.8	-	0.0%	-	0.0%
Lotus Notes Application Migration (2025)	-	-	-	-	-	479.3	479.3	-	479.3	-	-	-	-	147.7	331.6	-	479.3	-	0.0%	-	0.0%
Project Controls Management System - Major Projects (2025)	-	-	-	-	-	252.4	252.4	-	252.4	-	-	-	-	-	252.4	-	252.4	-	0.0%	-	0.0%
Replacement of Information Systems (2025)	-	-	-	-	-	1,518.6	1,518.6	195.9	1,714.5	-	-	-	-	1.4	1,517.2	195.9	1,714.5	-	0.0%	-	0.0%
Procure Stop Logs for Bay D'Espoir Units 1-7	-	-	-	-	-	740.0	740.0	-	740.0	-	-	-	-	36.4	703.6	-	740.0	-	0.0%	-	0.0%
Supply & Install New Work Stations Level 4 Hydro Place (2025)	-	-	-	-	-	747.8	747.8	-	747.8	-	-	-	-	296.2	451.6	-	747.8	-	0.0%	-	0.0%
Purchase & Install Site Radio System (2024) - Holyrood	-	-	-	412.2	388.5	-	388.5	-	412.2	-	-	-	23.7	266.5	122.0	-	412.2	-	0.0%	-	0.0%
Replace Plant Lighting (2024) - Holyrood	-	-	-	139.8	(1.5)	549.5	548.0	-	689.3	-	-	-	141.3	74.0	474.1	-	689.3	-	0.0%	-	0.0%
Purchase Tools and Equipment Less than $50,000 (2025) - Central Region	-	-	-	-	-	477.7	477.7	-	477.7	-	-	-	-	137.3	340.4	-	477.7	-	0.0%	-	0.0%
Replace VHF Radio System (2024-2025)	-	-	-	1,261.6	1,133.0	290.6	1,423.6	-	1,552.2	-	-	-	128.6	680.2	743.4	-	1,552.2	-	0.0%	-	0.0%
Replace Powerhouse 1 Roof (2024-2025) - Bay d'Espoir	-	-	-	140.2	60.8	1,819.2	1,880.0	-	1,959.4	-	-	-	79.4	127.8	1,752.1	-	1,959.4	-	0.0%	-	0.0%
Replace Powerhouse 1 Air Conditioning Unit (2024-2025) - Bay d'Espoir	-	-	-	57.8	(2.0)	231.2	229.2	-	289.0	-	-	-	59.8	25.8	203.4	-	289.0	-	0.0%	-	0.0%
Refurbish Outbuilding and Powerhouse Building Envelopes (2024-2025) - Holyrood	-	-	-	156.2	81.4	1,039.4	1,120.8	-	1,195.6	-	-	-	74.8	64.2	1,056.6	-	1,195.6	-	0.0%	-	0.0%
Replace Mobile Equipment (2024-2025)	-	-	-	216.9	(347.9)	599.7	251.8	-	816.6	-	-	-	564.8	244.1	7.8	-	816.6	-	0.0%	-	0.0%
Purchase 50' Material Handler Aerial Device on Tracked Unit (2024-2026) - Happy Valley Goose Bay	-	-	-	24.0	1.5	841.8	843.3	7.1	872.9	-	-	-	22.5	25.1	818.2	7.1	872.9	-	0.0%	-	0.0%
Install Fire Protection in 230 kV Stations (2024–2025) - Voisey's Bay	-	-	-	53.8	30.9	599.0	629.9	-	652.8	-	-	-	22.9	43.3	586.5	-	652.8	-	0.0%	-	0.0%
Install Public EV Ultra Fast Charger (2024) - Conne River	-	-	-	220.0	212.3	242.6	454.8	-	462.6	-	-	-	7.7	143.1	311.8	-	462.6	-	0.0%	-	0.0%
Replace Light- and Heavy-Duty Vehicles (2023-2025)	-	-	1,308.1	2,584.6	755.4	673.3	1,428.7	-	4,566.0	-	-	2,573.2	564.1	42.4	1,386.2	-	4,566.0	-	0.0%	-	0.0%
Purchase Tools and Equipment Less than $50,000 (2025) - Northern Region	-	-	-	-	(0.0)	263.6	263.6	-	263.6	-	-	-	-	11.6	251.9	-	263.6	(0.0)	0.0%	-	0.0%
Nalcor Core IT (2024)	-	-	-	705.5	432.7	-	432.7	-	705.5	-	-	-	135.7	1.0	431.7	-	568.4	(137.1)	-19.4%	-	0.0%
Upgrade Work Protection Code Application (2025-2026)	-	-	-	-	-	452.0	452.0	449.4	901.4	-	-	-	-	338.2	370.5	-	708.6	(192.8)	-21.4%	256.6	56.8%
Total	**-**	**-**	**2,119.7**	**14,419.5**	**11,463.2**	**33,030.9**	**44,494.1**	**10,298.1**	**59,868.1**	**-**	**-**	**3,028.1**	**7,159.8**	**8,509.1**	**36,574.7**	**10,498.7**	**65,770.3**	**5,902.2**		**589.6**	

2025 Capital Expenditures By Investment Classification
As of May 31, 2025
Mandatory
($000)

	Capital Budget									Actual Expenditure and Forecast								Variance			
	A				B	C	D (B+C)	E	F (A+C+E)	G				H	I	J	K (G+H+I+J)	K-F		(H+I)-D	
Program/Project	2021	2022	2023	2024	Carryover to 2025	Budget 2025	Revised 2025	2026 and Beyond	Total	2021	2022	2023	2024	Actual 2025	2025 Forecast Remaining Jun-Dec	2026 and Beyond	Total	Project		Annual	
Replace Terminal Station Lighting (2023-2024)	-	-	323.3	594.1	310.6	-	310.6	-	917.4	-	-	388.7	717.0	115.1	195.5	-	1,416.3	498.9	54.4%	-	0.0%
Inspect Fuel Tanks (2025) - Holyrood	-	-	-	-	-	608.0	608.0	-	608.0	-	-	-	-	464.0	144.0	-	608.0	-	0.0%	-	0.0%
Purchase Meters and Metering Equipment (2025-2026)	-	-	-	-	-	446.2	446.2	278.4	724.6	-	-	-	-	282.5	163.7	278.4	724.6	-	0.0%	-	0.0%
Upgrade Station Lighting (2025-2026) - Bottom Waters, Deer Lake, Doyles, Indian River, and Western Avalon Terminal Stations	-	-	-	91.6	21.5	429.0	450.5	-	520.6	-	-	-	70.1	318.1	132.4	-	520.6	-	0.0%	-	0.0%
Total	**-**	**-**	**323.3**	**685.7**	**332.1**	**1,483.2**	**1,815.3**	**278.4**	**2,770.6**	**-**	**-**	**388.7**	**787.2**	**1,179.8**	**635.5**	**278.4**	**3,269.5**	**498.9**		**-**	

2025 Capital Expenditures By Investment Classification
As of May 31, 2025
Renewal
($000)

	Capital Budget									Actual Expenditure and Forecast								Variance			
	A				B	C	D (B+C)	E	F (A+C+E)	G				H	I	J	K (G+H+I+J)	K-F		(H+I)-D	
Program/Project	2021	2022	2023	2024	Carryover to 2025	Budget 2025	Revised 2025	2026 and Beyond	Total	2021	2022	2023	2024	Actual 2025	2025 Forecast Remaining Jun-Dec	2026 and Beyond	Total	Project		Annual	
Overhaul Unit 1 Turbine Valves and Generator (2024) - Holyrood	-	-	-	5,181.4	540.0	-	540.0	-	5,181.4	-	-	-	11,195.0	529.3	10.7	-	11,735.0	6,553.6	126.5%	-	0.0%
Refurbish Ebbegunbaeg Control Structure	3,236.8	3,238.3	3,470.1	2,781.6	1,258.7	4,952.2	6,210.9	-	17,679.0	2,196.4	4,301.5	3,923.6	5,494.1	787.4	5,423.6	-	22,126.6	4,447.6	25.2%	-	0.0%
Upgrade Power Transformers (2024-2025)	-	-	-	864.6	3,309.3	2,711.3	6,020.6	-	3,575.9	-	-	-	326.0	693.1	5,327.4	-	6,346.5	2,770.6	77.5%	-	0.0%
Renew Circuit Breakers (2025-2026)	-	-	-	-	-	129.7	129.7	1,021.7	1,151.4	-	-	-	-	53.4	76.3	2,531.3	2,661.0	1,509.6	131.1%	-	0.0%
Hydraulic In-Service Failures (2025)	-	-	-	-	-	2,000.0	2,000.0	-	2,000.0	-	-	-	-	335.0	2,980.0	-	3,315.0	1,315.0	65.8%	1,315.0	65.8%
Hydraulic Generation Refurbishment & Modernization	-	2,970.6	3,788.9	-	250.8	-	250.8	-	6,759.5	-	2,664.6	4,556.2	250.4	237.2	13.6	-	7,722.0	962.5	14.2%	-	0.0%
Replace Unit 2047 - Ramea	307.7	2,010.8	118.3	-	730.1	-	730.1	-	2,436.8	49.0	216.1	1,096.3	1,226.5	242.7	487.4	-	3,318.0	881.2	36.2%	-	0.0%
Perform Major Inspection - Synchronous Condenser 2 (2025-2026) - Wabush	-	-	-	-	-	22.8	22.8	572.8	595.6	-	-	-	-	760.0	253.2	258.6	1,271.8	676.2	113.5%	990.4	4344.1%
Install Breaker Failure Protection (2023-2024) - Sunnyside	-	-	73.5	216.2	92.1	-	92.1	-	289.7	-	-	467.2	389.3	221.4	(129.3)	-	948.6	658.9	227.4%	-	0.0%
Replace Protective Relays (2024–2025)	-	-	-	1,388.4	1,458.2	2,050.7	3,508.9	-	3,439.1	-	-	-	962.2	912.4	2,184.3	-	4,059.0	619.9	18.0%	(412.1)	-11.7%
Replace Intermediate Fuel Storage Tanks (2023-2024) - Nain	-	-	127.4	593.7	679.7	-	679.7	-	721.1	-	-	71.8	510.2	38.2	641.5	-	1,261.7	540.6	75.0%	-	0.0%
Renew Circuit Breakers (2024–2025)	-	-	-	183.9	428.1	2,120.1	2,548.2	-	2,304.0	-	-	-	92.8	359.0	2,189.2	-	2,641.0	337.0	14.6%	-	0.0%
Diesel Genset Replacements (2021-2022)	2,560.6	286.2	-	-	84.5	-	84.5	-	2,846.8	1,503.8	1,036.3	382.2	141.0	84.1	0.4	-	3,147.7	300.9	10.6%	-	0.0%
Replace Protective Relays (2025-2026)	-	-	-	-	-	668.6	668.6	2,070.9	2,739.5	-	-	-	-	55.6	490.9	2,404.7	2,951.2	211.7	7.7%	(122.1)	-18.3%
Replace Annunciator Panels (2024-2025) - Cat Arm	-	-	-	160.2	19.2	191.2	210.4	-	351.4	-	-	-	344.0	56.4	154.1	-	554.4	203.0	57.8%	-	0.0%
Replace Data Alarm System Annunciators (2023) - Buchans	-	-	61.2	104.8	94.9	-	94.9	-	166.0	-	-	77.9	127.6	144.3	(49.5)	-	300.3	134.3	80.9%	-	0.0%
Replace Annunciator - Phase 2 (2024-2025) - Bay d'Espoir	-	-	-	294.1	146.2	187.5	333.7	-	481.6	-	-	-	147.9	350.8	115.9	-	614.6	133.0	27.6%	133.0	39.9%
Replace Roof (2025) - Grey River	-	-	-	-	-	390.8	390.8	-	390.8	-	-	-	-	23.9	487.2	-	511.1	120.3	30.8%	120.3	30.8%
Replace Circuit Breaker Reclosing Controllers (2023-2024) - Hardwoods	-	-	81.6	149.6	100.1	-	100.1	-	231.2	-	-	43.8	129.8	30.2	70.0	-	273.7	42.5	18.4%	-	0.0%
Replace Diesel Gensets (2025-2027)	-	-	-	-	-	418.2	418.2	5,805.3	6,223.5	-	-	-	-	88.8	362.6	5,772.3	6,223.6	0.1	0.0%	33.1	7.9%
Diesel Genset Replacement Program (2023-2025)	-	-	819.1	174.0	(289.3)	1,415.1	1,125.8	-	2,408.2	-	-	683.6	598.8	915.2	210.6	-	2,408.2	0.0	0.0%	-	0.0%
Replace Human Machine Interface (2025) - Stephenville	-	-	-	-	-	277.0	277.0	-	277.0	-	-	-	-	20.5	256.5		277.0	-	0.0%	-	0.0%
Gas Turbine In-Service Failures (2025)	-	-	-	-	-	500.0	500.0	-	500.0	-	-	-	-	3.4	496.6	-	500.0	-	0.0%	-	0.0%
Replace 250 Vdc Battery Bank (2025-2026) - Stephenville	-	-	-	-	-	73.0	73.0	296.9	369.9	-	-	-	-	5.6	67.4	296.9	369.9	-	0.0%	-	0.0%
Inspect Fuel Tanks (2025) - Stephenville	-	-	-	-	-	676.9	676.9	-	676.9	-	-	-	-	7.3	669.6	-	676.9	-	0.0%	-	0.0%
Rewind Stator (2025-2026) - Hinds Lake	-	-	-	-	-	5,233.2	5,233.2	9,695.5	14,928.7	-	-	-	-	140.6	5,092.6	9,695.5	14,928.7	-	0.0%	-	0.0%
Replace Emergency Diesel Genset (2025-2027) - Cat Arm	-	-	-	-	-	266.2	266.2	1,335.0	1,601.2	-	-	-	-	33.5	232.7	1,335.0	1,601.2	-	0.0%	-	0.0%
Refurbish Intake 2 (2025-2026) - Bay d'Espoir	-	-	-	-	-	284.4	284.4	3,069.4	3,353.8	-	-	-	-	17.0	267.4	3,069.4	3,353.8	-	0.0%	-	0.0%
Perform Level 2 Condition Assessment - Unit 7 Intake and Draft Tube (2025) - Bay d'Espoir	-	-	-	-	-	471.5	471.5	-	471.5	-	-	-	-	30.2	441.3	-	471.5	-	0.0%	-	0.0%
Overhaul Hydraulic Units (2025)	-	-	-	-	-	4,972.4	4,972.4	-	4,972.4	-	-	-	-	718.4	4,254.0	-	4,972.4	-	0.0%	-	0.0%
Thermal In-Service Failures (2025)	-	-	-	-	-	3,900.0	3,900.0	-	3,900.0	-	-	-	-	938.0	2,962.0	-	3,900.0	-	0.0%	-	0.0%
Overhaul Major Pumps (2025) - Holyrood	-	-	-	-	-	1,101.9	1,101.9	-	1,101.9	-	-	-	-	238.5	863.4	-	1,101.9	-	0.0%	-	0.0%
Overhaul Turbine and Valves - Unit 3 (2025) - Holyrood	-	-	-	-	-	15,975.9	15,975.9	-	15,975.9	-	-	-	-	2,629.9	13,346.0	-	15,975.9	-	0.0%	-	0.0%
Update Flame Scanners - Unit 3 (2025) - Holyrood	-	-	-	-	-	140.6	140.6	-	140.6	-	-	-	-	11.0	129.6	-	140.6	-	0.0%	-	0.0%
Perform Level 2 Condition Assessment - Stage I & II Cooling Water Sump Structures (2025) - Holyrood	-	-	-	-	-	891.9	891.9	-	891.9	-	-	-	-	185.3	706.6	-	891.9	-	0.0%	-	0.0%
Perform Boiler Condition Assessment and Miscellaneous Upgrades (2025) - Holyrood	-	-	-	-	-	4,905.8	4,905.8	-	4,905.8	-	-	-	-	1,476.6	3,429.2	-	4,905.8	-	0.0%	-	0.0%
Refurbish Marine Terminal (2025-2026) - Holyrood	-	-	-	-	-	1,190.8	1,190.8	1,295.6	2,486.4	-	-	-	-	73.7	1,117.1	1,295.6	2,486.4	-	0.0%	-	0.0%
Overhaul Diesel Units (2025)	-	-	-	-	-	1,000.0	1,000.0	-	1,000.0	-	-	-	-	237.4	762.6	-	1,000.0	-	0.0%	-	0.0%
Diesel In-Service Failures (2025)	-	-	-	-	-	800.0	800.0	-	800.0	-	-	-	-	96.6	703.4	-	800.0	-	0.0%	-	0.0%
Replace Disconnects (2025-2026)	-	-	-	-	-	145.3	145.3	1,245.5	1,390.8	-	-	-	-	65.4	79.9	1,245.5	1,390.8	-	0.0%	-	0.0%
Replace Instrument Transformers (2025-2026)	-	-	-	-	-	112.5	112.5	356.4	468.9	-	-	-	-	50.7	61.8	356.4	468.9	-	0.0%	-	0.0%
Terminal Station In-Service Failures (2025)	-	-	-	-	-	2,500.0	2,500.0	-	2,500.0	-	-	-	-	153.9	2,346.1	-	2,500.0	-	0.0%	-	0.0%
Replace Terminal Station Battery Banks and Chargers (2025-2026)	-	-	-	-	-	123.2	123.2	315.3	438.5	-	-	-	-	19.2	104.0	315.3	438.5	-	0.0%	-	0.0%
Upgrade Power Transformers (2025–2026)	-	-	-	-	-	811.9	811.9	1,173.9	1,985.8	-	-	-	-	53.2	758.7	1,173.9	1,985.8	-	0.0%	-	0.0%
Install Breaker Failure Protection (2025–2027) - Holyrood	-	-	-	-	-	177.8	177.8	487.4	665.2	-	-	-	-	45.4	132.4	487.4	665.2	-	0.0%	-	0.0%
Upgrade Data Alarm Systems (2025-2026) - Hardwoods	-	-	-	-	-	184.0	184.0	188.7	372.7	-	-	-	-	17.2	166.8	188.7	372.7	-	0.0%	-	0.0%
Replace Circuit Breaker Reclosing Controllers (2025-2026) - Cow Head and Massey Drive	-	-	-	-	-	104.6	104.6	164.3	268.9	-	-	-	-	12.0	92.6	164.3	268.9	-	0.0%	-	0.0%
Transmission In-Service Failures (2025)	-	-	-	-	-	184.3	184.3	-	184.3	-	-	-	-	39.5	144.8	-	184.3	-	0.0%	-	0.0%
Wood Pole Line Management (2025)	-	-	-	-	-	4,281.3	4,281.3	-	4,281.3	-	-	-	-	1,567.7	2,713.6	-	4,281.3	-	0.0%	-	0.0%
Distribution System In-Service Failures, Miscellaneous Upgrades, and Street Lights (2025)	-	-	-	-	-	6,397.0	6,397.0	-	6,397.0	-	-	-	(0.0)	2,152.0	4,245.0	-	6,397.0	-	0.0%	-	0.0%
Completion of Fire Restoration – Fourth Floor Hydro Place	-	-	-	750.2	551.8	317.7	869.5	-	1,067.9	-	-	-	198.4	602.1	267.4	-	1,067.9	-	0.0%	-	0.0%
Replace Power Line Carrier (2024-2025) - TL247	-	-	-	87.2	(1.0)	667.4	666.4	-	754.6	-	-	-	88.2	43.4	623.0	-	754.6	-	0.0%	-	0.0%
Inspect Fuel Tanks (2024) - Hardwoods Gas Turbines	-	-	-	692.9	628.8	-	628.8	-	692.9	-	-	-	64.1	211.7	417.1	-	692.9	-	0.0%	-	0.0%
Refurbish Surge Tank 1 (2024-2025) - Bay d'Espoir	-	-	-	175.8	94.7	2,111.4	2,206.1	-	2,287.2	-	-	-	81.1	106.0	2,100.0	-	2,287.2	-	0.0%	-	0.0%
Refurbish Intake 1 (2024-2025) - Bay d'Espoir	-	-	-	272.1	(85.5)	3,071.9	2,986.4	-	3,344.0	-	-	-	357.6	691.4	2,295.0	-	3,344.0	-	0.0%	-	0.0%
Upgrade DCS Hardware - Units 1 and 2 (2024-2025) - Holyrood	-	-	-	195.2	132.6	277.3	409.9	-	472.5	-	-	-	62.6	162.1	247.8	-	472.5	-	0.0%	-	0.0%
Upgrade Unit 1 Control System (2024-2025) - Holyrood	-	-	-	468.3	(94.3)	184.3	90.0	-	652.6	-	-	-	562.6	170.8	(80.8)	-	652.6	-	0.0%	-	0.0%
Upgrade UPS 1 & 2 (2024-2025) - Holyrood	-	-	-	263.0	201.1	107.6	308.7	-	370.6	-	-	-	61.9	230.9	77.8	-	370.6	-	0.0%	-	0.0%
Upgrade Distribution (2024-2025) - Bay d'Espoir Terminal Station 2	-	-	-	93.2	17.2	331.5	348.7	-	424.7	-	-	-	76.0	64.2	284.6	-	424.7	-	0.0%	-	0.0%
Renew Distribution Feeders (2024-2025)	-	-	-	1,287.3	1,160.5	1,245.1	2,405.6	-	2,532.4	-	-	-	126.8	1,438.7	966.9	-	2,532.4	-	0.0%	-	0.0%
Replace Terminal Station Battery Banks and Chargers (2024–2025)	-	-	-	71.8	3.1	120.9	124.0	-	192.7	-	-	-	68.7	110.7	13.4	-	192.7	-	0.0%	-	0.0%
Replace Instrument Transformers (2024–2025)	-	-	-	154.9	(93.5)	714.8	621.3	-	869.7	-	-	-	248.4	122.0	499.4	-	869.7	-	0.0%	-	0.0%
Replace Disconnects (2024–2025)	-	-	-	127.4	(12.1)	1,358.1	1,346.0	-	1,485.5	-	-	-	139.5	116.9	1,229.1	-	1,485.5	-	0.0%	-	0.0%
Upgrade Data Alarm Systems (2024–2025) - Western Avalon Terminal Station	-	-	-	137.0	94.2	156.9	251.1	-	293.9	-	-	-	42.8	73.0	178.1	-	293.9	-	0.0%	-	0.0%
Replace Circuit Breaker Reclosing Controllers (2024–2025) - TL247	-	-	-	112.4	77.0	215.8	292.8	-	328.2	-	-	-	35.4	67.6	225.2	-	328.2	-	0.0%	-	0.0%
Replace Diesel Genset 1 (2023-2024) - Ebbegunbaeg	-	-	298.0	728.3	421.1	-	421.1	-	1,026.3	-	-	132.6	472.7	99.4	321.7	-	1,026.3	-	0.0%	-	0.0%
Penstock Life Extension - Phase 1 (2023-2025)	-	-	2,105.0	5,748.3	-	58,022.7	58,022.7	-	65,876.0	-	-	1,132.4	6,720.9	19,742.4	38,280.3	-	65,876.0	(0.0)	0.0%	-	0.0%
Flatten Downstream Slope (2024-2025) - Hinds Lake	-	-	-	276.1	(43.7)	2,953.4	2,909.7	-	3,229.5	-	-	-	158.3	115.1	2,794.7	-	3,068.0	(161.5)	-5.0%	-	0.0%
Diesel Genset Replacement Unit 2012 - L'Anse-Au-Loup	-	339.9	2,513.2	210.2	1,000.8	-	1,000.8	-	3,063.3	-	170.3	214.7	1,458.8	433.9	566.9	-	2,844.5	(218.8)	-7.1%	-	0.0%
Terminal Station R&M	-	3,111.9	6,109.7	-	32.3	-	32.3	-	9,221.6	-	2,168.7	5,679.5	156.2	79.0	(46.7)	-	8,036.7	(1,184.9)	-12.8%	-	0.0%
Replace Diesel Gensets (2024-2026)	-	-	-	535.8	355.8	478.0	833.8	3,902.3	4,916.1	-	-	-	180.0	269.7	564.1	2,404.7	3,418.5	(1,497.6)	-30.5%	-	0.0%
Refurbish Superstructure (2023-2024) - Salmon River Spillway	-	-	328.3	2,500.0	113.2	-	113.2	-	2,828.3	-	-	179.0	533.1	233.7	4.3	-	950.0	(1,878.3)	-66.4%	124.7	110.1%
Total	**6,105.1**	**11,957.7**	**19,894.3**	**26,979.9**	**13,456.8**	**147,276.4**	**160,733.2**	**32,996.9**	**245,210.4**	**3,749.3**	**10,557.4**	**18,640.7**	**33,829.3**	**43,142.5**	**119,773.1**	**32,995.4**	**262,687.7**	**17,477.4**		**2,182.4**	

2025 Capital Expenditures By Investment Classification
As of May 31, 2025
Service Enhancement
($000)

	Capital Budget									Actual Expenditure and Forecast								Variance			
	A				B	C	D (B+C)	E	F (A+C+E)	G				H	I	J	K (G+H+I+J)	K-F		(H+I)-D	
Program/Project	2021	2022	2023	2024	Carryover to 2025	Budget 2025	Revised 2025	2026 and Beyond	Total	2021	2022	2023	2024	Actual 2025	2025 Forecast Remaining	2026 and Beyond	Total	Project		Annual	
Replace Metering System (2022-2024)	-	515.6	4,365.6	994.6	189.0	-	189.0	-	5,875.8	-	2,264.4	1,993.4	3,649.0	717.8	376.1	-	9,000.7	3,124.9	53.2%	904.9	478.7%
Upgrade Worst-Performing Distribution Feeders (2024-2025)	-	-	-	1,064.3	756.9	2,227.4	2,984.3	-	3,291.7	-	-	-	307.4	1,124.0	3,491.1	-	4,922.4	1,630.7	49.5%	1,630.7	54.6%
Automate Bulk Metering (2024-2026)	-	-	-	302.6	131.1	214.4	345.5	235.3	752.3	-	-	-	171.5	106.4	239.1	289.7	806.7	54.4	7.2%	-	0.0%
Purchase Spare Generator Step-Up Transformer - Supplemental	-	-	39.6	1,298.9	1,269.9	1,822.1	3,092.0	9,163.4	12,324.0	-	-	17.5	51.0	757.6	68.0	11,429.8	12,324.0	0.0	0.0%	(2,266.4)	-73.3%
Remove Safety Hazards (2025)	-	-	-	-	-	203.3	203.3	-	203.3	-	-	-	-	103.3	100.0	-	203.3	-	0.0%	-	0.0%
Perform Minor Telecommunications Enhancements (2025)	-	-	-	-	-	99.8	99.8	-	99.8	-	-	-	-	24.3	75.5	-	99.8	-	0.0%	-	0.0%
Upgrade Worst-Performing Distribution Feeders (2025-2027)	-	-	-	-	-	2,678.9	2,678.9	6,207.2	8,886.1	-	-	-	-	109.5	2,569.4	6,207.2	8,886.1	-	0.0%	-	0.0%
Install Mid Span Structures - TL220 (2025-2026)	-	-	-	-	-	881.3	881.3	229.3	1,110.6	-	-	-	-	85.4	795.9	229.3	1,110.6	-	0.0%	-	0.0%
Install Additional Fuel Tank Ramea (2025)	-	-	-	-	-	232.5	232.5	-	232.5	-	-	-	-	-	232.5	-	232.5	-	0.0%	-	0.0%
Additions for Load Growth – Unit 2065 Replacement and Fuel Storage Upgrades (2024-2027) – Rigolet	-	-	-	50.1	28.2	226.4	254.6	3,152.8	3,429.2	-	-	-	21.9	82.2	1,545.6	1,779.5	3,429.2	-	0.0%	1,373.2	539.5%
Construct Maintenance Platform (2024-2025) - Holyrood Gas Turbine	-	-	-	130.5	64.7	228.7	293.4	-	359.2	-	-	-	65.8	85.6	207.8	-	359.2	-	0.0%	-	0.0%
Upgrade Instrumentation (2024-2025) - Hardwoods Gas Turbine	-	-	-	60.9	(34.9)	157.2	122.3	-	218.1	-	-	-	95.8	140.9	(18.6)	-	218.1	-	0.0%	-	0.0%
Total	**-**	**515.6**	**4,405.2**	**3,901.9**	**2,405.1**	**8,972.0**	**11,377.0**	**18,988.0**	**36,782.6**	**-**	**2,264.4**	**2,010.9**	**4,362.3**	**3,337.2**	**9,682.3**	**19,935.5**	**41,592.6**	**4,810.0**		**1,642.4**	

2025 Capital Expenditures By Investment Classifiction
As of May 31, 2025
System Growth
($000)

	Capital Budget									Actual Expenditure and Forecast								Variance			
	A				B	C	D (B+C)	E	F (A+C+E)	G				H	I	J	K (G+H+I+J)	K-F		(H+I)-D	
Program/Project	2021	2022	2023	2024	Carryover to 2025	Budget 2025	Revised 2025	2026 and Beyond	Total	2021	2022	2023	2024	Actual 2025	2025 Forecast Remaining Jun to Dec	2026 and Beyond	Total	Project		Annual	
Wabush Terminal Station Upgrades (2021-2024	2,301.7	4,935.5	1,632.9	3,808.0	883.4	-	883.4	-	12,678.1	794.0	1,843.2	7,992.3	4,607.7	355.0	528.4	-	16,120.6	3,442.5	27.2%	-	0.0%
Additions for Load Growth - Upgrade Transformer Capacity (2023-2024) Jean Lake Terminal Station	-	-	580.0	-	(68.8)	6,459.6	6,390.8	789.7	7,829.3	-	-	52.0	596.7	75.6	977.3	9,298.0	10,999.7	3,170.4	40.5%	(5,337.9)	-83.5%
Additions for Load - Wabush Substation Upgrades	1,186.7	6,253.0	-	2,739.9	2,206.7	514.5	2,721.2	-	10,694.1	300.6	2,299.4	4,384.5	1,075.7	339.9	2,381.3	-	10,781.3	87.2	0.8%	-	0.0%
Additions for Load - Distribution Systems (2024-2027) - Cartwright	-	-	-	19.7	19.7	0.9	20.6	487.2	507.8	-	-	-	-	3.6	17.0	487.2	507.8	-	0.0%	-	0.0%
Additions for Load - Distribution Systems (2024-2026) - Main Brook	-	-	-	326.7	(131.8)	26.3	(105.5)	-	353.0	-	-	-	458.5	25.8	(131.3)	-	353.0	-	0.0%	-	0.0%
Additions for Load (2022) - Mary's Harbour Service Conductor	-	307.8	51.3	-	36.7	-	36.7	-	359.1	-	123.0	38.6	12.8	3.7	33.0	-	211.0	(148.1)	-41.2%	-	0.0%
Total	**3,488.4**	**11,496.3**	**2,264.2**	**6,894.3**	**2,945.9**	**7,001.3**	**9,947.2**	**1,276.9**	**32,421.5**	**1,094.6**	**4,265.5**	**12,467.4**	**6,751.4**	**803.6**	**3,805.7**	**9,785.2**	**38,973.5**	**6,552.1**		**(5,337.9)**	

2025 Capital Expenditures By Investment Classification
Contribution in Aid of Construction ("CIAC")
As of May 31, 2025

	Capital Budget									Actual Expenditure and Forecast								Variance			
	A				B	C	D (B+C)	E	F (A+C+E)	G				H	I	J	K (G+H+I+J)	K-F		(H+I)-D	
Program/Project	2021	2022	2023	2024	Carryover to 2025	Budget 2025	Revised 2025	2026 and Beyond	Total	2021	2022	2023	2024	Actual 2025	2025 Forecast Remaining Jun to Dec	2026 and Beyond	Total	Project		Annual	
Carol Lake Metal Works (CIAC)	-	-	-	-	-	(217.6)	(217.6)	-	(217.6)	-	-	-	-	(189.3)	-	-	(189.3)	28.4	-13.0%	28.4	-13.04%
Puffin Energy (CIAC)	-	-	-	-	-	(344.2)	(344.2)	(933.8)	(1,278.0)	-	-	-	-	(1,278.0)	-	-	(1,278.0)	-	0.0%	(933.8)	271.30%
Install Public EV Ultra Fast Charger (2024) -	-	-	-	-	-	(242.6)	(242.6)	-	(242.6)	-	-	-	-	(120.0)	(122.6)	-	(242.6)	-	0.0%	-	0.00%
Upgrade Disribution Systems - All Areas (CIAC)	-	-	-	-	-	-	-	-	-	-	-	-	-	(21.4)	-	-	(21.4)	(21.4)		(21.4)	
Braya Renewable 2024 (CIAC)	-	-	-	(41.0)	(41.0)	(387.6)	(428.6)	-	(428.6)	-	-	-	(41.0)	-	(428.6)	-	(469.6)	(41.0)	9.6%	-	0.00%
Provide Service Extenstions - All Areas (CIAC)	-	-	-	-	-	-	-	-	-	-	-	-	-	(42.8)	-	-	(42.8)	(42.8)		(42.8)	
Vale Voisey's Bay (CIAC)	-	-	-	(53.8)	(107.6)	(599.0)	(706.6)	-	(652.8)	-	-	-	-	-	(706.6)	-	(706.6)	(53.8)	8.2%	-	0.00%
Ultra-Fast DC EV Chargers (CIAC)				(2,000.0)	-	-	-	-	(2,000.0)	-	-	-	(2,000.0)	(600.0)	-	-	(2,600.0)	(600.0)	30.0%	(600.0)	
Total	**-**	**-**	**-**	**(2,094.8)**	**(148.6)**	**(1,791.0)**	**(1,939.6)**	**(933.8)**	**(4,819.6)**	**-**	**-**	**-**	**(2,041.0)**	**(2,251.5)**	**(1,257.8)**	**-**	**(5,550.3)**	**(730.7)**		**(1,569.7)**	

Appendix B

Capital Expenditures and Carryover Report for the Year Ended December 31, 2024

newfoundland labrador hydro

Newfoundland and Labrador Hydro
Hydro Place. 500 Columbus Drive
P.O. Box 12400. St. John's. NL
Canada A1B 4K7
t. 709.737.1400 I f. 709.737.1800
nlhydro.com

April 1, 2025

Board of Commissioners of Public Utilities
Prince Charles Building
120 Torbay Road, P.O. Box 21040
St. John's, NL A1A 5B2

Attention: Jo-Anne Galarneau
Executive Director and Board Secretary

Re: Capital Expenditures and Carryover Report for the Year Ended December 31, 2024

Enclosed please find Newfoundland and Labrador Hydro's ("Hydro") "Capital Expenditures and Carryover Report for the Year Ended December 31, 2024," filed pursuant to the Board of Commissioners of Public Utilities ("Board") Order No. P.U. 35(2023), and in compliance with Section 41(4) of the *Public Utilities Act.*

This report provides information on Hydro's capital expenditures for all programs and projects proposed and approved as part of its "2024 Capital Budget Application"[1] and additional supplemental capital budgets approved by the Board. As per the "Capital Budget Application Guidelines (Provisional),"[2] this report provides key performance indicator data as well as details and explanations regarding the reportable variances between budgeted and actual expenditures for programs and projects with expenditures in the 2024 year. This report also provides a listing of budget carried over to future years and specific details regarding the execution of the Remove Safety Hazards (2024) – Various program, the Perform Software Upgrades and Minor Enhancements (2024) program, various In-Service Failures programs, the Boiler Condition Assessment and Miscellaneous Upgrades (2024) – Holyrood program, and the Major Condition Assessment and Miscellaneous Refurbishments Synchronous Condensers 1 and 2 (2023–2024) – Wabush Terminal Station program.

Should you have any questions, please contact the undersigned.

Yours truly,

NEWFOUNDLAND AND LABRADOR HYDRO

SWalsh

Shirley A. Walsh
Senior Legal Counsel, Regulatory
SAW/kd

[1] "2024 Capital Budget Application," Newfoundland and Labrador Hydro, rev. September 21, 2023 (originally filed July 12, 2023).
[2] "Capital Budget Application Guidelines (Provisional)," Board of Commissioners of Public Utilities, January 2022.

Jo-Anne Galarneau 2
Board of Commissioners of Public Utilities

Encl.

ecc:

Board of Commissioners of Public Utilities
Jacqui H. Glynn
Board General

Island Industrial Customer Group
Paul L. Coxworthy, Stewart McKelvey
Denis J. Fleming, Cox & Palmer
Glen G. Seaborn, Poole Althouse

Labrador Interconnected Group
Senwung F. Luk, Olthuis Kleer Townshend LLP
Nicholas E. Kennedy, Olthuis Kleer Townshend LLP

Consumer Advocate
Dennis M. Browne, KC, Browne Fitzgerald Morgan & Avis
Stephen F. Fitzgerald, KC, Browne Fitzgerald Morgan & Avis
Sarah G. Fitzgerald, Browne Fitzgerald Morgan & Avis
Bernice Bailey, Browne Fitzgerald Morgan & Avis

Newfoundland Power Inc.
Dominic J. Foley
Douglas W. Wright
Regulatory Email

Capital Expenditures and Carryover Report

For the Year Ended December 31, 2024

April 1, 2025

A report to the Board of Commissioners of Public Utilities

Contents

List of Appendices

1.0 Overview

This report is filed pursuant to correspondence from the Board of Commissioners of Public Utilities ("Board") in Board Order No. P.U. 35(2023), and in compliance with Section 41(4) of the *Public Utilities Act;* it provides information on Newfoundland and Labrador Hydro's ("Hydro") capital expenditures for all programs and projects proposed and approved as part of the 2024 Capital Budget Application ("CBA").[1] As noted within this report, information is also provided on capital expenditures related to additional supplemental capital budgets approved by the Board. As per the "Capital Budget Application Guidelines (Provisional)" ("Provisional Guidelines"),[2] this report provides key performance indicator ("KPI") data as well as details and explanations regarding the reportable variances between budgeted and actual expenditures for programs and projects with expenditures in the 2024 calendar year. Appendix A provides the variances by investment classification and Appendix B provides specific details regarding the execution of the following programs:

- Remove Safety Hazards (2024);
- Perform Software Upgrades and Minor Enhancements (2024);
- In-Service Failures for various asset categories;
- Boiler Condition Assessment and Miscellaneous Upgrades (2024) – Holyrood; and
- Major Condition Assessment and Miscellaneous Refurbishments Synchronous Condensers 1 and 2 (2023–2024) – Wabush Terminal Station.

1.1 Expenditures

Hydro's 2024 capital expenditures totalled $154.2 million. Renewal of existing assets was the largest driver of investment in 2024, accounting for $108.1 million in 2024. General Plant and Service Enhancement investments accounted for $20.6 million and $9.2 million, respectively, followed by System Growth ($6.8 million), Access ($6.6 million), and Mandatory investments ($2.9 million).

[1] "2024 Capital Budget Application," Newfoundland and Labrador Hydro, rev. September 21, 2023 (originally filed July 12, 2023).
[2] "Capital Budget Application Guidelines (Provisional)," Board of Commissioners of Public Utilities, January 2022.

The thermal generation equipment and infrastructure at the Holyrood Thermal Generating Station ("Holyrood TGS") required 2024 expenditures totalling $40.0 million, including:

- $19.8 million for the overhaul of the Units 1 and 2 turbine, valves and generators, that included replacement of turbine blades;
- $7.9 million for the condition assessment and upgrades of the three boilers;
- $4.6 million to address in-service failures; and
- $4.3 million to inspect and refurbish Fuel Oil Storage Tanks 1 and 4.

Invested capital for terminal station infrastructure was $28.0 million, including:

- $8.3 million for the 2023–2024 terminal station renewal program;
- $5.0 million in circuit breaker replacements and refurbishments;
- $4.8 million in upgrades at the Wabush Terminal Station; and
- $2.5 million to address in-service failures.

Expenditures to maintain Hydro's hydraulic generation equipment and infrastructure across the province totalled $20.7 million and included:

- $6.7 million to complete early works for the Penstock 1 life extension;
- $5.5 million for the ongoing refurbishment of Ebbegunbaeg Control Structure;
- $3.0 million to address in-service failures; and
- $1.6 million to replace the powerhouse station service panel at Upper Salmon Hydroelectric Generating Station ("Upper Salmon").

Capital expenditures for distribution assets totalled $16.3 million and included:

- $6.3 million for distribution system in-service failures, miscellaneous upgrades, and street lights;
- $6.1 million to provide service extensions;
- $1.9 million for the voltage conversion of Labrador City Line L22; and
- $1.7 million for upgrades to address worst performing feeders.

Diesel generation required 2024 expenditures totalling $10.2 million, including:

- $4.6 million for the replacement of various diesel gensets;
- $2.0 million to address in-service failures;
- $1.3 million for various diesel unit overhauls; and
- $1.1 million to replace the powerhouse building exterior for the Postville Diesel Generating Station.

Invested capital for combustion turbine ("CT") generation was $10.0 million, including:

- $7.1 million to address in-service failures; and
- $2.5 million to perform the combustor inspection and refurbishment for the Holyrood CT.

Hydro's total capital expenditures of $154.2 million included unplanned additional work totalling approximately $27.5 million. Unplanned expenditures included $2.2 million under the scope of supplemental projects approved in 2024 and a net $25.3 million more than budget for work to address in-service failures[3] and unforeseen levels of required refurbishment identified during planned condition assessments in 2024.

1.2 Expenditures Compared to Approved Budget

Actual expenditures in Hydro's overall capital campaign for 2024 were over budget by $20.0 million (14.9%). Hydro completed an analysis of 2024 capital expenditure variances to determine the categories and main drivers of under- and over-expenditure variances from the approved capital budget.

The primary driver of capital program and project over-expenditures in 2024 was planned work completed at a net higher cost than the original budget estimates. Most of these over-expenditures are attributed to materials and construction contracts that exceeded the budget estimates, which are due to a general shift in market pricing. Unplanned work completed to address in-service failures, at net higher costs than budgeted, was also a significant contributor to over-expenditures. Similarly,

[3] Includes expenditures completed under the Distribution System In-Service Failures, Miscellaneous Upgrades, and Street Lights (2024) program.

unanticipated work that was required to address findings of condition assessments, at net higher costs than budgeted, also contributed to over-expenditures.

The primary driver of capital program and project under-expenditures in 2024 was work paused to reassess justification or re-evaluate the cost of alternative solutions. Hydro canceled scopes of work in 2024 that were no longer justified. In other cases, Hydro confirmed the justification and least-cost alternatives and resumed the work, but with delayed expenditures. Carryover of work as a result of challenges scheduling design and construction labour resources was also a significant contributor to 2024 under-expenditures.

Sections 2.0 and 4.0 of this report provide more details on under- and over-expenditures.

1.3 Carryover

In 2024, Hydro carried over $29.7 million of budget to future years; this includes carryover of $12.6 million associated with the deferred completion of scopes previously planned for completion in 2024 and $17.1 million associated with reallocation of cost-flow within the years of approved projects and programs. For comparison, the average carryover amount for the previous nine years 2015–2023 was $26.6 million. Section 6.0 provides the overall carryover amount for the ten years 2015–2024.

Hydro's analysis of 2024 expenditures concluded that the main drivers of carryover from 2024 to future years are:

- Unforeseen challenges that arose during the detailed planning and design stage of work scopes;
- Work delayed as a result of challenges scheduling design and construction labour resources;
- Work paused to reassess justification or re-evaluate the cost of alternative solutions;
- Unavailability of equipment outages required to safely complete work scopes; and
- Delayed delivery of new equipment from vendors.

1.4 Key Performance Indicators

As set out in the Provisional Guidelines approved by the Board, Hydro has introduced a summary of KPIs for capital expenditures specific to projects and programs in Section 3.0 of this report. The Provisional Guidelines require the inclusion of ten years of data for each KPI. The Provisional Guidelines introduced a new definition for programs and, as Hydro did not track the required metrics for each indicator prior to the approval of the Provisional Guidelines, Hydro has provided this data beginning with 2023 and will continue to add data with each subsequent annual report.

2.0 Capital Budget versus Actual Expenditures 2015–2024

Appendix A provides a summary of capital expenditures related to programs and projects that were active in 2024, with associated expenditures broken out annually for the periods 2020–2024 (actual) and 2025 and beyond (forecast). Table 1 and Chart 1 provide a summary of Hydro's capital budget variances for the years 2015–2024.

Table 1: Capital Budget vs. Actual Expenditures 2015–2024

Year	Approved Budget ($000)	Actual Expenditures ($000)	Variance ($000)	Variance (%)
2024	134,200	154,176	19,976	14.9
2023	146,403	148,876	2,473	1.7
2022	138,136	103,408	(34,728)	(25.1)
2021	136,304	113,492	(22,812)	(16.7)
2020	134,752	87,555	(47,197)	(35.0)
2019	164,194	126,575	(37,619)	(22.9)
2018	213,050	156,985	(56,065)	(26.3)
2017	340,501	340,741	240	0.1
2016	350,601	203,941	(146,660)	(41.8)
2015	311,177	125,119	(186,058)	(59.8)

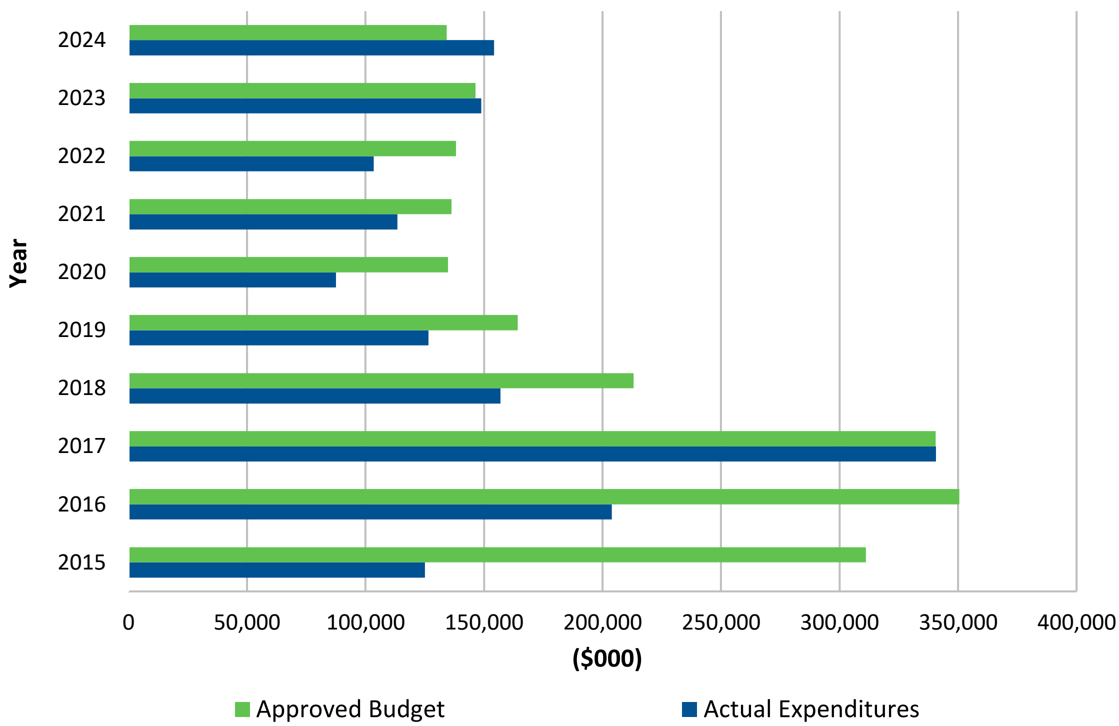

Chart 1: Capital Budgets vs. Actual Expenditures 2015–2024

In 2024, actual expenditures were above budget in Hydro's overall capital campaign by $20.0 million (14.9%), as shown in Table 1 and Chart 1. Variance explanations for individual projects and programs are provided in Section 4.0. Hydro completed an overall analysis of the expenditure variances for the 2024 capital campaign to determine the major drivers or categories of variances from the approved capital budget.

The main drivers of the 2024 program and project over-expenditures were identified as:

- Work completed for a net higher cost than the original budget estimates;
- Work completed to address in-service failures at a net higher cost than budgeted; and
- Work completed to address the findings of condition assessments at a net higher cost than budgeted.

1 The main drivers of the 2024 program and project under-expenditures were identified as:

2 • Work paused to reassess justification or re-evaluate the cost of alternative solutions, resulting in
3 cancelled or delayed expenditures; and

4 • Carryover of work as a result of challenges scheduling design and construction labour resources.

5 The results of Hydro's analysis are summarized in Chart 2 and discussed in more detail herein.[4]

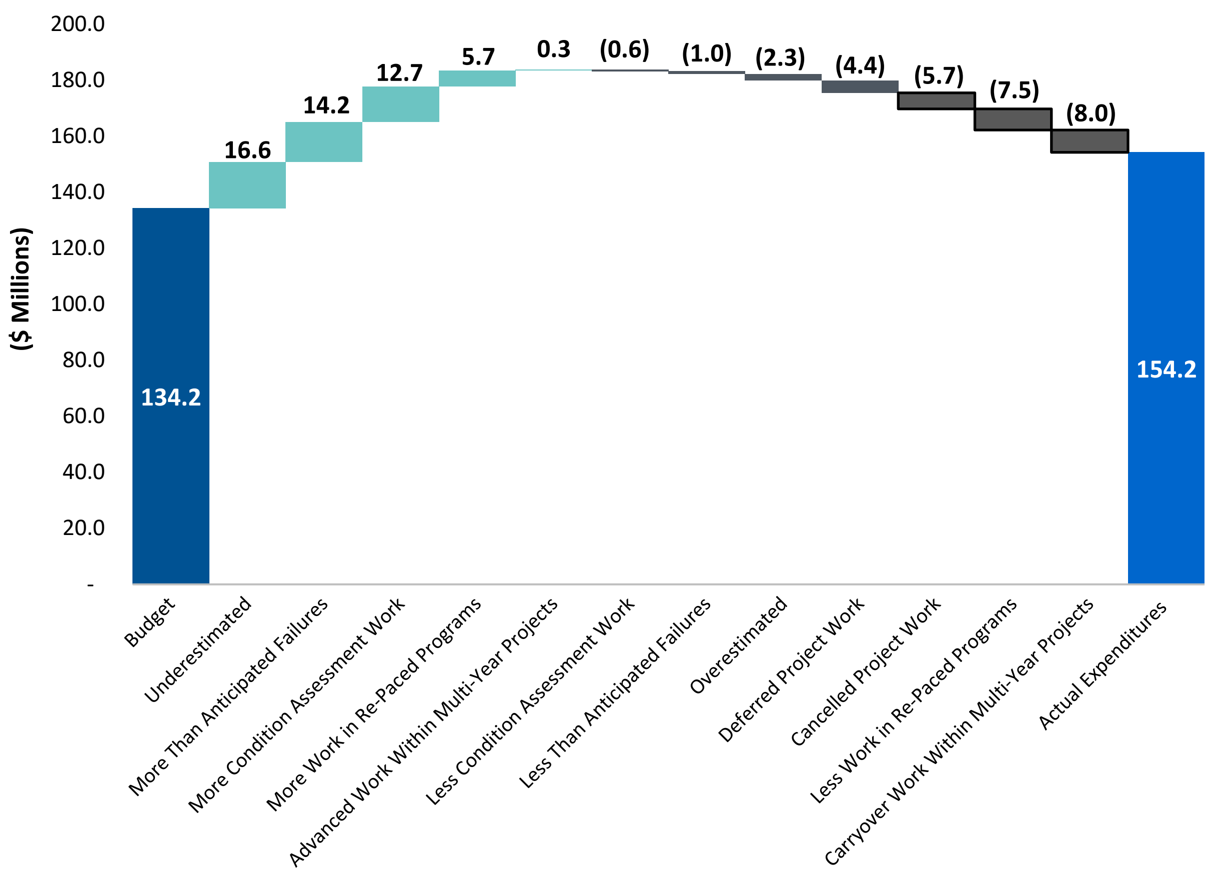

Chart 2: Analysis of 2024 Budget to Actual Capital Expenditures[5]

[4] Projects and programs with a material variance (at least $100,000 and 10%) are listed within their respective sections herein. Per the Provisional Guidelines, variance explanations for underspent projects and programs are not required; however, underspent projects and programs are listed and a brief description of the factors contributing to underspend are provided within this section.
[5] Numbers may not add due to rounding.

2.1 Actual Expenditure Variances from Estimates

As shown in Chart 2, capital program and project work completed in 2024 for more than the original budget estimates accounted for approximately $16.6 million of over-expenditure and work completed in 2024 for less than the original budget estimates accounted for $2.3 million in under-expenditure, for a net over-expenditure of $14.2 million associated with estimates. The majority of these over-expenditures associated with estimates are attributed to materials and construction contracts that exceeded the budget estimates, which may be indicative of a general shift in market pricing.

The programs and projects with material over-expenditures are:

- Refurbish Ebbegunbaeg Control Structure (2021–2025);
- Replace Metering System (2022–2024);
- Wabush Terminal Station Upgrades (2021–2024);
- Wood Pole Line Management (2024);
- Overhaul Unit 2 Turbine and Valves (2023) – Holyrood;
- Replace Protective Relays (2023–2024);[6]
- Circuit Breakers Renewal Program (2023–2024).

2.2 Work Required to Address In-Service Failures

In-Service Failures programs for various asset classifications have undefined scopes of work at the time of budget estimate preparation. Budget estimates for these programs are typically based on historical expenditures and engineering judgement. As well, Hydro's annual capital budget includes $1.0 million in the Allowance for Unforeseen Items account, as another mechanism for expenditures to address in-service failures.

In 2024, as shown in Chart 2, programs to address failures with expenditures in excess of the estimates accounted for $14.2 million in over-expenditures. There were no programs for in-service failures in 2024 with fewer expenditures than estimated in 2024. The $1.0 million in Chart 2 represents the Allowance for Unforeseen Items account, which was not utilized in 2024. The net over-expenditure for work to

[6] Replace Protective Relays (2023–2024) was a sub-program within the Terminal Station Renewal Program (2023–2024).

address in-service failures was therefore $13.2 million. The programs in this category with material over-expenditures are:

- Gas Turbine In-Service Failures (2024);
- Distribution System In-Service Failures, Miscellaneous Upgrades, and Street Lights (2024);
- Diesel In-Service Failures (2024);
- Hydraulic In-Service Failures (2024);
- Terminal Station In-Service Failures (2024); and
- Thermal In-Service Failures (2024).

2.3 Work Required to Address Condition Assessments

Some programs and projects involve taking assets out-of-service for condition assessment to determine the extent of refurbishment required. For these programs and projects, budget estimates are typically based on historical expenditures and engineering judgement. In 2024, as shown in Chart 2, programs and projects required to address condition assessments with expenditures in excess of the estimates accounted for $12.7 million in over-expenditures and programs and projects of this nature with fewer expenditures than estimated accounted for $0.6 million in under-expenditures, for a net over-expenditure of $12.1 million. The programs and projects in this category with material over-expenditures are:

- Overhaul Unit 1 Turbine, Valves and Generator (2024) – Holyrood;
- Boiler Condition Assessment and Miscellaneous Upgrades (2024) – Holyrood; and
- Holyrood Fuel Tank 1 Inspection and Refurbishment (Supplemental).[7]

2.4 Changes within Continuing Multi-Year Projects

Schedule changes are made to some multi-year projects without affecting the project completion date but impacting the annual cost flow. As shown in Chart 2, expenditures that are now expected to be incurred in future years within multi-year projects accounted for $8.0 million in 2024 under-

[7] In Board Order No. P.U. 30(2022), the Board approved Hydro's request to modify Order No. P.U. 24(2022) to approve the refurbishment of Tank 1 rather than Tank 2.

expenditures while costs advanced from future years into 2024 accounted for $0.3 million in over-expenditures, for a net under-expenditure of $7.7 million.[8]

Two main drivers of changes within continuing multi-year projects have been identified.

1) **Design and Construction Resource Challenges:** Some activities in multi-year projects have carried over to 2025 as a result of challenges recruiting, retaining and scheduling internal design and construction resources. The projects with material under-expenditures due to resource challenges are:

    - **Additions for Load - Wabush Substation Upgrades**: Construction planned for 2024 was not completed due to a re-alignment of internal and external labour resources causing a delay with civil construction and downstream procurement activities. The civil design was originally to be completed internally but internal resources were over-committed. The delay in transferring this to external resources and subsequent challenges in competing the required field survey resulted in carryover.

    - **Replace MDR8000 Microwave Radios**: Internal telecommunications labour resources were not available to complete testing of the microwave communications system that was required before ordering some of the materials for the new radio system. Procurement costs originally expected in 2024 are now expected in 2025.

2) **Work Paused to Reassess Justification or Re-evaluate Alternatives:** When information comes available during execution of a project that may impact the project justification or change the least-cost alternative solution, Hydro may pause the project for further assessment of the justification or re-evaluation of alternatives. Such pauses have resulted in carryover of expenditures within some multi-year projects. The projects with material 2024 under-expenditures of this nature are:

    - **Purchase Spare Generator Step-Up ("GSU") Transformer**: Hydro issued a tender in the spring of 2024 which resulted in no compliant bidders. In accordance with public procurement legislation, Hydro proceeded to re-tender the GSU transformer specification. On evaluation of tender bids received, Hydro determined that there

[8] Numbers may not add due to rounding.

was one compliant bid. Due to increased commodity pricing, current original equipment manufacturer ("OEM") shop loading, and the specific arrangement required for the spare GSU transformer to be able to be utilized in various locations, there was a significant forecast cost increase for this project. In January 2025, Hydro paused the project to confirm justification and subsequently submitted a request to the Board to change or modify Board Order No. P.U. 28(2023)—Approval of Capital Expenditures for the Purchase of a Spare GSU Transformer—to account for the higher cost. Approval was received in Board Order No. P.U. 8(2025) and Hydro is proceeding with the project. The project pause resulted in the initial transformer procurement payment carrying over from 2024 to 2025.

- **Replace VHF[9] Radio System**: The scope of this 2024-2025 project is to replace the functionality previously provided by the VHF radio system with a combination of mobile and fixed PTT[10]-capable satellite phones as well as a small number of fixed cellular phones. During detailed project planning in 2024, Hydro became aware of recent changes in technology that may impact the selection of the type of equipment to replace the VHF Radio system. Time required to further evaluate solutions has resulted in carryover of a portion of the procurement and equipment installation activity from 2024 to 2025.[11]

2.5 Cancelled Project Scopes of Work

Following approval by the Board, projects may be cancelled in whole, or in part, when new information or conditions impact the original project justification. As shown in Chart 2, cancelled scopes of work resulted in approximately $5.7 million in 2024 under-expenditure. There were three projects with material cancelled scopes:

- Upgrades for Future Retirement of Stephenville Gas Turbine (2021–2022);
- Refurbish Superstructure (2023–2024) – Salmon River Spillway; and
- Replace Diesel Shop Building (2023–2025) – Bishop's Falls.

[9] Very high frequency ("VHF").
[10] Push-to-talk ("PTT").
[11] Hydro will notify the Board of any material change in scope or budget.

2.6 Deferred Project Scopes of Work

As shown in Chart 2, several projects planned for completion in 2024 have had scopes of work carried over to 2025, resulting in 2024 under-expenditures of $4.4 million. Two main themes related to these deferrals were identified:

1) **Planning and Design Challenges:** During the detailed planning and design phase of projects, Hydro sometimes encounters unforeseen challenges that delay the execution. The following project encountered significant challenges that resulted in material carryover of expenditures from 2024 to 2025:
    - Upgrade Water and Fire Suppression Systems (2023-2024) – Bishop's Falls

2) **Equipment Outages Not Available:** A portion of Hydro's capital project scopes of work require equipment outages to safely complete the work. At times, due to system conditions, it is not possible for equipment outages to proceed, resulting in the carryover of work. The following project could not be executed in 2024 due to unavailability of the required equipment outage, resulting in material carryover of expenditures from 2024 to 2025:
    - **Inspect Fuel Tank (2024) – Hardwoods Gas Turbine:** The inspection of the fuel storage tank for the Hardwoods Gas Turbine requires all fuel to be removed from the tank. It was originally anticipated that enough fuel would be consumed at Hardwoods and Holyrood gas turbines through the winter of 2023–2024 to allow remaining fuel at Hardwoods to be transferred to Holyrood in 2024. However, the gas turbines did not operate as much as anticipated and there remained too much fuel in the Hardwoods tank in 2024. The work has been deferred from 2024 to 2025.

2.7 Re-Pacing of Programs

The pace of work within programs impacted Hydro's 2024 capital expenditures. As shown in Chart 2, programs with less work completed in 2024 compared to the budget estimate accounted for an under-expenditure of $7.5 million while programs with more work completed in 2024 compared to the budget estimate accounted for an over-expenditure of $5.7 million, for a net under-expenditure of $2.0 million.[12] Three main drivers of the re-pacing of program work to future years have been identified.

[12] Numbers may not add due to rounding.

1) **Supply Chain Challenges:** Supply chain challenges resulted in the delayed delivery of some new equipment, preventing Hydro from completing capital work for some programs in 2024. In particular, Hydro is experiencing long lead times for diesel gensets and heavy-duty vehicles, impacting program pacing. The programs with material under-expenditures due to delayed delivery of equipment are:

   - **Diesel Genset Replacement Unit 2012 – L'Anse-Au-Loup:** Delayed delivery of the new genset; and
   - **Replace Light- and Heavy-Duty Vehicles (2023–2025):** Delayed delivery of the new heavy-duty vehicles.

2) **Design and Construction Resource Challenges:** Some capital program activities have carried over to 2025 as a result of challenges scheduling internal design and construction labour resources or securing external resources. The programs with material under-expenditures due to resource challenges are:

   - **Replace Protective Relays (2024–2025)**: Hydro is experiencing challenges in scheduling sufficient internal and external protection and control resources, for both engineering and construction, leading to the carryover of some scopes of work within the Replace Protective Relays program.
   - **Perform Software Upgrades and Minor Enhancements (2024)**: Hydro depends on software vendors for the upgrade of externally designed software systems and, at times, the vendor's resources are unavailable to complete scheduled upgrades. This was the case for a portion of the planned upgrades within the Perform Software Upgrades and Minor Enhancements (2024) program.
   - **Upgrade Energy Management System (2024)**: Hydro depends on the software vendor for the upgrade of its Energy Management System. The vendor's resources were unavailable to complete the scheduled upgrades in 2024.

3) **Work Paused to Reassess Justification:** When information comes available during execution of program scopes of work that may impact the project justification, Hydro may pause the work for further assessment of the justification. There was one program in this category that had a material under-expenditure in 2024:

- **Renew Distribution Feeders (2024–2025)**: This program to renew the St. Brendan's distribution feeder was paused in 2024 to confirm the justification. In 2024, there was uncertainty regarding the future electrical system requirements for St. Brendan's, following reports that the community's fuel oil supplier may no longer deliver to residential customers in the area. Any significant electrical system load changes would have meant that the current system design may not meet future requirements. As a result of this pause, the planned setting of wood poles has carried over from 2024 to 2025.

The decreased pacing of some programs in 2024 was partially offset by higher pacing of other programs. The programs with higher pacing that contributed materially to over-expenditures in 2024 are:

- Provide Service Extensions (2024)
- Circuit Breakers Renewal Program (2023–2024)
- Refurbish and Upgrade Power Transformers (2023–2024)[13]
- Replace Light- and Heavy-Duty Vehicles (2024–2026)

2.8 Modified Scopes of Work

Following approval of the Board, scopes of work within projects and programs may be modified if new information or conditions impact the selection of the preferred alternatives. There was one such instance within active projects and programs in 2024. Specifically, the scope of work was modified for the replacement of Unit 2053 and replacement or upgrade of associated equipment at the Hopedale Diesel Generating Station, within the Diesel Genset Replacement Program (2023–2025). As reflected in a budget update in the 2024 CBA, Hydro changed the scope to a lower-cost alternative. Hydro is proceeding with that alternative.

3.0 Key Performance Indicators

As set out in the Provisional Guidelines, this report includes a summary of KPIs for capital expenditures specific to projects and programs for the last ten years.

[13] Refurbish and Upgrade Power Transformers (2023-2024) was a sub-program within the Terminal Station Renewal Program (2023–2024).

The KPIs for projects are:

- The number of projects planned and completed by materiality threshold; and
- The original budget value of projects completed, and the final cost of projects completed by materiality threshold.[14]

The KPIs for programs are:

- The number of units planned and completed by materiality threshold; and
- The estimated average unit cost and actual average unit cost.

Hydro began tracking its capital expenditures in a manner to allow reporting of these KPIs in 2023. KPI data is now available and presented herein for the two-year period 2023–2024.

3.1 Project Key Performance Indicators

3.1.1 Planned versus Completed Projects by Year and Materiality Threshold

In this section, Hydro has provided table and graphical representations, both in aggregate and for each Investment Classification, of the planned versus completed projects by materiality threshold.[15] Hydro completed 35 of 54 projects planned for completion in 2024. The primary contributing factors for projects planned for completion but not completed in 2024 were internal resource challenges, procurement challenges, unavailable equipment outages, and projects paused to re-evaluate the justification. Hydro has assessed the risks associated with delayed completion of these projects and, where necessary, has applied appropriate mitigations. As such, none of the projects carried over into 2025 represent a significant risk to the supply of electricity to customers.

[14] Does not include ongoing projects.
[15] For the purposes of this metric, a project is deemed complete when the full project scope is complete, all assets are in service, and the project is closed. For projects that have multiple assets planned to go in service, some assets may be in service when planned while others may have carried over. In 2024, 11 projects counted as incomplete in this metric had some assets placed in service, 5 of which were over 50% complete.

Table 2: Planned vs. Completed Projects – Aggregate

	Under $1 Million		$1 Million to $5 Million		Over $5 Million	
Year	Planned Projects	Completed Projects	Planned Projects	Completed Projects	Planned Projects	Completed Projects
2024	37	24	12	8	5	3
2023	37	29	12	6	2	0

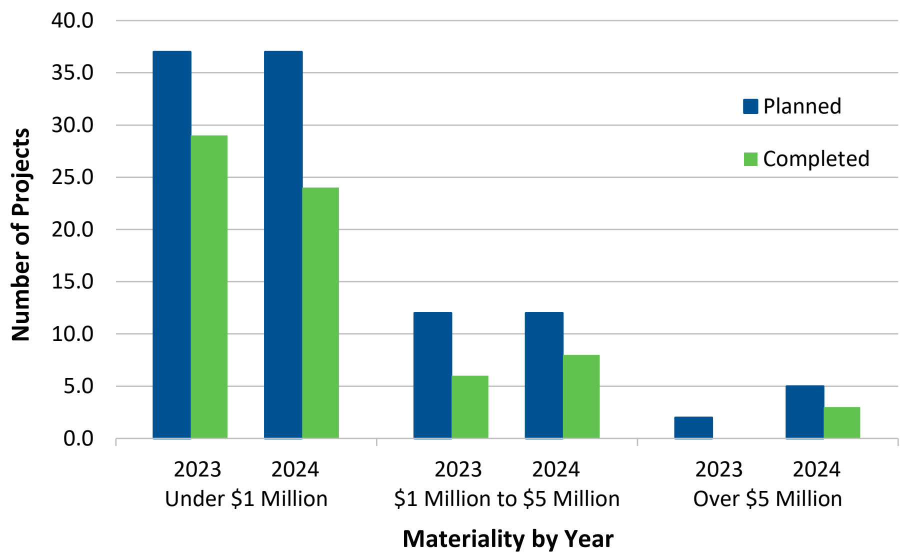

Chart 3: Planned vs. Completed Projects – Aggregate[16]

[16] Does not include projects that were advanced and completed in 2024.

1 ## *Renewal*

Table 3: Planned vs. Completed Projects – Renewal

	Under $1 Million		$1 Million to $5 Million		Over $5 Million	
Year	**Planned Projects**	**Completed Projects**	**Planned Projects**	**Completed Projects**	**Planned Projects**	**Completed Projects**
2024	14	7	6	3	1	1
2023	23	18	8	5	N/A	N/A

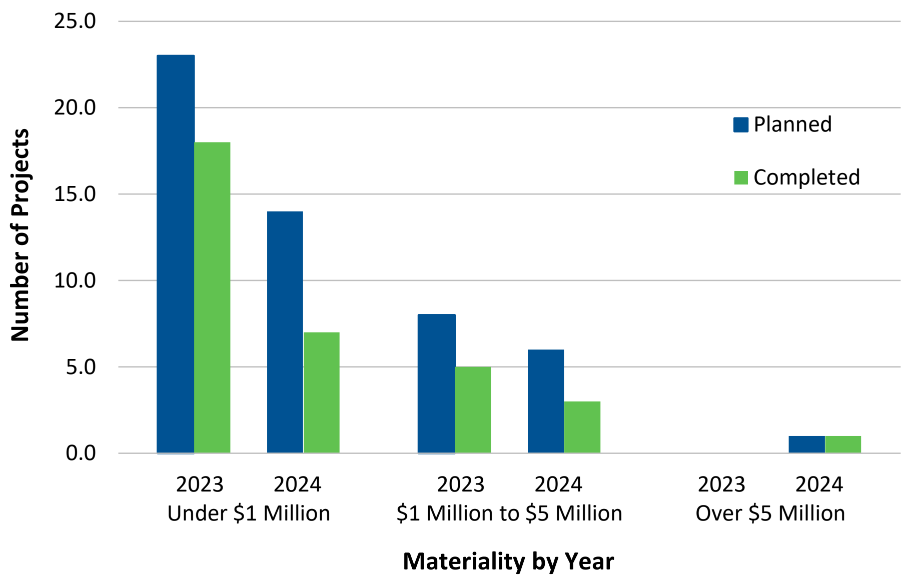

Chart 4: Planned vs. Completed Projects – Renewal

1 ## *General Plant*

Table 4: Planned vs. Completed Projects – General Plant

	Under $1 Million		$1 Million to $5 Million		Over $5 Million	
Year	Planned Projects	Completed Projects	Planned Projects	Completed Projects	Planned Projects	Completed Projects
2024	14	10	3	2	N/A	N/A
2023	5	5	2	1	N/A	N/A

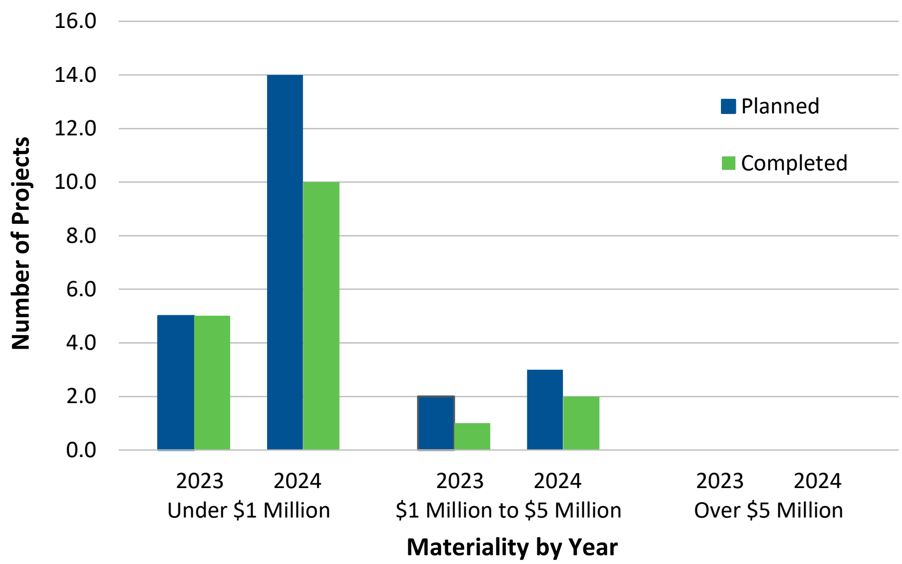

Chart 5: Planned vs. Completed Projects – General Plant

1 ## *System Growth*

Table 5: Planned vs. Completed Projects – System Growth

	Under $1 Million		$1 Million to $5 Million		Over $5 Million	
Year	Planned Projects	Completed Projects	Planned Projects	Completed Projects	Planned Projects	Completed Projects
2024	1	0	N/A	N/A	1	0
2023	1	0	N/A	N/A	N/A	N/A

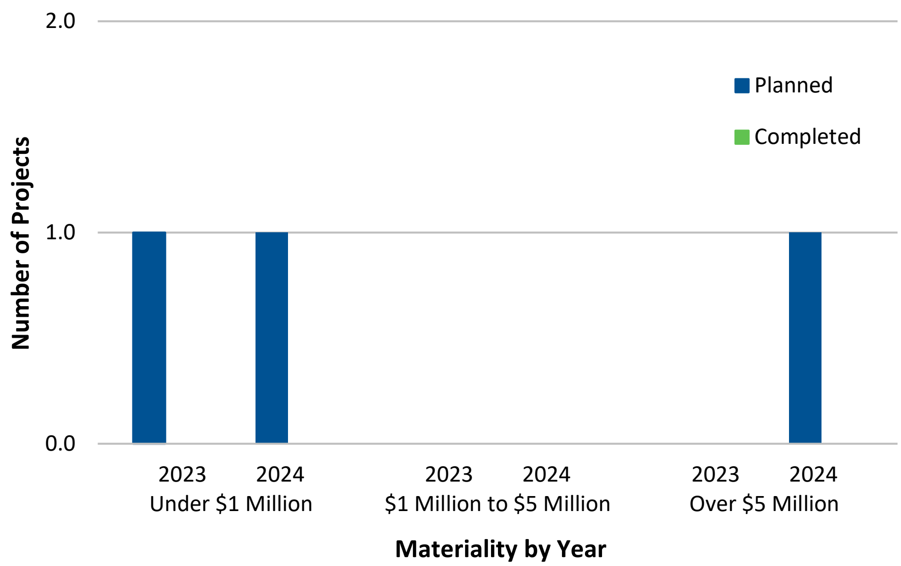

Chart 6: Planned vs. Completed Projects – System Growth

1 ## *Access*

Table 6: Planned vs. Completed Projects – Access

	Under $1 Million		$1 Million to $5 Million		Over $5 Million	
Year	**Planned Projects**	**Completed Projects**	**Planned Projects**	**Completed Projects**	**Planned Projects**	**Completed Projects**
2024	N/A	N/A	N/A	N/A	1	1
2023	1	1	N/A	N/A	1	0

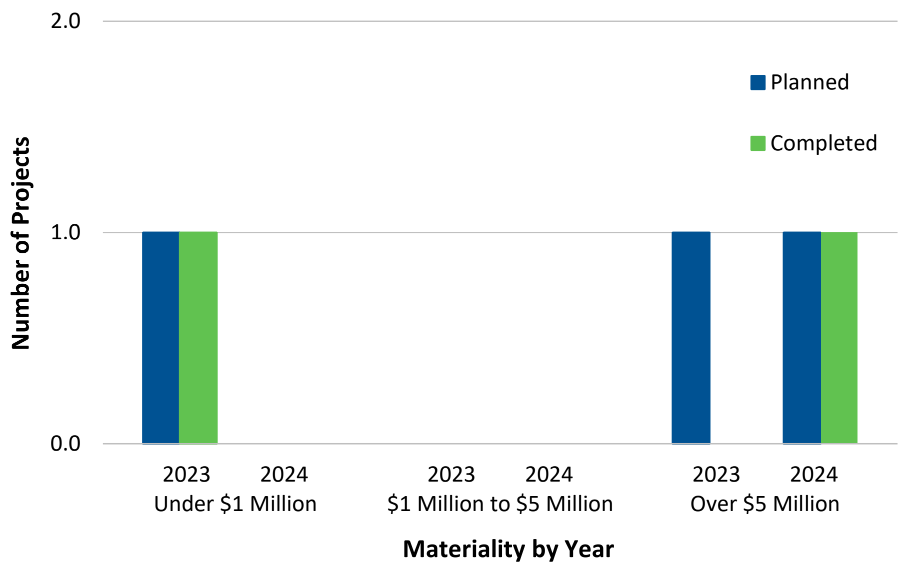

Chart 7: Planned vs. Completed Projects – Access

1 ## *Service Enhancements*

Table 7: Planned vs. Completed Projects – Service Enhancements

	Under $1 Million		$1 Million to $5 Million		Over $5 Million	
Year	Planned Projects	Completed Projects	Planned Projects	Completed Projects	Planned Projects	Completed Projects
2024	7	7	2	2	2	1
2023	7	5	2	0	1	0

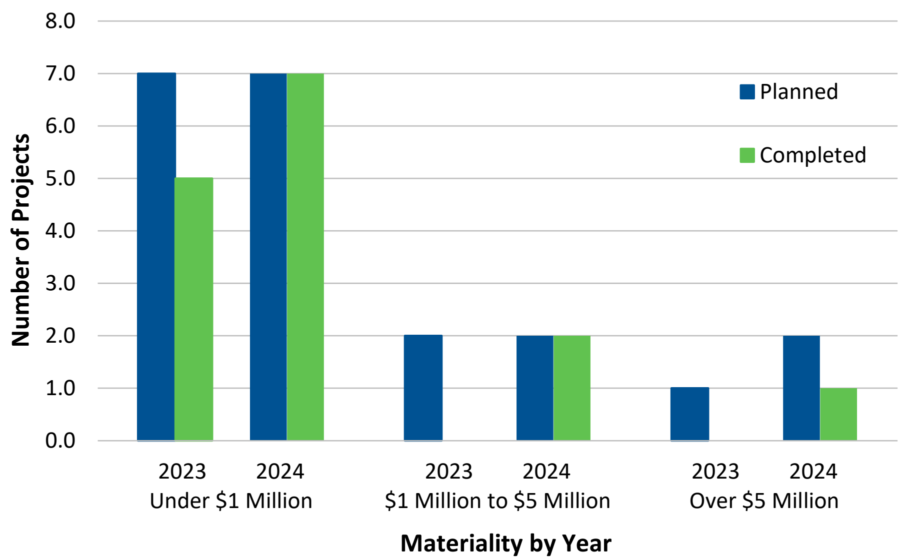

Chart 8: Planned vs. Completed Projects – Service Enhancements

1 ## *Mandatory*

Table 8: Planned vs. Completed Projects – Mandatory

	Under $1 Million		$1 Million to $5 Million		Over $5 Million	
Year	**Planned Projects**	**Completed Projects**	**Planned Projects**	**Completed Projects**	**Planned Projects**	**Completed Projects**
2024	1	0	1	1	N/A	N/A
2023	N/A	N/A	N/A	N/A	N/A	N/A

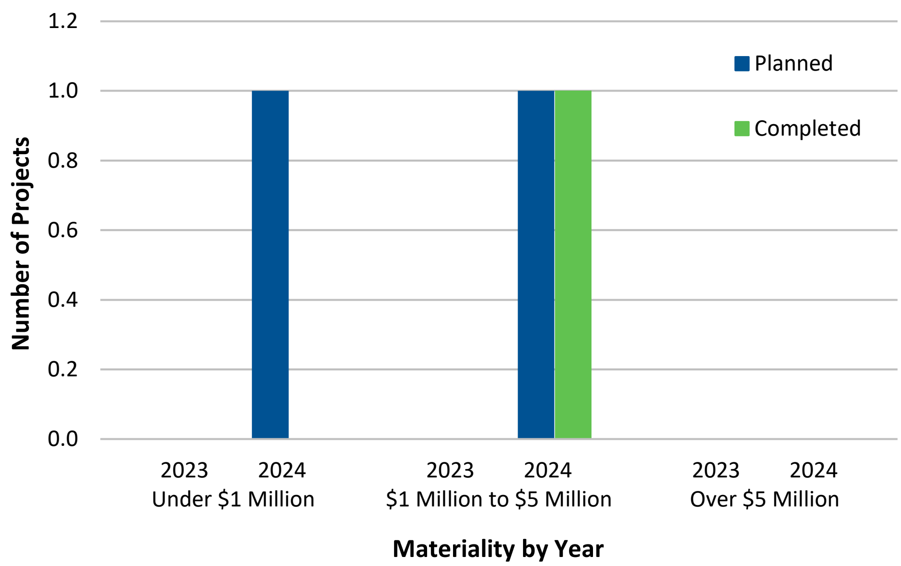

Chart 9: Planned vs. Completed Projects – Mandatory

3.1.2 Budget versus Actual Expenditures by Year and Materiality Threshold

In this section, Hydro has provided tables and graphical representations, both in aggregate and for each Investment Classification, of the planned budget versus actual expenditure for completed projects by materiality threshold. The actual expenditures for projects in these tables include total expenditures across all years of the projects. Major drivers of project variances are discussed in Section 2.0 and detailed discussion of variances exceeding $100,000 and 10% are provided in Section 4.0.

Table 9: Budget vs. Actual Expenditures – Completed Projects – Aggregate ($000)[17]

	Under $1 Million		$1 Million to $5 Million		Over $5 Million	
Year	**Total Budget**	**Actual Expenditures**	**Total Budget**	**Actual Expenditures**	**Total Budget**	**Actual Expenditures**
2024	10,384	10,877	13,962	19,146	29,631	27,937
2023	9,406	10,470	12,816	17,834	N/A	N/A

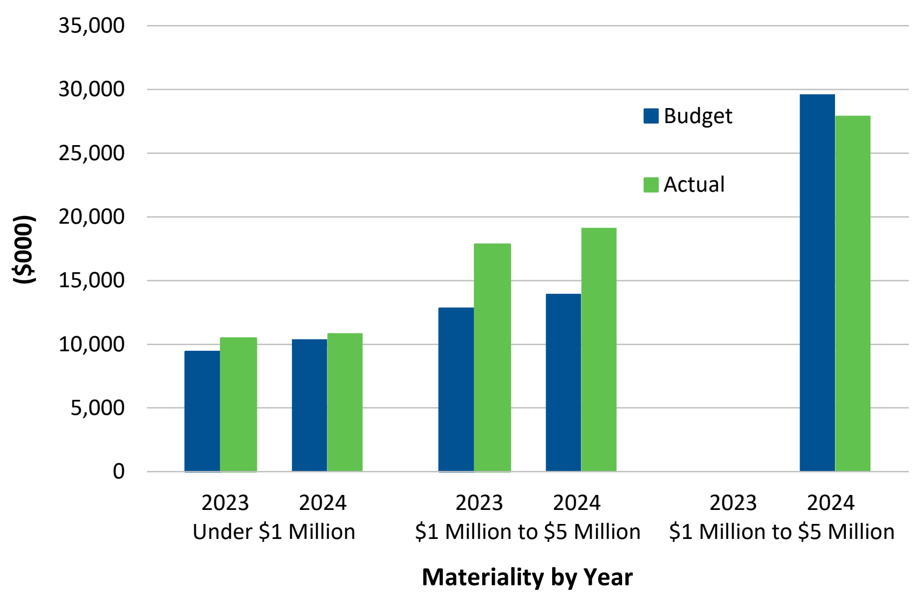

Chart 10: Budget vs. Actual Expenditures – Completed Projects – Aggregate

[17] Aggregate budgets and expenditures may not add due to rounding.

1 ## *Renewal*

Table 10: Budget vs. Actual Expenditures – Completed Projects – Renewal

	Under $1 Million		$1 Million to $5 Million		Over $5 Million	
Year	Total Budget	Actual Expenditures	Total Budget	Actual Expenditures	Total Budget	Actual Expenditures
2024	3,267	3,029	5,738	9,411	6,409	6,673
2023	6,875	7,480	11,680	16,349	N/A	N/A

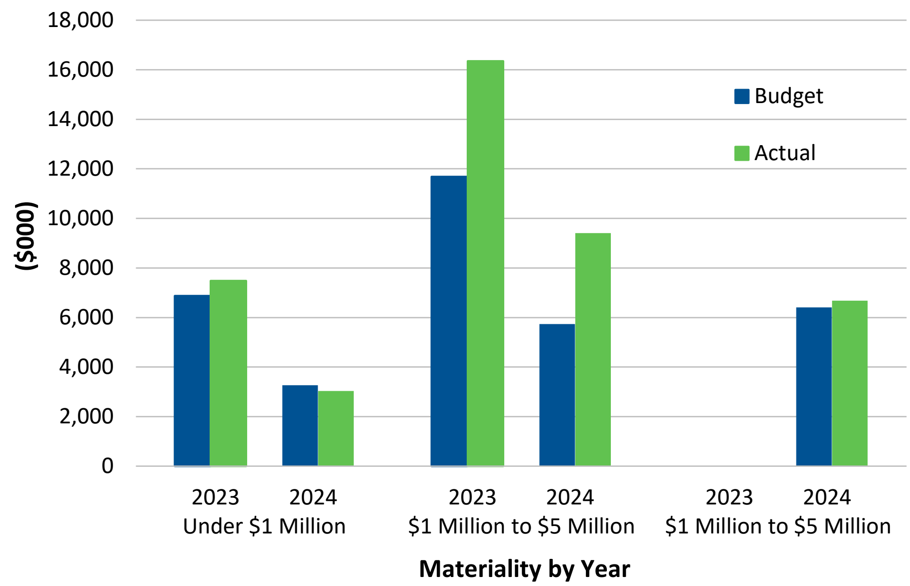

Chart 11: Budget vs. Actual Expenditures – Completed Projects – Renewal

1 ## *General Plant*

Table 11: Budget vs. Actual Expenditures – Completed Projects – General Plant

	Under $1 Million		$1 Million to $5 Million		Over $5 Million	
Year	Total Budget	Actual Expenditures	Total Budget	Actual Expenditures	Total Budget	Actual Expenditures
2024	4,866	5,245	3,060	4,282	N/A	N/A
2023	857	1,166	1,136	1,485	N/A	N/A

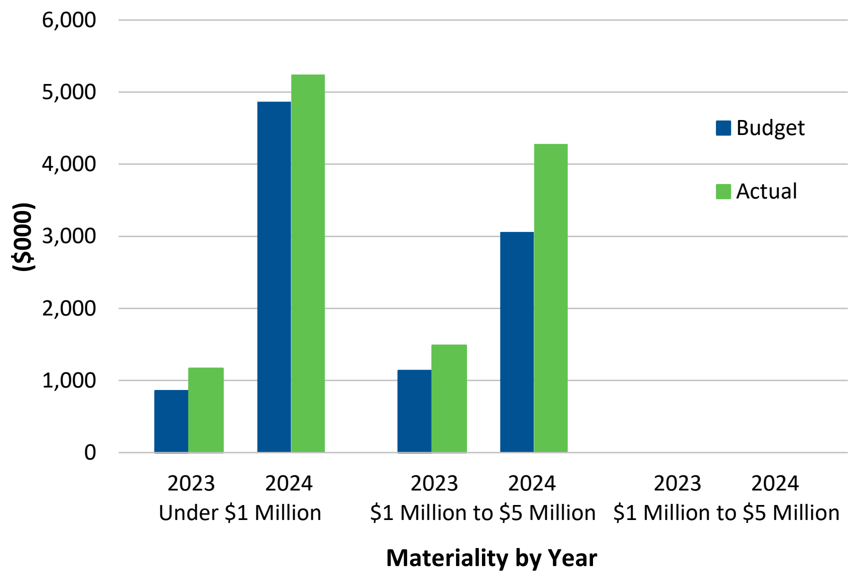

Chart 12: Budget vs. Actual Expenditures – Completed Projects – General Plant

System Growth

There were no projects planned or completed in 2023 or 2024 in the System Growth Investment Classification.

Access

Table 12: Budget vs. Actual Expenditures – Completed Projects – Access

	Under $1 Million		$1 Million to $5 Million		Over $5 Million	
Year	Total Budget	Actual Expenditures	Total Budget	Actual Expenditures	Total Budget	Actual Expenditures
2024	N/A	N/A	N/A	N/A	16,347	16,149
2023	227	203	N/A	N/A	N/A	N/A

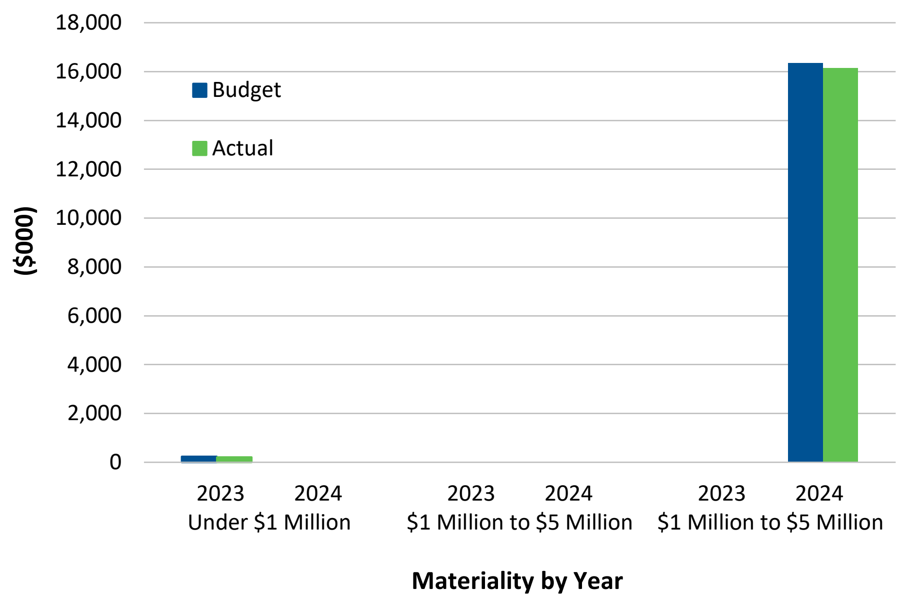

Chart 13: Budgets vs. Actual Expenditures – Completed Projects – Access

1 ## *Service Enhancements*

Table 13: Budget vs. Actual Expenditures – Completed Projects – Service Enhancements

	Under $1 Million		$1 Million to $5 Million		Over $5 Million	
Year	**Total Budget**	**Actual Expenditures**	**Total Budget**	**Actual Expenditures**	**Total Budget**	**Actual Expenditures**
2024	2,250	2,602	3,244	3,302	6,875	5,116
2023	1,448	1,620	N/A	N/A	N/A	N/A

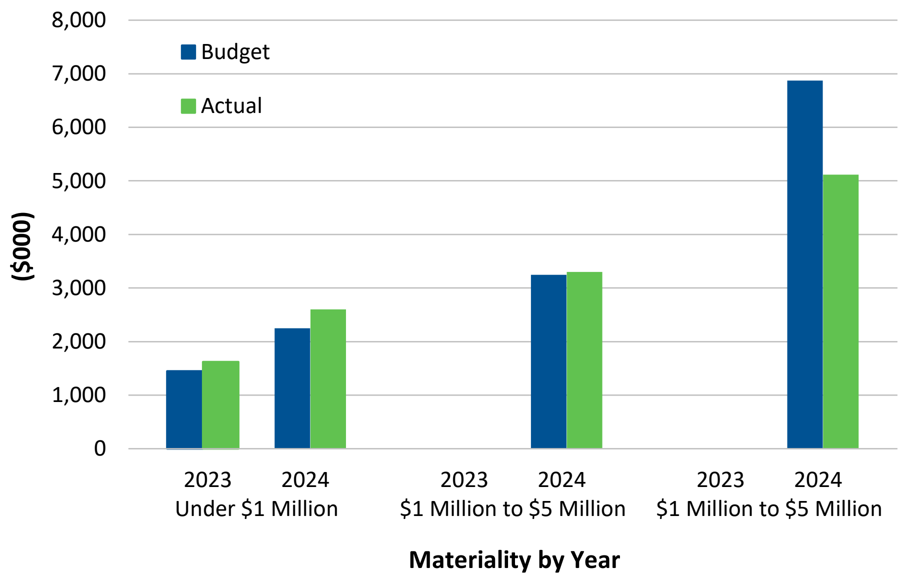

Chart 14: Budget vs. Actual Expenditures – Completed Projects – Service Enhancements

1 ***Mandatory***

Table 14: Budget vs. Actual Expenditures – Completed Projects – Mandatory

	Under $1 Million		$1 Million to $5 Million		Over $5 Million	
Year	**Total Budget**	**Actual Expenditures**	**Total Budget**	**Actual Expenditures**	**Total Budget**	**Actual Expenditures**
2024	N/A	N/A	1,920	2,151	N/A	N/A
2023	N/A	N/A	N/A	N/A	N/A	N/A

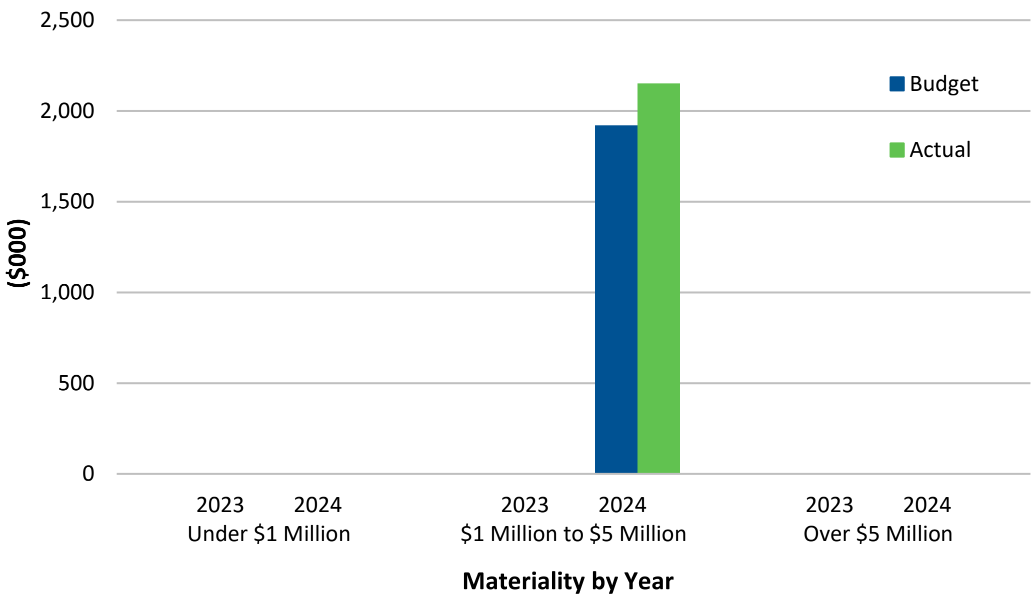

Chart 15: Budget vs. Actual Expenditures – Completed Projects – Mandatory

2 3.2 Program Key Performance Indicators

3 Planned versus completed units and budget versus actual weighted average unit costs for programs in
4 2024 are presented in Sections 3.2.1 and 3.2.2, respectively.[18] Some programs do not lend themselves to
5 unitization, despite otherwise meeting the definition of a program; therefore they are excluded from
6 the program KPIs herein.

7 Further, if there were no assets planned for completion within a program in 2024, it was also excluded
8 from Sections 3.2.1 and 3.2.2.

[18] Hydro notes that KPI data is presented for programs beginning in 2023 and is not available for programs that were proposed prior to the implementation of the Provisional Guidelines.

In total, Hydro completed the installation or refurbishment of 2,084 units, compared to 1,878 planned units in 2024. The additional units completed are primarily attributed to greater-than-anticipated replacements for mobile devices and personal computers.[19]

3.2.1 Planned versus Completed Units by Year and Materiality Threshold

In this section, Hydro will provide table and graphical representations, both in aggregate and for each Investment Classification, of the planned number of units versus the actual number of units completed by year and materiality threshold.

Hydro began tracking its capital expenditures in a manner to allow reporting of these KPIs in 2023. KPI data is now available and presented herein for the two-year period 2023–2024, unless otherwise noted.

Table 15: Planned vs. Completed Program Units – Aggregate

	Under $1 Million		$1 Million to $5 Million		Over $5 Million	
Year	**Planned Units**	**Completed Units**	**Planned Units**	**Completed Units**	**Planned Units**	**Completed Units**
2024	1810	1988	68	96	N/A	N/A
2023	341	450	53	53	N/A	N/A

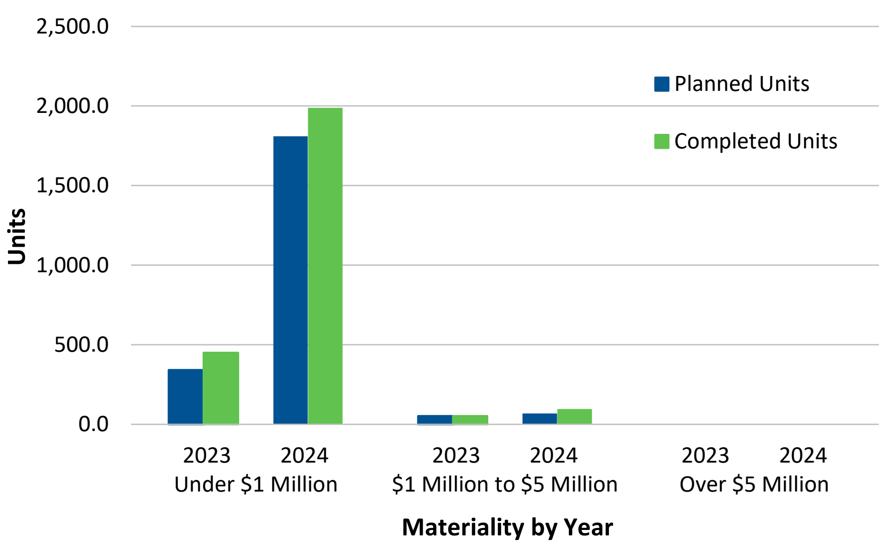

Chart 16: Planned vs. Completed Program Units – Aggregate

[19] Increased procurement of personal computers in 2024 was primarily due to unexpected replacements required after the November 2023 fire on the fourth floor of Hydro Place, and to supply new personnel hires. Increased procurement of mobile devices was primarily related to new personnel hires.

1 ## *Renewal*

Table 16: Planned vs. Completed Program Units – Renewal

	Under $1 Million		$1 Million to $5 Million		Over $5 Million	
Year	Planned Units	Completed Units	Planned Units	Completed Units	Planned Units	Completed Units
2024	165	305	36	53	N/A	N/A
2023	31	34	14	15	N/A	N/A

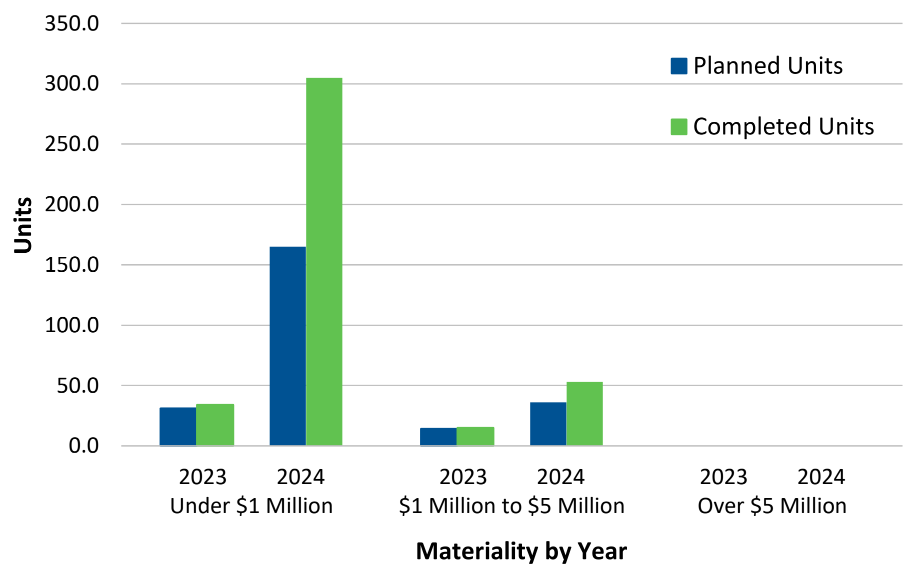

Chart 17: Planned vs. Completed Program Units – Renewal

1 ## *General Plant*

Table 17: Planned vs. Completed Program Units – General Plant

	Under $1 Million		$1 Million to $5 Million		Over $5 Million	
Year	Planned Units	Completed Units	Planned Units	Completed Units	Planned Units	Completed Units
2024	253	291	32	43	N/A	N/A
2023	310	416	39	38	N/A	N/A

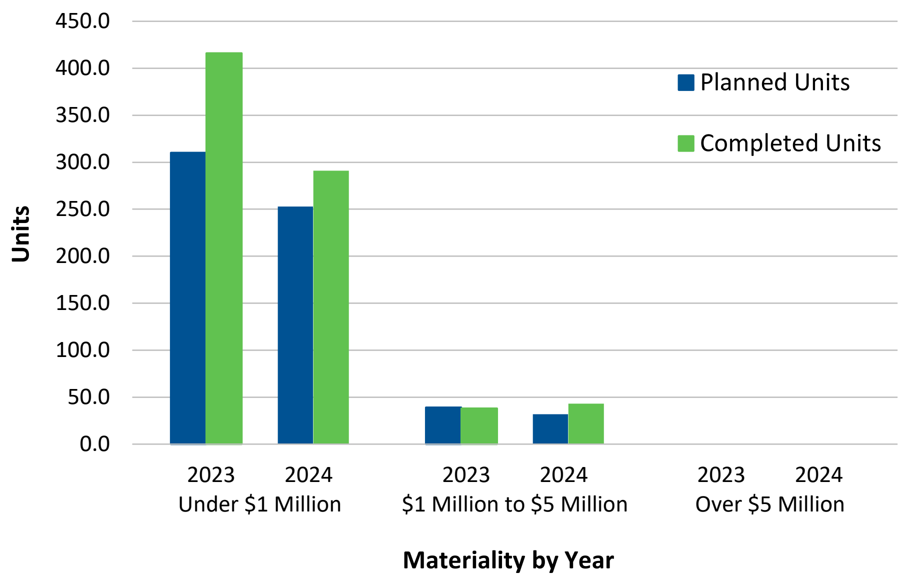

Chart 18: Planned vs. Completed Program Units – General Plant

Access

Table 18: Planned vs. Completed Program Units – Access[20]

	Under $1 Million		$1 Million to $5 Million		Over $5 Million	
Year	**Planned Units**	**Completed Units**	**Planned Units**	**Completed Units**	**Planned Units**	**Completed Units**
2024	1392	1392	N/A	N/A	N/A	N/A

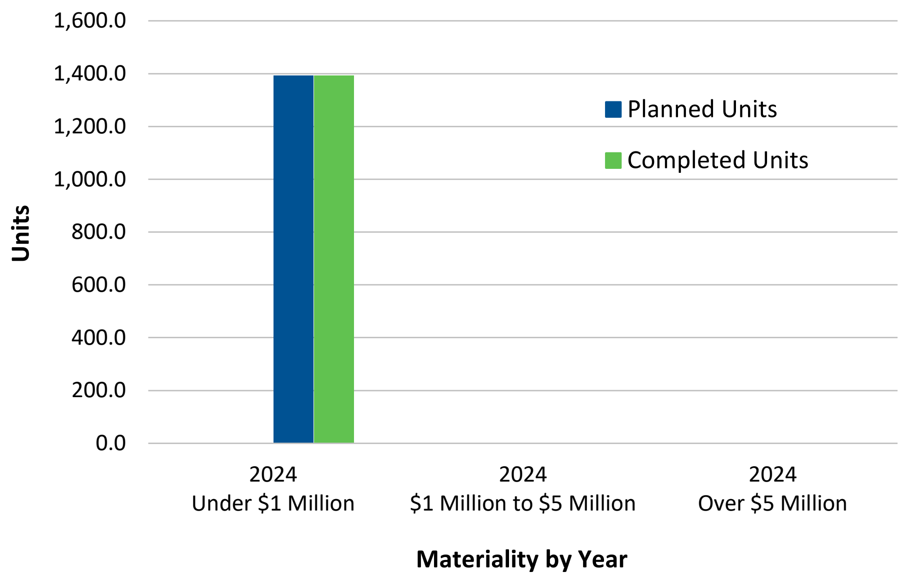

Chart 19: Planned vs. Completed Program Units – Access

3.2.2 Estimated versus Actual Weighted Average Unit Cost

In this section, Hydro will provide table and graphical representations, both in aggregate and for each Investment Classification, of the estimated weighted average unit cost versus the actual weighted average unit cost by year. The primary drivers of lower weighted average unit costs were lower than anticipated unit costs for pump overhauls, mobile equipment, peripheral infrastructure, and 48V battery banks and chargers.

Hydro began tracking its capital expenditures in a manner to allow reporting of these KPIs in 2023. KPI data is now available and presented herein for the two-year period 2023–2024, unless otherwise noted.

[20] As detailed in Section 3.2, some programs do not lend themselves to unitization and have been excluded from the program KPIs herein; as such, no data was available for the Access programs in 2023.

Table 19: Estimated vs. Actual Weighted Average Unit Cost – Aggregate ($000)

Year	Estimated Weighted Average Unit Cost	Actual Weighted Average Unit Cost
2024	15.7	11.2
2023	24.1	21.0

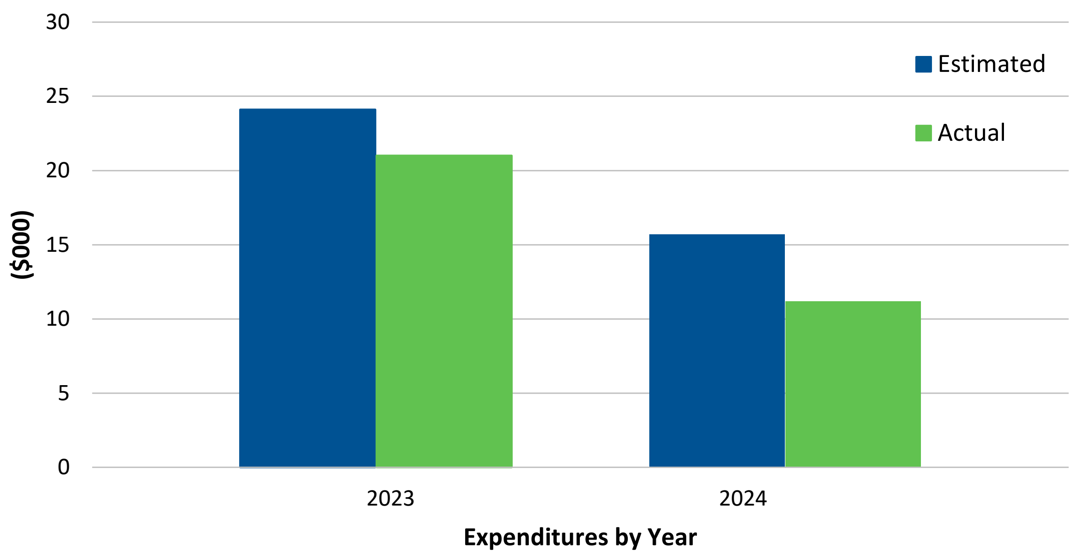

Chart 20: Estimated vs. Actual Weighted Average Unit Cost – Aggregate

Renewal

Table 20: Estimated vs. Actual Weighted Average Unit Cost – Renewal ($000)

Year	Estimated Weighted Average Unit Cost	Actual Weighted Average Unit Cost
2024	116.5	50.6[21]
2023	123.3	134.5

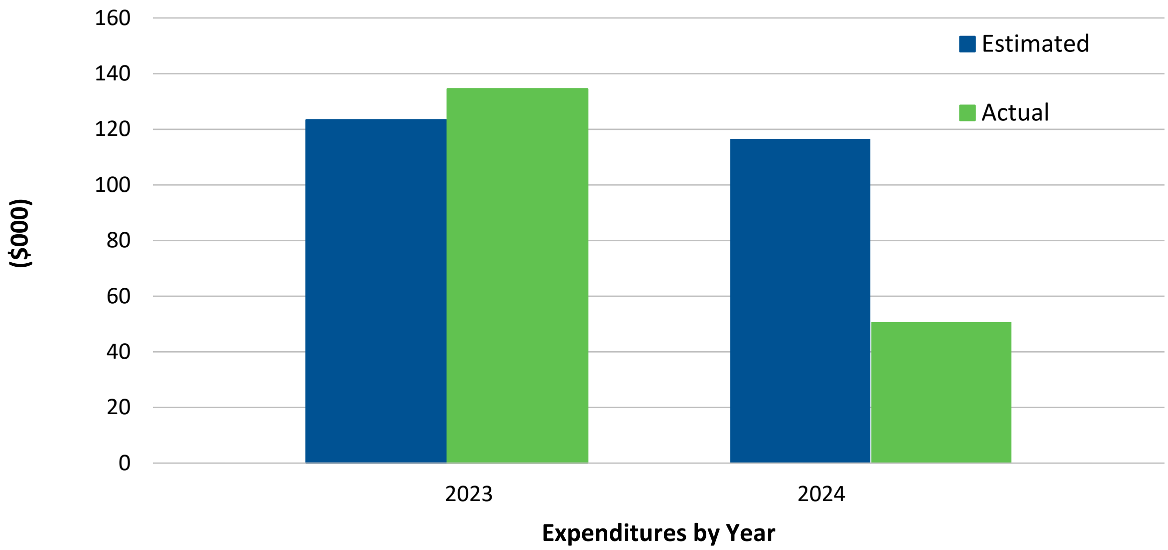

Chart 21: Estimated vs. Actual Weighted Average Unit Cost – Renewal

[21] Low actual unit cost in 2024 is primarily related to mobile devices, which were incorrectly categorized as Renewal in the 2024 CBA. Mobile Devices are categorized as General Plant in the 2025 CBA and will continue to be into the future.

1 ## *General Plant*

Table 21: Estimated vs. Actual Weighted Average Unit Cost – General Plant ($000)

Year	Estimated Weighted Average Unit Cost	Actual Weighted Average Unit Cost
2024	19.7	14.1
2023	11.4	8.7

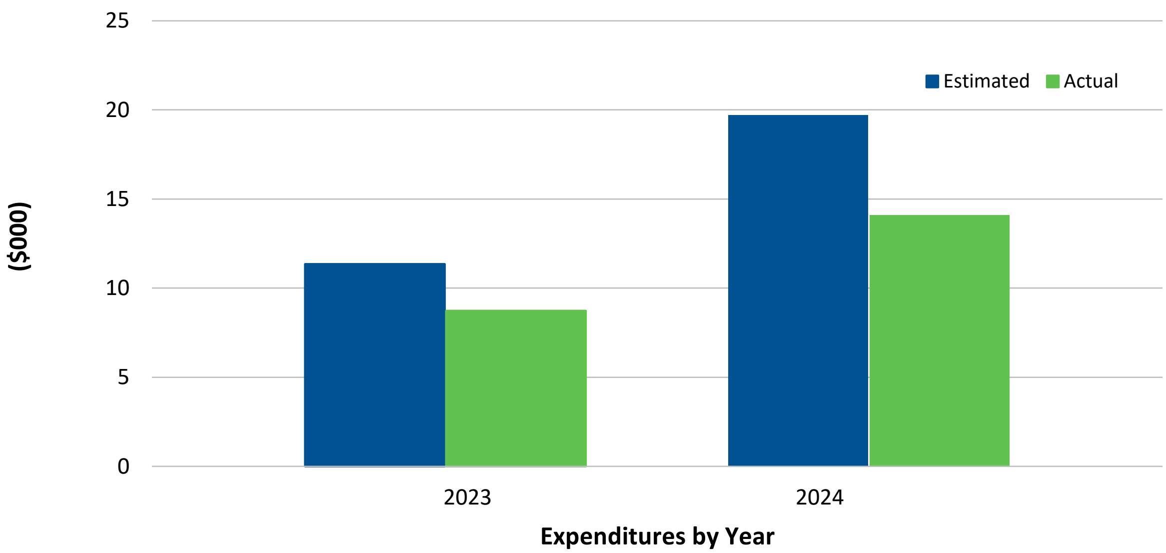

Chart 22: Estimated vs. Actual Weighted Average Unit Cost – General Plant

Access

Table 22: Estimated vs. Actual Weighted Average Unit Cost – Access ($000)[22]

Year	Estimated Weighted Average Unit Cost	Actual Weighted Average Unit Cost
2024	0.34	0.29

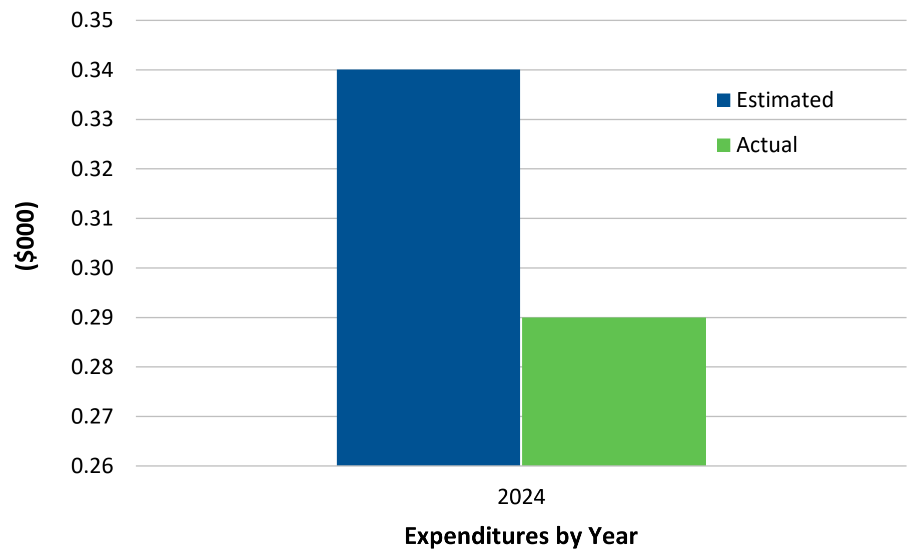

Chart 23: Estimated vs. Actual Weighted Average Unit Cost – Access

4.0 Variance Explanations

As per the Provisional Guidelines set forth by the Board, Hydro is required to report on actual capital expenditure variances that exceed the approved total program or project budget by more than 10% and $100,000. Hydro has also included variance explanations for projects or programs continuing beyond 2024 with forecasted variances exceeding the threshold, and for 2024 programs or projects where expenditures exceeded the approved 2024 budget by more than 10% and $100,000. For multi-year projects and programs, annual and overall variances are reported.[23] For programs and projects that commenced in 2023 or 2024 and were budgeted under $750,000, Hydro has included variance explanations if the actual or forecast expenditures exceeded $750,000. Explanations are also provided

[22] As detailed in Section 3.2, some programs do not lend themselves to unitization and have been excluded from the program KPIs herein; as such, no data was available for the Access programs in 2023.
[23] In cases where actual expenditures of only one of the annual and overall project/program budgets meets the reporting thresholds (exceeding the budget by 10% and 100,000), only the applicable variance includes an explanation.

for projects and programs for which Hydro has cancelled or significantly reduced the scope of work. The programs and projects are ordered in the sections below based on investment classification and materiality thresholds, then alphabetically.

4.1 Renewal

4.1.1 In-Service Failures (2024)[24]

Program	Budget ($000)	Actual Expenditures ($000)	Variance ($000)
Gas Turbine	358.0	7,101.7	6,743.7
Distribution	4,345.4	6,346.5	2,001.1
Diesel	488.3	1,984.5	1,496.2
Hydraulic	1,500.0	2,973.9	1,473.9
Terminal Station	1,300.0	2,459.2	1,159.2
Thermal	3,508.7	4,587.8	1,079.1
Telecommunications	91.4	253.8	162.4
Transmission	158.5	162.2	3.7
Total[25]	**11,750.3**	**25,869.6**	**14,119.3**

In-Service Failures are one-year programs (2024) that closed in 2024. The scope of these programs included refurbishment and replacement work due to the occurrence of actual failures, the identification of incipient failures, or the determination of faster-than-anticipated equipment deterioration for Hydro's assets and include the procurement of capital spares required to support such work.[26] Budget estimates for In-Service Failure programs are based on historical averages, along with Hydro's experience and engineering judgement. As many of these programs are new or have been introduced in recent years and have limited historical data, Hydro expects that it may take several years of implementation to determine an appropriate baseline estimate for annual in-service failure expenditures. The variances in 2024 were primarily attributed to greater scopes of work required in 2024 than anticipated at the time of the original budget estimates, and the nature of failures in 2024 requiring more material expenditure to address. Hydro experienced a number of failures necessitating

[24] While some individual In-Service Failure programs did not meet the threshold for reportable variance, all 2024 In-Service Failures programs are listed herein for completeness.
[25] Numbers may not add due to rounding.
[26] The Distribution System In-Service Failures, Miscellaneous Upgrades, and Street Lights program also includes distribution system upgrades and the installation of LED street lights in addition to in-service failures.

material investment in 2024; further detail on material expenditures for In-Service Failure programs is provided in Appendix B.

4.1.2 Approved Budgets Over $5 Million

Overhaul Unit 2 Turbine and Valves (2023) – Holyrood

Variance Type	Budget ($000)	Expenditures and Forecast ($000)	Variance ($000)
Annual	2,092.0	3,352.0	1,260.0
Program	9,701.8	12,628.4	2,926.6

This is a one-year program (2023) that has carried over into 2025. The program scope is to overhaul the Unit 2 turbine and valves and complete electrical testing on the generator. The variance in 2024 expenditures and the forecasted variance in overall program expenditures are attributed to the extent of the turbine rotor refurbishment work that was required following unit disassembly and inspection of the rotor at the OEM facility. The inspection revealed cracks on the low-pressure turbine blades, which required the purchase and installation of a new set of blades. The original program budget was based on historical turbine and valve overhaul expenditures. The extent of the turbine and valve overhaul costs can only be determined after the unit is removed from service and disassembled for inspection during the program execution. In this case, the extent of the required refurbishment was greater than originally estimated. The turbine rotor was overhauled at the OEM facility and returned to the Holyrood TGS in 2023.

A number of challenges arose during unit reassembly in 2024 that resulted in schedule delays and costs that contributed to the expenditures variance:

- Unit realignment work;
- Damage to the turbine rotor diaphragm that required refurbishment;
- Standby charges for contract resources related to delays as a result of inclement weather and permitting;
- Lost time due to inclement weather delays; and
- Unit start-up issues including high turbine vibration levels, turbine valve operational issues, and miscellaneous issues with the balance of plant.

There are no viable alternatives for this program and Hydro proceeded with execution. After returning Unit 2 to service in 2024, vibration levels on the turbine bearings were within the acceptable range, but higher than the vibration levels prior to completing the turbine overhaul. The program was carried over into 2025 to enable the collection of further vibration data for analysis by the OEM and determination if action is required to reduce vibration levels.

Overhaul Unit 1 Turbine, Valves and Generator (2024) – Holyrood

Variance Type	Budget ($000)	Expenditures and Forecast ($000)	Variance ($000)
Annual	5,181.4	11,195.0	6,013.6
Program	5,181.4	11,735.0	6,553.6

This is a one-year program (2024) that has carried over into 2025. The program scope is to overhaul the Holyrood Unit 1 turbine valves and generator. The valve overhauls consist of dismantling the control valves, main stop valve, combined re-heat stop and intercept valves, extraction non-return valves, and blowdown valves for inspection and refurbishment or replacement of components as required. The generator overhaul consists of dismantling the generator end shields, hydrogen seals and bearings, removal of the rotor from the stator, electrical testing of the rotor and stator windings, inspection, and refurbishment/replacement of components as required.

The variance in 2024 expenditures and forecasted variance in overall project expenditures are attributed to unanticipated additional scope required to refurbish the steam turbine. The original program budget was based on historical turbine valve and generator overhaul expenditures. The full extent of refurbishment work can only be determined after the unit is removed from service and disassembled for inspection, during the program execution. In this case, significant additional refurbishment was required.

As part of the supplemental Replace Unit 1 and 2 Last Stage Turbine Blades – Holyrood, project,[27] the turbine rotor was removed and sent to the OEM facility to replace the last stage turbine blades. While at the facility, inspection revealed extensive damage on the rotor diaphragms and bearing journals which required refurbishment and replacement of the L-1 (second-last stage) turbine blades. Hydro proceeded

[27] Approved in Board Order No. P.U 12(2023).

with this additional refurbishment work while the turbine rotor was at the OEM's facility and determined that it was most appropriate to execute this scope as part of the "Overhaul Unit 1 Turbine Valves and Generator (2024)" program, as outlined in the 2024 CBA. The additional turbine rotor refurbishment work was completed at the OEM facility and the rotor was returned to the Holyrood TGS in 2024. Installation and commissioning of the unit continued into 2025. There are no viable alternatives for this program and Hydro proceeded with execution.

Refurbish Ebbegunbaeg Control Structure (2021–2025)

Variance Type	Budget ($000)	Expenditures and Forecast ($000)	Variance ($000)
Annual	2,305.3	5,494.1	3,188.8
Project	17,679.0	22,126.6	4,447.6

This is a five-year project (2021–2025) that commenced in 2021. The project scope is to refurbish the three water control gates and associated equipment at the Ebbegunbaeg Control Structure.

The variance in 2024 expenditures was attributed to a change in the work sequence for 2024 and 2025. The refurbishment of Gates 1 and 3 screw hoists was originally planned for 2024, and the refurbishment of Gate 2 was planned for 2025. Due to the long lead time on materials for Gates 1 and 3 screw hoists, materials could not be procured in time for 2024 construction. The refurbishment of Gate 2 was then advanced to 2024, and the construction for the Gates 1 and 3 screw hoists deferred to 2025. The Gate 2 refurbishment is more costly than the Gates 1 and 3 screw hoist refurbishments, resulting in the variance in 2024 expenditures.

The forecasted variance in overall project expenditures is attributed to:

- Contract tendered pricing that was higher than what was included in the budget estimate for refurbishment work completed on Gates 1 and 2 in 2023 and 2024 respectively;
- The forecasted cost increase to refurbish Gates 1 and 3 screw hoists and the upstream stoplog gains for all three (3) bays; and
- Internal engineering, construction management, and project management effort required during construction and commissioning of the work in 2023 and 2024.

There are no alternatives to the refurbishment of the Ebbegunbaeg Control Structure and Hydro is proceeding with the project.

Terminal Station Renewal Program (2023–2024)

Variance Type	Budget ($000)	Actual Expenditures ($000)	Variance ($000)
Annual	5,883.6	8,301.9	2,418.3
Program	7,318.2	9,736.5	2,418.3

This was a two-year program (2023–2024) that closed in 2024. The program scope was to replace or refurbish failing or failed terminal station assets including instrument transformers, disconnect switches, power transformers, battery banks and chargers, and protective relays. The variances in 2024 and overall program expenditures were primarily associated with the programs for protective relays and power transformers. These were primarily attributed to:

- Higher-than-originally-estimated labour and materials costs for protective relay replacements and transformer refurbishments completed in 2023 and 2024; and
- A net increase in the number of power transformer refurbishment scopes of work completed in 2023 and2024 compared to the scopes of work assumed for the original program estimate.

Terminal Station Refurbishment and Modernization (2022–2023)

Variance Type	Budget ($000)	Actual Expenditures ($000)	Variance ($000)
Annual	33.8	156.2	122.4

This is a two-year program (2022–2023) to replace or refurbish failing or failed terminal station assets including instrument transformers, disconnect switches, power transformers, terminal station lighting, battery banks and chargers, equipment foundations, fire suppression systems in control buildings, and protection, control, and monitoring systems. All these sub-programs were closed in 2023 with the exception of a portion of the program for protection, control, and monitoring systems. Specifically, installation of a digital fault recorder in the Wabush Terminal Station to improve the analysis of system events has carried over into 2025.

The variance in 2024 expenditures was attributed to extra work required to complete the installation of the digital fault recorder in the Wabush Terminal Station. Additional alarm points had to be incorporated into the data alarm system, resulting in the requirement for additional alarm marshalling equipment and time for construction, which has extended into 2025. The additional alarm points were a result of i) discrepancies between available drawings and actual field conditions; and ii) recent other projects that added new equipment.

The overall Terminal Station Refurbishment and Modernization (2022–2023) program is expected to close with actual expenditures lower than the approved budget.

Hydraulic Generation Refurbishment and Modernization (2022–2023)

Variance Type	Budget ($000)	Expenditures and Forecast ($000)	Variance ($000)
Program	6,759.5	7,722.0	962.5

This is a two-year program (2022–2023) that has carried over into 2025. The program scope is to replace or refurbish failing or failed assets at hydraulic generating facilities, and includes sub-programs for generating units, hydraulic structures, reservoirs, site buildings and services and common auxiliary systems. All these sub-programs were closed in 2023 with the exception of the draft tube deck substructure Level 2 condition assessment - Powerhouse 1 for the Bay d'Espoir Hydroelectric Generating Station, within the site buildings and services sub-program.

The forecasted variance in overall program expenditures is primarily attributed to the draft tube deck substructure condition assessment. There was additional construction costs associated with a requirement to schedule the in-water inspections in stages, necessitated by unforeseen challenges in taking the Bay d'Espoir generating units offline so that inspection work could be completed safely. Crews were mobilized to site to perform the inspections in 2022 and 2024; however, work was unable to be completed due to unforeseen circumstances and resulted in mobilization, standby, and demobilization contract costs. The in-water inspection work was deferred in 2022 as a result of the closure of the Bay d'Espoir Highway; again in 2023 as a result of outage availability; and work was deferred in 2024 as a result of the unanticipated delay in return to service of Bay d'Espoir Unit 7. The unit outages could not be rescheduled to complete the in-water inspections later in the year. Hydro is planning to complete in-water inspections of the draft tube deck substructure for Units 1 to 4 in 2025 and will use these results to form assumptions on the condition of Units 5 to 6.

The variance is also associated with the additional refurbishment work required for the overhaul of Unit 6 at the Bay d'Espoir Hydroelectric Generating Station, completed in 2022. More refurbishment work was required for the turbine runner and various components of the generator rotor than anticipated at the time of budget estimate preparation.

Hydraulic Generation Refurbishment and Modernization (2021–2022)[28]

Variance Type	Budget ($000)	Actual Expenditures ($000)	Variance ($000)
Annual	72.7	185.3	112.5

This was a two-year program (2021-2022) that carried over and was completed in 2024. The program scope was to replace or refurbish failing or failed assets at hydraulic generating facilities, and includes sub-programs for generating units, hydraulic structures, reservoirs, site buildings and services and common auxiliary systems. All these sub-programs were closed prior to 2024 with the exception of the annunciator replacement at the Hinds Lake Hydraulic Generating Station, within the common auxiliary equipment sub-program.

The variance in 2024 expenditures was attributed to additional project management, engineering, and internal trades effort during construction and commissioning of the annunciator replacement at Hinds Lake. Additional effort was required to address technical issues. The overall Hydraulic Generation Refurbishment and Modernization (2021–2022) program was completed for lower than the approved budget amount.

[28] Numbers may not add due to rounding.

4.1.3 Approved Budgets Between $1 and $5 Million

Boiler Condition Assessment and Miscellaneous Upgrades (2024) – Holyrood

Variance Type	Budget ($000)	Actual Expenditures ($000)	Variance ($000)
Annual	3,957.8	7,864.5	3,906.7
Program	3,957.8	7,864.5	3,906.7

This was a one-year program (2024) that was closed in 2024. The program scope was to perform a Level 2 Condition Assessment on the internal components of the boilers and associated high-energy piping and to complete refurbishment work required before the 2024-2025 winter operating season. The variances in 2024 and overall program expenditures were primarily attributed to the extent of the required boiler refurbishment work. Upon disassembly and assessment of the boilers in 2023 and 2024, the level of necessary refurbishment identified for execution in 2024 was greater than anticipated at the time of the original budget estimate.[29] Hydro has not identified any viable alternative strategies for the continued safe and reliable operation of the boilers for Units 1, 2, and 3 and associated high-energy piping through the Bridging Period[30] until the capacity of Holyrood TGS can be adequately replaced, and therefore proceeded with execution.

Circuit Breakers Renewal Program (2023–2024)

Variance Type	Budget ($000)	Actual Expenditures ($000)	Variance ($000)
Annual	3,178.2	4,944.9	1,766.7
Program	3,812.0	5,578.7	1,766.7

This was a two-year program (2023-2024) that closed in 2024. The program scope was to refurbish or replace select circuit breakers at a number of terminal stations. The variances in 2024 and overall program expenditures were attributed to:

[29] A summary of refurbishment work identified and executed in 2024 as part of the Boiler Condition Assessment and Miscellaneous Upgrades (2024) – Holyrood program is included in Appendix B.
[30] Hydro considers the Bridging Period to be from present to 2030. During the Bridging Period, the system would rely primarily on existing sources of generation capacity to maintain reliability while new generation capacity is being built. The primary, readily available supply options in this period are extending the retirements of the Holyrood TGS, Stephenville Gas Turbine and the Hardwoods Gas Turbine until their capacities can be adequately replaced.

- An increase in the number of circuit breakers replacements completed, as a result of deferrals from the Upgrade Circuit Breakers (2022–2023) program due to engineering and construction resource challenges and outage availability;
- A level of effort for internal and external engineering and construction resources that exceeded the budget estimate;
- The advancement of a circuit breaker refurbishment to 2024 at Howley Terminal Station, due to an inspection that revealed a deteriorated condition; and
- A replacement of line-to-ground insulators on seven previously installed circuit breakers as a result of findings from an investigation into a failure that occurred in 2022.

The over-expenditure was partially offset by the deferral of four circuit breaker refurbishments to future years. There are no viable alternatives for this program and Hydro proceeded with execution.

Diesel Genset Replacement Program (2023–2025)

Variance Type	Budget ($000)	Actual Expenditures ($000)	Variance ($000)
Annual	241.1	598.8	357.7

This is a three-year program (2023-2025) that commenced in 2023. The program scope is to:

- Replace Unit 2053 and replace or upgrade associated equipment at the Hopedale Diesel Generating Station; and
- Replace Unit 2056 and replace or upgrade associated equipment at the St. Brendan's Diesel Generating Station.

The work at St. Brendan's was completed in 2023. As reflected in a budget update in the 2024 CBA, following the initial tender for the new genset, it was determined that the planned 1,067 kW, 1,200 rpm genset cost was significantly higher than originally estimated. An updated analysis of alternatives concluded that a genset between 700 kW and 850 kW at 1,800 rpm is the least-cost alternative by a significant margin. Hydro changed the scope for Hopedale to a lower-cost alternative and extended the project schedule into 2026.

After the budget update in the 2024 CBA, Hydro was able to make improvements to the schedule and budget, and a further update was provided in the 2025 CBA. At that time, the expected delivery of the genset was shorter than previously anticipated, which would allow construction to commence in 2024 and be completed in 2025; however, due to failure of the new unit during testing at the factory, the genset will not be ready for installation until 2025.

The variance in 2024 expenditures was primarily attributed to the addition of a hydronic heating system for the Hopedale generating station to the scope of the program. The hydronic heating system will utilize waste heat from the diesel genset to heat the powerhouse. This system is expected to lower the overall generating station operating costs and reduce the environmental impact through a reduction in the quantity of diesel fuel consumed to power electric heaters. The materials for the heating system were procured and construction commenced in 2024. The overall program expenditures are expected to be within 10% of the approved budget.

Diesel Genset Replacements (2021–2022)

Variance Type	Budget ($000)	Expenditures and Forecast ($000)	Variance ($000)
Program	2,846.8	3,147.7	300.9

This is a two-year program (2021–2022) that has been carried over into 2025. The program scope is to replace a diesel genset and upgrade associated mechanical, electrical, and protection and control equipment at the Nain Diesel Generating Station. The program is substantially complete with most planned assets in service in 2022. A portion of the plant automation work carried over to 2025 due to internal protection and control resources being dedicated to higher-priority work. Work completed in 2024 included installation of communications equipment, field modifications to the main switchgear, and engineering design for modifications to the Generator G4 switchgear. Work carried over to 2025 is the field work to modify the G4 switchgear, and updates to the overall plant automation system. The forecasted variance in overall program expenditures is attributed to the costs associated with carrying the program an additional two years and delays associated with resource constraints and program team turnover.

Holyrood Fuel Tank 1 Inspection and Refurbishment (2022–2023) – Supplemental

Variance Type	Budget ($000)	Actual Expenditures ($000)	Variance ($000)
Annual	190.8	2,134.5	1,943.7
Project	2,052.1	5,793.8	3,741.7

This was a two-year supplemental project (2022–2023) that carried over and was completed in 2024. The project scope was to clean, inspect, and refurbish a fuel oil storage tank (Tank 1) at the Holyrood TGS. The variances in 2024 and overall project expenditures were attributed to more cleaning, inspection, and refurbishment work required than was anticipated at the time of the original budget estimate. A leak was identified in Tank 1 during the initial filling in 2023 following the planned cleaning, inspection, and refurbishment work. This required the removal of fuel from the tank and additional cleaning, inspection, and refurbishment work. Soil remediation was also required as a result of the leak. Additional tank inspections and refurbishment work were completed in 2024 prior to returning Tank 1 to service. This included refurbishment of the tank chine[31] to remove holes and cuts that were identified during the inspection and replacement of tank access covers that had corroded. Additional costs were incurred during the reinstallation of the tank door sheath due to the requirement to increase the size of the weld root pass. There were no viable alternatives for this project and Hydro proceeded with execution.

Labrador City L22 Voltage Conversion (2022–2023)

Variance Type	Budget ($000)	Actual Expenditures ($000)	Variance ($000)
Annual	1,210.7	1,895.1	684.4
Project	1,491.2	2,175.6	684.4

This was a two-year project (2022–2023) that carried over and was completed in 2024. The project scope was to convert Line L22 to a 22 kV line utilizing pad-mounted transformers and connecting it to a distribution line originating in Vanier Substation located in Labrador City. The project carried over into 2024 as a result of delayed delivery of the new transformers.

[31] The “tank chine” is the flat plate at the bottom of a steel tank that intersects the shell and rests on a concrete foundation.

The variances in 2024 and overall project expenditures were primarily attributed to higher-than-anticipated construction contract costs. Higher procurement, engineering and project management costs also contributed to the variance. Hydro tendered the construction work in 2024, and the tendered pricing exceeded the budget estimate. Prior to award, Hydro revisited the project alternatives identified at the budget estimate phase of the project. Considering that the new pad-mounted transformers had already been procured, and that other alternatives could reasonably be expected to experience similar higher construction costs, Hydro concluded that the planned solution remained the least-cost alternative. Hydro then awarded the contract and completed the project in 2024.

Refurbish Superstructure (2023–2024) – Salmon River Spillway

Variance Type	Budget ($000)	Expenditures and Forecast ($000)	Variance ($000)
Annual	2,649.3	533.1	(2,116.2)
Project	2,828.3	825.3	(2,003.0)

This was a two-year project (2023–2024) that carried over and was completed in early 2025. The project scope of work was to refurbish the Salmon River Spillway steel superstructure. Although there is no over-expenditure and therefore no reportable variance explanation required, Hydro is providing a summary, as there was a significant change in the project scope.

During execution of the planned structural analysis as part of this project, the engineering consultant advised that more extensive refurbishment and/or replacement of the superstructure would be required, which could include replacing steel members and installing additional supports, or a full replacement of the superstructure. Such a level of refurbishment would require significantly more expenditures than was budgeted in this project. As a result, the following scopes of work that would have directly interfaced with structural members were cancelled and may be reconsidered in a future CBA:[32]

- Replacement of deteriorated grout beneath column base plates;
- Replacement of defective welds with bolted connections;
- Replacement of horizontal bracing and gusset plates;

[32] Hydro intends to submit a new project proposal for review by the Board as part of a future CBA.

- Replacement of expansion joints; and
- Surface preparation and application of coating system.

Hydro completed the following project scopes of work that would not be impacted by future superstructure refurbishment work or were required to address safety risks:

- Completion of a structural analysis;
- Replacement of missing anchors;
- Replacement of handrails on spillway bridge deck with traffic barriers;
- Replacement of access ladder to top of superstructure; and
- Replacement of missing/deteriorated bolts.

Hydro completed the following additional scopes of work that were identified during the project execution to address safety hazards:

- Replacement of handrails on the upper superstructure deck;
- Installation of new safety gates; and
- Installation of fall arrest anchors and lifelines.

Renew Circuit Breakers (2024–2025)

Variance Type	Budget ($000)	Expenditures and Forecast ($000)	Variance ($000)
Program	2,304.0	2,641.0	337.0

This is a two-year program (2024–2025) that commenced in 2024. The program scope is to refurbish or replace select circuit breakers at a number of terminal stations. The forecasted variance in overall program expenditures is attributed to a net increase in the required number of circuit breaker refurbishments. The program scope previously anticipated the refurbishment of five circuit breakers. As a result of the deferral of some breaker refurbishments from the Circuit Breakers Renewal (2023–2024) program, and some adjustments to the long-term asset plan for some circuit breakers, the planned number of refurbishments has changed to nine. The program scope also anticipates the replacement of three circuit breakers, which has not changed.

Replace Powerhouse Station Service Panel (2023–2024) – Upper Salmon

Variance Type	Budget ($000)	Actual Expenditures ($000)	Variance ($000)
Annual	1,228.2	1,643.4	415.2
Project	1,568.5	2,526.7	958.2

This was a two-year project (2023–2024) that was completed in 2024. The project scope was to replace the 600 V station service panel at Upper Salmon. The variances in 2024 and overall project expenditures were attributed to:

- Contract pricing to procure the replacement station service panel that was higher than the original budget estimate;
- Construction contract pricing to install the station service panel that was higher than the original budget estimate, primarily as a result of having to include work in the contractor's scope that was originally expected to be completed by internal resources that became unavailable; and
- Additional engineering and project management effort required to address unforeseen turnover of project team resources and various technical challenges.

There were no viable alternatives for this project and Hydro proceeded with execution.

Replace Protective Relays (2024–2025)

Variance Type	Budget ($000)	Expenditures and Forecast ($000)	Variance ($000)
Program	3,439.1	4,471.1	1,032.0

This is a two-year program (2024–2025) that commenced in 2024. The program scope is to replace protection systems at a number of terminal stations and generating stations. The forecasted variance in overall program expenditures is attributed to a net increase in the planned number of protection systems to be replaced. The program scope originally anticipated the replacement of 16 systems. Seven more protection system replacements were added to the program for completion as a result of transfers of scopes from the Terminal Station Renewal Program (2023–2024) and the Upgrades for the Future Retirement of Stephenville Gas Turbine project.

Replace Transformer T7 (2020) – Holyrood Terminal Station

Variance Type	Budget ($000)	Actual Expenditures ($000)	Variance ($000)
Annual	(34.4)	223.2	257.6
Project	2,678.1	4,708.4	2,030.3

This was a one-year project (2020) that carried over and was completed in 2024. The project scope was to replace a transformer at the Holyrood Terminal Station (T7) with a transformer removed from the Churchill Falls Switchyard (T31) and complete associated civil and protection and control upgrades. The removal of the old T7 transformer and its foundation and the installation of a new concrete pad and oil containment system were completed in 2020.

As a result of Hydro's decision to maintain L1301 as a backup for the Muskrat Falls to Happy Valley Interconnection for the winter of 2020–2021, T31 was not available in 2020 to replace T7, as planned by Hydro and approved by the Board. In 2020, Hydro performed an analysis of the resulting risk and confirmed that there would be low risk to customers as a result of this deferral. The work was deferred again in 2021 as a result of further deferral of the Muskrat Falls to Happy Valley Interconnection. In 2022, logistical issues related to the size of the transformer and its transportation route delayed the transformer delivery to Holyrood into 2023.

As a result of a tragic incident at the Holyrood Terminal Station in August 2023, resulting in a workplace fatality, some remaining construction and commissioning activities at the Holyrood Terminal Station carried over into 2024. The remaining work was completed in 2024.

The variance in 2024 expenditures was attributed to a greater level of effort required for internal field execution resources to complete the final construction and commissioning work. The variance in overall project expenditures was primarily attributed to higher-than-originally estimated transformer transportation costs.

Replace Unit 2047 (2021–2023) – Ramea (Supplemental)

Variance Type	Budget ($000)	Expenditures and Forecast ($000)	Variance ($000)
Annual	1,075.4	1,226.5	151.1
Project	2,436.8	3,318.0	881.2

This is a three-year supplemental project (2021-2023) that has carried over into 2025. The project scope is to replace Unit 2047 in the Ramea Diesel Generating Station with a new 500 kW, 1,800 rpm diesel genset, as well as replacement of the associated exhaust stack, radiator, aftercooler, switchgear, and breaker. The scope also includes the installation of fuel coolers and upgrades to some existing protection and control equipment and the existing cooling system. The new genset and associated new components were installed and placed in service in 2024 and the unit is operable in manual mode. Challenges with availability of internal protection and control engineering and construction resources resulted in the carryover of a portion of the automation and communications work to 2025.

The variance in 2024 expenditures and forecasted variance in overall project expenditures are primarily attributed to the following activities that were not included in the budget estimate:

- Additional labour and travel costs for internal resources to complete the construction and commissioning activities;
- An external engineering consultant for commissioning of switchgear modifications;
- Replacement of the silencer for the new unit to reduce noise in the surrounding community; and
- Modifications of the powerhouse hydronic heating system and the fire alarm system to make them compatible with the new genset.

There were no viable alternatives for this project and Hydro is proceeding with execution.

Upgrade Power Transformers (2024–2025)

Variance Type	Budget ($000)	Expenditures and Forecast ($000)	Variance ($000)
Program	3,575.9	6,346.5	2,770.6

This is a two-year program (2024–2025) that commenced in 2024. The program scope includes the refurbishment of power transformers at a number of terminal stations. The forecasted variance in overall program expenditures is attributed to:

- A higher-than-originally-estimated cost to supply bushings for the 40 year-old Holyrood Transformer T1, due to a lack of drawings;
- Additional transformer refurbishments resulting from the deferral of work from the Terminal Station Renewal (2023-2024) program due to:
  - challenges in finding a supplier for new oil dehydrators;
  - an unavailable equipment outage for work in Stephenville Terminal Station; and
  - unavailability of the mobile substation required for work at Glenburnie and Wiltondale Terminal Stations;
- Additional transformer bushing replacements required to meet the requirements of the federal government PCB[33] regulations; and
- Additional transformer refurbishments required to address updated asset condition information.

Wood Pole Line Management Program (2024)

Variance Type	Budget ($000)	Actual Expenditures ($000)	Variance ($000)
Annual	3,765.2	5,122.8	1,357.6
Program	3,765.2	5,122.8	1,357.6

This was a one-year program (2024) that closed in 2024. The program scope was to inspect, refurbish, or replace wood pole transmission line components, including poles, structures, hardware, and conductors.

[33] Polychlorinated biphenyls (“PCB”).

The variances in 2024 and overall program expenditures were attributed to higher costs to execute work compared to the historical costs that were used for the original budget estimate. In particular, Hydro experienced higher contract costs and additional activities were required to mitigate environmental risk when accessing transmission lines through bogs and wetlands. There are no viable alternatives for this program other than re-pacing of the work. To partially mitigate the over-expenditure in 2024, Hydro reviewed the timing of the program activities and deferred a portion of the work to subsequent years.

4.1.4 Approved Budgets Under $1 Million

Install Breaker Failure Protection (2023–2024) – Sunnyside

Variance Type	Budget ($000)	Expenditures and Forecast ($000)	Variance ($000)
Annual	206.2	389.3	183.1
Project	289.7	948.6	658.9

This is a two-year project (2023–2024) that has carried over into 2025. The project scope is to upgrade the 230 kV breaker failure protection at the Sunnyside Terminal Station. The variances in 2024 and overall project expenditures were attributed to:

- The addition of breaker failure protection upgrades at Oxen Pond and Massey Drive Terminal Stations, which were partially completed as part of the scope for the Terminal Station Refurbishment and Modernization (2021–2022) program, as approved as part of the 2021 CBA, but could not be fully completed in 2022 due to engineering and construction resource challenges and outage unavailability; and
- Additional effort required to complete the scope due to unforeseen complexity of the work and a high level of turnover of project team resources.

There are no viable alternatives to this project and Hydro is proceeding with execution.

Overhaul Diesel Units (2024)

Variance Type	Budget ($000)	Actual Expenditures ($000)	Variance ($000)
Annual	829.2	1,300.3	471.1
Program	829.2	1,300.3	471.1

This was a one-year program (2024) that closed in 2024. The program scope was to overhaul or replace diesel engines and to overhaul alternators at Hydro's diesel generating stations. The variances in 2024 and overall program expenditures were attributed to a greater number of engine overhauls completed than anticipated at the time of the original budget estimate. The timing of overhauls is based upon the operating hours of the units.[34] The 2024 program scope originally anticipated the overhaul of five diesel engines at the various diesel generating stations, whereas seven overhauls were required and completed during the year. Also contributing to the variance, the actual costs associated with two of the overhauls were higher than the original estimates.

Overhaul Pumps (2024) – Holyrood

Variance Type	Budget ($000)	Actual Expenditures ($000)	Variance ($000)
Annual	661.0	134.7	(526.3)
Program	661.0	134.7	(526.3)

This was a one-year program (2024) that closed in 2024. Although there is no over-expenditure and therefore no reportable variance explanation required, Hydro is providing a summary, as there was a significant change in the program scope.

The original program scope was to overhaul three pumps at the Holyrood TGS:

- Unit 1 South Vacuum Pump;
- Unit 2 North Vacuum Pump; and
- Unit 2 East Boiler Feedwater Pump.

The Unit 1 South Vacuum Pump and the Unit 2 North Vacuum Pump were overhauled in 2024 as planned. The overhaul of the Unit 2 East Boiler Feedwater Pump was deferred to 2025, due to a necessity to shorten the planned Unit 2 outage in 2024 by 2 weeks, leaving insufficient time to overhaul the pump. The outage was shortened to address electrical system conditions and ensure planned outages could proceed for other generating units required for more critical work. As part of the decision to shorten the outage, it was confirmed that carry over of the pump overhaul work into 2025 would not

[34] Units that operate at 1,200 rpm are overhauled at a frequency of 30,000 operating hours and units that operate at 1,800 rpm are overhauled at 20,000 hours.

result in a significant winter readiness risk. Meanwhile, parts required for the pump overhaul were procured and are available for when the work proceeds as part of the Overhaul Pumps (2025) program.

Replace Intermediate Fuel Storage Tanks (2023–2024) – Nain

Variance Type	Budget ($000)	Expenditures and Forecast ($000)	Variance ($000)
Project	721.1	1,261.7	540.6

This is a two-year project (2023–2024) that has carried over into 2025. The project scope is to increase the intermediate fuel storage system capacity at the Nain Diesel Generating Station. The forecasted variance in overall project expenditures is associated with higher-than-originally-estimated contract pricing for the construction work. Hydro tendered the work in early 2024 but did not award the contract as the tendered pricing significantly exceeded the budget estimate. Opportunities to optimize the design and construction strategy were then considered, and the project estimate and cost benefit analysis of project alternatives were updated. It was confirmed the project alternative to increase the intermediate fuel supply capacity remains the least-cost alternative. The additional time to review the project estimate and alternatives has resulted in the project carrying over to 2025. Hydro is re-tendering the work and has incorporated a construction strategy improvement that will eliminate the need for a mobile crane to be brought to site.

4.2 General Plant

4.2.1 Approved Budgets Over $5 Million

Replace Light- and Heavy-Duty Vehicles (2024–2026)

Variance Type	Budget ($000)	Actual Expenditures ($000)	Variance ($000)
Annual	1,479.1	2,053.8	574.7

This is a three-year program (2024–2026) that commenced in 2024. The program scope is to replace light- and heavy-duty vehicles. The variance in 2024 expenditures was primarily attributed to an increase in the required number of new light-duty vehicles. The program scope originally anticipated the procurement of 30 light-duty vehicles and eight heavy-duty vehicles. In 2024, a need was identified to procure an additional eight light-duty vehicles in 2024, due to unforeseen in-service failures. The failed vehicles did not merit repair costs, given their age, high usage, and/or condition. Although there has been an increase in the quantity of vehicles to be purchased, the overall program expenditures are expected to be within 10% of the approved budget.

4.2.2 Approved Budgets Between $1 Million and $5 Million

Install Ultra-Fast DC Electric Vehicle Chargers (2023–2025) – Supplemental

Variance Type	Budget ($000)	Expenditures and Forecast ($000)	Variance ($000)
Project	2,059.8	2,779.8	720.0

This is a three-year supplemental project (2023–2025) that commenced in 2023. The project scope is to expand the capacity of the province's Electric Vehicle ("EV") fast charging network, in partnership with the Government of Newfoundland and Labrador and the Government of Canada. The forecasted variance in overall project expenditures is attributed to an increase in the planned number of charging stations being installed. The original scope of this project was to procure and install seven ultra-fast direct current EV chargers at five of Hydro's most utilized charging sites along the Trans Canada Highway. In 2024, additional funding was secured by the Government of Newfoundland and Labrador and the number of planned new chargers has increased to ten.

Replace Diesel Shop Building (2023–2025) – Bishop's Falls

Variance Type	Budget ($000)	Actual Expenditures ($000)	Variance ($000)
Annual	1,223.4	43.2	(1,180.2)
Project	1,422.1	241.9	(1,180.2)

This three-year project (2023–2025) closed in 2024 before commencement of construction. The project scope was to replace the existing diesel shop building at the Bishop's Falls Complex. As the engineering design approached 33% completion, the estimate to complete the project increased from $2.3 million to approximately $5.7 million. Hydro then decided to halt project activity and close the project, to allow for further review of the scope, estimate, and justification. Hydro intends to submit a new project proposal for review by the Board as part of a future CBA. The engineering and planning expenditures incurred on this project will be treated financially as work-in-progress. If the expenditures are deemed used and useful to the new project scope, the expenditures will be assigned to the new asset if and when the new project is approved, constructed, and placed in service.

Replace Underground Firewater Distribution System (2022–2023) – Holyrood

Variance Type	Budget ($000)	Actual Expenditures ($000)	Variance ($000)
Project	1,706.3	3,080.5	1,374.2

This was a two-year project (2022–2023) that carried over and was completed in 2024. The project scope was to replace the underground firewater distribution system that protects the buildings and terminal station at the Holyrood TGS. The project carried over into 2024 due to a longer than originally planned design phase. The variance in overall project expenditures was attributed to construction contract pricing that was higher than what was included in the original budget estimate. There were no viable alternatives for this project and Hydro proceeded with execution in 2024.

Upgrade Water and Fire Suppression Systems (2023–2024) – Bishop's Falls

Variance Type	Budget ($000)	Expenditures and Forecast ($000)	Variance ($000)
Project	3,240.0	5,800.0	2,560.0

This is a two-year project (2023–2024) that has carried over into 2025. The project scope is to:

- Install a new water supply line from the town near the Botwood Highway close to the Bishop’s Falls Complex;
- Install dedicated domestic water and firewater distribution lines; and
- Upgrade the fire suppression system in the main building of the Bishop’s Falls Complex.

The forecasted variance in overall project expenditures is attributed to procurement and construction costs that are higher than the original budget estimate. In particular, it was determined during the engineering design that a new pump house building, and a backup fire pump generator are required. At the time of preparation of the 2024 Capital Expenditures Overview in the 2025 CBA, Hydro forecasted a variance of $1.57 million, based upon a pre-tender estimate for the construction work.[35] Hydro has now tendered and awarded the work, and the forecasted variance has been adjusted to $2.56 million to reflect the actual tendered pricing. There are no viable alternatives for this project and Hydro is proceeding with execution. The project has carried over into 2025 due to a longer-than-originally-planned design phase and longer-than-originally-expected lead times for some of the new components.

4.2.3 Approved Budgets Under $1 Million

Replace Building Exterior (2023–2024) – Postville

Variance Type	Budget ($000)	Actual Expenditures ($000)	Variance ($000)
Annual	683.3	1,200.8	517.5
Project	683.3	1,200.8	517.5

This was a two-year project (2023–2024) that was completed in 2024. The project scope was to refurbish the powerhouse building exterior envelope for the Postville Diesel Generating Station. The variance in 2024 and overall project expenditures was attributed to contract pricing that was higher than the original budget estimate. There were no viable alternatives for this project.

Replace Mobile Equipment (2024–2025)

Variance Type	Budget ($000)	Actual Expenditures ($000)	Variance ($000)
Annual	216.9	564.8	347.9

This is a two-year program (2024–2025) that commenced in 2024. The program scope originally anticipated the procurement of seven ATVs,[36] three light-duty trailers, two heavy-duty trailers, and one forklift. The variance in 2024 expenditures was primarily associated with delivery of several mobile equipment items in 2024 that were originally expected to be delivered in 2025. Also contributing to the variance is the procurement of one additional ATV and two additional trailers due to unforeseen in-service failures. The failed equipment did not merit repair costs given their age, high usage, and/or

[35] For further information, please refer to "2025 Capital Budget Application," Newfoundland and Labrador Hydro, July 16, 2024, sch. 5, sec. 1.2.3, p. 8.
[36] All-terrain vehicle ("ATV").

condition. Although there has been an increase in the quantity of equipment to be purchased, the overall program expenditures are expected to be within the approved budget.

Replace Mobile Equipment (2023–2024)

Variance Type	Budget ($000)	Actual Expenditures ($000)	Variance ($000)
Program	728.5	764.6	36.1

This was a two-year program (2023–2024) that was closed in 2024. The program scope originally anticipated the procurement of 10 ATVs, 8 snow mobiles, and 12 light-duty trailers. The overall program expenditures were approximately 5% over the approved budget.[37] The over-expenditure was attributed to a need to procure two additional ATVs, due to unforeseen in-service failures. The failed equipment did not merit repair costs given their age, high usage, and/or condition. This was partially offset by procuring two less light-duty trailers in this program.

Upgrade Energy Management System (2024)

Variance Type	Budget ($000)	Actual Expenditures ($000)	Variance ($000)
Annual	366.4	4.6	(361.8)
Program	366.4	4.6	(361.8)

This one-year program (2024) has been cancelled. The program scope was to upgrade the Energy Management System software to mitigate security vulnerabilities, implement bug fixes, and introduce enhanced functionality on a two-year cycle. Although there is no over-expenditure and therefore no reportable variance explanation required, Hydro is providing a summary, as there was a significant change in the program scope. The software vendor advised Hydro that it was unable to support this work in 2024. Hydro's attempts to escalate with the vendor did not lead to change. The scope originally planned for 2024 is now included within the Upgrade Energy Management System (2025–2026) program, approved as part of the 2025 CBA.

[37] This percentage variance is less than 10% and does not trigger a requirement for a variance explanation, but an explanation has been provided since the project was internally approved as an under $750,000 expenditure but the actual expenditures at completion exceeded that threshold.

Water System Condition Assessment and Upgrades (2023–2024) – Bay d'Espoir

Variance Type	Budget ($000)	Expenditures and Forecast ($000)	Variance ($000)
Project	665.9	1,328.2	662.3

This is a two-year project (2023–2024) that has carried over into 2025. The project scope is to complete improvements to the Bear Brook water supply system at the Bay d'Espoir Hydroelectric Generating Station which include replacement of the water storage tank and the relocation of a section of the water line located at Bear Brook crossing. The project scope also includes a condition assessment of the remaining system components to identify issues and assist with the planning of future capital refurbishment work necessary to maintain system reliability. The project carried over into 2025 due to procurement delays during tendering and the longer-than-anticipated lead time on the new water storage tank.

The forecasted variance in overall project expenditures is primarily attributed to higher-than-originally-estimated contract pricing to procure and install the replacement water storage tank and to relocate the section of water line. In addition, project management and internal labour costs are higher than what was carried in the original budget estimate. Completion of the proposed water supply system improvements is the only viable project alternative, and Hydro is proceeding with execution.

4.3 System Growth

4.3.1 Approved Budgets Over $5 Million

Wabush Terminal Station Upgrades (2021–2024)

Variance Type	Budget ($000)	Expenditures and Forecast ($000)	Variance ($000)
Annual	3,229.4	4,607.7	1,378.3
Project	12,678.1	16,120.6	3,442.5

This is a four-year project (2021–2024) that has carried over into 2025. The project scope includes the replacement of Transformers T4 and T5 and the addition of a new capacitor bank to support Hydro's ability to provide firm supply for customers in accordance with the criteria established for the transmission system in Western Labrador. The capacitor bank was installed in 2023. The project carried over as a result of longer than originally expected delivery of two new transformers, resulting in the installation of T5 being delayed from 2023 to 2024 and installation of T4 being delayed from 2024 to 2025.

The variance in 2024 expenditures was primarily attributed to contract pricing that exceeded the budget estimates for Transformer T5: supply; civil and electrical construction; and protection and control construction.

The forecasted variance in overall project expenditures is primarily attributed to:

- Higher-than-originally-estimated costs for work completed in 2024;
- Contract pricing that exceeded the budget estimates for capacitor bank supply and civil and electrical construction; and,
- Anticipated higher than estimated contract pricing for Transformer T4 supply and construction in 2025.

4.4 Access

4.4.1 Approved Budgets Between $1 Million and $5 Million

Provide Service Extensions (2024)

Variance Type	Budget ($000)	Actual Expenditures ($000)	Variance ($000)
Annual	4,272.0	6,074.7	1,802.7
Program	4,272.0	6,074.7	1,802.7

This is an annual project to provide service extensions to customers. The budget is based on historical data from each region. The variance in 2024 was primarily the result of more requests for completion of service extensions than budgeted.

4.5 Service Enhancement

4.5.1 Approved Budgets Over $5 Million

Replace Metering System (2022–2024)

Variance Type	Budget ($000)	Expenditures and Forecast ($000)	Variance ($000)
Annual	1,618.0	3,649.0	2,031.0
Project	5,875.8	8,095.8	2,220.0

This three-year project (2022–2024) has carried over into 2025. The project scope is to replace manually-read meters and TS1 meters with a drive-by automatic meter reading system. The variance in 2024 expenditures and forecasted variance in overall project expenditures are primarily attributed to contract labour costs necessary to complete the project. The original project plan was to utilize internal resources to complete the installation of the meters; however, the pace of meter replacements was slower than anticipated due to resource constraints. To bring the project to completion in a reasonable timeframe, Hydro hired internal temporary resources to support the project and is utilizing contractors to install approximately 16,000 meters. Also contributing to the variances, project management and implementation of the associated information systems require additional funding to complete the planned scope of work. Hydro reviewed the cost-benefit analysis of alternatives and confirmed that the solution being implemented remains the least cost alternative. Hydro is proceeding with execution.

Upgrades for Future Retirement of Stephenville Gas Turbine (2021–2022)

Variance Type	Budget ($000)	Actual Expenditures ($000)	Variance ($000)
Annual	2,954.7	408.9	(2,545.8)
Project	6,874.9	5,115.6	(1,759.3)

This was a two-year project (2021–2022) that carried over and was closed in 2024. Although there is no over-expenditure and therefore no reportable variance explanation required, Hydro is providing a summary as a significant portion of the project has been cancelled.

The project scope included several upgrades to the Bottom Brook and Stephenville Terminal Stations to minimize the risk of customer outages due to a transformer or transmission line failure following the decommissioning of the Stephenville Gas Turbine. A portion of the project scope is complete and in service. In 2024, Hydro decided to cancel most of the remaining scope of this project as a result of the decision to keep the Stephenville Gas Turbine available for the Bridging Period until 2030,[38] or until such time that sufficient alternative generation is commissioned, adequate performance of the Labrador-Island Link is proven, and generation reserves are met. Hydro intends to submit a future capital budget proposal for a new project to complete the remaining upgrades, timed to coincide with the retirement of Stephenville Gas Turbine.

No scope of work was completed at the Stephenville Terminal Station. Completed project scope at the Bottom Brook Terminal Station includes:

- Concrete pads and oil containment systems for two transformers;
- A new disconnect switch;
- Foundations and structures for 230 kV and 69 kV buses;
- A portion of the lighting upgrades; and
- A portion of the grounding system upgrades.

Transformer and transmission line protection upgrades were partially completed and these scopes have been transferred to the Replace Protective Relays (2024–2025) program, for completion of the work. These upgrades will provide immediate benefits by reducing customer impact from any unplanned outages.

All other remaining scope is cancelled and will be completed as part of the future capital project. For new equipment purchased but not yet installed, Hydro was able to utilize some of that equipment on other projects, retain it as capital spares, or add it to inventory. All other expenditures incurred on this project will be treated financially as work in progress. If the expenditures are deemed used and useful with regard to the new project scope, the expenditures will be assigned to the new assets if and when the new project is approved, constructed and placed in service.

[38] "2024 Resource Adequacy Plan – An Update to the Reliability and Resource Adequacy Study," Newfoundland and Labrador Hydro, rev. August 26, 2024 (originally filed July 9, 2024).

4.5.2 Approved Budgets Between $1 Million and $5 Million

Winterize Unit 2102 and Install Mobile – Charlottetown (Supplemental)[39]

Variance Type	Budget ($000)	Actual Expenditures ($000)	Variance ($000)
Annual	44.1	191.1	147.0
Project	1,314.7	1,786.7	472.0

This supplemental project commenced in 2022 and was carried over and completed in 2024. The project scope was to perform upgrades to improve the reliability of service for the communities of Charlottetown and Pinsent's Arm in Labrador. Construction was completed in 2023 except for the replacement of the transformer for Unit 2108, due to late delivery of the new transformer. The transformer was subsequently delivered and installed in 2024. The variances in 2024 and overall project expenditures were primarily attributed to more extensive refurbishment work required than originally anticipated and additional environmental permitting requirements. A review of project alternatives confirmed that the project remained the least-cost alternative.

Upgrade of Worst-Performing Distribution Feeders (2023–2024)

Variance Type	Budget ($000)	Actual Expenditures ($000)	Variance ($000)
Annual	774.3	1,420.3	646.0
Program	1,446.0	2,092.0	646.0

This is a two-year program (2023–2024) that closed in 2024. The program scope was to upgrade a distribution feeder and relocate a section of distribution line in the Farewell Head Distribution System. The variances in 2024 and overall program expenditures were attributed to asset conditions being worse than originally anticipated, resulting in the need to replace additional poles, cross arms and other components. Also, the construction activity took longer than originally anticipated due to challenging site conditions. Hydro considered the alternative of constructing a new feeder at the time of the original budget proposal; however, the line is approximately 58 kilometres long and approximately 88% of the poles were less than 35 years old. Other existing feeder components are still in operable condition, such

[39] "Application for Approval of Capital Expenditures Necessary to Address Supply in Charlottetown and Pinsent's Arm, Labrador," Newfoundland and Labrador Hydro, October 7, 2022.

as conductors, insulators, and cross arms. The complete replacement of the existing feeder would require a level of investment that is not required for the continuation of reliable service.

4.5.3 Approved Budgets Under $1 Million

Install Oil Spill Containment Transformer T1S (2023–2024) – Cat Arm

Variance Type	Budget ($000)	Actual Expenditures ($000)	Variance ($000)
Project	581.6	873.8	292.2

This was a two-year project (2023–2024) that was completed in 2024. The project scope was to install a secondary oil containment system for the spare power Transformer T1S located at Hydro's Cat Arm Hydroelectric Generating Station to prevent the accidental release of transformer oil into the environment. The variance in overall project expenditures was attributed to supply and construction contract pricing that exceeded the original budget estimate. There were no viable alternatives to this project and Hydro proceeded with execution.

4.6 Mandatory

4.6.1 Approved Budgets Between $1 Million and $5 Million

Refurbish Fuel Oil Storage Tank 4 (2024) – Holyrood

Variance Type	Budget ($000)	Actual Expenditures ($000)	Variance ($000)
Annual	1,920.0	2,150.8	230.8
Project	1,920.0	2,150.8	230.8

This is a single year (2024) project that was completed in 2024. The project scope was to clean, inspect, and refurbish a fuel oil storage tank (Tank 4) at the Holyrood TGS. The variances in 2024 and overall project expenditures were attributed to more refurbishment work required than was anticipated at the time of the original budget estimate. During the tank inspection following fuel transfer and cleaning, deformation was noted on the tank shell which necessitated the engagement of an external engineering consultant to perform a finite element analysis on the shell to determine stress levels in the area where deformation was noted. The engineering consultant recommended the installation of steel stiffeners on the shell in the area where deformation was noted to reinforce the tank so that it could be filled to the maximum operating level. This additional refurbishment work was completed in 2024 prior to returning Tank 4 to service. There were no viable alternatives for this project and Hydro proceeded with execution.

4.6.2 Approved Budgets Under $1 Million

Replace Terminal Station Lighting (2023–2024)

Variance Type	Budget ($000)	Expenditures and Forecast ($000)	Variance ($000)
Annual	528.7	717.0	188.3
Project	917.4	1,416.3	498.9

This is a two-year project (2023–2024) that has carried over into 2025. The project scope is to replace terminal station service lighting at various terminal stations. The variance in 2024 expenditures was attributed to higher than originally estimated construction, project management, procurement and engineering costs. The forecasted variance in overall project expenditures is attributed to:

- The higher-than-originally-estimated costs for work completed in 2024;
- A change in execution strategy for the lighting replacements for Sunnyside, which did not get completed in 2024 due to internal construction resource challenges; that scope will be completed by a contractor in 2025, which is expected to result in higher expenditures than budgeted; and
- Expansion of the project scope to include lighting replacements for the generating unit transformer bays at Bay d'Espoir, which is expected to be completed in 2025.

There are no viable alternatives for this project and Hydro is proceeding with execution.

4.7 Allowance for Unforeseen

Hydro did not identify any work in 2024 that necessitated the use of the Allowance for Unforeseen Items Account.

5.0 Lease/Purchase Approval Approach

Hydro did not execute any capital leases in 2024.

6.0 Carryover Report

In 2024, Hydro carried over $29.7 million of budget to future years; this includes carryover of $12.6 million associated with the deferred completion of scopes previously planned for completion in 2024 and $17.1 million associated with reallocation of cost-flow within the years of approved projects and programs. For comparison, the average carryover amount for the previous nine years 2015–2023 was $26.6 million. Chart 24 shows Hydro's capital carryover for the years 2015–2024.

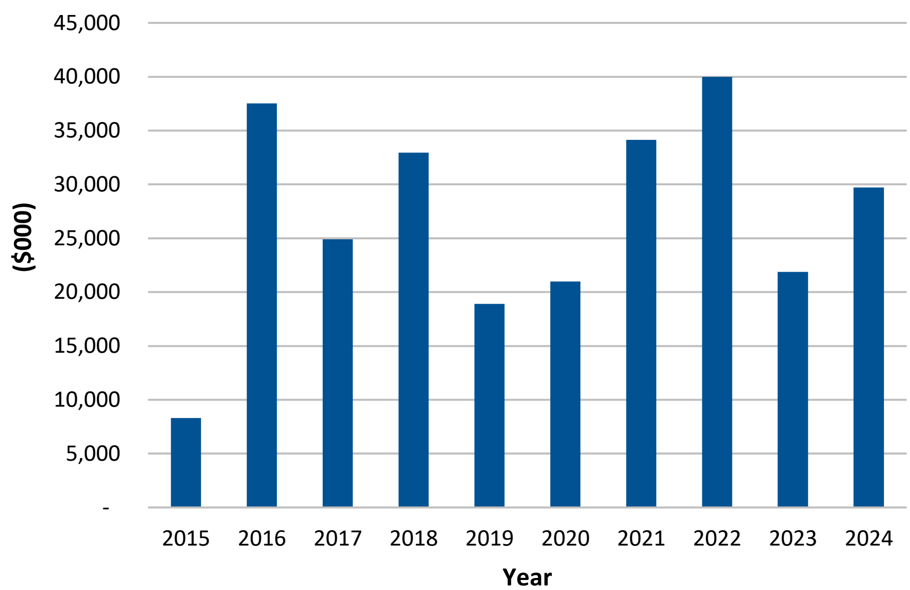

Chart 24: Carryover by Year (2015–2024)

Hydro's analysis of 2024 expenditure variances concluded that the main drivers of carryover from 2024 to future years are:

- Unforeseen challenges that arose during the detailed planning and design of work scopes;
- Work delayed as a result of challenges scheduling design and construction labour resources;
- Work paused to reassess justification or re-evaluate the cost of alternative solutions;
- Unavailability of equipment outages required to safely complete some work scopes; and
- Delayed delivery of some new equipment from vendors.

As part of its annual work planning cycle, in the early part of the calendar year, Hydro determines the risk associated with a one-year delay in completing each capital program and project work scope. This allows Hydro to minimize the risk of carryover if constraints prevent Hydro from executing all planned work. For the upcoming 2026 CBA cycle, Hydro is evaluating whether a broader approach to deferral could allow for execution of the 2026 work scope and prevent the further deferral of prior carryover to future years. Hydro utilizes an established project change management process to identify the impacts of carryover and to develop temporary mitigation plans to reduce the impact where possible until the work can be completed.

7.0 Conclusion

Hydro's 2024 capital expenditures totalled $154.2 million, exceeding the budget by $20.0 million (14.9%). Projects and programs that exceeded their individual 2024 approved budgets were partially offset by projects and programs that underspent their individual 2024 approved budgets.

The primary driver of capital program and project over-expenditures in 2024 was planned work completed at a net higher cost than the original budget estimates. Most of these over-expenditures associated with estimates are attributed to materials and construction contracts that exceeded the budget estimates, which may be indicative of a general shift in market pricing. Internal resource challenges also contributed to increased costs as a result of increasing contractor scopes to accomplish work, and deferrals subsequently impacting initial budget estimates. Unplanned work completed to address in-service failures at net higher costs than budgeted was also a significant contributor to over-expenditures. Similarly, unanticipated work completed to address condition assessments at net higher costs than budgeted also contributed to over-expenditures.

The primary driver of capital program and project under-expenditures in 2024 was work paused to reassess justification or re-evaluate the cost of alternative solutions. Hydro canceled scopes of work in 2024 that were no longer justified. In other cases, Hydro confirmed the justification or least cost alternatives and resumed the work, but with delayed expenditures. Carryover of work as a result of challenges scheduling design and construction labour resources was also a contributor to 2024 under-expenditures.

Hydro proposes projects and programs required to maintain safe, reliable, least-cost service to its customers, in an environmentally responsible manner. Hydro strives to execute all approved scopes of work when they are required and inevitably experiences some carryover of work each year. Hydro utilizes established project management practices and procedures to monitor, control, and manage this carryover. These practices and procedures incorporate continual improvement methodologies to ensure that lessons learned are captured and leveraged.

In 2024, Hydro carried over $29.7 million of budget to future years, as compared to the previous nine-year carryover average of $26.6 million. As part of its annual work planning cycle, in the early part of the calendar year, Hydro determines the risk associated with a one-year delay in completing each capital program and project work scope. This allows Hydro to minimize the risk of carryover if constraints prevent Hydro from executing all planned work. For the upcoming 2026 CBA cycle, Hydro is evaluating whether a broader approach to deferral could allow for execution of the 2026 work scope and prevent the further deferral of prior carryover to future years. Hydro utilizes an established project change management process to identify the impacts of carryover and to develop temporary mitigation plans to reduce the impact where possible until the work can be completed.

Hydro continues to review its capital budget planning and execution methodologies and use its expenditures analysis to identify opportunities that may contribute to reduced capital expenditure variances in future years.

Appendix A

Financial Schedules

2024 Capital Expenditures Summary By Year
($000)[1]

	Capital Budget									Actual Expenditure and Forecast										Variance			
	A				B	C	D (B+C)	E	F (A+C+E)	G				H	I	J: Carryover to 2025 and Beyond		K (G+H+I+J)	K-F		H-D	
Year	2020	2021	2022	2023	Carryover to 2024	Original 2024	Revised 2024	2025 and Beyond	Total	2020	2021	2022	2023	2024	2025 and Beyond	Project Carryover	Multi-Year Cash Flow Reallocation	Total	Project Variance	Project Variance (%)	Annual Variance	Annual Variance (%)
2024	-	-	-	-	(0.00)	60,448.48	60,448.48	42,873.53	103,322.01	(0.00)	0.00	(0.00)	(0.00)	78,956.20	42,873.53	1,813.17	10,455.77	134,098.67	30,776.66	29.79%	18,507.71	30.62%
2023	-	-	-	25,295.92	4,172.98	38,912.09	43,085.07	73,720.13	137,928.14	-	-	-	23,834.22	41,821.13	73,720.13	7,618.18	3,164.33	150,157.99	12,229.85	8.87%	(1,263.93)	-2.93%
2022	-	-	11,687.32	26,782.80	11,042.69	3,631.00	14,673.69	-	42,101.12	-	-	9,470.76	20,119.32	17,441.86	-	1,509.61	-	48,541.55	6,440.43	15.30%	2,768.17	18.86%
2021	-	17,693.43	27,073.90	5,221.30	3,552.84	9,329.50	12,882.34	5,466.70	64,784.83	-	8,635.85	17,324.77	21,472.33	13,139.23	5,466.70	1,697.99	3,465.38	71,202.25	6,417.42	9.91%	256.90	1.99%
2020	3,224.28	5,979.25	14,709.10	586.36	3,110.79	-	3,110.79	-	24,498.99	695.61	1,115.55	9,104.31	12,245.41	2,817.20	-	-	-	25,978.08	1,479.09	6.04%	(293.59)	-9.44%
Total	**3,224.28**	**23,672.68**	**53,470.32**	**57,886.38**	**21,879.29**	**112,321.07**	**134,200.37**	**122,060.36**	**372,635.09**	**695.61**	**9,751.40**	**35,899.84**	**77,671.28**	**154,175.62**	**122,060.36**	**12,638.94**	**17,085.48**	**429,978.54**	**57,343.45**		**19,975.25**	

[1] Numbers may not add due to rounding.

2024 Capital Expenditures Summary by Category
($000)[1]

Category	Capital Budget: A 2020	A 2021	A 2022	A 2023	B Carryover to 2024	C Original 2024	D (B+C) Revised 2024	E 2025 and Beyond	F (A+C+E) Total
Hydraulic Plant	-	9,806.36	11,214.50	10,743.10	1,433.43	17,053.09	18,486.52	73,540.73	**122,357.78**
Thermal Plant	-	-	1,559.20	16,223.50	5,852.38	20,355.83	26,208.21	2,158.13	**40,296.67**
Combustion Turbines	546.14	2,500.00	2,427.40	277.10	2,990.24	1,536.58	4,526.82	385.90	**7,673.13**
Terminal Stations	2,678.14	5,018.76	19,644.90	11,663.90	3,194.11	24,164.20	27,358.31	24,813.50	**87,983.40**
Transmission	-	3,479.25	12,281.70	586.36	272.23	5,062.52	5,334.75	-	**21,409.82**
Distribution	-	-	486.80	1,077.80	612.43	12,674.51	13,286.94	4,534.68	**18,773.79**
Generation	-	2,868.31	4,702.20	7,621.72	5,499.85	3,439.97	8,939.82	7,865.02	**26,497.22**
Properties	-	-	-	565.10	(12.98)	4,269.20	4,256.22	-	**4,834.30**
Metering	-	-	515.60	4,365.60	623.41	1,767.90	2,391.31	449.70	**7,098.80**
Tools and Equipment	-	-	40.80	2,505.70	1,752.32	2,498.63	4,250.95	1,474.89	**6,520.02**
Information Systems	-	-	-	187.40	42.78	2,519.30	2,562.08	-	**2,706.70**
Telecontrol	-	-	28.22	105.30	73.99	5,875.50	5,949.49	1,458.30	**7,467.32**
Transportation	-	-	569.00	1,963.80	(454.90)	8,471.93	8,017.03	5,061.80	**16,066.53**
Administration	-	-	-	-	-	1,631.91	1,631.91	317.70	**1,949.61**
Allowance for Unforeseen Items	-	-	-	-	(0.00)	1,000.00	1,000.00	-	**1,000.00**
Total	**3,224.28**	**23,672.68**	**53,470.32**	**57,886.38**	**21,879.29**	**112,321.07**	**134,200.37**	**122,060.36**	**372,635.09**

Category	Actual Expenditure and Forecast: G 2020	G 2021	G 2022	G 2023	H 2024	I 2025 and Beyond	J Carryover to 2025 and Beyond: Project Carryover	J Carryover to 2025 and Beyond: Multi-Year Cash Flow Reallocation	K (G+H+I+J) Total	Variance: K-F Project Variance	Project Variance (%)	H-D Annual Variance	Annual Variance (%)
Hydraulic Plant	-	5,836.64	13,533.58	11,097.61	20,732.95	73,540.73	1,517.95	1,448.36	**127,707.83**	5,350.05	4.37%	2,246.43	12.15%
Thermal Plant	-	-	1,296.48	15,458.81	39,989.37	2,158.13	540.02	319.25	**59,762.06**	19,465.40	48.31%	13,781.16	52.58%
Combustion Turbines	35.03	39.28	2,367.51	334.98	10,044.05	385.90	628.83	29.84	**13,865.42**	6,192.29	80.70%	5,517.23	121.88%
Terminal Stations	660.58	1,496.59	7,930.04	28,508.41	27,983.51	24,813.50	1,513.40	8,789.71	**101,695.73**	13,712.33	15.59%	625.20	2.29%
Transmission	-	826.07	6,178.94	9,070.17	6,437.91	-	-	-	**22,513.08**	1,103.26	5.15%	1,103.16	20.68%
Distribution	(0.00)	0.00	99.11	853.06	16,254.52	4,534.68	-	2,166.67	**23,908.03**	5,134.24	27.35%	2,967.57	22.33%
Generation	-	1,552.83	2,066.73	5,783.79	10,192.82	7,865.02	2,531.71	94.72	**30,087.63**	3,590.41	13.55%	1,252.99	14.02%
Properties	-	-	-	578.08	664.57	-	5,073.68	-	**6,316.33**	1,482.03	30.66%	(3,591.65)	-84.39%
Metering	-	-	2,264.44	1,993.35	4,263.47	449.70	189.03	131.14	**9,291.12**	2,192.32	30.88%	1,872.16	78.29%
Tools and Equipment	-	-	35.58	758.59	4,694.61	1,474.89	-	(478.14)	**6,485.54**	(34.48)	-0.53%	443.65	10.44%
Information Systems	-	-	-	114.62	1,630.90	-	-	-	**1,745.52**	(961.18)	-35.51%	(931.18)	-36.34%
Telecontrol	-	-	1.87	57.66	3,954.05	1,458.30	497.90	1,879.33	**7,849.12**	381.80	5.11%	(1,995.43)	-33.54%
Transportation	-	-	125.56	3,062.14	6,234.02	5,061.80	-	2,152.79	**16,636.31**	569.78	3.55%	(1,783.02)	-22.24%
Administration	-	-	-	-	1,098.89	317.70	146.42	551.81	**2,114.81**	165.20	8.47%	(533.02)	-32.66%
Allowance for Unforeseen Items	-	-	-	-	-	-	-	-	**-**	(1,000.00)	-100.00%	(1,000.00)	-100.00%
Total	**695.61**	**9,751.40**	**35,899.84**	**77,671.28**	**154,175.62**	**122,060.36**	**12,638.94**	**17,085.48**	**429,978.54**	**57,343.45**		**19,975.25**	

[1] Numbers may not add due to rounding.

2024 Capital Expenditures By Investment Classification
($000)[1]

	Capital Budget									
	A				B	C	D (B+C)	E	F (A+C+E)
Investment Classification	2020	2021	2022	2023	Carryover to 2024	Original 2024	Revised 2024	2025 and Beyond	Total
Access	-	3,479.25	12,281.70	586.36	272.23	4,742.70	5,014.93	-	**21,090.01**
General Plant	-	-	738.10	7,164.80	3,371.95	25,273.87	28,645.81	12,226.91	**45,403.67**
Mandatory	-	-	-	323.30	(65.38)	2,605.70	2,540.32	429.00	**3,358.00**
Renewal	3,224.28	15,174.67	21,705.40	40,630.00	14,391.36	64,665.59	79,056.95	88,555.71	**233,955.64**
Service Enhancement	-	1,530.35	7,248.82	6,917.72	3,455.04	7,138.87	10,593.91	12,570.55	**35,406.30**
System Growth	-	3,488.42	11,496.30	2,264.20	454.09	6,894.35	7,348.43	8,278.20	**32,421.46**
Allowance for Unforeseen	-	-	-	-	(0.00)	1,000.00	1,000.00	-	**1,000.00**
Total	**3,224.28**	**23,672.68**	**53,470.32**	**57,886.38**	**21,879.29**	**112,321.07**	**134,200.37**	**122,060.36**	**372,635.09**

	Actual Expenditure and Forecast									Variance			
	G				H	I	J		K (G+H+I+J)	K-F		H-D	
							Carryover to 2025 and Beyond						
Investment Classification	2020	2021	2022	2023	2024	2025 and Beyond	roject Carry-Ov	Multi-Year Cash Flow Reallocation	Total	Project Variance	Project Variance (%)	Annual Variance	Annual Variance (%)
Access	(0.00)	826.07	6,178.94	9,070.17	6,591.23	-	-	-	**22,666.41**	1,576.40	7.47%	1,576.30	31.43%
General Plant	-	-	276.32	5,785.13	20,563.35	12,226.91	6,450.82	4,133.78	**49,436.31**	4,032.63	8.88%	(8,082.46)	-28.22%
Mandatory	-	-	-	388.68	2,937.99	429.00	310.63	21.46	**4,087.76**	729.76	21.73%	397.67	15.65%
Renewal	695.61	7,678.96	21,569.37	40,875.35	108,105.30	88,555.71	4,768.38	8,688.41	**280,937.08**	46,981.44	20.08%	29,048.35	36.74%
Service Enhancement	-	151.77	3,609.67	9,084.52	9,226.33	12,570.55	189.03	2,216.04	**37,047.90**	1,641.60	4.64%	(1,367.58)	-12.91%
System Growth	-	1,094.61	4,265.54	12,467.43	6,751.41	8,278.20	920.09	2,025.80	**35,803.09**	3,381.62	10.43%	(597.02)	-8.12%
Allowance for Unforeseen	-	-	-	-	-	-	-	-	**-**	(1,000.00)	-100.00%	(1,000.00)	-100.00%
Total	**695.61**	**9,751.40**	**35,899.84**	**77,671.28**	**154,175.62**	**122,060.36**	**12,638.94**	**17,085.48**	**429,978.54**	**57,343.45**		**19,975.25**	

[1] Numbers may not add due to rounding.

2024 Capital Expenditures By Investment Classification
Renewal
($000)[1]

	Capital Budget									Actual Expenditure and Forecast									Variance			
	A				B	C	D (B+C)	E	F (A+C+E)	G				H	I	J		K (G+H+I+J)	K-F		H-D	
																Carryover to 2025 and Beyond						
Project	2020	2021	2022	2023	Carryover 2024	Original 2024	Revised 2024	2025 and Beyond	Total	2020	2021	2022	2023	2024	2025 and Beyond	Project Carryover	Multi-Year Cash Flow Reallocation	Total	Project Variance	Project Variance (%)	Annual Variance	Annual Variance (%)
Telecommunications In-Service Failure (2024)	-	-	-	-	-	91.40	91.40	-	**91.40**	-	-	-	-	253.81	-	-	-	**253.81**	162.41	177.69%	162.41	177.69%
Purchase Mobile Devices (2024)	-	-	-	-	-	155.60	155.60	-	**155.60**	-	-	-	-	166.57	-	-	-	**166.57**	10.97	7.05%	10.97	7.05%
Replace 48 V Battery Banks and Chargers (2024)	-	-	-	-	-	422.20	422.20	-	**422.20**	-	-	-	-	253.25	-	-	-	**253.25**	(168.95)	-40.02%	(168.95)	-40.02%
Replace Power Line Carrier (2024-2025) - TL247	-	-	-	-	-	87.20	87.20	667.40	**754.60**	-	-	-	-	88.18	667.40	-	(0.98)	**754.60**	-	0.00%	0.98	1.12%
Upgrade Remote Terminal Units (2024)	-	-	-	-	-	165.90	165.90	-	**165.90**	-	-	-	-	200.53	-	-	-	**200.53**	34.63	20.87%	34.63	20.87%
Flatten Downstream Slope (2024-2025) - Hinds Lake	-	-	-	-	-	276.10	276.10	2,953.40	**3,229.50**	-	-	-	-	158.27	2,953.40	-	(43.67)	**3,068.00**	(161.50)	-5.00%	(117.83)	-42.68%
Penstock Level II Condition Assessment (2024) - Upper Salmon	-	-	-	-	-	382.80	382.80	-	**382.80**	-	-	-	-	149.22	-	-	-	**149.22**	(233.58)	-61.02%	(233.58)	-61.02%
Replace Annunciator Panels (2024-2025) - Cat Arm	-	-	-	-	-	160.20	160.20	191.20	**351.40**	-	-	-	-	343.98	191.20	-	19.22	**554.40**	203.00	57.77%	183.78	114.72%
Refurbish Surge Tank 1 (2024-2025) - Bay d'Espoir	-	-	-	-	-	175.80	175.80	2,111.40	**2,287.20**	-	-	-	-	81.14	2,111.40	-	94.66	**2,287.20**	-	0.00%	(94.66)	-53.85%
Replace Timber Crib and Insulation (2024) - Burnt Dam Spillway	-	-	-	-	-	161.80	161.80	-	**161.80**	-	-	-	-	100.06	-	-	-	**100.06**	(61.74)	-38.16%	(61.74)	-38.16%
Hydraulic In-Service Failures (2024)	-	-	-	-	-	1,500.00	1,500.00	-	**1,500.00**	-	-	-	-	2,973.94	-	-	-	**2,973.94**	1,473.94	98.26%	1,473.94	98.26%
Replace Annunciator - Phase 2 (2024-2025) - Bay d'Espoir	-	-	-	-	-	294.10	294.10	187.50	**481.60**	-	-	-	-	147.88	187.50	-	146.22	**481.60**	-	0.00%	(146.22)	-49.72%
Refurbish Intake 1 (2024-2025) - Bay d'Espoir	-	-	-	-	-	272.10	272.10	3,071.90	**3,344.00**	-	-	-	-	357.62	3,071.90	-	(85.52)	**3,344.00**	-	0.00%	85.52	31.43%
Overhaul Hydraulic Units (2024)	-	-	-	-	-	323.80	323.80	-	**323.80**	-	-	-	-	376.81	-	-	-	**376.81**	53.01	16.37%	53.01	16.37%
Thermal In-Service Failures (2024)	-	-	-	-	-	3,508.70	3,508.70	-	**3,508.70**	-	-	-	-	4,587.75	-	-	-	**4,587.75**	1,079.05	30.75%	1,079.05	30.75%
Upgrade DCS Hardware - Units 1 and 2 (2024-2025) - Holyrood	-	-	-	-	-	195.20	195.20	277.30	**472.50**	-	-	-	-	62.64	277.30	-	132.56	**472.50**	-	0.00%	(132.56)	-67.91%
Upgrade Unit 1 Control System (2024-2025) - Holyrood	-	-	-	-	-	468.30	468.30	184.30	**652.60**	-	-	-	-	562.59	184.30	-	(94.29)	**652.60**	-	0.00%	94.29	20.13%
Overhaul Pumps (2024) - Holyrood	-	-	-	-	-	661.00	661.00	-	**661.00**	-	-	-	-	134.74	-	-	-	**134.74**	(526.26)	-79.62%	(526.26)	-79.62%
Overhaul Unit 1 Turbine, Valves and Generator (2024) - Holyrood	-	-	-	-	-	5,181.40	5,181.40	-	**5,181.40**	-	-	-	-	11,194.98	-	540.02	-	**11,735.00**	6,553.60	126.48%	6,013.58	116.06%
Upgrade UPS 1 & 2 (2024-2025) - Holyrood	-	-	-	-	-	263.00	263.00	107.60	**370.60**	-	-	-	-	61.89	107.60	-	201.11	**370.60**	-	0.00%	(201.11)	-76.47%
Boiler Condition Assessment and Miscellaneous Upgrades (2024) - Holyrood	-	-	-	-	-	3,957.80	3,957.80	-	**3,957.80**	-	-	-	-	7,864.55	-	-	-	**7,864.55**	3,906.75	98.71%	3,906.75	98.71%
Overhaul Marine Terminal Loading Arms (2024) - Holyrood	-	-	-	-	-	511.00	511.00	-	**511.00**	-	-	-	-	468.30	-	-	-	**468.30**	(42.70)	-8.36%	(42.70)	-8.36%
Renew Circuit Breakers (2024–2025)	-	-	-	-	-	183.90	183.90	2,120.10	**2,304.00**	-	-	-	-	92.83	2,120.10	-	428.07	**2,641.00**	337.00	14.63%	(91.07)	-49.52%
Terminal Station In-Service Failures (2024)	-	-	-	-	(0.00)	1,300.00	1,300.00	-	**1,300.00**	-	-	-	-	2,459.25	-	-	-	**2,459.25**	1,159.25	89.17%	1,159.25	89.17%
Upgrade Power Transformers (2024-2025)	-	-	-	-	-	864.60	864.60	2,711.30	**3,575.90**	-	-	-	-	325.98	2,711.30	-	3,309.25	**6,346.53**	2,770.63	77.48%	(538.62)	-62.30%
Replace Terminal Station Battery Banks and Chargers (2024–2025)	-	-	-	-	-	71.80	71.80	120.90	**192.70**	-	-	-	-	68.66	120.90	-	3.14	**192.70**	-	0.00%	(3.14)	-4.37%
Replace Instrument Transformers (2024–2025)	-	-	-	-	-	154.90	154.90	714.80	**869.70**	-	-	-	-	248.38	714.80	-	(93.48)	**869.70**	-	0.00%	93.48	60.35%
Replace Protective Relays (2024–2025)	-	-	-	-	-	1,388.40	1,388.40	2,050.70	**3,439.10**	-	-	-	-	962.21	2,050.70	-	1,458.19	**4,471.10**	1,032.00	30.01%	(426.19)	-30.70%
Replace Disconnects (2024–2025)	-	-	-	-	-	127.40	127.40	1,358.10	**1,485.50**	-	-	-	-	139.51	1,358.10	-	(12.11)	**1,485.50**	-	0.00%	12.11	9.50%
Upgrade Data Alarm Systems (2024–2025) - Western Avalon Terminal Station	-	-	-	-	-	137.00	137.00	156.90	**293.90**	-	-	-	-	42.76	156.90	-	94.24	**293.90**	-	0.00%	(94.24)	-68.79%
Replace Circuit Breaker Reclosing Controllers (2024–2025) - TL247	-	-	-	-	-	112.40	112.40	215.80	**328.20**	-	-	-	-	35.40	215.80	-	77.00	**328.20**	-	0.00%	(77.00)	-68.50%
Diesel In-Service Failures (2024)	-	-	-	-	-	488.30	488.30	-	**488.30**	-	-	-	-	1,984.51	-	-	-	**1,984.51**	1,496.21	306.41%	1,496.21	306.41%
Overhaul Diesel Units (2024)	-	-	-	-	-	829.20	829.20	-	**829.20**	-	-	-	-	1,300.31	-	-	-	**1,300.31**	471.11	56.81%	471.11	56.81%
Wood Pole Line Management (2024)	-	-	-	-	-	3,765.20	3,765.20	-	**3,765.20**	-	-	-	-	5,122.77	-	-	-	**5,122.77**	1,357.57	36.06%	1,357.57	36.06%
Transmission In-Service Failures (2024)	-	-	-	-	-	158.50	158.50	-	**158.50**	-	-	-	-	162.24	-	-	-	**162.24**	3.74	2.36%	3.74	2.36%
Upgrade Distribution (2024-2025) - Bay d'Espoir Terminal Station 2	-	-	-	-	-	93.20	93.20	331.50	**424.70**	-	-	-	-	75.95	331.50	-	17.25	**424.70**	-	0.00%	(17.25)	-18.51%
Renew Distribution Feeders (2024-2025)	-	-	-	-	-	1,287.30	1,287.30	1,245.10	**2,532.40**	-	-	-	-	126.80	1,245.10	-	1,160.50	**2,532.40**	-	0.00%	(1,160.50)	-90.15%
Replace Diesel Gensets (2024-2026)	-	-	-	-	-	535.80	535.80	3,070.77	**3,606.57**	-	-	-	-	180.01	3,070.77	-	355.79	**3,606.57**	-	0.00%	(355.79)	-66.40%
Completion of Fire Restoration – Fourth Floor Hydro Place	-	-	-	-	-	750.20	750.20	317.70	**1,067.90**	-	-	-	-	198.39	317.70	-	551.81	**1,067.90**	-	0.00%	(551.81)	-73.55%
Gas Turbine In-Service Failures (2024)	-	-	-	-	-	358.00	358.00	-	**358.00**	-	-	-	-	7,101.68	-	-	-	**7,101.68**	6,743.68	1883.71%	6,743.68	1883.71%
Inspect Fuel Tanks (2024) - Hardwoods Gas Turbines	-	-	-	-	-	692.90	692.90	-	**692.90**	-	-	-	-	64.07	-	628.83	-	**692.90**	-	0.00%	(628.83)	-90.75%
Distribution System In-Service Failures, Miscellaneous Upgrades, and Street Lights (2024)	-	-	-	-	-	4,345.40	4,345.40	-	**4,345.40**	-	-	-	(0.00)	6,346.52	-	-	-	**6,346.52**	2,001.12	46.05%	2,001.12	46.05%
Replace Power Line Carrier (2023–2024) - TL223 and TL224	-	-	-	105.30	49.52	852.40	901.92	-	**957.70**	-	-	-	55.78	823.64	-	-	-	**879.43**	(78.27)	-8.17%	(78.27)	-8.68%
Replace Human Machine Interface (2023) - Happy Valley Gas Turbine	-	-	-	138.60	17.31	-	17.31	-	**138.60**	-	-	-	137.69	28.95	-	-	-	**166.64**	28.04	20.23%	11.64	67.24%
Replace Oil Mist Separator (2023-2024) - Happy Valley Gas Turbine	-	-	-	138.50	99.94	262.10	362.04	-	**400.60**	-	-	-	38.56	140.46	-	-	-	**179.02**	(221.58)	-55.31%	(221.58)	-61.20%
Replace Powerhouse Station Service Panel (2023-2024) - Upper Salmon	-	-	-	591.80	251.52	976.70	1,228.22	-	**1,568.50**	-	-	-	883.28	1,643.40	-	-	-	**2,526.68**	958.18	61.09%	415.18	33.80%
Replace Diesel Genset 1 (2023-2024) - Ebbegunbaeg	-	-	-	298.00	165.45	728.30	893.75	-	**1,026.30**	-	-	-	132.55	472.66	-	421.09	-	**1,026.30**	-	0.00%	(421.09)	-47.12%
Refurbish Superstructure (2023-2024) - Salmon River Spillway	-	-	-	328.30	149.30	2,500.00	2,649.30	-	**2,828.30**	-	-	-	179.00	533.05	-	113.23	-	**825.28**	(2,003.02)	-70.82%	(2,116.25)	-79.88%
Overhaul Unit 2 Turbine and Valves (2023) - Holyrood	-	-	-	9,701.80	2,092.02	-	2,092.02	-	**9,701.80**	-	-	-	9,276.35	3,352.04	-	-	-	**12,628.40**	2,926.60	30.17%	1,260.03	60.23%
Replace Intermediate Fuel Storage Tanks (2023-2024) - Nain	-	-	-	127.40	55.57	593.70	649.27	-	**721.10**	-	-	-	71.83	510.17	-	679.70	-	**1,261.70**	540.60	74.97%	(139.10)	-21.42%
Circuit Breakers Renewal Program (2023-2024)	-	-	-	216.90	(416.88)	3,595.10	3,178.22	-	**3,812.00**	-	-	-	633.78	4,944.91	-	-	-	**5,578.69**	1,766.69	46.35%	1,766.69	55.59%
Install Breaker Failure Protection (2023-2024) - Sunnyside	-	-	-	73.50	(9.96)	216.20	206.24	-	**289.70**	-	-	-	467.17	389.32	-	92.07	-	**948.56**	658.86	227.43%	183.09	88.78%
Replace Data Alarm System Annunciators (2023) - Buchans	-	-	-	61.20	(16.65)	104.80	88.15	-	**166.00**	-	-	-	77.85	127.56	-	94.85	-	**300.26**	134.26	80.88%	39.41	44.71%
Replace Circuit Breaker Reclosing Controllers (2023-2024) - Hardwoods	-	-	-	81.60	37.76	149.60	187.36	-	**231.20**	-	-	-	43.84	129.77	-	100.12	-	**273.72**	42.52	18.39%	(57.59)	-30.74%
Major Condition Assessment and Miscellaneous Refurbishments Synchronous Condenser 1 and 2 (2023-2024) - Wabush Terminal Station	-	-	-	577.20	(115.13)	516.10	400.97	-	**1,093.30**	-	-	-	692.33	356.93	-	-	-	**1,049.26**	(44.04)	-4.03%	(44.04)	-10.98%
Penstock Life Extension - Phase 1 (2023-2025)	-	-	-	2,105.00	972.64	5,748.29	6,720.93	58,022.73	**65,876.02**	-	-	-	1,132.36	6,720.93	58,022.73	-	-	**65,876.02**	(0.00)	0.00%	(0.00)	0.00%
Holyrood Thermal Generating Station Unit 1 and Unit 2 Turbine Last Stage Blades	-	-	-	3,596.50	1,567.26	2,812.20	4,379.46	-	**6,408.70**	-	-	-	2,029.24	4,643.82	-	-	-	**6,673.07**	264.37	4.13%	264.37	6.04%
Diesel Genset Replacement Program (2023-2025)	-	-	-	819.10	67.08	174.00	241.08	1,415.10	**2,408.20**	-	-	-	683.62	598.79	1,415.10	-	(289.26)	**2,408.25**	0.05	0.00%	357.71	148.38%
Terminal Station Renewal Program (2023-2024)	-	-	-	1,733.70	299.11	5,584.50	5,883.61	-	**7,318.20**	-	-	-	1,434.59	8,301.95	-	-	-	**9,736.54**	2,418.34	33.05%	2,418.34	41.10%
Labrador City L22 Voltage Conversion (2022-2023)	-	-	486.80	1,004.40	1,210.71	-	1,210.71	-	**1,491.20**	-	-	99.11	181.39	1,895.14	-	-	-	**2,175.64**	684.44	45.90%	684.44	56.53%
Diesel Genset Replacement Unit 2039 - St. Lewis	-	-	397.00	1,583.80	1,365.25	-	1,365.25	-	**1,980.80**	-	-	238.70	361.75	979.62	-	-	-	**1,580.06**	(400.74)	-20.23%	(385.64)	-28.25%
Diesel Genset Replacement Unit 2012 - L'Anse-Au-Loup	-	-	339.90	2,513.20	2,468.15	210.20	2,678.35	-	**3,063.30**	-	-	170.26	214.69	1,458.77	-	1,000.82	-	**2,844.55**	(218.75)	-7.14%	(1,219.57)	-45.53%
Holyrood Upgrade Turbine Control System Unit 2 - Supplemental	-	-	235.90	490.10	68.71	-	68.71	-	**726.00**	-	-	150.68	506.61	94.86	-	-	-	**752.16**	26.16	3.60%	26.16	38.07%
Holyrood Fuel Tank #1 Fuel Inspection And Refurbishment - Supplemental	-	-	1,195.00	857.10	190.79	0.00	190.79	-	**2,052.10**	-	-	1,030.63	2,628.58	2,134.54	-	-	-	**5,793.75**	3,741.65	182.33%	1,943.75	1018.79%
Hydraulic Generation Refurbishment & Modernization (2022-2023)	-	-	2,970.60	3,788.90	228.18	-	228.18	-	**6,759.50**	-	-	2,664.56	4,556.23	250.36	-	250.81	-	**7,721.97**	962.47	14.24%	22.18	9.72%
Hydraulic Generation Refurbishment & Modernization (2021-2022)	-	6,569.54	5,005.60	-	72.74	-	72.74	-	**11,575.14**	-	3,640.20	6,567.48	199.44	185.28	-	-	-	**10,592.40**	(982.74)	-8.49%	112.54	154.70%
Terminal Station Refurbishment & Modernization (2022-2023)	-	-	3,111.90	6,109.70	33.78	-	33.78	-	**9,221.60**	-	-	2,168.73	5,679.46	156.17	-	32.30	-	**8,036.67**	(1,184.93)	-12.85%	122.40	362.38%
Refurbish Ebbegunbaeg Control Structure	-	3,236.82	3,238.30	3,470.10	(476.25)	2,781.60	2,305.35	4,952.20	**17,679.02**	-	2,196.44	4,301.54	3,923.59	5,494.12	4,952.20	-	1,258.71	**22,126.60**	4,447.58	25.16%	3,188.76	138.32%
Replace Unit 2047 - Ramea	-	307.71	2,010.80	118.30	1,075.39	-	1,075.39	-	**2,436.81**	-	49.04	216.05	1,096.33	1,226.50	-	730.07	-	**3,317.99**	881.19	36.16%	151.12	14.05%
Diesel Genset Replacements (2021-2022)	-	2,560.60	286.20	-	49.53	-	49.53	-	**2,846.80**	-	1,503.79	1,036.26	382.20	140.99	-	84.47	-	**3,147.71**	300.91	10.57%	91.46	184.67%
Perform Combustor Inspection - Holyrood Gas Turbine	546.14	2,500.00	2,427.40	-	2,872.98	-	2,872.98	-	**5,473.54**	35.03	39.28	2,367.51	158.73	2,520.44	-	-	-	**5,120.99**	(352.55)	-6.44%	(352.54)	-12.27%
Replace Transformer T7 - HRD	2,678.14	-	-	-	(34.42)	-	(34.42)	-	**2,678.14**	660.58	250.21	557.86	3,016.51	223.21	-	-	-	**4,708.37**	2,030.23	75.81%	257.64	-748.41%
Total	**3,224.28**	**15,174.67**	**21,705.40**	**40,630.00**	**14,391.36**	**64,665.59**	**79,056.95**	**88,555.71**	**233,955.64**	**695.61**	**7,678.96**	**21,569.37**	**40,875.35**	**108,105.30**	**88,555.71**	**4,768.38**	**8,688.41**	**280,937.08**	**46,981.44**		**29,048.35**	

[1] Numbers may not add due to rounding.

2024 Capital Expenditures By Investment Classification
General Plant
($000)[1]

	Capital Budget									Actual Expenditure and Forecast									Variance			
	A				B	C	D (B+C)	E	F (A+C+E)	G				H	I	J		K (G+H+I+J)	K-F		H-D	
																Carryover to 2025 and Beyond						
Project	2020	2021	2022	2023	Carryover to 2024	Original 2024	Revised 2024	2025 and Beyond	Total	2020	2021	2022	2023	2024	2025 and Beyond	Project Carryover	Multi-Year Cash Flow Reallocation	Total	Project Variance	Project Variance (%)	Annual Variance	Annual Variance (%)
Replace Network Communications Equipment (2024)	-	-	-	-	-	180.70	180.70	-	**180.70**	-	-	-	-	235.20	-	-	-	**235.20**	**54.50**	**30.16%**	**54.50**	**30.16%**
Purchase Tools and Equipment Less than $50,000 (2024) - Telecontrol	-	-	-	-	-	45.60	45.60	-	**45.60**	-	-	-	-	44.51	-	-	-	**44.51**	**(1.09)**	**-2.39%**	**(1.09)**	**-2.39%**
Upgrade SCADA Network (2024)	-	-	-	-	-	402.30	402.30	-	**402.30**	-	-	-	-	571.67	-	109.39	-	**681.06**	**278.76**	**69.29%**	**169.37**	**42.10%**
Minor Telecommunications Enhancements (2024)	-	-	-	-	-	96.90	96.90	-	**96.90**	-	-	-	-	87.60	-	-	-	**87.60**	**(9.30)**	**-9.60%**	**(9.30)**	**-9.60%**
Replace MDR8000 Microwave Radios (2024-2025)	-	-	-	-	-	953.50	953.50	500.30	**1,453.80**	-	-	-	-	283.32	500.30	-	747.27	**1,530.89**	**77.09**	**5.30%**	**(670.18)**	**-70.29%**
Replace CCTV Cameras (2024)	-	-	-	-	-	317.60	317.60	-	**317.60**	-	-	-	-	369.72	-	-	-	**369.72**	**52.12**	**16.41%**	**52.12**	**16.41%**
Replace SONET Multiplexors (2024)	-	-	-	-	-	430.40	430.40	-	**430.40**	-	-	-	-	398.70	-	-	-	**398.70**	**(31.70)**	**-7.37%**	**(31.70)**	**-7.37%**
Replace VHF Radio System (2024-2025)	-	-	-	-	-	1,261.60	1,261.60	290.60	**1,552.20**	-	-	-	-	128.56	290.60	-	1,133.04	**1,552.20**	**-**	**0.00%**	**(1,133.04)**	**-89.81%**
Purchase & Install Site Radio System (2024) - Holyrood	-	-	-	-	-	412.20	412.20	-	**412.20**	-	-	-	-	23.69	-	388.51	-	**412.20**	**-**	**0.00%**	**(388.51)**	**-94.25%**
Purchase Tools and Equipment Less than $50,000 (2024) - Hydraulic Plants	-	-	-	-	-	209.40	209.40	-	**209.40**	-	-	-	-	177.77	-	-	-	**177.77**	**(31.63)**	**-15.11%**	**(31.63)**	**-15.11%**
Replace Powerhouse 1 Roof (2024-2025) - Bay d'Espoir	-	-	-	-	-	140.20	140.20	1,819.20	**1,959.40**	-	-	-	-	79.44	1,819.20	-	60.76	**1,959.40**	**-**	**0.00%**	**(60.76)**	**-43.34%**
Replace Powerhouse 1 Air Conditioning Unit (2024-2025) - Bay d'Espoir	-	-	-	-	-	57.80	57.80	231.20	**289.00**	-	-	-	-	59.82	231.20	-	(2.02)	**289.00**	**-**	**0.00%**	**2.02**	**3.49%**
Purchase Tools and Equipment Less than $50,000 (2024) - Thermal Plants	-	-	-	-	-	167.10	167.10	-	**167.10**	-	-	-	-	152.27	-	-	-	**152.27**	**(14.83)**	**-8.88%**	**(14.83)**	**-8.88%**
Refurbish Outbuilding and Powerhouse Building Envelopes (2024-2025) - Holyrood	-	-	-	-	-	156.20	156.20	1,039.40	**1,195.60**	-	-	-	-	74.82	1,039.40	-	81.38	**1,195.60**	**-**	**0.00%**	**(81.38)**	**-52.10%**
Replace Plant Lighting (2024) - Holyrood	-	-	-	-	-	139.77	139.77	549.53	**689.30**	-	-	-	-	141.27	549.53	-	(1.50)	**689.30**	**-**	**0.00%**	**1.50**	**1.08%**
Install Fire Protection in 230 kV Stations (2024–2025) - Voisey's Bay	-	-	-	-	-	53.80	53.80	599.00	**652.80**	-	-	-	-	22.93	599.00	-	30.87	**652.80**	**-**	**0.00%**	**(30.87)**	**-57.39%**
Refurbish Control Building (2024-2025) - Grandy Brook and Doyles	-	-	-	-	-	109.40	109.40	444.70	**554.10**	-	-	-	-	154.11	444.70	-	65.29	**664.10**	**110.00**	**19.85%**	**44.71**	**40.87%**
Purchase Tools and Equipment Less than $50,000 (2024) - Gas Turbine	-	-	-	-	-	18.60	18.60	-	**18.60**	-	-	-	-	19.42	-	-	-	**19.42**	**0.82**	**4.43%**	**0.82**	**4.43%**
Replace Mobile Equipment (2024-2025)	-	-	-	-	-	216.90	216.90	599.70	**816.60**	-	-	-	-	564.80	599.70	-	(347.90)	**816.60**	**-**	**0.00%**	**347.90**	**160.40%**
Replace Light- and Heavy-Duty Vehicles (2024-2026)	-	-	-	-	-	1,479.10	1,479.10	4,157.20	**5,636.30**	-	-	-	-	2,053.79	4,157.20	-	(99.69)	**6,111.30**	**475.00**	**8.43%**	**574.69**	**38.85%**
Replace Grader Unit V9829 (2024) - Bay d'Espoir	-	-	-	-	-	836.70	836.70	-	**836.70**	-	-	-	-	872.94	-	-	-	**872.94**	**36.24**	**4.33%**	**36.24**	**4.33%**
Purchase 50' Material Handler Aerial Device on Tracked Unit (2024-2026) - Happy Valley Goose Bay	-	-	-	-	-	24.00	24.00	848.90	**872.90**	-	-	-	-	22.45	848.90	-	1.55	**872.90**	**-**	**0.00%**	**(1.55)**	**-6.45%**
Install Public EV Ultra Fast Charger (2024) - Conne River	-	-	-	-	-	219.99	219.99	242.57	**462.57**	-	-	-	-	7.74	242.57	-	212.26	**462.57**	**-**	**0.00%**	**(212.26)**	**-96.48%**
Purchase Office Equipment Less Than $50,000 (2024)	-	-	-	-	-	50.00	50.00	-	**50.00**	-	-	-	-	55.06	-	-	-	**55.06**	**5.06**	**10.12%**	**5.06**	**10.12%**
General Property Rehabilitation (2024) - Hydro Place	-	-	-	-	-	234.00	234.00	-	**234.00**	-	-	-	-	289.61	-	146.42	-	**436.03**	**202.03**	**86.34%**	**55.61**	**23.76%**
Upgrade HVAC Supervisory Controllers (2024) - Hydro Place	-	-	-	-	-	149.60	149.60	-	**149.60**	-	-	-	-	136.98	-	-	-	**136.98**	**(12.62)**	**-8.44%**	**(12.62)**	**-8.44%**
Purchase Personal Computers (2024)	-	-	-	-	-	555.90	555.90	-	**555.90**	-	-	-	-	519.72	-	-	-	**519.72**	**(36.18)**	**-6.51%**	**(36.18)**	**-6.51%**
Replace Peripheral Infrastructure (2024)	-	-	-	-	-	276.80	276.80	-	**276.80**	-	-	-	-	167.40	-	-	-	**167.40**	**(109.40)**	**-39.52%**	**(109.40)**	**-39.52%**
Upgrade Core OT Infrastructure (2024)	-	-	-	-	-	174.70	174.70	-	**174.70**	-	-	-	-	148.13	-	-	-	**148.13**	**(26.57)**	**-15.21%**	**(26.57)**	**-15.21%**
Update Cyber Security Infrastructure (2024)	-	-	-	-	-	281.30	281.30	-	**281.30**	-	-	-	-	409.50	-	-	-	**409.50**	**128.20**	**45.57%**	**128.20**	**45.57%**
Perform Software Upgrades and Minor Enhancements (2024)	-	-	-	-	-	864.20	864.20	-	**864.20**	-	-	-	-	337.07	-	-	-	**337.07**	**(527.13)**	**-61.00%**	**(527.13)**	**-61.00%**
Upgrade Energy Management System (2024)	-	-	-	-	-	366.40	366.40	-	**366.40**	-	-	-	-	4.61	-	-	-	**4.61**	**(361.79)**	**-98.74%**	**(361.79)**	**-98.74%**
Upgrade Fleet Infrastructure Program - Install L2 EV Chargers (2024) - Hydro Place	-	-	-	-	-	322.63	322.63	-	**322.63**	-	-	-	-	203.58	-	-	-	**203.58**	**(119.05)**	**-36.90%**	**(119.05)**	**-36.90%**
Perform Office Modifications (2024) - Hydro Place	-	-	-	-	-	249.81	249.81	-	**249.81**	-	-	-	-	96.37	-	-	-	**96.37**	**(153.44)**	**-61.42%**	**(153.44)**	**-61.42%**
Install L-1 Blades Unit 1 (2024) Holyrood	-	-	-	-	-	581.26	581.26	-	**581.26**	-	-	-	-	512.50	-	-	-	**512.50**	**(68.77)**	**-11.83%**	**(68.77)**	**-11.83%**
Purchase Tools and Equipment Less than $50,000 (2023) - Central Region	-	-	-	-	-	188.20	188.20	-	**188.20**	-	-	-	-	291.91	-	-	-	**291.91**	**103.71**	**55.11%**	**103.71**	**55.11%**
Purchase Tools and Equipment Less than $50,000 (2023) - Labrador Region	-	-	-	-	0.00	120.10	120.10	-	**120.10**	-	-	-	-	143.59	-	-	-	**143.59**	**23.49**	**19.56%**	**23.49**	**19.56%**
Purchase Tools and Equipment Less than $50,000 (2023) - Northern Region	-	-	-	-	(0.00)	97.00	97.00	-	**97.00**	-	-	-	-	77.87	-	-	-	**77.87**	**(19.13)**	**-19.72%**	**(19.13)**	**-19.72%**
Replace Peripheral Infrastructure (2023)	-	-	-	187.40	42.78	-	42.78	-	**187.40**	-	-	-	114.62	44.47	-	-	-	**159.08**	**(28.32)**	**-15.11%**	**1.68**	**3.94%**
Replace Light- and Heavy-Duty Vehicles (2023-2025)	-	-	-	1,308.10	(1,065.10)	2,584.60	1,519.50	673.30	**4,566.00**	-	-	-	2,573.20	564.14	673.30	-	755.36	**4,566.00**	**-**	**0.00%**	**(955.36)**	**-62.87%**
Water System Condition Assessment and Upgrades (2023) - Bay d'Espoir	-	-	-	161.00	69.84	504.90	574.74	-	**665.90**	-	-	-	91.16	504.22	-	732.82	-	**1,328.19**	**662.29**	**99.46%**	**(70.52)**	**-12.27%**
Replace Building Exterior (2023-2024) - Postville	-	-	-	124.60	(4.45)	558.70	554.25	-	**683.30**	-	-	-	129.05	1,071.79	-	-	-	**1,200.84**	**517.54**	**75.74%**	**517.54**	**93.38%**
Upgrade Water and Fire Suppression Systems (2023-2024) - Bishop's Falls	-	-	-	353.70	37.51	2,886.30	2,923.81	-	**3,240.00**	-	-	-	316.19	410.13	-	5,073.68	-	**5,800.00**	**2,560.00**	**79.01%**	**(2,513.68)**	**-85.97%**
Replace Diesel Shop Building (2023-2025) - Bishop's Falls	-	-	-	168.00	(30.65)	1,254.10	1,223.45	-	**1,422.10**	-	-	-	198.65	43.22	-	-	-	**241.87**	**(1,180.23)**	**-82.99%**	**(1,180.23)**	**-96.47%**
Replace HVAC System (2023-2024) - Bishop's Falls	-	-	-	43.40	(19.84)	128.80	108.96	-	**172.20**	-	-	-	63.24	211.21	-	-	-	**274.46**	**102.26**	**59.38%**	**102.26**	**93.85%**
Install Fire Protection in 230 kV Stations (2023-2024) - Deer Lake	-	-	-	79.20	45.73	535.30	581.03	-	**614.50**	-	-	-	33.47	500.93	-	-	-	**534.40**	**(80.10)**	**-13.03%**	**(80.10)**	**-13.79%**
Replace Mobile Equipment (2023-2024)	-	-	-	541.20	(147.31)	187.30	39.99	-	**728.50**	-	-	-	688.51	76.10	-	-	-	**764.61**	**36.11**	**4.96%**	**36.11**	**90.31%**
Install Ultra-Fast DC Electric Vehicle Chargers - Supplemental	-	-	-	62.50	51.26	1,766.00	1,817.26	231.30	**2,059.80**	-	-	-	11.24	1,040.15	231.30	-	1,497.11	**2,779.80**	**720.00**	**34.95%**	**(777.11)**	**-42.76%**
Replace Light- and Heavy-Duty Vehicles (2022-2024)	-	-	569.00	593.20	558.93	2,319.60	2,878.53	-	**3,481.80**	-	-	125.56	477.70	2,372.36	-	-	-	**2,975.63**	**(506.17)**	**-14.54%**	**(506.17)**	**-17.58%**
Replace Underground Fire Water Distribution System - Holyrood	-	-	128.30	1,578.00	1,933.60	-	1,933.60	-	**1,706.30**	-	-	115.17	1,018.02	1,947.26	-	-	-	**3,080.45**	**1,374.15**	**80.53%**	**13.66**	**0.71%**
Purchase 46' Material Handler Aerial Device on Track Unit	-	-	20.40	698.80	669.50	38.80	708.30	-	**758.00**	-	-	13.19	36.52	691.21	-	-	-	**740.91**	**(17.09)**	**-2.25%**	**(17.09)**	**-2.41%**
Purchase 85' Material Handler Aerial Device on Track Unit	-	-	20.40	1,265.70	1,230.14	67.80	1,297.94	-	**1,353.90**	-	-	22.40	33.56	1,145.76	-	-	-	**1,201.72**	**(152.18)**	**-11.24%**	**(152.18)**	**-11.72%**
Total	-	-	**738.10**	**7,164.80**	**3,371.95**	**25,273.87**	**28,645.81**	**12,226.91**	**45,403.67**	-	-	**276.32**	**5,785.13**	**20,563.35**	**12,226.91**	**6,450.82**	**4,133.78**	**49,436.31**	**4,032.63**		**(8,082.46)**	

[1] Numbers may not add due to rounding.

2024 Capital Expenditures By Investment Classification
System Growth
($000)[1]

	Capital Budget								
	A				B	C	D (B+C)	E	F (A+C+E)
Project	**2020**	**2021**	**2022**	**2023**	**Carryover to 2024**	**Original 2024**	**Revised 2024**	**2025 and Beyond**	**Total**
Additions for Load - Distribution Systems (2024-2027) - Cartwright	-	-	-	-	-	19.72	19.72	488.11	**507.83**
Additions for Load - Distribution Systems (2024-2026) - Main Brook	-	-	-	-	-	326.73	326.73	26.29	**353.02**
Additions for Load Growth - Upgrade Transformer Capacity (2023-2024) - Jean Lake Terminal Station	-	-	-	580.00	527.98	-	527.98	7,249.30	**7,829.30**
Additions for Load (2022) - Mary's Harbour Service Conductor	-	-	307.80	51.30	49.41	-	49.41	-	**359.10**
Additions for Load - Wabush Substation Upgrades	-	1,186.70	6,253.00	-	455.29	2,739.90	3,195.19	514.50	**10,694.10**
Wabush Terminal Station Upgrades	-	2,301.72	4,935.50	1,632.90	(578.58)	3,808.00	3,229.42	-	**12,678.12**
Total	-	**3,488.42**	**11,496.30**	**2,264.20**	**454.09**	**6,894.35**	**7,348.43**	**8,278.20**	**32,421.46**

	Actual Expenditure and Forecast									Variance			
	G				H	I	J		K (G+H+I+J)	K-F		H-D	
							Carryover to 2025 and Beyond						
Project	**2020**	**2021**	**2022**	**2023**	**2024**	**2025 and Beyond**	**Project Carryover**	**Multi-Year Cash Flow Reallocation**	**Total**	**Project Variance**	**Project Variance (%)**	**Annual Variance**	**Annual Variance (%)**
Additions for Load - Distribution Systems (2024-2027) - Cartwright	-	-	-	-	-	488.11	-	19.72	**507.83**	-	0.00%	(19.72)	-100.00%
Additions for Load - Distribution Systems (2024-2026) - Main Brook	-	-	-	-	458.51	26.29	-	(131.79)	**353.02**	-	0.00%	131.79	40.34%
Additions for Load Growth - Upgrade Transformer Capacity (2023-2024) - Jean Lake Terminal Station	-	-	-	52.02	596.75	7,249.30	-	(68.80)	**7,829.27**	(0.03)	0.00%	68.77	13.03%
Additions for Load (2022) - Mary's Harbour Service Conductor	-	-	122.97	38.62	12.76	-	36.65	-	**211.00**	(148.10)	-41.24%	(36.65)	-74.18%
Additions for Load - Wabush Substation Upgrades	-	300.60	2,299.38	4,384.48	1,075.71	514.50	-	2,206.67	**10,781.33**	87.23	0.82%	(2,119.48)	-66.33%
Wabush Terminal Station Upgrades	-	794.01	1,843.19	7,992.32	4,607.69	-	883.44	-	**16,120.64**	3,442.53	27.15%	1,378.27	42.68%
Total	-	**1,094.61**	**4,265.54**	**12,467.43**	**6,751.41**	**8,278.20**	**920.09**	**2,025.80**	**35,803.09**	**3,381.62**		**(597.02)**	

[1] Numbers may not add due to rounding.

2024 Capital Expenditures By Investment Classification
Access
($000)[1]

	Capital Budget									Actual Expenditure and Forecast									Variance			
	A				B	C	D (B+C)	E	F (A+C+E)	G				H	I	J		K (G+H+I+J)	K-F		H-D	
																Carryover to 2025 and Beyond						
Project	2020	2021	2022	2023	Carryover to 2024	Original 2024	Revised 2024	2025 and Beyond	Total	2020	2021	2022	2023	2024	2025 and Beyond	Project Carryover	Multi-Year Cash Flow Reallocation	Total	Project Variance	Project Variance (%)	Annual Variance	Annual Variance (%)
Purchase Meters and Metering Equipment (2024)	-	-	-	-	-	470.70	470.70	-	**470.70**	-	-	-	-	443.02	-	-	-	**443.02**	(27.68)	-5.88%	(27.68)	-5.88%
Provide Service Extensions (2024)	-	-	-	-	-	4,272.00	4,272.00	-	**4,272.00**	(0.00)	0.00	(0.00)	(0.00)	6,074.66	-	-	-	**6,074.66**	1,802.66	42.20%	1,802.66	42.20%
Valentine Gold Interconnection - Supplemental	-	3,479.25	12,281.70	586.36	272.23	-	272.23	-	**16,347.31**	-	826.07	6,178.94	9,070.17	73.55	-	-	-	**16,148.73**	(198.58)	-1.21%	(198.68)	-72.98%
Total	**-**	**3,479.25**	**12,281.70**	**586.36**	**272.23**	**4,742.70**	**5,014.93**	**-**	**21,090.01**	**(0.00)**	**826.07**	**6,178.94**	**9,070.17**	**6,591.23**	**-**	**-**	**-**	**22,666.41**	**1,576.40**		**1,576.30**	

[1] Numbers may not add due to rounding.

2024 Capital Expenditures By Investment Classification
Service Enhancement
($000)[1]

	Capital Budget								
	A				B	C	D (B+C)	E	F (A+C+E)
Project	2020	2021	2022	2023	Carryover to 2024	Original 2024	Revised 2024	2025 and Beyond	Total
Install Anemometer (2024) - Cat Arm	-	-	-	-	-	68.60	68.60	-	**68.60**
Remove Safety Hazards (2024)	-	-	-	-	-	198.30	198.30	-	**198.30**
Automate Bulk Metering (2024-2026)	-	-	-	-	-	302.60	302.60	449.70	**752.30**
Construct Maintenance Platform (2024-2025) - Holyrood Gas Turbine	-	-	-	-	-	130.50	130.50	228.70	**359.20**
Upgrade Worst-Performing Distribution Feeders (2024-2025)	-	-	-	-	-	1,064.30	1,064.30	2,227.40	**3,291.70**
Upgrade Instrumentation (2024-2025) - Hardwoods Gas Turbine	-	-	-	-	-	60.90	60.90	157.20	**218.10**
Install Line Monitoring System (2024) - TL201	-	-	-	-	-	469.90	469.90	-	**469.90**
Additions for Load - Diesel Genset Replacement and Fuel Storage Upgrade - Rigolet	-	-	-	-	-	50.07	50.07	3,379.15	**3,429.22**
Widen Rights-of-Way of Transmission Lines TL239 & TL259 (2024)	-	-	-	-	-	668.91	668.91	-	**668.91**
Upgrade Exhaust Stack Expansion Joints (2024) - Hardwoods and Stephenville	-	-	-	-	-	32.18	32.18	-	**32.18**
Upgrade of Worst-Performing Distribution Feeders (2023-2024)	-	-	-	73.40	(598.28)	1,372.60	774.32	-	**1,446.00**
Install Oil Spill Containment Transformer T1S (2023-2024) - Cat Arm	-	-	-	155.10	54.71	426.50	481.21	-	**581.60**
Purchase Spare Generator Step-Up Transformer - Supplemental	-	-	-	39.60	22.07	1,298.90	1,320.97	6,128.40	**7,466.90**
Replace Unit 2090/2044 - Charlottetown and Mary's Harbour	-	-	-	401.02	(13.73)	-	(13.73)	-	**401.02**
IOC SCADA Data Link	-	-	28.22	-	24.47	-	24.47	-	**28.22**
Install Fire Protection in Diesel Plants (2022-2023) - Ramea	-	-	90.70	1,838.10	343.57	-	343.57	-	**1,928.80**
Replace Metering System	-	-	515.60	4,365.60	623.41	994.60	1,618.01	-	**5,875.80**
CHT Winterize Unit 2102 and Install Mobile - Supplemental	-	-	1,269.80	44.90	44.10	0.00	44.10	-	**1,314.70**
Upgrades for Future Retirement of Stephenville Gas Turbine	-	1,530.35	5,344.50	-	2,954.72	-	2,954.72	-	**6,874.85**
Total	-	**1,530.35**	**7,248.82**	**6,917.72**	**3,455.04**	**7,138.87**	**10,593.91**	**12,570.55**	**35,406.30**

	Actual Expenditure and Forecast									Variance			
	G				H	I	J		K (G+H+I+J)	K-F		H-D	
							Carryover to 2025 and Beyond						
Project	2020	2021	2022	2023	2024	2025 and Beyond	Project Carryover	Multi-Year Cash Flow Reallocation	Total	Project Variance	Project Variance (%)	Annual Variance	Annual Variance (%)
Install Anemometer (2024) - Cat Arm	-	-	-	-	100.74	-	-	-	100.74	32.14	46.85%	32.14	46.85%
Remove Safety Hazards (2024)	-	-	-	-	322.48	-	-	-	322.48	124.18	62.62%	124.18	62.62%
Automate Bulk Metering (2024-2026)	-	-	-	-	171.46	449.70	-	131.14	752.30	-	0.00%	(131.14)	-43.34%
Construct Maintenance Platform (2024-2025) - Holyrood Gas Turbine	-	-	-	-	65.78	228.70	-	64.72	359.20	-	0.00%	(64.72)	-49.60%
Upgrade Worst-Performing Distribution Feeders (2024-2025)	-	-	-	-	307.36	2,227.40	-	756.94	3,291.70	-	0.00%	(756.94)	-71.12%
Upgrade Instrumentation (2024-2025) - Hardwoods Gas Turbine	-	-	-	-	95.78	157.20	-	(34.88)	218.10	-	0.00%	34.88	57.28%
Install Line Monitoring System (2024) - TL201	-	-	-	-	455.13	-	-	-	455.13	(14.77)	-3.14%	(14.77)	-3.14%
Additions for Load - Diesel Genset Replacement and Fuel Storage Upgrade - Rigolet	-	-	-	-	21.87	3,379.15	-	28.20	3,429.22	-	0.00%	(28.20)	-56.32%
Widen Rights-of-Way of Transmission Lines TL239 & TL259 (2024)	-	-	-	-	624.22	-	-	-	624.22	(44.69)	-6.68%	(44.69)	-6.68%
Upgrade Exhaust Stack Expansion Joints (2024) - Hardwoods and Stephenville	-	-	-	-	26.89	-	-	-	26.89	(5.29)	-16.44%	(5.29)	-16.44%
Upgrade of Worst-Performing Distribution Feeders (2023-2024)	-	-	-	671.68	1,420.34	-	-	-	2,092.02	646.02	44.68%	646.02	83.43%
Install Oil Spill Containment Transformer T1S (2023-2024) - Cat Arm	-	-	-	100.39	773.43	-	-	-	873.81	292.21	50.24%	292.21	60.72%
Purchase Spare Generator Step-Up Transformer - Supplemental	-	-	-	17.53	51.05	6,128.40	-	1,269.92	7,466.90	-	0.00%	(1,269.92)	-96.14%
Replace Unit 2090/2044 - Charlottetown and Mary's Harbour	-	-	-	414.75	77.81	-	-	-	492.56	91.54	22.83%	91.54	-666.62%
IOC SCADA Data Link	-	-	1.87	1.88	25.13	-	-	-	28.88	0.66	2.34%	0.66	2.70%
Install Fire Protection in Diesel Plants (2022-2023) - Ramea	-	-	76.87	1,000.97	437.79	-	-	-	1,515.63	(413.17)	-21.42%	94.22	27.42%
Replace Metering System	-	-	2,264.44	1,993.35	3,648.98	-	189.03	-	8,095.80	2,220.00	37.78%	2,030.97	125.52%
CHT Winterize Unit 2102 and Install Mobile - Supplemental	-	-	205.62	1,389.98	191.13	-	-	-	1,786.73	472.03	35.90%	147.03	333.42%
Upgrades for Future Retirement of Stephenville Gas Turbine	-	151.77	1,060.87	3,493.98	408.95	-	-	-	5,115.58	(1,759.27)	-25.59%	(2,545.77)	-86.16%
Total	-	**151.77**	**3,609.67**	**9,084.52**	**9,226.33**	**12,570.55**	**189.03**	**2,216.04**	**37,047.90**	**1,641.60**		**(1,367.58)**	

[1] Numbers may not add due to rounding.

2024 Capital Expenditures By Investment Classification
Mandatory
($000)[1]

	Capital Budget									Actual Expenditure and Forecast									Variance			
	A				B	C	D (B+C)	E	F (A+C+E)	G				H	I	J		K (G+H+I+J)	K-F		H-D	
																Carryover to 2025 and Beyond						
Project	2020	2021	2022	2023	Carryover to 2024	Original 2024	Revised 2024	2025 and Beyond	Total	2020	2021	2022	2023	2024	2025 and Beyond	Project Carryover	Multi-Year Cash Flow Reallocation	Total	Project Variance	Project Variance (%)	Annual Variance	Annual Variance (%)
Refurbish Fuel Oil Storage Tank 4 (2024) - Holyrood	-	-	-	-	-	1,920.00	1,920.00	-	**1,920.00**	-	-	-	-	2,150.81	-	-	-	**2,150.81**	230.81	12.02%	230.81	12.02%
Upgrade Station Lighting (2024-2025) - Bottom Waters, Deer Lake, Doyles, Indian River, and Western Avalon Terminal Stations	-	-	-	-	-	91.60	91.60	429.00	**520.60**	-	-	-	-	70.14	429.00	-	21.46	**520.60**	-	0.00%	(21.46)	-23.43%
Replace Terminal Station Lighting (2023-2024)	-	-	-	323.30	(65.38)	594.10	528.72	-	**917.40**	-	-	-	388.68	717.04	-	310.63	-	**1,416.35**	498.95	54.39%	188.32	35.62%
Total	-	-	-	323.30	(65.38)	2,605.70	2,540.32	429.00	3,358.00	-	-	-	388.68	2,937.99	429.00	310.63	21.46	4,087.76	729.76		397.67	

[1] Numbers may not add due to rounding.

2024 Capital Expenditures By Investment Classification
CIAC
($000)[1]

	Capital Budget									Actual Expenditure and Forecast									Variance			
	A				B	C	D (B+C)	E	F (A+C+E)	G				H	I	J		K (G+H+I+J)	K-F		H-D	
																Carryover to 2024 and Beyond						
Project	2020	2021	2022	2023	Carryover to 2024	Original 2024	Revised 2024	2025 and Beyond	Total	2020	2021	2022	2023	2024	2025 and Beyond	Project Carryover	Multi-Year Cash Flow Reallocation	Total	Project Variance	Project Variance (%)	Annual Variance	Annual Variance (%)
Braya Renewable 2024 (CIAC)	-	-	-	-	-	(41.00)	(41.00)	(387.60)	**(428.60)**	-	-	-	-	(41.00)	(387.60)	-	(41.00)	**(469.60)**	(41.00)	9.57%	-	0.00%
Vale Voisey's Bay (CIAC)	-	-	-	-	-	(53.80)	(53.80)	(599.00)	**(652.80)**	-	-	-	-	-	(599.00)	-	(107.60)	**(706.60)**	(53.80)	8.24%	53.80	-100.00%
IOC - Refurb WAB Circcuit Breakers 2024 (CIAC)	-	-	-	-	-	(1,210.20)	(1,210.20)	-	**(1,210.20)**	-	-	-	-	(1,290.84)	-	-		**(1,290.84)**	(80.64)	6.66%	(80.64)	6.66%
Install Public EV Ultra Fast Charger (2024) - Conne River (CIAC)	-	-	-	-	-	-	-	(235.00)	**(235.00)**	-	-	-	-	-	(235.00)	-	-	**(235.00)**	-	0.00%	-	0.00%
Braya Renewable 2023 (CIAC)	-	-	-	(28.00)	(28.00)	(391.60)	(419.60)	-	**(419.60)**	-	-	-	-	(782.28)	-	-	-	**(782.28)**	(362.68)	86.43%	(362.68)	86.43%
IOC - Refurb WAB Circcuit Breakers 2023 (CIAC)	-	-	-	(770.00)	-	(30.40)	(30.40)	-	**(800.40)**	-	-	-	(624.34)	-	-	-	-	**(624.34)**	176.06	-22.00%	30.40	-100.00%
Ultra-Fast DC EV Chargers (CIAC)	-	-	-	-	-	(2,000.00)	(2,000.00)	-	**(2,000.00)**	-	-	-	-	(2,000.00)	-	-		**(2,000.00)**	-	0.00%	-	0.00%
IOC SCADA Data Link (CIAC)	-	-	(28.22)	-	(28.22)	-	(28.22)	-	**(28.22)**	-	-	-	-	(28.88)	-	-	-	**(28.88)**	(0.66)	2.34%	(0.66)	2.34%
Valentine Gold Interconnection (CIAC)	-	(3,730.00)	(12,085.00)	-	(498.27)	-	(498.27)	-	**(15,815.00)**	-	(3,730.00)	(9,015.73)	(2,571.00)	(266.09)	-	-	-	**(15,582.83)**	232.17	-1.47%	232.17	-46.60%
Provide Service Extenstions - All Areas (CIAC)	-	-	-	-	-	-	-	-	**-**	-	-	-	-	(862.13)	-	-	-	**(862.13)**	(862.13)	100.00%	(862.13)	100.00%
Upgrade Disribution Systems - All Areas (CIAC)	-	-	-	-	-	-	-	-	**-**	-	-	-	-	(29.78)	-	-	-	**(29.78)**	(29.78)	100.00%	(29.78)	100.00%
Total	**-**	**(3,730.00)**	**(12,113.22)**	**(798.00)**	**(554.49)**	**(3,727.00)**	**(4,281.49)**	**(1,221.60)**	**(21,589.82)**	**-**	**(3,730.00)**	**(9,015.73)**	**(3,195.34)**	**(5,301.01)**	**(1,221.60)**	**-**	**(148.60)**	**(22,612.27)**	**(1,022.46)**		**(1,019.52)**	

[1] Numbers may not add due to rounding.

Appendix B

Program Scope Details 2024

Remove Safety Hazards (2024)

In Board Order No. P.U. 38(2010) related to Hydro's 2011 CBA, the Board directed Hydro to include in its annual report on capital expenditures an explanation of each scope of work that was undertaken for the Remove Safety Hazards program, setting out the safety hazard that was identified, the location, the steps taken to address the issue, and the amount of the expenditure. Table B-1 outlines the work scopes undertaken in 2024.

Total Approved Budget: **$198,300**

Total Expenditure: **$322,483**

Table B-1: Remove Safety Hazards[1]

Program Work Scope	Expenditure[2] ($000)	Safety Hazard Identified	Work Scope Detail
Replace Security Lift Gate – Bay d'Espoir Generating Station	136.7	The existing lift gate had failed, and a new gate was needed to control site access and manage traffic.	A new lift gate including support structure and electrical components was installed.
Replace Emergency Exit Doors – Holyrood TGS	76.9	Seven emergency exit doors on various buildings were identified with deficiencies, preventing them from working properly.	Replacement doors with associated hardware were installed.
Replace Parking Lot Lights and Poles – Hydro Place	57.7[3]	A condition assessment of the parking lot poles, and lighting identified that 18 poles and their associated lighting systems should be replaced due to corrosion and wear on the poles and defective lighting systems.	New poles and LED[4] lighting systems were purchased in 2023 and installed in 2024.
Work Scopes Under $50,000	51.2		

[1] Details are provided for program scopes greater than $50,000.
[2] Numbers may not add due to rounding.
[3] This work scope incurred $131,000 in 2023 for a total 2023–2024 cost of $188,700.
[4] Light Emitting Diode ("LED").

Perform Software Upgrades and Minor Enhancements (2024)

In its 2024 CBA, Hydro committed to providing a summary of unforeseen work executed under the Perform Software Upgrades and Minor Enhancements (2024) program in this report. Table B-2 provides a summary of such work.

Total Approved Budget: **$864,200**

Total Expenditure: **$337,069**

Table B-2: Unforeseen Software Upgrades and Minor Enhancement Scope

Program Work Scope	Expenditure ($000)	Scope Detail and Justification[5]
Replace Password Manager	65.8	A review identified that the currently deployed password manager software was outdated and becoming a risk. Available password manager systems were evaluated, and a best fit solution selected. The password manager software was replaced.
Work Scopes Under $50,000	123.0	

[5] Details are provided for program scopes greater than $50,000.

Terminal Station In-Service Failures

Hydro has provided a summary of scopes of work undertaken under the Terminal Station In-Service Failures program that exceed $750,000. Table B-3 outlines 2024 expenditures under this program.

Total Approved Budget: **$1,300,000**

Total Expenditure: **$2,459,247**

Table B-3: Terminal Station In-Service Failures

Program Work Scope	Expenditure[6] ($000)	Failure Identified	Scope Description
Restore Power Transformer Capital Spare for Hydraulic Generating Unit Transformers – Bay d'Espoir Terminal Station 1	1,733.5[7]	The spare transformer used to replace Bay d'Espoir Transformer T6 in 2023 was serving as a spare for nine power transformers—Bay d'Espoir T1 to T7, Granite Canal T1, and Upper Salmon T1. Two alternatives were considered to restore availability of a spare—procurement of a new transformer; and refurbishment of the failed Bay d'Espoir T6. The alternative to procure a new transformer was rejected as the risk of being without a spare while waiting for fabrication and delivery of a new transformer (24 to 30 months) was deemed unacceptable. Refurbishment of the failed Transformer T6 was established as the best solution to restore the availability of a spare.	The failed Bay d'Espoir Transformer T6 was refurbished, to restore the availability of a capital spare generation transformer. This work commenced in 2023 as part of the Terminal In-Service Failure (2023) program and was completed in 2024.
Work Scopes Under $750,000	725.7		

[6] Numbers may not add due to rounding.
[7] This work scope incurred $613,700 in 2023 for a total 2023–2024 cost of $2,347,200.

Hydraulic In-Service Failures

Hydro has provided a summary of scopes of work undertaken under the Hydraulic In-Service Failures program that exceed $750,000. Table B-4 outlines 2024 expenditures under this program.

Total Approved Budget: **$1,500,000**

Total Expenditure: **$2,973,945**

Table B-4: Hydraulic In-Service Failures

Program Work Scope	Expenditure[8] ($000)	Failure Identified	Scope Description
Unit 1 Turbine Runner Replacement – Cat Arm	466.9[9]	In 2024, an OEM was engaged to complete a condition assessment on the Cat Arm Unit 1 turbine runner. Inspections revealed that the runner has experienced progressive wear and damage, including accelerated cavitation and a piece broken away on the leading edge. The OEM determined that the runner has operated beyond the normal intended lifecycle hours for a Pelton-style runner. In addition, cavitation had progressed enough that an in-situ weld refurbishment could not be executed, due to a requirement for specialized heat treatment as part of the refurbishment procedure. Replacement of the runner is required for safe and reliable operation of Cat Arm Unit 1.	In 2024, the OEM completed a constructability review for the replacement of the Unit 1 runner. Work planning commenced in 2024, and materials were procured. Replacement of the runner with an available spare is planned to be completed as part of the 2025 Hydraulic In-Service Failures program. The scope of work will include alignment of the generating unit, if required.
Work Scopes Under $750,000	2,507.0		

[8] Numbers may not add due to rounding.
[9] This work scope is expected to exceed $750,000 when 2024 and 2025 expenditures are final.

Thermal In-Service Failures

Hydro has provided a summary of scopes of work undertaken under the Thermal In-Service Failures program that exceed $750,000. Table B-5 outlines 2024 expenditures under this program.

Total Approved Budget: **$3,508,700**

Total Expenditure: **$4,587,751**

Table B-5: Thermal In-Service Failures

Program Work Scope	Expenditure[10] ($000)	Failure Identified	Scope Description
Purchase Spare Low-Pressure L-1 Turbine Rotor Blades – Holyrood TGS	1,435.0	During the Overhaul Unit 2 Turbine and Valves project completed in 2023-2024, the turbine rotor low pressure L-1 blades were found to have significant deterioration and were replaced. Since Holyrood Units 1 and 2 are of identical design and have been subjected to near-identical operating conditions, a comparable finding on the Unit 1 L-1 turbine rotor blades was highly probable.	In 2024, a spare set of low-pressure L-1 turbine rotor blades was purchased. The spare blades were subsequently installed in 2024 as part of the Overhaul Unit 1 Turbine, Valves and Generator project.
Replace Sanitary Sewer Distribution Piping System and Overhaul Lift Station – Holyrood TGS	574.8[11]	The sanitary sewer distribution piping system and lift station at the Holyrood TGS was installed in 1969. Numerous leaks have been experienced in the piping system and repair efforts have been exhausted as leaks continue to return. Blockages in the cast iron piping system have been difficult to clear, leading to sinks backing up in the washrooms and kitchen areas. Chemical cleaning necessary to remove the blockages results in leaks along the main header that runs above high-traffic areas in the powerhouse, posing a safety and health risk to employees. Replacement of the cast iron piping and supports is required to ensure safe and reliable operation of the system. In addition, an inspection of the lift station completed by an authorized service provider determined that the system requires an overhaul.	Work planning for the replacement of the sanitary sewer distribution system commenced in 2023 as part of the 2023 Thermal In-Service Failures Program. A section of the sanitary sewer piping system was replaced in 2024. The remaining sections of the piping system are planned to be replaced, and the lift station overhauled as part of the 2025 Thermal In-Service Failures Program.
Work Scopes Under $750,000	2,578.0		

[10] Numbers may not add due to rounding.
[11] This work scope is expected to exceed $750,000 when 2023, 2024 and 2025 expenditures are final.

Gas Turbine In-Service Failures

Hydro has provided a summary of scopes of work undertaken under the Gas Turbine Generation In-Service Failures program that exceed $750,000. Table B-6 outlines 2024 expenditures under this program.

Total Approved Budget: **$358,000**

Total Expenditure: **$7,101,679**

Table B-6: Gas Turbine Generation In-Service Failures

Program Work Scope	Expenditure[12] ($000)	Failure Identified	Scope Description
Generator Refurbishment – Stephenville Gas Turbine	6,219.4[13]	In August 2023, generator rotor blades were damaged, which also caused secondary damage to the stator end windings, exciter and other components.	As part of the 2023 Gas Turbine In-Service Failures Program, the generator was disassembled including removal of the stator and rotor. The stator was refurbished on site and the rotor and exciter were shipped to Hydro's generator service provider for refurbishment in November 2023. The remaining work was expected to be completed in the second quarter of 2024. However, the exciter was damaged during shipment back to site and had to be sent back for repair. Reassembly of the unit with the refurbished components re-commenced in May 2024 and the unit was returned to service in September 2024.
Overhaul Engine 202205 – Hardwoods Gas Turbine	621.9[14]	During a borescope inspection of Engine 202205, material loss was discovered on a nozzle guide vane. Hydro's service provider recommended that the engine be removed and overhauled.	As part of the 2023 Gas Turbine In-Service Failures Program, Engine 202205 was removed from service and sent for overhaul to the service provider's facility. An available spare engine was installed and placed in service in 2023 to restore full generation capacity for the Hardwoods Gas Turbine. The damaged engine was overhauled, returned to Hydro, and stored as a spare in the second quarter of 2024.
Work Scopes Under $750,000	260.4		

[12] Numbers may not add due to rounding.
[13] This work scope incurred $3,436,100 in 2023 for a total 2023–2024 cost of $9,655,500.
[14] This work scope incurred $77,000 in 2023 for a total 2023–2024 cost of $698,900. This scope was originally expected to exceed $750,000.

Diesel In-Service Failures

Hydro has provided a summary of scopes of work undertaken under the Diesel In-Service Failures program that exceed $750,000. Table B-7 outlines 2024 expenditures under this program.

Total Approved Budget: **$488,300**

Total Expenditure: **$1,984,510**

Table B-7: Diesel In-Service Failures

Program Work Scope	Expenditure ($000)	Failure Identified	Scope Description
Purchase Spare Mobile Diesel Generator	1,112.9	Hydro identified a requirement for a spare mobile diesel generator in Southern Labrador. Hydro has six mobile diesel generators stationed in Charlottetown, L'Anse-Au-Loup and Mary's Harbour, all of which are installed and would require immediate replacement upon failure. Recent failures of Unit 2082 in L'Anse-Au-Loup and Unit 2090 in Charlottetown led to Hydro securing and installing rental units while the failed units were refurbished. A third mobile generator, Unit 2102 in Charlottetown, is showing excess metal in its oil samples, which is indicative of an impending engine failure. Hydro owning a spare unit and stationing it in Southern Labrador would allow subsequent failed units to be replaced 7-10 days faster than having to secure a rental unit.	A spare mobile diesel generator was purchased and delivered to Charlottetown.
Work Scopes Under $750,000	871.6		

Telecommunications In-Service Failures

Hydro has provided a summary of scopes of work undertaken under the Telecommunications In-Service Failures program that exceed $750,000. All scopes of work undertaken in the 2024 program were under $750,000.

Total Approved Budget: **$91,400**

Total Expenditure: **$253,809**

Transmission In-Service Failures

Hydro has provided a summary of scopes of work undertaken under the Transmission In-Service Failures program that exceed $750,000. All scopes of work undertaken in the 2024 program were under $750,000.

Total Approved Budget: **$158,500**

Total Expenditure: **$162,244**

Boiler Condition Assessment and Miscellaneous Upgrades (2024) – Holyrood

For refurbishment work scopes identified and executed in 2024 under this program that were material in dollar value and met capitalization criteria, Hydro proposed to implement and communicate these items to the Board in this 2024 Capital Expenditures and Carryover Report. The boiler condition assessments were completed on Units 1, 2, and 3 in 2024 and Table B-8 provides a summary of the refurbishment work identified and executed in 2024.

Total Approved Budget: **$3,957,800**

Total Expenditure: **$7,864,546**

Table B-8: Boiler Condition Assessment and Miscellaneous Upgrades (2024) – Holyrood

Scope Title	Expenditure ($000)[15]	Scope of Work and Justification[16]
Units 1, 2 and 3 Exhaust Gas Outlet Duct and Expansion Joint Refurbishment	1,218.1	During unit operation, boiler exhaust gases corrode the internal surface of outlet duct to the boiler stack, when the gas temperature falls below the sulphuric acid dew point causing the formation of sulphuric acid condensation. In addition, particulate material in the exhaust gases erodes the duct internal lining and expansion joints, causing leaks during operation. In 2024, the boiler gas outlet ducts and expansion joints were refurbished on all three units to ensure safe and reliable operation when the units were returned to service.
Units 1 and 3 High Pressure (“HP”) Feedwater Heater Overhauls	1,026.1	HP feedwater heaters utilize high pressure steam extracted from the turbine steam cycle to preheat the boiler feedwater before it is returned to the boiler, thereby optimizing the generating unit thermal efficiency. During the 2024 operating season, leaking tubes were discovered on Unit 1 – HP Feedwater Heater #4 and the heater was removed from service to prevent water induction into the turbine and will require replacement due to its deteriorated condition. Unit 1 - HP Feedwater Heater #5 was also inspected and overhauled during the planned 2024 Unit 1 outage prior to returning the heater to service. The plant control system requires HP Feedwater Heaters #’s 4 and 5 to be operated as a set, so both heaters will remain out of service until HP Feedwater #4 is replaced. During the 2024 operating season, leaking tubes were also discovered on Unit 3 - HP Feedwater Heater #5 and the heater was removed from service to prevent water induction into the steam turbine. The heater was then inspected and overhauled during the planned 2024 Unit 3 outage and the leaking tubes were plugged prior to returning the heater to service.
Unit 3 Economizer Hoppers and Associated Piping Replacement	989.1	During the 2024 Unit 3 planned outage, inspection of the economizer hoppers and associated piping revealed significant deterioration due to erosion and corrosion. Erosion in the hoppers and piping is caused by the abrasive nature of boiler ash and high gas velocities. Corrosion in the hoppers and piping also occurred due to the chemical composition of the boiler exhaust gas. The extent of the deterioration was too extensive to allow for patching in the economizer hoppers and piping system. In 2024, replacement of the Unit 3 boiler economizer hoppers and associated piping was completed to ensure safe and reliable operation during the 2024-2025 operating season.
Units 1 and 2 Lower Waterwall Slope Tube Refurbishment	548.8	In 2023, the boiler service provider recommended an inspection of the Units 1 and 2 lower water wall slope tubes to check for tube thinning. Boiler tube thinning leads to inadequate wall thickness for pressure requirements and can result in a forced outage. During the 2024 planned Units 1 and 2 outages, inspections were completed on the lower waterwall slope tubes. Following the inspections, welding

[15] These expenditures include both the condition assessment, and the upgrade costs associated with each scope of work. The upgrade costs were not tracked separately from the condition assessment costs.
[16] Details are provided for program scopes greater than $50,000.

Scope Title	Expenditure ($000)[15]	Scope of Work and Justification[16]
		refurbishment was completed on tubes that were measured to be below the minimum wall thickness.
Unit 3 Burner Windbox Floor Replacement	312.6	During the 2024 planned Unit 3 outage, an inspection of the boiler burner windbox revealed that the floor had significant deterioration due to corrosion/erosion and required replacement due to concerns about its structural integrity. The floor is utilized by employees to safely access the windbox internal for inspections during annual unit outages. The floor was replaced during the annual Unit 3 outage.
Unit 3 Super Heater Attemperator Feedwater Spray Nozzle Refurbishment	283.5	Superheated steam from the boiler must be maintained within a specific temperature range for safe and reliable turbine operation. The Unit 3 boiler super heater attemperator system injects boiler feedwater into the superheated steam to control and reduce the steam operating temperature. There were issues controlling the Unit 3 superheater temperature during the 2024 operating season. The superheater attemperator system was inspected during the planned 2024 Unit 3 outage and the feedwater spray nozzle was found to be detached from the feedwater header. The nozzle was refurbished during the Unit 3 outage prior to returning the unit to service.
Unit 1 Penthouse Refurbishment	159.9	The penthouse section of the Unit 1 boiler contains critical tubing systems that require inspection during the annual unit outage as recommended by the OEM to ensure safe and reliable operation. This location of the boiler contains asbestos which required abatement work prior to completing the tubing inspections. In 2024, the Unit 1 boiler Penthouse tubing was inspected, and minor refurbishment was required and completed.
Unit 1, 2, and 3 Reheat Attemperator Inspections and Refurbishment	155.6	The boiler reheat attemperator is a system that controls the temperature of the boiler reheat steam that utilizes boiler feedwater to reduce the reheat steam temperature before it enters the turbine. During the 2024 Units 1, 2 and 3 annual outages, the boiler reheat attemperators were inspected and minor refurbishment was required and completed.
Unit 1 Front Wall Downcomer and Header Expansion Joints Refurbishment	142.1	During boiler operation, downcomers and headers are subjected to temperature differentials, causing them to expand and contract during operation, which is accommodated by expansion joints. During the 2024 Unit 1 annual outage, expansion joints were cleaned, inspected and refurbished or replaced as required.
Unit 1 Sootblower Wallbox Replacements	82.8	A sootblower is a system that is used to clean fouling from the boiler tubes during operation to improve the rate of heat transfer and overall boiler efficiency. Leaking sootblower wall boxes, which house the sootblower lances, can cause flue gas leaks or a loss of steam inside the powerhouse, posing a safety risk to plant personnel. During the 2024 Unit 1 annual outage, sootblower wall boxes were inspected and four were replaced due to deterioration.
Work Scopes Under $50,000	-	

Major Condition Assessment and Miscellaneous Refurbishments Synchronous Condensers 1 and 2 (2023–2024) – Wabush Terminal Station

For refurbishments that are material in dollar value and meet capitalization criteria, Hydro proposed in its 2023 CBA to complete these refurbishment activities within this program and communicate these items to the Board in its 2023 and 2024 Capital Expenditures and Carryover Reports. The condition assessments for Synchronous Condenser 1 ("SC1") and Synchronous Condenser 2 ("SC2") were completed in 2023 and 2024, respectively. Table B-9 provides a summary of the completed refurbishment activities that exceeded $50,000.

Total Approved Budget: **$1,093,300**

Total Expenditure: **$1,049,263**

Table B-9: Major Condition Assessment and Miscellaneous Refurbishments Synchronous Condensers 1 and 2 (2023–2024) – Wabush Terminal Station

Scope Title	Expenditure ($000)	Scope of Work and Justification[17]
SC1 and SC2 Oil Ring Seals Replacement	258.8	As part of an inspection in 2022, the OEM recommended that the oil ring seals be replaced as they were worn and causing secondary oil contamination. New sets of oil rings were procured and installed for both SC1 and SC2.
SC2 Stator and Rotor Cleaning and Painting	56.8	As part of an inspection in 2022, the OEM recommended that the SC2 rotor be removed, cleaned, and painted. In 2023, the SC2 rotor was removed. The rotor and stator were found to be coated in an oily residue, and both were cleaned with carbon dioxide and painted.
Work Scopes Under $50,000	-	

[17] Details are provided for program scopes greater than $50,000.

Sch 6: 2024 Average Rate Base

Schedule 6

2024 Average Rate Base

2026 Capital Budget Application

2024 Average Rate Base

Table 1: Computation of Average Rate Base for the Year Ended December 31, 2024 ($000)[1]

	2024
Capital Assets – Return 4	3,118,245
Work in Progress[2]	62,088
	3,180,333
Deduct:	
Accumulated Depreciation – Return 6[3,4]	(773,107)
Contributions in Aid of Construction – Return 7[2,4]	(66,689)
Total Capital Assets[4]	2,340,537
Deduct Items Excluded from Rate Base:	
Work in Progress[2]	(62,088)
Asset Retirement Obligations (Net of Amortization)	(10,385)
Net Capital Assets	2,268,064
Net Capital Assets, Previous Year	2,196,889
Unadjusted Average Capital Assets	2,232,477
Deduct:	
Average Net Capital Assets Excluded from Rate Base	(7,713)
Average Capital Assets	**2,224,764**
Working Capital Allowance – Return 8	**1,416**
Fuel Inventory – Return 10	**53,950**
Supplies Inventory – Return 10	**43,698**
Average Deferred Charges for Rate Base – Return 11	**55,215**
Average Rate Base at Year End – Return 12	**2,379,043**

[1] The 2024 Average Rate Base is an excerpt of Return 3. For further information, please refer to "2024 Annual Return," Newfoundland and Labrador Hydro, April 1, 2025, Return 3.
[2] Contributions of $2.7 million related to Capital Assets not in service have been net in Work in Progress. In addition, insurance proceeds of $1.0 million related to Capital Assets not in service have been net in Work in Progress.
[3] Accumulated Depreciation is net of the Retirement Asset Pool and Removal Provision. For further details, please refer to "2024 Annual Return," Newfoundland and Labrador Hydro, April 1, 2025, Return 6.
[4] As per Board Order No. P.U. 33(2023), electric vehicle chargers were excluded from Capital Assets and included in Regulatory Assets. The total is comprised of $0.8 million in Capital Assets and $(0.3) million in Deferred Contributions.

Schedule 7

Capital Programs and Projects

Programs

Over $750,000

Table of Contents

Volume I

Schedule 7: Capital Programs and Projects

Over $5,000,000

Program 1

Wood Pole Line Management

(2026)

Wood Pole Line Management (2026)

Location: Various

Investment Classification: Renewal

Asset Category: Transmission

Estimated Cost: $6,313,700

Executive Summary

The Wood Pole Line Management ("WPLM") Program is an annual program that promotes the early detection and replacement of deteriorated poles and other line components to extend the expected useful life of the poles and Newfoundland and Labrador Hydro's ("Hydro") wood pole transmission lines. This program is a least-cost strategy for wood pole line management, as investments made in regular inspection and early detection of issues extend the useful life of the poles, support the deferral of line reconstruction, and prevent forced outages.

As of 2025, Hydro has 35 wood pole transmission lines that are 40 or more years old, surpassing their anticipated useful service life. Hydro's experience with the WPLM Program has demonstrated that the expected useful life of its transmission lines can be extended by more than 15 years through early inspection and refurbishment.

Two complete inspection cycles (10 years per cycle) have now been performed under the WPLM Program, the results of which demonstrate that the cost of the program is well justified by reductions of in-service failures and unplanned repair costs, as well as reliability improvements and life extension of existing pole plant assets. In addition, the program has been effective in preventing the premature retirement of viable components, which have not reached the end of their expected useful life.

Due to its cyclical nature, this program is continuous in nature, as poles are inspected and refurbished each year based on the prior two-year inspection cycle. Treatments for poles begin at the 20-year in-service mark, with refurbishment completed as required. The planned work for 2026 is estimated at $6,313,700.

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List of Appendices

1.0 Introduction

Many of Hydro's transmission lines are of wood pole construction. As wooden poles and other framing members age, their preservative retention levels decrease, causing them to become increasingly vulnerable to deterioration by different agents, including fungi and insects. In addition, metal parts can rust and/or suffer from metal fatigue over decades. Wood poles and the associated components must be regularly inspected and treated to proactively identify and assess deterioration.

The WPLM Program is an annual program that promotes the early detection of deteriorated poles and other line components. Early detection is required to avoid potential safety hazards and identify poles and other components that are at early stages of decay or deterioration to ensure that corrective measures can be taken to extend the expected useful life of the poles. This program is a least-cost strategy for wood pole line management, as investments made in regular inspection and early detection of issues extend the useful life of the poles, support the deferral of line reconstruction, and prevent forced outages.

2.0 Program Description and Justification

2.1 Program Background

Hydro first initiated the WPLM Program as a pilot study in 2003 and subsequently determined that the program should continue as a long-term asset management and life-extension program. The program was presented to the Board of Commissioners of Public Utilities ("Board") as part of Hydro's 2005 Capital Budget Application.[1]

Prior to 2003, Hydro's pole inspection and maintenance practices followed the traditional utility approach of sounding inspections only. In 1998, Hydro began to collect core samples from select poles to test for preservative retention levels and pole decay. The results of early tests raised concerns regarding the general preservative retention levels in the poles. This testing confirmed that there were poles in Hydro's system that had a preservative level below that which is necessary to maintain the required design criteria. During this period, Hydro replaced certain poles because the preservative level had decreased to the point that decay had advanced and the pole was no longer structurally sound.

[1] "2005 Capital Budget Application," Newfoundland and Labrador Hydro, rev. September 28, 2004 (originally filed August 10, 2004), sec. G, app. 2.

These inspections and the analysis of the data confirmed that a more rigorous WPLM Program was required.

Figure 1 illustrates typical wood pole inspection techniques conducted in the WPLM Program. Figure 2 provides examples of wood pole line inspection results.

Figure 1: WPLM Inspection Techniques[2]

Figure 2: Examples of Wood Pole Inspection Results

[2] Clockwise from Bottom Left: (1) Field Data Collector, (2) Installing Boron Treatment, (3) Climbing Inspection, and (4) Destructive Testing at Memorial University of Newfoundland.

Historically, Hydro used 40 years as the anticipated useful or economic life for its wooden pole lines. As of 2025, Hydro has 35 wood pole transmission lines that have surpassed this anticipated useful service life. Of these lines, 27 are over the age of 45 years, with the oldest wood pole line having been installed 60 years ago in 1965. Hydro's experience with the WPLM Program has therefore demonstrated that the expected useful life of its transmission lines can be extended by more than 15 years through early inspection and refurbishment. For details, please refer to "Interim Report – Review of the Current WPLM Program,"[3] "Progress Report #2 (2012–2017) Review of the Current Wood Pole Line Management (WPLM) Program,"[4] and "Wood Pole Line Management Program Progress Report (2018–2022)."[5]

2.2 Program Description

The WPLM Program is a condition-based asset renewal program that uses the basic principles and strategies of reliability-centered maintenance. Under the WPLM Program, full climbing inspections are performed on wooden transmission structures, poles are re-treated internally with preservatives, and components are assigned a rating. Inspections that result in findings on the lower end of the rating scale are subject to further assessment and increased inspection frequency as necessary. If these inspection results identify concerns over the adequacy of a pole, further engineering analysis is performed to estimate the in-service pole strength and to determine if the structure is still able to withstand its design loads. Recommendations are then made for refurbishment or replacement of deteriorated line components, including poles, bracing, hardware, conductors, etc. Recommended work is generally completed in subsequent years; however, in cases where components are deemed unable to last another year, Hydro replaces or refurbishes them in the current year. Such replacements are typically managed within the existing budget.

The purpose of the WPLM Program is to detect and treat deteriorating wood poles and line components before the integrity of the structures is jeopardized. If the deterioration of the structures or components is not detected early, the reduced integrity of the structure could affect the reliability of the line and present safety issues and hazards for Hydro personnel and the public.

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[3] "2013 Capital Budget Application," Newfoundland and Labrador Hydro, rev. August 31, 2012 (originally filed August 8, 2012), vol. II, tab 17, app. B.

[4] "2019 Capital Budget Application," Newfoundland and Labrador Hydro, rev. October 9, 2013 (originally filed July 31, 2018), vol. I, 2019–2023 Capital Plan, app. C.

[5] "Wood Pole Line Management Program Progress Report (2018–2022)," Newfoundland and Labrador Hydro, April 21, 2023.

The WPLM Program inspection schedule generally reflects plans to complete older lines first and work toward newer lines. The specific lines and the number of poles included in the program are reviewed on an annual basis and may be modified based on age, priority (i.e., radial or redundant), and condition. Lines are incorporated into the program at the age of 20 years.

Hydro committed to providing the Board with annual updates on the program, including progress summaries of the work completed to date and a forecast of future program objectives. This update is provided herein.

2.2.1 2024 WPLM Program – Review

The inspection and treatment work scheduled for 2024 is summarized in Table 1. This work was completed between April and October of 2024.

Table 1: 2024 Inspections Completed

Regions	Line Name	Year In Service	Voltage Level	Number of Poles Inspected
Eastern	TL203	1965	230 kV	424
Central	TL224	1968	138 kV	602
	TL263	2002	230 kV	152
Western	TL250	1987	138 kV	300
Northern	TL227	1970	69 kV	426
	TL262	2002	69 kV	48
Labrador	L40	1963[6]	46 kV	300
Total				**2,252**

[6] Line 40 is part of the 46 kV system in Labrador West. As this line was not constructed by Hydro (constructed by the mines in western Labrador in the 1960s), the exact age of the line is unknown. It is assumed that these lines were constructed during the same timeframe as the lines between Twin Falls and Wabush in 1963.

A list of the refurbishment of defective components completed in 2024 is provided in Table 2.

Table 2: 2024 Refurbishments Completed

Component	Region				
	Eastern	**Central**	**Western**	**Northern**	**Total**
Poles	44	22	8	10	**84**
Crossarms	44	7	13	3	**67**
Cross Bracing	56	33	4	1	**94**
Knee Bracing	23	7	3	-	**33**
Foundations	1	-	1	1	**3**
Miscellaneous (e.g., Insulators, hardware, etc.)	121	54	19	51	**245**

2.2.2 2025 WPLM Program

The inspection and treatment work scheduled for 2025 is summarized in Table 3. This work is scheduled to be executed between April and October 2025.

Table 3: 2025 Inspection Plan

Region	Line No.	Voltage Level (kV)	Year Built	Age of Line	Planned Number of Poles to Inspect
Eastern	TL218	230	1966	59	425
Central	TL224	138	1968	57	225
	TL263	230	2002	23	554
Western	TL250	138	1987	38	300
Northern	TL227	69	1970	55	480
	TL239	138	1982	43	347
Labrador[7]	L32	46	1963	62	50
	L33	46	1963	62	50
	L36	46	1963	62	50
Total					**2,481**

[7] Lines 32, 33, and 36 are part of the 46 kV system in Labrador West. As this line was not constructed by Hydro (constructed by the mines in western Labrador in the 1960s), the exact age of the line is unknown. It is assumed that these lines were constructed during the same timeframe as the lines between Twin Falls and Wabush in 1963.

Scheduled refurbishment work for 2025 is summarized in Table 4, with planned refurbishment activities accounted for in the approved 2025 WPLM Program. Carryover work from 2024 is due to the unforeseen cancellation of a planned outage on TL201 as a result of low water issues and reduced generation capability. Scope additions to the 2025 refurbishment plan are the result of the identification of wood poles rated as 5 during inspections in 2024, which require refurbishment as soon as practicable.[8]

Table 4: 2025 Refurbishment Plan

Components	Planned	Carryover from 2024	Additional Scope	Total
Poles	72	42	3	**117**
Crossarms	50	46	2	**98**
Cross Bracing	10	37	4	**51**
Knee Bracing	39	32	2	**73**
Foundations	2	1	-	**3**
Miscellaneous (e.g., Insulators, hardware, etc.)	136	87	7	**230**

2.2.3 Program Justification

The program is a strategic asset management and life extension program for Hydro’s wood pole transmission lines. Since its inception, Hydro has demonstrated that it is a least-cost strategy for the WPLM Program, as investments made in the regular inspection and early detection of issues extend the useful life of the poles, support the deferral of line reconstruction, and prevent forced outages. In 2005, the Board determined that this approach was justified and prudent, stating:

> This approach is a more strategic method of managing wood poles and conductors and associated equipment and (the Board) is persuaded that the new WPLM Program, based on RCM principles, will lead to an extension of the life of the assets, as well as a more reliable method of determining the residual life of each asset. One of the obvious benefits of RCM will be to defer the replacement of these assets, thereby resulting in a direct benefit to ratepayers.[9]

Two complete inspection cycles (10 years per cycle) have now been performed under the program; the results of which demonstrate that the cost of the WPLM Program is well justified by cost-avoidance

[8] Please refer to Table 5 for an explanation of Rating 5.
[9] Board Order No. P.U. 53(2004) REASONS FOR DECISION, Board of Commissioners of Public Utilities, April 13, 2005, p. 23/13–18.

savings through reduced in-service failures and reduced unplanned repair costs, as well as reliability improvements and life extension of existing pole plant assets. In addition, the program has been effective in preventing the premature retirement of viable components, which still have continued life expectancy.

3.0 Asset Overview

3.1 Asset Background

Hydro maintains approximately 2,500 km[10] of wood pole transmission lines operating at voltages of 46 kV, 69 kV, 138 kV, and 230 kV. These lines consist of over 24,000 poles of varying ages, from new to 60 years old. As of 2025, approximately 95% of Hydro's transmission pole assets are more than 20 years old; approximately 62% are more than 40 years old.

3.2 Asset Condition

All poles inspected under the program are rated based on a full climbing inspection and condition assessment. Explanations for the rating system are found in Table 5.

Table 5: Wood Pole Line Management Rating System

Condition	Rating	Post-Inspection and Treatment Actions
Severe/Hazardous to Climb	5	Refurbishment required as soon as practicable.
Poor	4	Engineering analysis and subsequent refurbishment if deemed necessary.
Moderate	3	Monitor.
No Issues	2	None.
New (<10 Years)	1	Climbing inspection and treatment not required.

Chart 1 highlights the current condition rating for Hydro's wood transmission pole assets as of April 2025.[11] As can be seen by the information presented, the majority of poles within Hydro's Transmission system are considered to be in excellent condition based on established inspection criteria within the WPLM Program.

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[10] This quantity includes the recent addition of the 46 kV lines in Labrador (42 km) as they have recently been transferred from a distribution asset to a transmission asset based on system planning requirements.

[11] Full inspections have now been completed on two of Hydro's oldest Lines (L201 and L203), and although there is an increase in proposed work as a result, it is deemed to be in compliance with life extension practices within the utility industry.

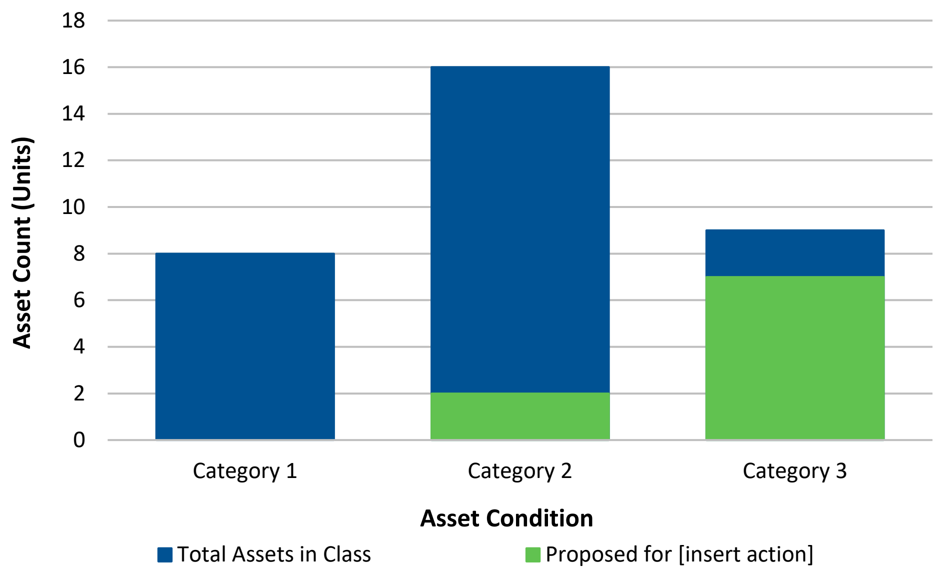


Chart 1: Asset Condition

1 ## 3.3 Condition-Based Remaining Life

2 Chart 2 presents Hydro's wood transmission pole assets by expected remaining life as of April 2025.

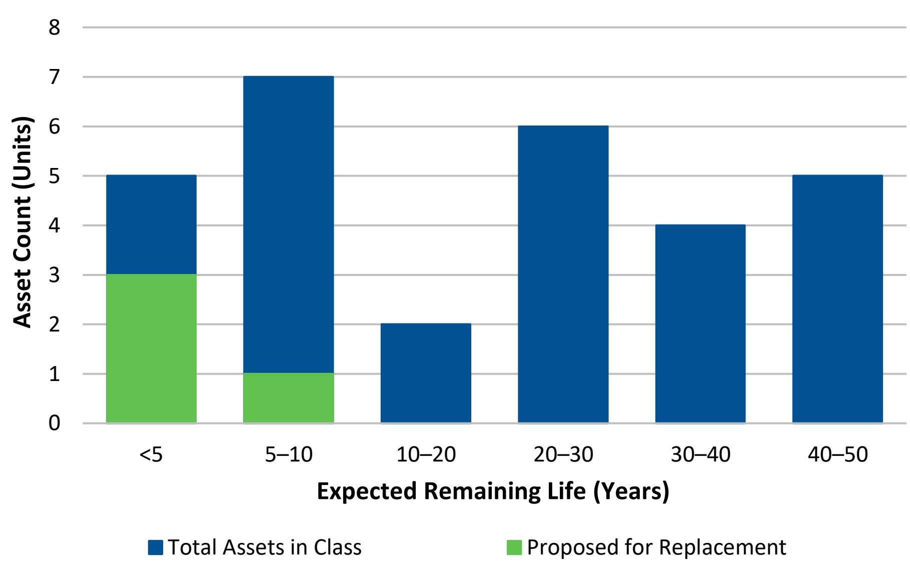


Chart 2: Condition-Based Expected Remaining Life

3.4 Asset Ages

Chart 3 presents Hydro's wood transmission pole assets by age as of April 2025.

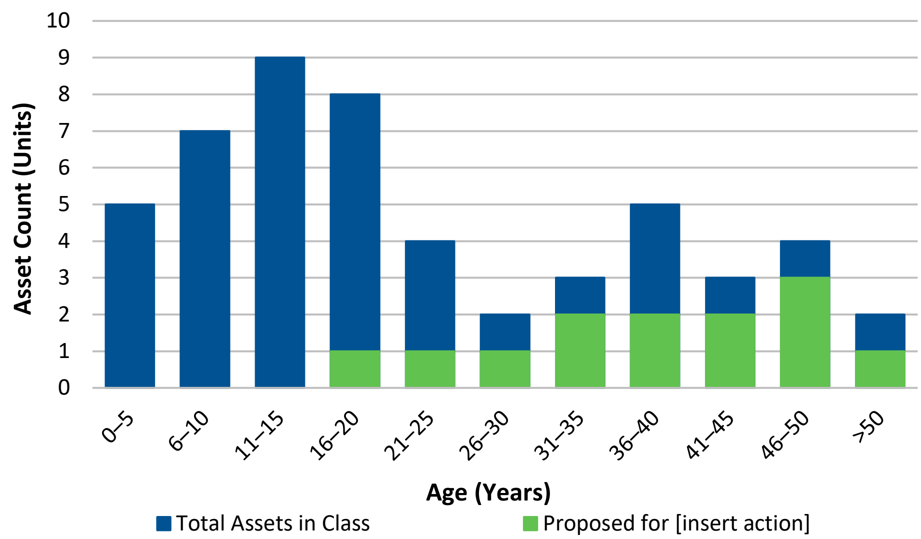


Chart 3: Asset Counts by Asset Age

4.0 Trending

4.1 Assets Installed/Replaced/Upgraded

Chart 4 provides the five-year historical, current, and five-year forecast number of poles replaced per year. It should be noted that Hydro is forecasting an increase in pole replacements over the next two to three years due to having recently completed inspections for two of the oldest assets in the system: TL201 and TL203. These lines were constructed in the mid-1960s, and current trends show that these lines require more restoration. Based on recent inspections, the condition assessment is also consistent with expected utility experience. Hydro is planning to inspect additional 1960s lines in 2027, 2028 and 2029. The increases shown in 2025, 2027, and 2030 corresponds with increased restoration work on 1960s lines, particularly in years 2 and 3 post-inspection.

Forecast numbers are determined through Iowa curves. Iowa curves were developed in a study at the University of Iowa and display functional failures or retirements of asset classes. Each curve represents a probability distribution and has a series of attributes. The curves support realistic forecasting of the remaining life of groups of assets. The latest Iowa curve for poles in Hydro's Island Interconnected

System can be found in Appendix A. Costs for this increase have been accounted for in the projected program budget as presented in Section 6.1.

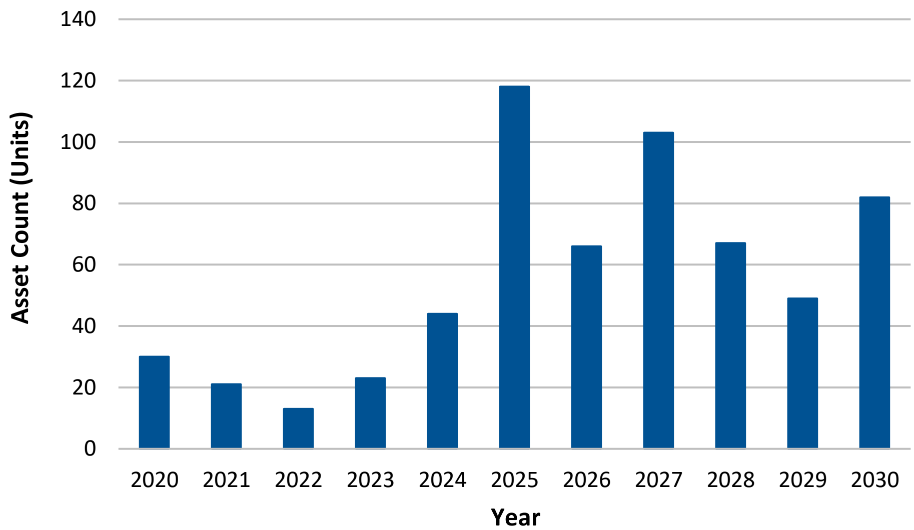


Chart 4: Historical and Forecast Number of Assets Installed/Replaced/Upgraded

4.2 Historical and Forecast Average Unit Costs

As discussed, in addition to pole replacements, the WPLM Program includes the inspection and refurbishment of all components of Hydro's wooden transmission lines, such as crossarms, cross bracing, knee bracing, hardware, etc. The work completed varies based on the actual condition of the asset. In most cases, the work completed on any one structure is not related to the work on the next structure (e.g., one structure may require a pole replacement, and the next structure may need a crossarm or an insulator replacement). The same is true for a breakdown by individual transmission line, where the cost will be affected by the configuration, voltage, age, and geographical location of the line. Additionally, environmental sensitivities are higher for some areas, and, in recent years, a significant amount of environmental mitigation has been required to travel over wetlands to complete pole replacements.

4.3 Historical Reliability

Chart 5 and Chart 6 show the average annual forced outage hours due to structural failures on wooden transmission lines before and after the implementation of the WPLM Program. Chart 5 presents data for the entirety of the Island Interconnected System, while Chart 6 presents data for the Avalon Peninsula

1 specifically. The outage data demonstrates that there has been a material improvement on the Avalon
2 Peninsula since Hydro launched the WPLM Program in 2003.

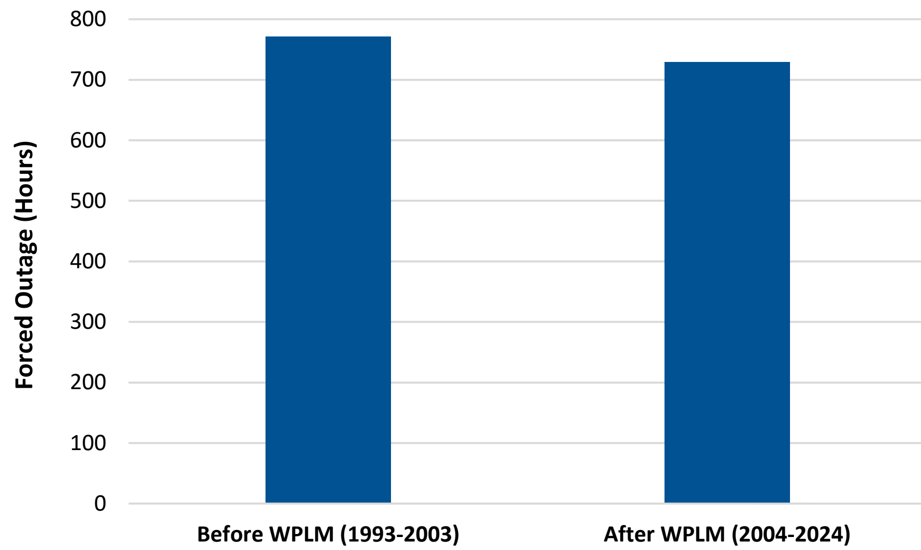


Chart 5: Outage Data for Hydro's Wooden Transmission System (1993-2024)

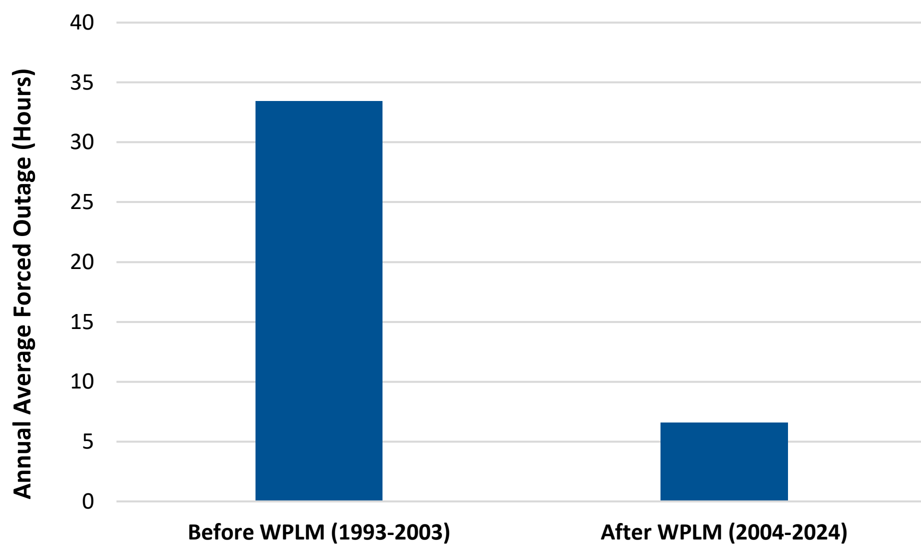


Chart 6: Outage Data for Hydro's Wooden Transmission System on the Avalon Peninsula (1993-2024)

1 Chart 7 and Chart 8, respectively, show the historical total outage frequencies and durations for Hydro's
2 wooden transmission lines from 2020 to 2024. The total outage duration for 2023, as shown in Chart 8,
3 can be attributed mainly to a pole fire on TL221 in early February 2023. TL221 was out of service for ten
4 days before the pole was replaced; however, there were no customer outages due to this event.

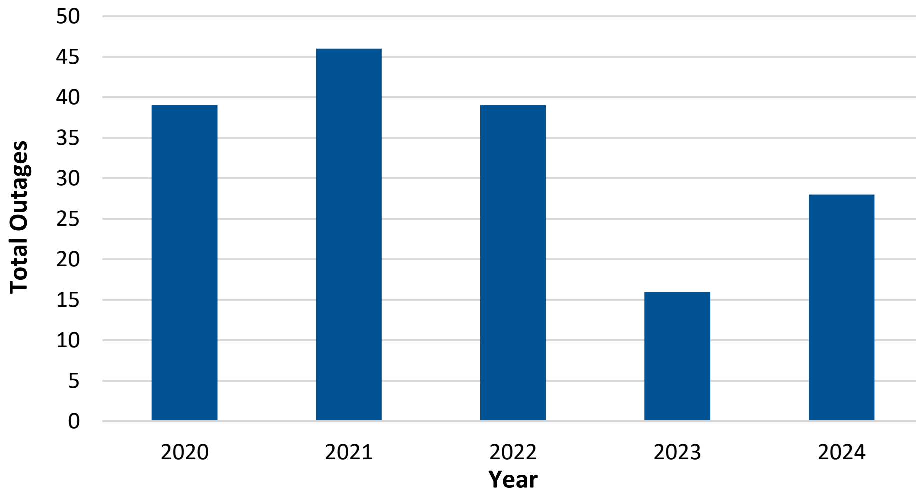


Chart 7: Historical Line Outage Frequency for Wooden Transmission Lines (All Causes)

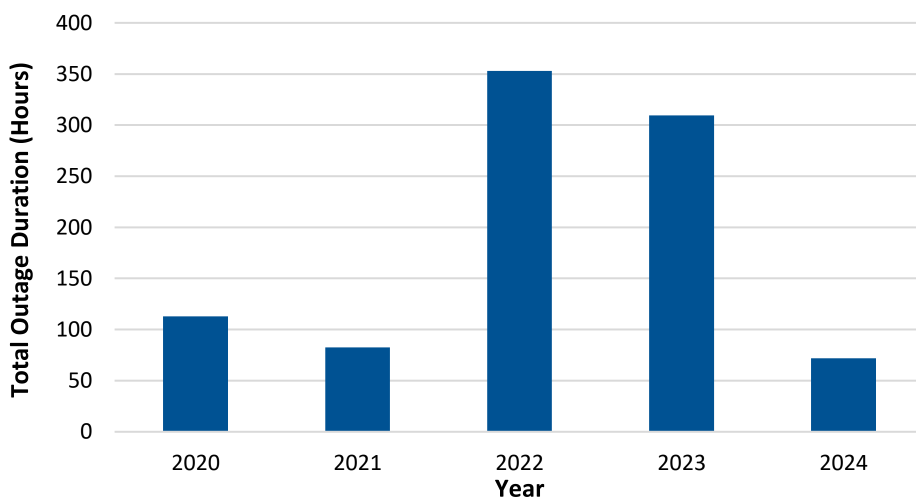


Chart 8: Historical Line Outage Duration for Wooden Transmission Lines (All Causes)[12]

[12] The increase in total outage duration for 2022 can be attributed mainly to failures that occurred on TL203 and TL219 during an ice storm in early February 2022, as reported to the Board in "Power Outage and Incident Advisory Report 2022-H-010-a." In 2023, TL221 had a ten-day outage in February, accounting for 240 hours in 2023. At the time of the trip (burned pole and crossarm replacement), there were snow squalls and a wind warning in effect. The reason this forced outage was not corrected in a timely manner was due to the fact that Hawkes Bay was being fed via the Mobile Transformer, and there was no customer impact due to this forced outage.

5.0 Analysis

5.1 Evaluation of Alternatives

Hydro considered the following alternatives:

- Pace Reduction; and
- Continuation of the program at the current pace.

5.1.1 Pace Reduction

The program employs a balanced ten-year inspection cycle that includes inspection, treatment, and replacement, as required, following reliability-centered maintenance principles. Deferral of the program would be detrimental to program execution, effectiveness, and resource balancing. In 2018, as part of its second WPLM Program progress report, Hydro investigated the optimum inspection/maintenance interval for the program. Results showed that Hydro's inspection interval is in line with industry best practices.

5.1.2 Continuation of the Program at the Current Pace

The WPLM Program is a proactive, condition-based asset management program that follows reliability-centred maintenance principles. Transmission line assets must be managed in such a manner as to balance reliability and costs. Condition-based programs are more progressive than age-based programs, in which assets are replaced once they have surpassed their expected useful life with no or little consideration of their condition.

5.2 Least-Cost Evaluation

This program is a least-cost strategy for the WPLM Program, as investments made in regular inspection, treatment, and early detection of issues extend the useful life of the lines, support the deferral of line reconstruction, and prevent forced outages. Hydro's analysis of this program substantiates the program as a least-cost strategy. It demonstrates that the cost of the program and the average inspection interval of 10 years is well justified by cost-avoidance savings through reduced in-service failures and reduced unplanned repair costs, as well as life extension of existing pole plant assets by between 10 to 20 years. The overall pole replacement rate per year is well below the published industry data. The development of a rigorous methodology to assess and analyze the pole inspection data allows Hydro to continue to proactively identify the right level of expenditure, on the right poles, at the right time.

5.3 Recommended Alternative

Hydro proposes the continuation of its WPLM Program at the current inspection intervals, as this approach is demonstrated to be the least-cost strategy for the renewal of wood pole transmission lines.

5.3.1 Risk of Asset Stranding

All of the transmission lines currently included in the program are planned to remain in service; therefore, Hydro does not foresee any risk of asset stranding as it relates to the WPLM Program.

5.3.2 Risk Mitigation

Hydro assessed the pre- and post-implementation risk of the scope of work for the 2026 program in accordance with Hydro's Capital Risk Assessment process, as outlined in Section 7.0 of Schedule 1. The outcome of this assessment is provided in Table 6.

Table 6: Risk Scoring Pre- and Post-Implementation

	Impact	Likelihood	Score
Pre-Implementation	4	4	**16**
Post-Implementation	4	1	**4**
		Risk Mitigated	**12**
		Risk Mitigated per $1 Million	**1.9**

6.0 Scope of Work

The inspection and treatment work scheduled for 2026 is summarized in Table 7. This work is scheduled to be executed between April 2026 and October 2026.

Table 7: 2026 Inspection Plan[13]

Region	Line No.	Year Built	Age of Line	Target Number of Poles to Inspect
Central (230kV)	TL232	1981	45	400
Central (<230kV)	TL212	1966	60	372
	TL250	1987	39	300
	TL264	2005	20	552
Northern	TL239	1982	44	300
	TL241	1995	31	542
Total				**2,466**

[13] There are currently no line inspections planned for Labrador under this program in 2026.

Scheduled refurbishment for 2026 is summarized in Table 8.

Table 8: 2026 Refurbishment Plan

Components	Central (230kV)	Central (<230Kv)	Northern	Labrador	Total
Poles	28	14	10	9	**61**
Crossarms	28	8	19	4	**59**
Cross Bracing	2	10	-	-	**12**
Knee Bracing	14	-	-	-	**14**
Foundations	2	1	1	5	**9**
Miscellaneous (e.g., Insulators, hardware, etc.)	96	70	15	5	**186**

6.1 Program Budget

The estimate for the program is shown in Table 9.

Table 9: Program Estimate 2026 ($000)

Program Cost	2026	2027	Beyond	Total
Material Supply	472.8	0.0	0.0	**472.8**
Labour	2,934.0	0.0	0.0	**2,934.0**
Consultant	54.4	0.0	0.0	**54.4**
Contract Work	1,150.5	0.0	0.0	**1,150.5**
Other Direct Costs	831.2	0.0	0.0	**831.2**
Interest and Escalation	326.5	0.0	0.0	**326.5**
Contingency	544.3	0.0	0.0	**544.3**
Total	**6,313.7**	**0.0**	**0.0**	**6,313.7**

Chart 9 provides the five-year historical program expenditures, the forecast 2025 expenditures, the proposed 2026 program budget, and the forecast budget through 2030.

Increased program expenditures can be attributed to:

- Increased cost for environmental mitigation, due to work in recent years on remote sections of the line without adequate existing access. In addition, work methods requiring heavy tracked equipment are increasing in frequency within Hydro and the utility industry as a whole, prompting the need for additional environmental protection to safely utilize this equipment.

- Increased Labour costs/Contractor Pricing due to global inflation exceeding that projected in the budget application.
- Increased cost for procurement and expediting of materials as a result of global supply chain issues.
- Increased quantity of structures with poor condition assessment results due to the completion of inspections for the oldest lines in the system (TL201 and TL203). This has also resulted in unplanned scope additions to the scheduled refurbishment plan.
- Work carryover/delay due to unforeseen outage restrictions resulting in additional planning costs and contractor expenses.

Hydro will monitor these issues in order to determine the optimal balance of cost, reliability and environmental responsibility in relation to the delivery of this program.

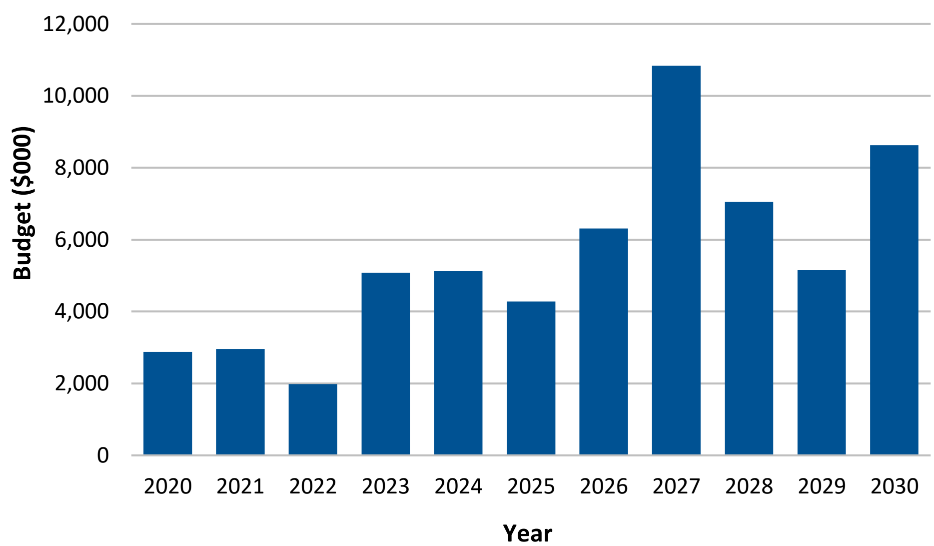


Chart 9: Historical and Forecast Program Budget

6.2 Program Schedule

The 2026 program schedule involves many transmission lines and is dependent on the annual workload and availability of outages. As both the inspection and refurbishment scopes are highly dependent on weather constraints, work scheduled for 2026 will commence as early in the year as system conditions allow. The detailed annual work schedule for 2026 will be determined during the engineering and planning stage and will be highly dependent upon planned outages.

Table 10 provides a high-level program activity schedule reflecting the planned cycle of the program. This takes into account the one-year gap between inspections and resultant refurbishment work.

Table 10: Program Schedule for 2026

Activity	Start Date	End Date
Line Inspection and Treatment	May 2026	September 2026
Inspection Data Analysis	June 2026	October 2026
Material Procurement	February 2027	November 2027
Refurbishment Work Field Planning	May 2027	September 2027
Refurbishment	April 2028	October 2028

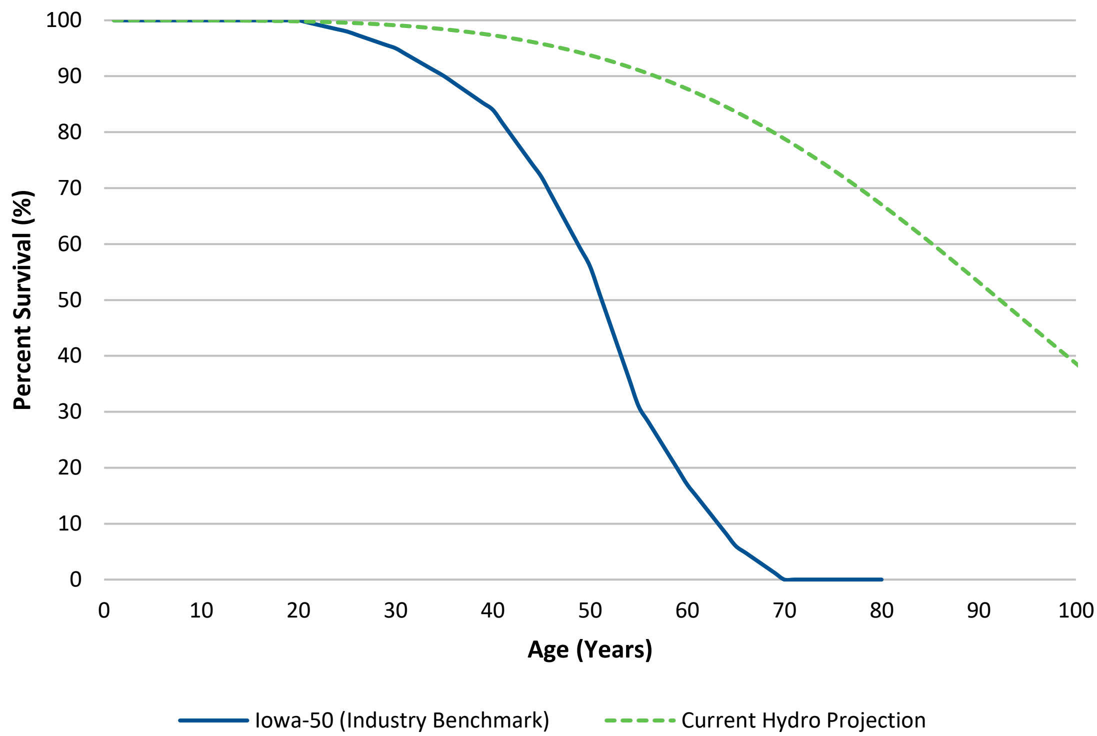
7.0 Conclusion

The WPLM Program is an important part of Hydro’s ongoing asset renewal. Proactive refurbishment of Hydro’s wood pole transmission lines is required to support Hydro’s legislated mandate to ensure the delivery of safe, reliable, least-cost electricity in an environmentally responsible manner. Therefore, Hydro proposes to continue the WPLM Program in 2026.

Appendix A

Iowa Curve

Hydro Wood Pole Line Network


100
90
80
70
60
50
40
30
20
10
0
Percent Survival (%)
0
10
20
30
40
50
60
70
80
90
100
Age (Years)
Iowa-50 (Industry Benchmark)
Current Hydro Projection

Program 2

Distribution System In-Service Failures, Miscellaneous Upgrades and Street Lights

(2026)

newfoundland labrador hydro

Distribution System In-Service Failures, Miscellaneous Upgrades and Street Lights (2026)

Location: Various

Investment Classification: Renewal

Asset Category: Distribution

Estimated Cost: $6,114,900

Executive Summary

Newfoundland and Labrador Hydro ("Hydro") has an Asset Management Program that governs the lifecycle of its distribution assets. This program monitors, maintains, refurbishes, replaces, and disposes of assets as required to ensure fulfillment of Hydro's legislated mandate to provide reliable service in an environmentally responsible manner consistent with least cost. The program also includes expenditures related to the replacement of existing street lights, outdated high-pressure sodium ("HPS") and mercury vapor ("MV"), with light-emitting diode ("LED") fixtures, and for the purchase of selected capital spare equipment.

Generally, Hydro identifies and plans the refurbishment and replacement work that will be required for its distribution assets in time for inclusion within the capital budget applications ("CBA"). However, there are situations where immediate refurbishment or replacement must be completed due to the occurrence of an actual failure, the identification of an incipient failure, or the determination of faster-than-anticipated equipment deterioration.

Hydro directly supplies electricity to over 39,000 customers across the province. Hydro proposes the continuation of this program to provide safe, least-cost, environmentally responsible, and reliable power. Without this program in place, there is a high risk of substantial distribution equipment damage, customer outages that exceed the maximum allowable durations, and unsafe conditions for Hydro personnel. There have been no viable alternatives to this type of program identified.

The estimated cost for work executed under this program in 2026 is $6,114,900, which is based on the average expenditures over the past three years, from 2022 to 2024.

Contents

1.0 Introduction

Hydro conducts asset management activities to proactively identify, replace, repair, or refurbish equipment to minimize disruption of service and to avoid unsafe working conditions due to equipment failure. An objective of Hydro's Asset Management Program is to identify refurbishment and replacement activities that require approval by the Board of Commissioners of Public Utilities ("Board") in time to be included in Hydro's annual CBA. This identification is done through the Preventive Maintenance Program using various condition-based assessments and testing procedures.

Hydro has had success in projecting the deterioration rate of equipment for submission of refurbishment or replacement work into CBAs. However, there are situations where immediate refurbishment or replacement must be completed due to the occurrence of an actual failure, the identification of an incipient failure, or the determination of faster-than-anticipated equipment deterioration. These situations can be caused by events such as vandalism, storm damage, lightning, accidental damage, abnormal system operations, or existing installation deficiencies. Hydro uses historical data and engineering judgment to predict the magnitude of in-service failure expenditures.

The Distribution System In-Service Failures, Miscellaneous Upgrades and Street Lights Program permits Hydro to perform refurbishment, replacement and upgrades of equipment as required, ensuring the continued delivery of reliable electrical service to its customers.

2.0 Program Description and Justification

Under the Distribution System In-Service Failures and Miscellaneous Upgrades portion of this program, Hydro is proposing to undertake the immediate capital refurbishment and replacement work required to maintain the safe and reliable operation of its distribution systems. Due to the nature of distribution equipment and infrastructure, unanticipated failures and deterioration will occur. Deferral of work that is justified under this program could result in a detrimental impact on customer power supply or an unacceptable risk to workers or public safety. Required work will be evaluated to determine the appropriate form of execution as an in-service failure, an allowance for unforeseen item or a supplemental project, depending on the relevant circumstances.

The purchase of capital spare equipment, or their refurbishment, is also a part of this program. Items which are of critical importance in the delivery of energy to customers have long lead times and may be needed quickly during an emergency.

The program also includes expenditures related to the replacement of existing street lights with LED street lights, as Hydro works to complete the retirement of HPS and MV street lighting in its system. The capital investment to modernize street lights is justified based on the long-term cost savings and reliability benefits to customers. Hydro's street light modernization effort is consistent with Newfoundland Power Inc.'s plan to transition to LED street lights, resulting in reduced street and area lighting rates for customers. Hydro anticipates full completion of the street light modernization effort in 2026 as planned. As such, this will be the last year street light modernization will be included in this program, with the exception of regular lighting maintenance activities going forward.

3.0 Asset Overview

3.1 Asset Background

The majority of Hydro's distribution system assets were installed in the 1960s and 1970s and have been deteriorating at varying rates over the last 50 to 60 years. Like many electrical systems, the reliability of the entire distribution network is a function of its least reliable component. The assets requiring immediate, unplanned replacement or refurbishment work in a given year cannot be identified in advance. Broad categories of distribution assets that are included under the Distribution System In-Service Failures, Miscellaneous Upgrades and Street Lights Program are:

- Substation transformers;
- Voltage regulators;
- Reclosers;
- Capacitors;
- Sectionalizers;
- Switches;
- Poles;
- Crossarms, insulators, conductors, hardware;

- Pole top distribution transformers; and
- Street lights.

3.2 Asset Condition

Assets replaced or refurbished under this program have experienced unplanned failure or exhibit signs of incipient failure. The methodologies indicated in this section also apply to its replacement in a similar fashion to all other distribution assets.

3.3 Condition-Based Remaining Life

Assets replaced or refurbished under this program have experienced unplanned failure or exhibit signs of incipient failure; therefore, these assets have reached the end of their serviceable life.

3.4 Asset Ages

The age of assets potentially covered under this program varies. Unplanned replacement or refurbishment activities due to failure may be necessary at any time during the asset lifecycle.

4.0 Trending

Data from 2024 indicates that Hydro replaced 188 distribution assets during that year. The average over the past five years has been 218 assets replaced per year, excluding the street light modernization effort.

4.1 Assets Installed/Replaced/Upgraded

Chart 1 indicates the total number of assets installed under the program during the five years from 2020 to 2024, excluding street lights. The types of assets replaced vary from year to year.

The scope of the 2024 program focused on the replacement of distribution electrical equipment that has a higher cost per unit price than distribution hardware or structural equipment. As a result, a lower number of assets were replaced in 2024 compared to previous iterations of the program, as shown in Chart 1.

As of March 2025, Hydro has replaced more than 6,735 street lights with LED technology, representing 77% of all fixtures. Hydro anticipates full completion of the street light modernization effort in 2026 as planned.

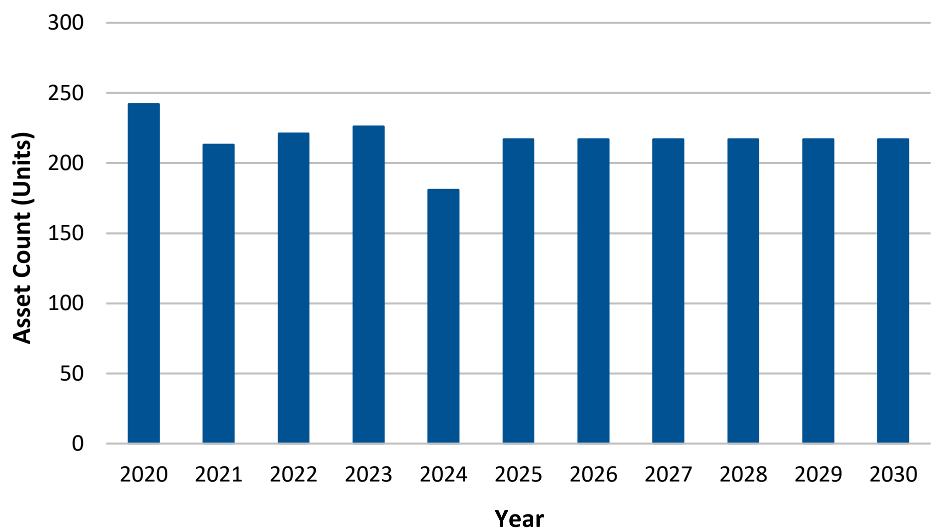


Chart 1: Historical and Forecast Number of Assets Installed/Replaced/Upgraded

4.2 Historical and Forecast Average Unit Costs

Due to the nature of this program and the range of assets covered, average unit cost information is not applicable. An increase in program cost is forecast based on the anticipated escalation of both material and labour costs, as seen in Section 6.1, Chart 2.

4.3 Historical Reliability

This program plays a key role in allowing Hydro to ensure the provision of reliable service to customers. Hydro tracks reliability data for its distribution systems and feeders using several metrics, including SAIDI,[1] SAIFI,[2] CHI,[3] CHIKM,[4] and CIKM.[5] A summary of Hydro's distribution reliability performance is provided in Section 4.0 of Schedule 1.

[1] System Average Interruption Duration Index ("SAIDI"). SAIDI indicates the average length of time a customer is without power in the respective distribution system per year.
[2] System Average Interruption Frequency Index ("SAIFI"). SAIFI indicates the average number of power outages a customer has experienced in the respective distribution system per year.
[3] Customer Hours of Interruption ("CHI") is the sum of the products of the outage duration multiplied by the number of customers affected during the outage for each event within a one-year period.
[4] Customer Hours of Interruption per Kilometre ("CHIKM") is calculated by dividing the number of customer outage hours by the kilometres of feeder.
[5] Customers Interrupted per Kilometre ("CIKM") is calculated by dividing the sum of the number of customers that have experienced an outage within a one-year period by the kilometres of feeder.

5.0 Analysis

5.1 Evaluation of Alternatives

Depending on the nature of each failure or incipient failure, Hydro reviews viable technical alternatives to determine the most appropriate solution to address the unplanned event while balancing safety and operational risks.

The alternative of executing required unplanned work under the Allowance for Unforeseen Items Account is considered on a case-by-case basis, subject to the requirements set out by the Board for the use of the account.

5.1.1 Pace Reduction

Hydro has not identified any pace reduction options for this program. Due to the immediate and emergency nature of failures noted under this program, delays in asset replacement are not conducive to maintaining a continuous, reliable supply of energy to customers.

5.1.2 Pace Advancement

Any opportunity to perform pace advancement on the replacement of distribution assets, in an economical way, is taken advantage of by Hydro under separately-defined distribution projects such as Upgrade Worst-Performing Distribution Feeders, Renew Distribution Feeders and other, limited scope projects such as Bay d'Espoir Terminal Station 2. Accelerating the replacement of deteriorated distribution assets is preferred rather than allowing the assets to experience unplanned failure. This methodology is preferred due to the large number of assets which are being identified as having reached end-of-life through Hydro's inspection program. This is expected as the vast majority of like assets were originally installed at a similar time period and are deteriorating at similar rates.

5.1.3 Alternative Strategies

Hydro has not identified any alternative strategies for this program.

5.2 Least-Cost Evaluation

Hydro has not identified any viable alternatives to facilitate a least-cost evaluation.

5.3 Recommended Alternative

5.3.1 Risk of Asset Stranding

The assets installed under this program can generally be redeployed should the service requirements change in a given location. For this reason, the risk of asset stranding is very low.

5.3.2 Risk Mitigation

Hydro assessed the pre- and post-implementation risk of the scope of work for the 2026 program in accordance with Hydro's Capital Risk Assessment process, as outlined in Section 7.0 of Schedule 1. The outcome of this assessment is provided in Table 1.

Table 1: Risk Scoring Pre- and Post-Implementation

	Impact	Likelihood	Score
Pre-Implementation	3	5	**15**
Post-Implementation	1	1	**1**
		Risk Mitigated	**14**
		Risk Mitigated per $1 Million	**2.3**

6.0 Scope of Work

The Distribution System In-Service Failures, Miscellaneous Upgrades and Street Lights Program covers the annual expenditures required to upgrade Hydro's distribution systems in response to in-service failures of equipment, address localized service deficiencies, accommodate small-scale infrastructure replacements and purchase/refurbish distribution capital spares. The scope of this program also includes the ongoing conversion of Hydro's existing street lights to efficient LED technology.

6.1 Program Budget

The estimate for this 2026 program is shown in Table 2.

Table 2: Program Estimate ($000)[6]

Program Cost	2026	2027	Beyond	Total
Material Supply	2,424.0	0.0	0.0	**2,424.0**
Labour	2,746.7	0.0	0.0	**2,746.7**
Consultant	0.0	0.0	0.0	**0.0**
Contract Work	342.4	0.0	0.0	**342.4**
Other Direct Costs	383.5	0.0	0.0	**383.5**
Interest and Escalation	218.4	0.0	0.0	**218.4**
Contingency	0.0	0.0	0.0	**0.0**
Total	**6,114.9**	**0.0**	**0.0**	**6,114.9**

Chart 2 provides the five-year historical program expenditures, the forecast 2025 expenditures, the proposed 2026 program budget, and the forecast budget through 2030. The estimated cost for work executed under this program in 2026 is $6,114,900, which is based on the average expenditures over the past three years, from 2022 to 2024.

As Hydro cannot predict the quantity and nature of failures to be addressed within this program for future years, Hydro has forecast expenditures for iterations of this program occurring from 2027 to 2030 based on the 2026 program budget with cost escalation applied, after the application of an adjustment to reflect the conclusion of the Street Light Modernization Program in 2026.[7,8] Costs of the labour and materials have been steadily increasing during the five-year historical asset and budget period, and as a result, Hydro is forecasting fewer asset replacements per year at a higher cost, as shown in Chart 2.

[6] Numbers may not add due to rounding.

[7] Hydro reduced the estimated 2026 budget by about $500,000, which is the estimated cost of the Street Light Modernization Program work in 2026, prior to applying escalation for the remaining forecast period.

[8] The additional $1,042,442 included in the 2025 CBA for the purchase of a large spare power transformer is not included in the calculation of the forecast 2027–2029 values, as this purchase is outside of typical program costs.

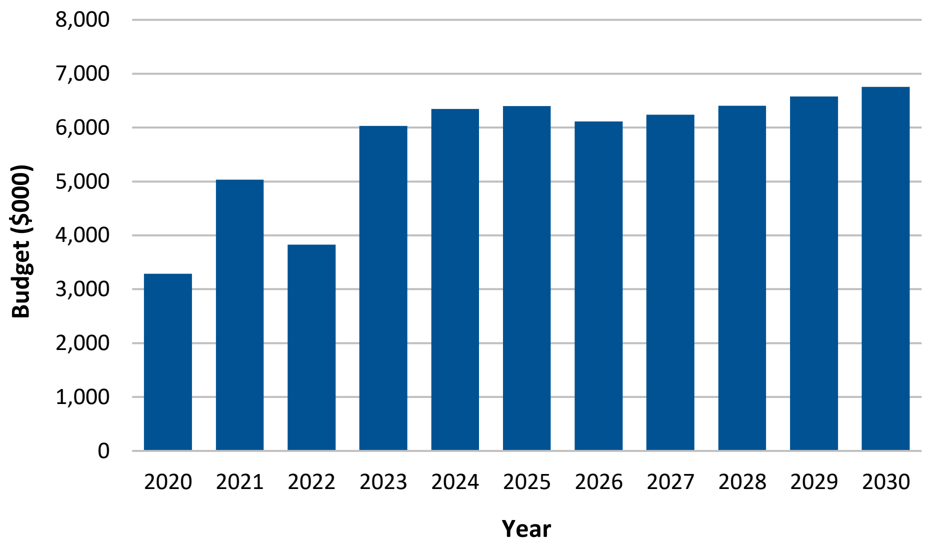


Chart 2: Historical and Forecast Program Budget

6.2 Program Schedule

Work schedules are established subsequent to an unplanned failure or incipient failure event. Street light installations are performed on an ongoing basis.

7.0 Conclusion

The Distribution System In-Service Failures, Miscellaneous Upgrades and Street Lights Program allows Hydro to undertake timely refurbishment and replacement work that is not included in its Preventive Maintenance Program, supporting Hydro's effort to maintain safe and reliable electrical distribution to customers. Street light modernization efforts will result in cost savings for Hydro and its customers.

Program 3

Provide Service Extensions

(2026)

Provide Service Extensions (2026)

Location: Various

Investment Classification: Access

Asset Category: Distribution

Estimated Cost: $5,401,900

Executive Summary

Newfoundland and Labrador Hydro ("Hydro") provides service hookups on an as-required basis using customer-driven service requests. This program provides an annual allotment for new service connections and streetlights based on past expenditures and forecasted activity within the central and northern regions of Newfoundland and throughout Labrador.

Service requests can include residential, cabin, and new business developments. Each customer requires interconnection with the local distribution service system. Service requests are received by Hydro, and plans are developed by the local regions to provide the service extensions required to meet the requests within this program.

This program will also include the relocation of distribution infrastructure at the request of customers or third parties. Service requests and relocation requests are governed by Hydro's policy respecting Contributions in Aid of Construction ("CIAC").

Hydro receives more than 500 new service requests per year; this program trend is expected to continue in the coming years.

The estimated cost for work executed under the 2026 program is $5,401,900.

Contents

1.0 Introduction

Hydro provides direct service to approximately 39,000 customers within its service areas. Hydro provides service connections on an as-required basis using customer-driven service requests. This program provides an annual allotment for new service connections and streetlights based on past expenditures and forecasted activity within the regions.

2.0 Program Description and Justification

Hydro receives service requests for both residential and general service, driven by local growth and activity within Hydro's three service regions—Central, Northern, and Labrador. Service requests can include residential, cabin, and new business developments. Each customer requires interconnection to the local distribution service system. Hydro's Customer Service Department receives service requests, and plans are developed by the local regions to provide the service extensions required to meet the requests. In addition to new service requests, Hydro occasionally receives requests from customers or third parties to relocate distribution infrastructure. Such relocations, when they arise, are addressed within this program. In some cases, CIAC funded by the requestor are required and applied under Hydro's CIAC Policy.

While Hydro will plan the work under this program as efficiently as possible, Hydro is obligated to provide the requested services, and deferral is not an option.

3.0 Asset Overview

3.1 Asset Background

Typically, Hydro accommodates new service requests to customers as required and receives more than 500 new service requests per year. However, new service requests for the Labrador Interconnected System are governed by Hydro's approved load restriction for Labrador East and Labrador West, which limits the load growth for new services based on current transmission capacity.[1]

[1] Approved in Board of Commissioners of Public Utilities Order No. P.U. 34(2019).

4.0 Trending

4.1 Assets Installed/Replaced/Upgraded

Chart 1 shows the five-year historical, the forecast for 2025, the proposed 2026 budget, and the forecast through 2030 of new service requests received each year. The total number of new service requests for each year is comprised of those completed, on hold, and cancelled.

The historical data for 2020–2024 shows that the number of new service requests received continues to trend above 500. This program trend is expected to continue in the coming years.

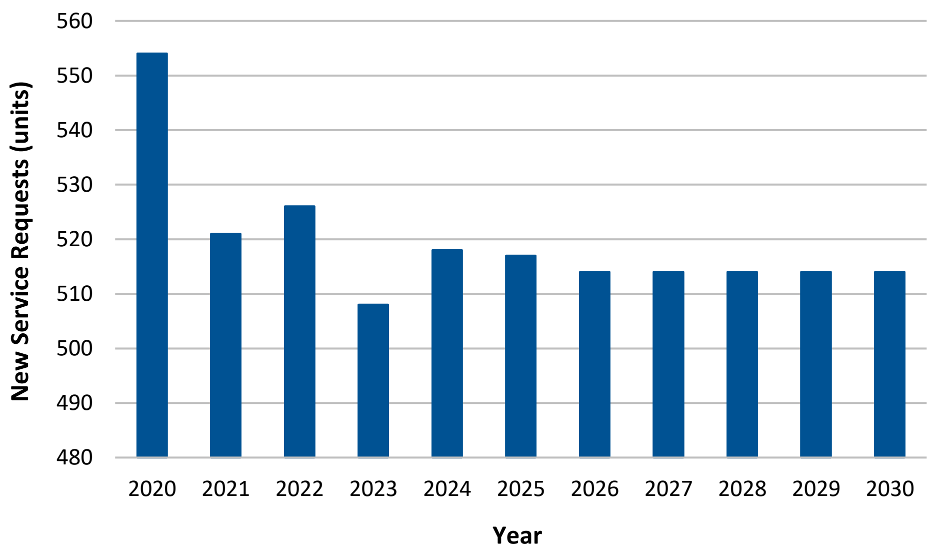


Chart 1: Historical and Forecast New Service Requests Received

4.2 Historical and Forecast Average Unit Costs

As this is a customer-driven program that includes a range of scopes and costs, actual historical costs per year tend to fluctuate. Forecast 2026 costs are based on the average expenditures from 2022–2024. Costs per service request vary greatly depending on the nature of the request and the magnitude of infrastructure modifications required to accommodate the request. To provide the average unit cost as required by the provisional Capital Budget Application ("CBA") Guidelines,[2] Hydro has aggregated its annual data to provide an estimated unit cost for each year, as shown in Chart 2.[3]

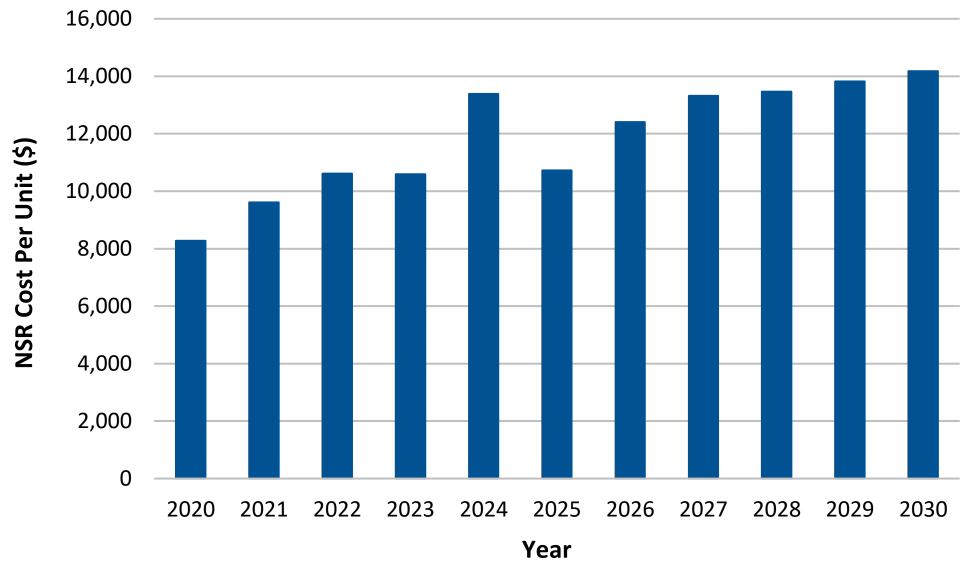


Chart 2: Historical and Forecast Average Unit Cost per New Service Requests Completed

5.0 Analysis

5.1 Recommended Alternative

Hydro is obligated to provide service extensions upon request. During the technical review of individual requests, viable alternatives will be considered where appropriate.

5.1.1 Risk of Asset Stranding

Although generally not applicable to this program, Hydro would consider the risk of asset stranding in the context of individual requests. Temporary requests for service are governed by Hydro's Schedule of Rates, Rules and Regulations and the CIAC Policy.

[2] "Capital Budget Application Guidelines (Provisional)," Board of Commissioners of Public Utilities, January 2022.
[3] As per Hydro's response to request for information PUB-NLH-043 of the 2025 CBA, Hydro performed queries to test the availability and granularity of work order data to determine what additional data or processes would be required to calculate the cost per new service request. As queries were unable to produce an exact historical cost per new service request, Hydro has provided an estimate of its unit cost accordingly.

6.0 Scope of Work

Work executed under this program involves the installation of new service connections and streetlights on an as-required basis throughout Hydro's service areas. On average, Hydro receives over 500 requests for new service connections per year with varying scopes of work.

6.1 Program Budget

The estimate for this program is shown in Table 1.

Table 1: Program Estimate ($000)[4]

Program Cost	2026	2027	Beyond	Total
Material Supply	1,609.1	0.0	0.0	**1,609.1**
Labour	2,687.6	0.0	0.0	**2,687.6**
Consultant	0.0	0.0	0.0	**0.0**
Contract Work	531.4	0.0	0.0	**531.4**
Other Direct Costs	381.5	0.0	0.0	**381.5**
Interest and Escalation	192.4	0.0	0.0	**192.4**
Contingency	0.0	0.0	0.0	**0.0**
Total	**5,401.9**	**0.0**	**0.0**	**5,401.9**

Chart 3 shows the five-year historical expenditures, the forecast 2025 expenditures, the proposed 2026 program budget, and the forecast costs through 2030. Hydro has forecast future expenditures for this program based on the 2026 program budget with cost escalation applied.

[4] Numbers may not add due to rounding.

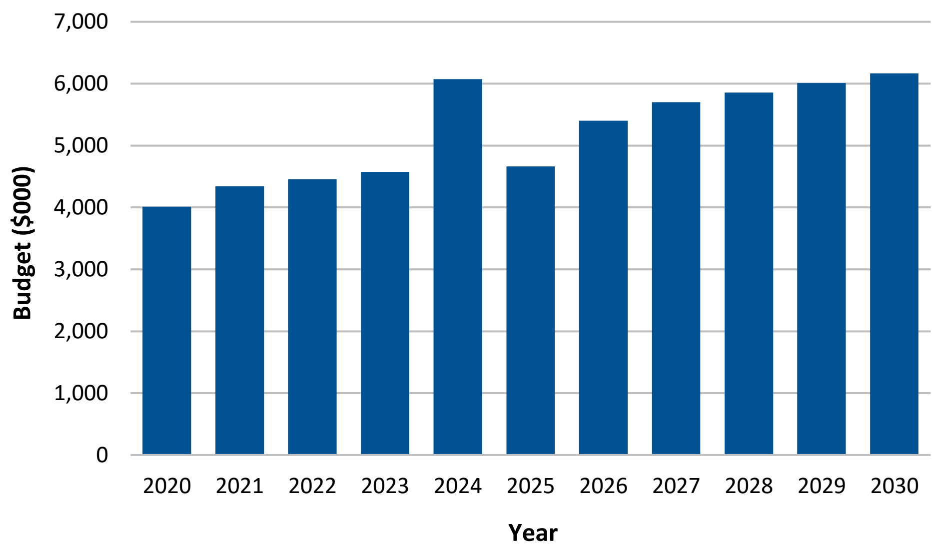


Chart 3: Historical and Forecast Program Budget

6.2 Program Schedule

New service requests are customer-driven and are ongoing throughout the year.

7.0 Conclusion

Hydro provides service connections on an as-required basis using customer-driven service requests in its service areas. This program provides an annual allotment, adjusted yearly, based on the average expenditure over the past three years for Hydro's connection of new residential and general service requests and distribution infrastructure relocation.

$1,000,000 to $5,000,000

Replace Heavy-Duty Vehicles

(2026–2028)

Contents

Replace Heavy-Duty Vehicles (2026–2028)

Location: Various

Investment Classification: General Plant

Asset Category: Transportation

Estimated Cost: $4,517,000

1.0 Introduction

Newfoundland and Labrador Hydro ("Hydro") operates a fleet of heavy-duty vehicles distributed across Hydro's operating areas throughout the province, comprising 67 heavy-duty assets. This fleet is utilized daily to support staff engaged in the operation and maintenance of the electrical system. This equipment includes heavy-duty, single-axle and tandem-axle trucks with various specialized equipment[1] mounted on them, used for line construction and maintenance.

Under this program scope, Hydro will replace seven heavy-duty vehicles in accordance with Hydro's replacement criteria.

2.0 Program Description and Justification

Hydro's heavy-duty vehicle fleet is strategically distributed across Hydro's operating areas throughout the province. This equipment is utilized daily by staff engaged in the maintenance and repair of the electrical system and shared amongst work groups as required.

Hydro operates its fleet of heavy-duty vehicles as required to maintain the safety and reliability of the electrical system. Hydro's key replacement criteria for heavy-duty vehicles are provided in Table 1. Age and odometer readings are common criteria for unit replacements; however, a review of asset condition and the criticality of the unit to operations is also considered in determining whether to replace a vehicle in the upcoming year.

[1] Specialized equipment includes light-duty aerial devices, single- and tandem-axle material handlers, and single- and tandem-axle radial boom derricks.

Table 1: Replacement Criteria

Vehicle	Replacement Criteria
Heavy-Duty – Class 4 and 6	9 years or 200,000 kilometres (odometer reading), dependent on condition/maintenance cost and reliability.

Under this program's scope, Hydro's seven heavy-duty vehicles are in accordance with Hydro's replacement criteria. A reliable fleet of heavy-duty vehicles is critically important for the provision of safe, reliable power. Without addressing this need, the existing vehicles will continue to age, be overworked and result in increased downtime and decreased reliability.

Historically, the replacement of heavy-duty vehicles was part of a larger program scope that also included light-duty vehicles, such as fleet transportation. In Board of Commissioners of Public Utilities ("Board") Order No. P.U. 28(2024), the Board had noted concerns with including scopes of light- and heavy-duty vehicles in the same program, stating:

> The Board finds that Hydro has not provided sufficient justification for the combining of light- and heavy-duty vehicles/assets. While there may be some efficiencies gained in grouping the different types of vehicles/assets together, the Board finds that separation will allow for greater transparency, clarity, and better reflect delivery time and cost.[2]

Upon further review of the program scopes and consideration of the Board's request, Hydro has separated light- and heavy-duty vehicles into separate programs, beginning in this capital budget application. In addition, as described further in Section 6.1, due to additional price uncertainty caused by socioeconomic factors, Hydro has elected to increase the amount of cost escalation and contingency included within the budget for this program.

3.0 Asset Overview

3.1 Asset Background

Entering 2026, the composition of Hydro's heavy-duty fleet is forecast to include 67 heavy-duty, single-axle and tandem-axle trucks with various specialized equipment mounted on them, used for line construction and maintenance.

[2] Board Order No. P.U. 28(2024), p. 7/19–22.

On average, Hydro's vehicles accumulate 20,000–25,000 kilometres per year, or an average of 180,000–225,000 kilometres over the nine-year life of the vehicle. On occasion, a small number of vehicles receive greater usage while other vehicles will incur lower total kilometres driven and provide a longer service life.

This usage indicates that Hydro's vehicle replacement criteria is consistent with its operational experience and that Hydro's heavy-duty fleet is appropriately sized for its operation. Hydro continues to monitor practices of other Canadian utilities, as well as statistics on Hydro's vehicle usage rates, to ensure Hydro's criteria and vehicle replacement rates are appropriate and conducive to Hydro's operations.

3.2 Asset Condition

As equipment ages, failures and resulting downtime will impact response times for outages or planned maintenance. In many cases, heavy-duty vehicles are subjected to accelerated wear and tear due to operation in rough areas and premature corrosion from salt spray. Heavy-duty vehicles are inspected in accordance with the preventive maintenance schedule, and all maintenance and repairs are performed by both in-house and third-party service providers as needed.

Assets identified for replacement align with the criteria specified in Table 1. These assets are replaced based on the age of the asset or kilometres accumulated, with consideration given to vehicle condition. Should an asset that has reached one of the replacement milestones be assessed and determined to be in adequate condition to remain as part of the fleet, Hydro does consider the option to extend the service life of the asset. This decision must weigh the increased chance of failure against its potential impact on utility reliability.

3.3 Condition-Based Remaining Life

Hydro evaluates assets as they reach retirement criteria to determine if it is appropriate to extend the life of the vehicles. This could include reassignment to an area with less or different usage, or usage in easier terrain, among other considerations.

3.4 Asset Ages

Chart 1 provides the heavy-duty vehicle asset age of the fleet, including those proposed for replacement. For heavy-duty vehicles, the average age of the fleet entering 2026 will be just under seven years, which is higher than optimal for the average nine-year service life. Supply chain constraints, in which orders could not be taken on a timely basis, and production delays on orders placed have been substantial. This has led to Hydro having no choice but to continue to use vehicles longer than ideal. The experience has validated that excessive failures and operational impacts do result, and the replacement criteria are sound.

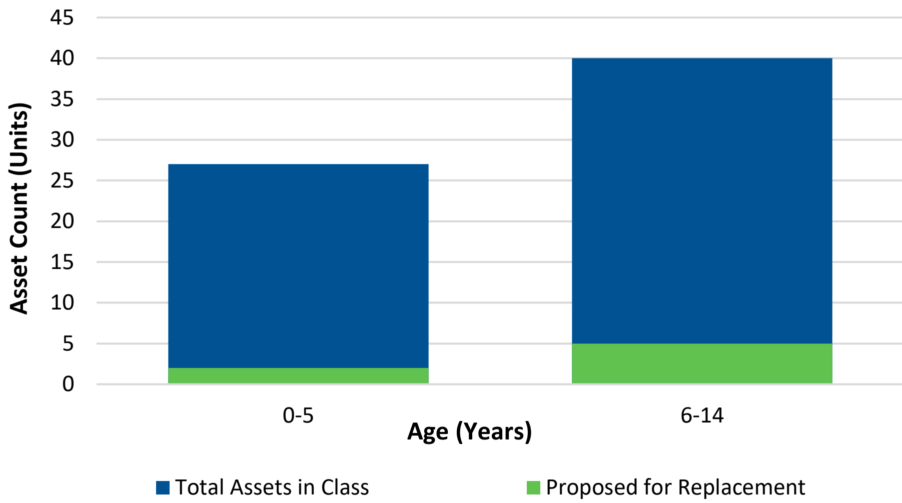


Chart 1: Asset Count by Asset Age

4.0 Trending

4.1 Assets Installed/Replaced/Upgraded

Chart 2 provides the five-year historical, current, and five-year forecast number of heavy-duty vehicles replaced under this program. Assets in service from 2020 to 2024 are below average due to global supply chain challenges; deliveries in 2025 to 2026 are higher than normal, primarily due to the delayed delivery of orders from previous years. The forecast for future years is based on Hydro's review of average age versus service life as discussed in Section 3.4, and reduces volatility in annual replacement rates. These projections are reflected in Chart 2 and consider current fleet size requirements, with some variances observed due to uneven age distributions and varying delivery times within the fleet.

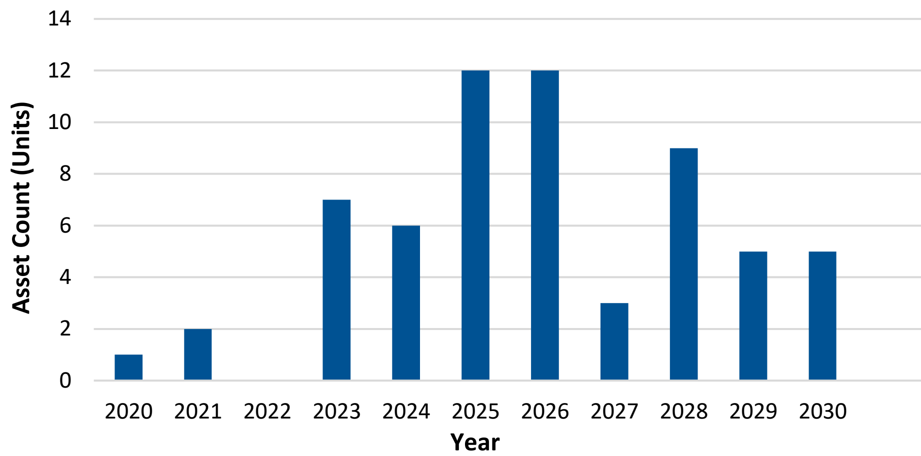


Chart 2: Historical and Forecast Number of Assets Replaced[3]

4.2 Historical and Forecast Average Unit Costs

Chart 3 indicates the average cost of vehicles for replacement and is reflective of the average cost for heavy-duty vehicles. Substantial cost escalation has been experienced in the heavy-duty segments since 2020. The variation in average costs in heavy-duty vehicles is attributed to the procurement of varying types of vehicles under this program. The vehicle types expected to be delivered in 2027, 2028, and 2030 are of a higher-than-average cost, thus increasing the per-unit cost calculations for those same years. Per-unit costs are also affected by socioeconomic factors, including tariffs, as discussed in Section 6.1.

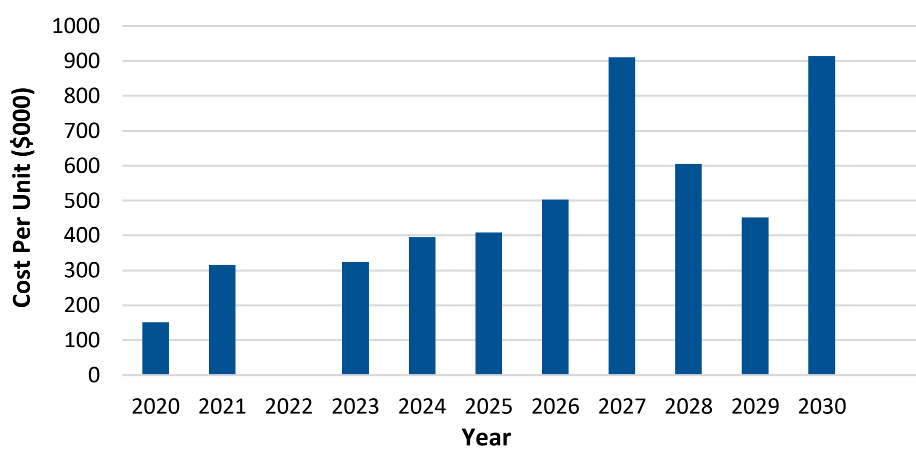


Chart 3: Historical and Forecast Average Unit Costs of Assets Replaced

[3] Hydro had previously report six assets replaced in 2022; however, this number had been provided in error.

4.3 Historical Reliability

Heavy-duty vehicles are inspected in accordance with the preventive maintenance schedule, and all maintenance and repairs are performed by either in-house or third-party service providers, as needed.

5.0 Analysis

5.1 Evaluation of Alternatives

Hydro considered the following alternatives:

- Pace reduction;
- Pace advancement;
- Continue program at current pace; and
- Alternative strategies – vehicle rentals.

5.1.1 Pace Reduction

In 2020, Hydro re-evaluated its replacement criteria and reduced the pace based on a review of industry standards and the condition of the units upon replacement. Hydro's current replacement criteria is consistent with utility counterparts across Canada, and, based on Hydro's current experience, further extending the timing of these replacements would present reliability risks. Unplanned pace reduction imposed by supply chain constraints from 2020 to present confirmed an increased rate of vehicle failure that has resulted in challenges to completing required work. For this reason, pace reduction is not considered a viable option.

5.1.2 Pace Advancement

Advancing the pace of this program may result in premature retirement of existing, functional assets, requiring a level of investment that is not required for the continuation of delivering safe, reliable, least-cost electricity in an environmentally responsible manner. Hydro is continuing to evaluate the appropriate pace for vehicle replacement, particularly heavy-duty vehicles, based on average asset age and service life as discussed in Section 3.4. For this reason, pace advancement is not considered a viable option at this time.

5.1.3 Continue Program at Current Pace

Hydro has determined that the current criteria is appropriate based on consultation with other utilities, the condition of the units upon replacement, and vehicle usage statistics. This approach allows Hydro to balance cost with the reliability of Hydro's vehicle fleet. These vehicles are required to facilitate required maintenance and timely response to system events, and as such, are required to be available and in appropriate working condition.

5.1.4 Alternative Strategies – Vehicle Rentals

Hydro has considered supplementing its heavy-duty fleet vehicle needs with rental vehicles. Hydro cannot utilize heavy-duty rental vehicles as they are not readily available. Additionally, much of Hydro's heavy-duty fleet is customized to industrial work usage to the extent that there is no direct replacement option possible from the rental market that can perform consistently with Hydro's fleet. As such, Hydro does not consider this a viable alternative for this program.

5.2 Least-Cost Evaluation

Hydro has not identified any viable alternatives to facilitate a least-cost evaluation.

5.3 Recommended Alternative

Hydro's recommended alternative is to proceed with the identified replacements based on its replacement criteria.

5.3.1 Risk of Asset Stranding

This program is necessary to maintain a safe and reliable fleet. Failure to replace this equipment will lead to increased maintenance costs, less reliable equipment, delays in scheduled and unscheduled work, and possible safety issues for operators. Hydro does not foresee any changes in its requirements for heavy-duty vehicles; therefore, the risk of asset stranding is low.

5.3.2 Risk Mitigation

Hydro assessed the pre- and post-implementation risk of the scope of work for the 2026–2028 program in accordance with Hydro's Capital Risk Assessment process as outlined in Section 7.0 of Schedule 1. The outcome of this assessment is provided in Table 2.

Table 2: Risk Scoring Pre- and Post-Implementation

	Impact	Likelihood	Score
Pre-Implementation	3	4	**12**
Post-Implementation	3	1	**3**
		Risk Mitigated	**9**
		Risk Mitigated per $1 Million	**2.0**

6.0 Scope of Work

This program proposes the replacement of seven heavy-duty vehicles in accordance with Hydro's replacement criteria. This scope includes the procurement of vehicles and accessorizing as required, based on the purpose of the vehicle.[4] This program also includes a budget to address in-service failures for fleet vehicles; Hydro will evaluate the cost of repair or refurbishment versus replacement prior to executing in-service failure repairs.

6.1 Program Budget

The estimate for this program is shown in Table 3.

Table 3: Program Estimate ($000)[5]

Program Cost	2026	2027	Beyond	Total
Material Supply	1,215.0	618.0	1,687.0	**3,520.0**
Labour	20.9	10.8	28.4	**60.1**
Consultant	0.0	0.0	0.0	**0.0**
Contract Work	0.0	0.0	0.0	**0.0**
Other Direct Costs	7.9	4.1	10.6	**22.5**
Interest and Escalation	34.5	30.6	137.1	**202.2**
Contingency	245.9	125.1	341.3	**712.3**
Total	**1,524.1**	**788.5**	**2,204.4**	**4,517.0**

For the purchase of vehicles, Hydro includes cost contingency in its budget, typically about 10%, to accommodate potential price increases relating to an array of socioeconomic factors. Recent implementation and adjustments of tariffs on vehicles, as well as the components and materials used to fabricate vehicles, have increased uncertainty and potential volatility in the end unit price of these

[4] Where appropriate, Hydro will consider electric vehicles during the procurement process. Vehicles will be selected based on their suitability for their intended purpose, as well as lifecycle cost.
[5] Numbers may not add due to rounding.

assets. To accommodate a larger range of price possibilities, Hydro has increased the amount of contingency included within this proposal to about 20%. As price effects relating to tariffs become more apparent, and in cases where tariffs are adjusted in the future, Hydro will reevaluate the amount of contingency included in future vehicle proposal budgets.

Heavy-duty vehicles will be requisitioned in 2026, with delivery expected in 2027 and 2028. Chart 4 provides the five-year historical program expenditures, the forecast 2025 expenditures, the proposed 2026 program budget, and the forecast budget through 2030. Heavy-duty vehicles are replaced considering age, accumulated kilometres, and condition; as such, the makeup of types of vehicles replaced will vary from year to year. This will result in budget variability due to the type and quantity of equipment purchased. Increases in costs up to 2025 and beyond are not reflective of changes in Hydro's strategy regarding the replacement of heavy-duty vehicles, but rather are reflective of increasing costs due to supply chain constraints and inflationary pressure. This program budget provides data for the heavy-duty fleet scope of work.

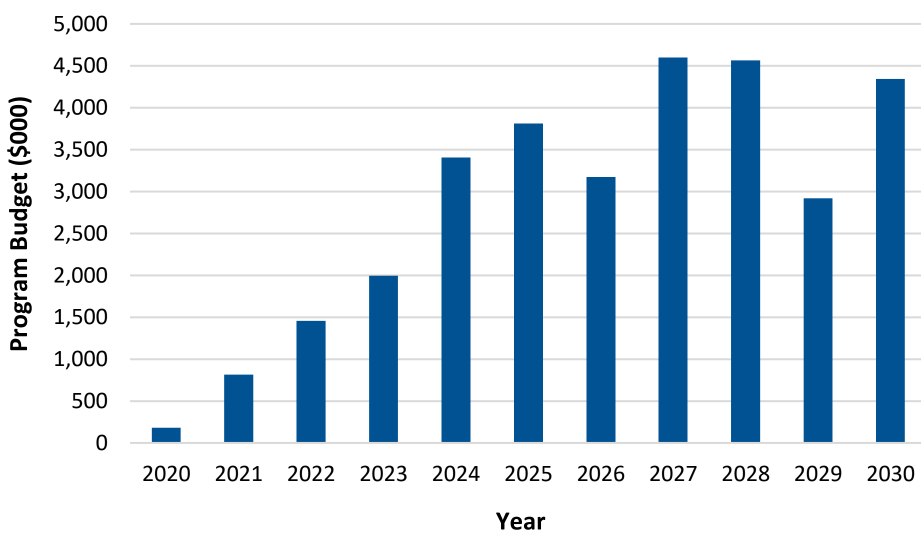


Chart 4: Historical and Forecast Program Budget

6.2 Program Schedule

The schedule for this program is shown in Table 4.

Table 4: Program Schedule

Activity	Start Date	End Date
Planning: Open work orders, plan, and develop detailed schedules.	January 2026	February 2026
Procurement: Tender and award contracts to purchase heavy-duty vehicles.	February 2026	April 2026
Commissioning: Receive and commission heavy-duty vehicles.	April 2027	October 2028
Closeout: Close work orders, complete all documentation, and complete lessons learned.	November 2028	December 2028

7.0 Conclusion

Hydro operates a fleet of heavy-duty vehicles to enable effective maintenance of the electrical system and timely response to system events. The established replacement guidelines have been determined to be appropriate. Hydro proposes to continue with the replacement of vehicles under this program for 2026.

Program 5

Renew Circuit Breakers

(2026–2028)

Contents

List of Appendices

Renew Circuit Breakers (2026–2028)

Location: Various

Investment Classification: Renewal

Asset Category: Terminal Stations

Estimated Cost: $4,413,900

1.0 Introduction

Circuit breakers are critical components of the power system. Located in terminal stations, circuit breakers perform switching actions that are necessary to complete, maintain, and interrupt current flow under normal or fault conditions. The reliable operation of circuit breakers is essential to protect and maintain the stability of the power system.

2.0 Program Description and Justification

In line with Newfoundland and Labrador Hydro's ("Hydro") established plan for the replacement of circuit breakers, SF_6[1] circuit breakers will be refurbished after approximately 20 years of service, and all circuit breakers will be considered for replacement at or near 40 years. Hydro's long-term plan for circuit breakers is as follows:

- Refurbishment of SF_6 circuit breakers after 20 years of service; and
- Consideration of replacement of circuit breakers after approximately 40 years of service, based on their condition at that time.

This program is required for Hydro to provide safe, reliable electrical service in an environmentally responsible manner, consistent with the least cost. To ensure the appropriate balance between cost and reliability for customers, Hydro is focused on optimizing the useful life of its in-service circuit breakers. As such, refurbishment is typically scheduled after 20 years of service and replacement is considered at approximately 40 years of service, depending on the condition and operational history of the circuit breaker. In addition, Hydro will proceed with the removal and replacement of the minimum oil circuit breakers that have been designated as obsolete. This action follows official notification from the original

[1] Sulfur hexafluoride ("SF_6").

equipment manufacturer ("OEM") indicating that technical support and spare parts for these units are no longer available, thereby confirming their obsolescence**.**

For 2026–2028, Hydro is proposing the refurbishment of one breaker and the replacement of six breakers under this program. As a result of increased equipment lead times, beginning in 2026, the work will be executed over three years instead of two, as is typically completed under the Renew Circuit Breakers Program.

3.0 Asset Overview

3.1 Asset Background

Hydro maintains two different types of circuit breakers—oil and SF_6—that operate across three different voltage classes.

Each type of circuit breaker has unique operating characteristics. Oil circuit breakers extinguish the electrical arc created inside the circuit breaker using insulating oil. SF_6 circuit breakers use SF_6 gas as an insulating medium to quench the electrical arcs created during switching.

Circuit breakers are comprised of two primary components:

- Interrupting device, which includes the arc-quenching medium; and
- Insulating material and operating mechanism.

Oil circuit breakers and SF_6 circuit breakers are designed and constructed differently; as such, refurbishment requirements vary for each type of circuit breaker. The SF_6 circuit breakers typically require refurbishment at approximately 20 years (i.e., halfway through the expected useful life). Oil circuit breakers are an older technology; therefore, replacements will be completed after 40 years. However, as oil circuit breakers come due, a further condition assessment will be completed to determine if life extension can be achieved through refurbishment. Three of the circuit breakers included in the 2026–2028 program scope of the 2026 Capital Budget Application ("CBA") are minimum oil circuit breakers following OEM confirmation of their obsolescence and withdrawal of support.

As of the end of 2024, Hydro has 222 SF_6 breakers, five minimum oil breakers, and three oil circuit breakers in its 46 kilovolt (kV) and above circuit breaker fleet. The three oil circuit breakers will be replaced by the end of 2025. Within the circuit breaker fleet, Hydro has 36 circuit breakers that range from 40–60 years of age that are in service. A number of the circuit breakers within Hydro's system have been operational for more than 30 years, with a significant number nearing or having already surpassed the expected useful life of such assets.[2] The probability of circuit breaker failure increases with age.

3.2 Asset Condition

Asset condition for circuit breakers is defined by risk of failure and quantified in Table 1.

Table 1: Asset Condition for Circuit Breakers

Asset Condition Category	Risk of Failure
5	>90%
4	50-90%
3	10-50%
2	1-10%
1	<1%

In alignment with Hydro's current asset management philosophy, circuit breakers are assessed for condition as they approach 40 years of age. As a result, the inclusion criteria for asset condition scoring in this section only include all circuit breakers aged 35 years or older. Breakers that are being refurbished at mid-life have not been included in the asset condition scoring, as this scoring is strictly age-based. Some breakers within Asset Condition Category 1 are planned for replacement in the next five years due to their age and the availability of replacement parts. Chart 1 presents the asset condition categories for breakers aged 35 years or older. The five circuit breakers with Condition 3 or 4, that are not planned for refurbishment or replacement by 2029, are scheduled for either refurbishment or replacement in 2030, which is the earliest year of eligibility. Eligibility is determined based on the circuit breaker refurbishment/replacement criteria outlined in Hydro's Terminal Station Asset Management Strategy.[3]

[2] Expected useful life is estimated to be 40 years.
[3] Provided as Appendix F to Schedule 1 of this application.

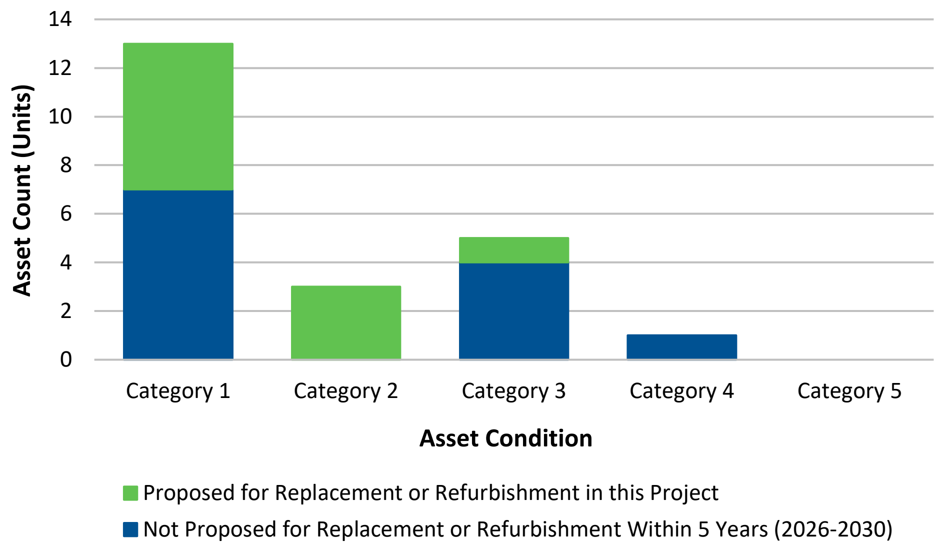


Chart 1: Asset Condition for Assets 35 Years and Older

3.3 Asset Ages

The age of the circuit breakers proposed for replacement or refurbishment as of 2025 is provided in Chart 2. One breaker is being refurbished, and six breakers are being replaced as part of the 2026–2028 program. The breakers being replaced are between 41 and 55 years old. The breaker being refurbished is 20 years old.

Chart 2 provides the asset age for all assets covered under the 2026 program.

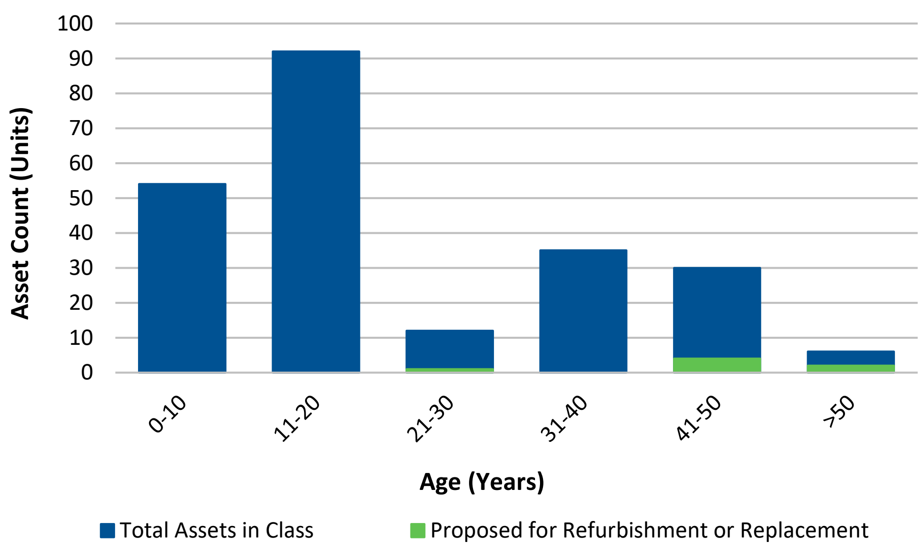


Chart 2: Asset Counts by Asset Age

4.0 Trending

4.1 Assets Replaced/Refurbished

Under this program, breakers are refurbished or replaced based on age and condition. Chart 3 and Chart 4 provides the five-year historical, current, and five-year forecast number of assets to be replaced or refurbished, respectively, per year.

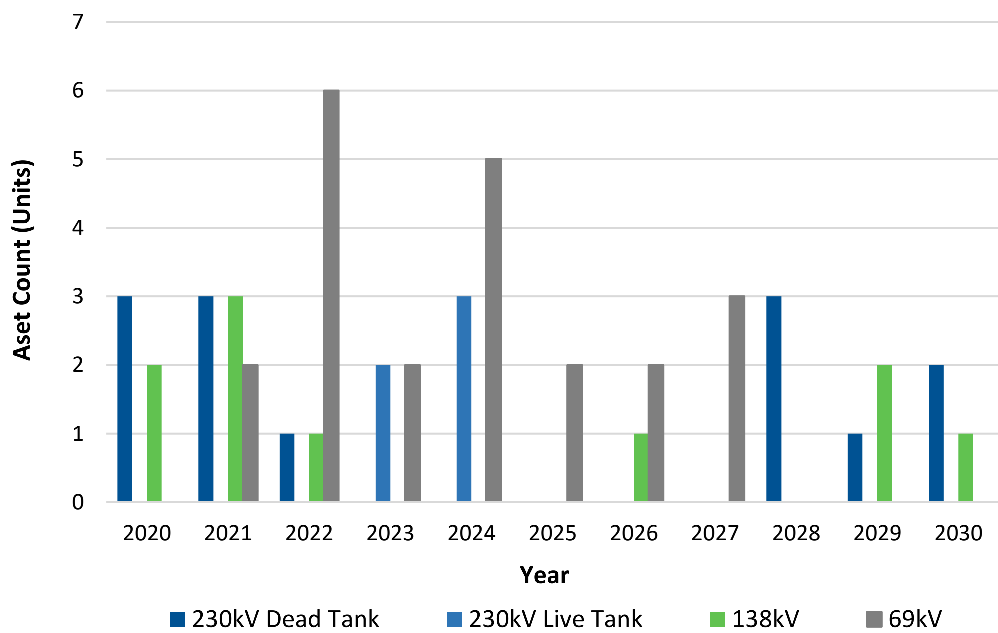


Chart 3: Historical and Forecast Number of Assets Replaced

The number of 138 kV and 230 kV circuit breaker replacements is expected to stay relatively stable. The majority of circuit breakers in these voltage classes were air-blast circuit breakers, which were largely replaced between 2015 and 2023. Replacements of 69 kV circuit breakers peaked in 2022 and 2024, and are projected to continue to decrease into the future, as Hydro phases out aging oil circuit breakers to maintain compliance with federal environmental legislations and transition away from older technologies.[4]

[4] The number of breaker replacements prior to 2025 is related to efforts to comply with federal environmental polychlorinated biphenyl ("PCB") Regulations, as well as Hydro's Accelerated Breaker Replacement program, the focus of which was the replacement of air blast circuit breakers across the province due to reliability concerns and the unavailability of OEM spare parts.

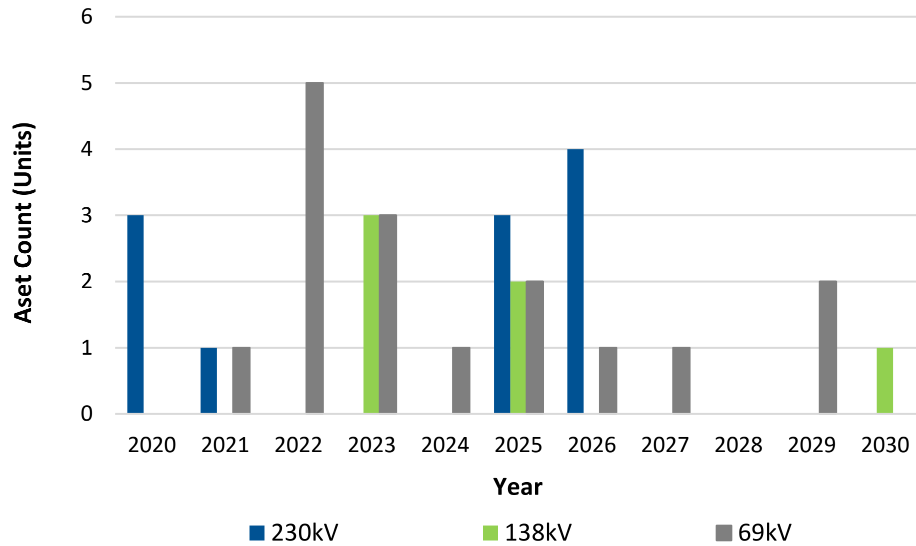


Chart 4: Historical and Forecast Number of Assets Refurbished

The number of circuit breakers being proposed for refurbishment varies from year to year. Circuit breakers are planned for refurbishment at approximately 20 years of age, and also at approximately 40 years of age if their condition is satisfactory and does not warrant replacement at that time.

4.2 Historical and Forecast Average Unit Costs

Chart 5 and Chart 6 show the average unit costs for replacements and refurbishments, respectively. While the unit cost for breaker replacements is consistent for each voltage class year over year, the overall costs vary significantly by breaker voltage class, as shown in Chart 5. The 230 kV live tank breaker replacement costs have been lower than average, as they generally exclude any cable replacements or protection upgrades.

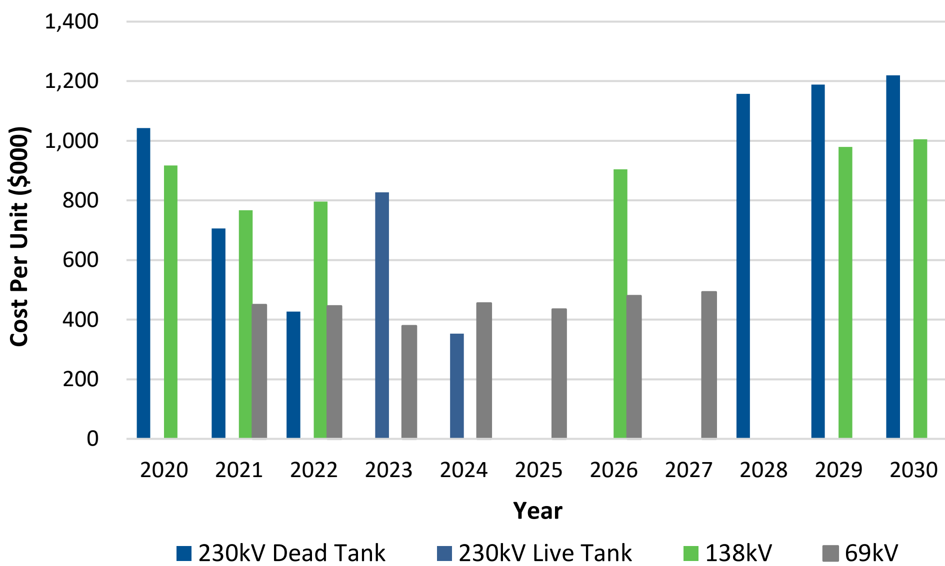


Chart 5: Historical and Forecast Average Unit Costs of Assets Replaced

1 The breaker refurbishment costs vary between breaker type and manufacturer; as such, unit costs per
2 year can show variability depending on the types of breakers refurbished.

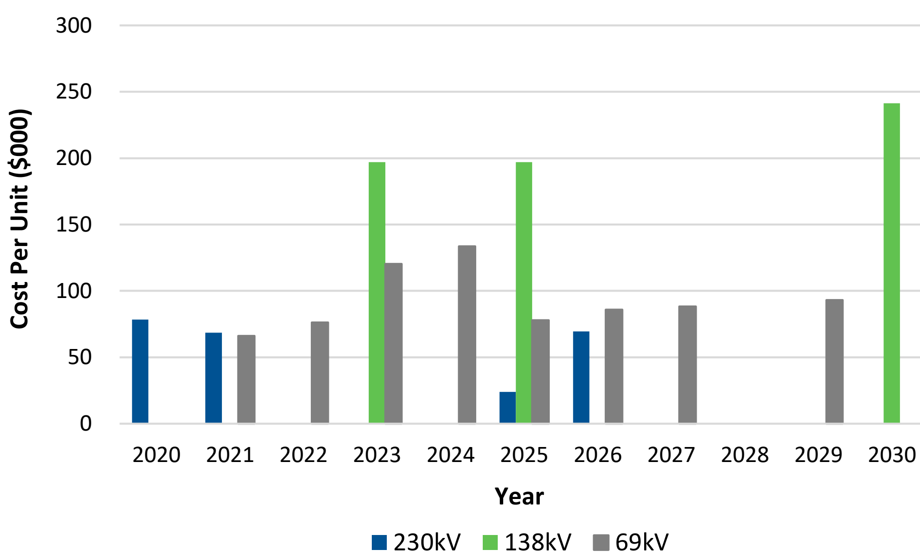


Chart 6: Historical and Forecast Average Unit Costs of Assets Refurbished

4.3 Historical Reliability

A listing of sustained forced outages for the last five years is shown in Table 2.

Table 2: Circuit Breaker Outages and Durations from 2020 to 2024

Start Date	Breaker	Outage Duration (minutes)
19-Oct-2024	Wabush B3L3	58
18-Oct-2024	Massey Drive T1	22
16-Jul-2024	Paradise River L58T1	3
15-Jul-2024	Buchans B2L64	231
16-Mar-2024	Narrows B1L36	550
14-Nov-2023	St. Anthony Airport B1C2	6,139[5]
30-Sep-2023	Voisey's Bay Nickel B1T1	1,789
30-Mar-2023	St. Anthony Airport B1T1	24[5]
21-Jan-2023	Holyrood B8L39	13[5]
21-Dec-2022	St. Anthony Airport B1C3	731
10-Dec-2022	St. Anthony Airport B1C3	817
21-Oct-2022	Cow Head B1L27	36
1-Sep-2022	Indian River B1L363	868
2-Jul-2022	Happy Valley 13-1	2
8-Jun-2022	Happy Valley 13-1	19
10-May-2022	Peter's Barren B1L41	5
24-Dec-2021	Doyle's SB1L15	4
21-Nov-2021	St. Anthony B1T1	10
23-Oct-2021	St. Anthony B1C1	4
1-Sep-2021	Springdale B1L22	3
20-Aug-2021	Holyrood B8L39	2
27-Jul-2021	Indian River B1L23	1
27-Jul-2021	Indian River B1L24	1
9-May-2021	Buchans L28L32	521
30-Jul-2020	Doyle's B1L15	78
22-Apr-2020	Hardwoods B1B2	46
17-Mar-2020	Springdale B1L22	90

[5] Outage was omitted from Table 2 of the Renew Circuit Breakers program within the 2025 CBA in error.

5.0 Analysis

5.1 Evaluation of Alternatives

The following alternatives were considered:

- Pace reduction;
- Pace advancement; and
- Continue program at current pace.

5.1.1 Pace Reduction

Hydro reviews its circuit breaker renewal program regularly to determine if the pace can be reduced while maintaining reliable service to its customers. However, for SF_6 breakers, pace reduction is demonstrated through Hydro's asset management philosophy, revised in 2020, to complete further condition assessment of circuit breakers to achieve additional life through a lower-cost alternative of refurbishment. Since 2020, Hydro has deferred sixteen SF_6 breaker replacements in favour of performing refurbishment. As a result, Hydro believes its philosophy of doing further condition assessments and increasing the life of breakers beyond 40 years is resulting in a pace reduction in comparison to the previously documented long-term plans. Further pace reduction is not a viable option as it will increase the risk of failure and will have a negative impact on system reliability.

5.1.2 Pace Advancement

Hydro has not identified any pace advancement options for this program.

5.1.3 Continue Program at Current Pace

As a result of increased equipment lead times, beginning in 2026, the work will be executed over three years instead of two, as is typical under the Renew Circuit Breakers program. As outlined herein, the refurbishment and replacement of circuit breakers in a planned, strategic manner is prudent and supports the reliable and safe operation of the assets. Such an approach enables Hydro to manage resource requirements and system outages to support its mandate to provide safe, reliable, least-cost electricity in an environmentally responsible manner.

5.2 Least-Cost Evaluation

Hydro has not identified any viable alternatives to facilitate a least-cost evaluation.

5.3 Recommended Alternative

Hydro recommends the refurbishment and replacement of circuit breakers as proposed. This approach is consistent with the methodology and philosophy outlined in Hydro's Terminal Station Asset Management Overview and will ensure the safe and reliable operation of the circuit breaker fleet while effectively balancing costs.

5.3.1 Risk of Asset Stranding

With ongoing considerations related to load growth in Labrador, there is a risk that the Wabush Terminal Station breakers scheduled for replacement may not be required for the full extent of their useful life. If developments in Labrador West occur in the near term, newly-installed breakers will be considered for deployment in a different terminal station location or will become spares. There is no known risk that the other circuit breakers under this program will be stranded before their useful life has been reached.

5.3.2 Risk Mitigation

Hydro assessed the pre- and post-implementation risk of the scope of work for the 2026–2028 program in accordance with Hydro's Capital Risk Assessment process, as outlined in Section 7.0 of Schedule 1. The outcome of this assessment is provided in Table 3.

Table 3: Risk Scoring Pre- and Post-Implementation

	Impact	Likelihood	Score
Pre-Implementation	3	3	**9**
Post-Implementation	3	1	**3**
		Risk Mitigated	**6**
		Risk Mitigated per $1 Million	**1.4**

6.0 Scope of Work

Hydro's five-year plan for the Renew Circuit Breakers program is provided in Appendix A. Based on current condition and asset data, Hydro plans to replace six circuit breakers and refurbish one circuit breaker under this program scope, with completion scheduled by the end of 2028. Based on asset condition and outage, and resource availability at the time of execution, Hydro may advance or defer the replacement of specific assets to ensure efficient and effective implementation of this program.

6.1 Program Budget

The estimate for this program is shown in Table 4.

Table 4: Program Estimate ($000)[6]

Program Cost	2026	2027	Beyond	Total
Material Supply	0.0	1,073.8	497.6	**1,571.4**
Labour	118.5	748.3	661.2	**1,528.0**
Consultant	48.0	52.0	44.0	**144.0**
Contract Work	0.0	120.0	510.0	**630.0**
Other Direct Costs	7.1	30.4	17.5	**54.9**
Interest and Escalation	6.0	124.4	158.7	**289.1**
Contingency	8.7	101.2	86.5	**196.4**
Total	**188.2**	**2,250.1**	**1,975.6**	**4,413.9**

Chart 7 provides the five-year historical expenditures, the forecast 2025 expenditures, the proposed 2026 program budget, and the forecast costs through 2030. Hydro notes that there has been a consistent year-over-year increase in breaker procurement costs. The budget is trending lower in future years as Hydro's remaining circuit breakers are replaced, fewer breakers are meeting the criteria for replacement, and the life extension of SF_6 breakers as a result of their refurbishment. The increased number of breaker replacements prior to 2025 is primarily attributed to Hydro's efforts to replace air blast circuit breakers[7] and comply with the federal environmental PCB Regulations.[8]

This program budget covers all types and voltage classes of breakers; as such, it will inherently show variability depending on the number, type, and voltage class of breakers addressed each year.

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[6] Numbers may not add due to rounding.

[7] As part of the Accelerated Breaker Replacement program, Hydro replaced air blast circuit breakers across the province due to reliability concerns and the unavailability of OEM spare parts, with the final replacements completed in 2023.

[8] All of the bulk-oil circuit breakers that are mandated for removal by 2025 as per the *Canadian Environmental Protection Act, 1999,* SC 1999, c 33*, PCB Regulations* (SOR/2008-273) will be completed by the end of 2025. The last of the affected breakers were approved for replacement as part of the 2024 CBA.

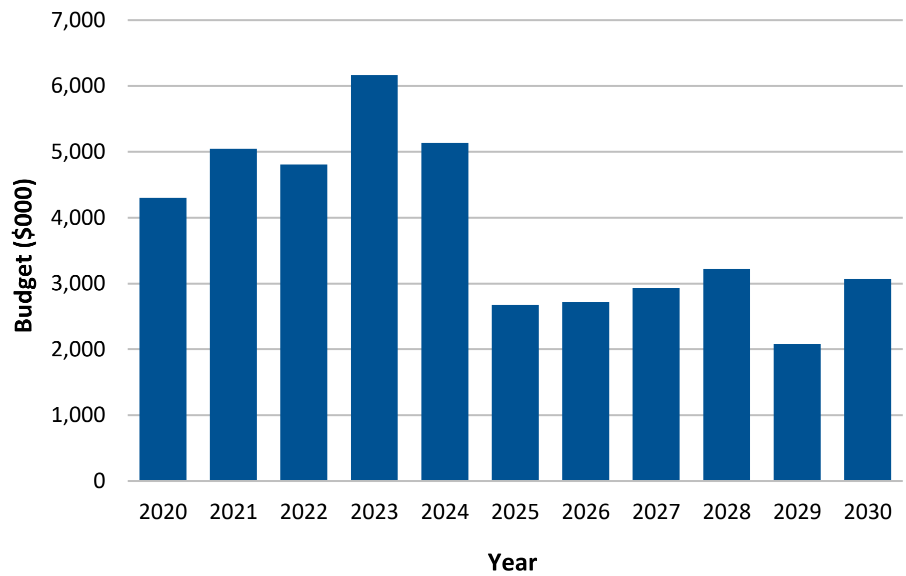

Chart 7: Historical and Forecast Program Budget

6.2 Program Schedule

The schedule for this program is shown in Table 5.

Table 5: Program Schedule

Activity	Start Date	End Date
Planning:		
Initial planning and scheduling.	January 2026	March 2026
Procurement:		
Order breakers and miscellaneous items.	March 2026	April 2028
Detailed Design:		
Conduct site visits.	July 2026	September 2026
Complete detailed design.	January 2026	March 2027
Procurement:		
Tender and award contract(s).	March 2027	April 2028
Construction/Commissioning:		
Breaker replacements and refurbishments.	May 2027	November 2028
Closeout:		
Complete closeout documentation.	November 2028	December 2028

7.0 Conclusion

This proposal is seeking approval for the refurbishment of one circuit breaker and replacement of six circuit breakers by the end of 2028. The refurbishment and replacement of the identified circuit breakers are required to ensure a safe and reliable power system.

Appendix A

Renew Circuit Breakers Program

2026–2030 Plan

newfoundland labrador hydro

1 Assets planned for replacement or refurbishment from 2026 to 2030 under the Renew Circuit Breakers
2 program are provided in Table A-1 to Table A-5.

Table A-1: Assets Planned for Replacement or Refurbishment in 2026

Name	Voltage (kV)	Activity
Stephenville B1L09	230	Refurbishment
Buchans B2L64	69	Refurbishment
Upper Salmon L34L63	230	Refurbishment
Western Avalon B1T1	230	Refurbishment
Western Avalon B1T2	230	Refurbishment
Howley B1L43	138	Replacement
Hardwoods B8T3	69	Replacement
Wabush B4L34	46	Replacement

Table A-2: Assets Planned for Replacement or Refurbishment in 2027

Name	Voltage (kV)	Activity
Hardwoods B7C1	69	Refurbishment
Oxen Pond B2T2	69	Replacement
Wabush B4L6	46	Replacement
Wabush B4L35	46	Replacement

Table A-3: Assets Planned for Replacement or Refurbishment in 2028

Name	Voltage (kV)	Activity
Holyrood B13B15	230	Replacement
Holyrood B12L18	230	Replacement
Hardwoods B2L42	230	Replacement

Table A-4:Assets Planned for Replacement or Refurbishment in 2029

Name	Voltage (kV)	Activity
Bay d' Espoir B9L34	230	Replacement
Bottom Brook L14L50	138	Replacement
Bottom Waters L60T1	138	Replacement
Howley L51T2	69	Refurbishment
Wabush B4SS2	46	Refurbishment

Table A-5: Assets Planned for Replacement or Refurbishment in 2030

Name	Voltage (kV)	Activity
Bay d' Espoir B9B10	230	Replacement
Bay d' Espoir L06L34	230	Replacement
Berry Hill B1L59	138	Refurbishment
Springdale B1L22	138	Refurbishment

Program 6

Thermal In-Service Failures

(2026)

newfoundland labrador hydro

Contents

Thermal In-Service Failures (2026)

Location: Holyrood

Investment Classification: Renewal

Asset Category: Thermal Plant

Cost: $3,823,700

1.0 Introduction

Newfoundland and Labrador Hydro ("Hydro") has an Asset Management Program that governs the life cycle of its thermal generation assets. An objective of Hydro's Asset Management Program is to identify refurbishment and replacement activities that require approval by the Board of Commissioners of Public Utilities ("Board") in time to be included in Hydro's annual capital budget application ("CBA"). This is achieved through the preventive maintenance program using various condition-based assessments and testing procedures.

Hydro conducts asset management activities to proactively identify, replace, repair, or refurbish equipment to minimize the disruption of service and to avoid unsafe working conditions due to equipment failure. Hydro has had success in projecting the deterioration rate of equipment for submission of refurbishment or replacement work into CBAs. However, there are situations where immediate refurbishment or replacement must be completed due to the occurrence of an actual failure, the identification of an incipient failure, or the identification of faster-than-anticipated equipment deterioration. These situations can be caused by events such as vandalism, storm damage, lightning, accidental damage, abnormal system operations, cavitation, corrosion, wear of mechanical components, sudden equipment failure, or existing installation deficiencies.

Hydro is proposing that, within the Thermal In-Service Failures Program, it will undertake the immediate capital refurbishment and replacement work required for its thermal generation assets to maintain safe and reliable operation and to ensure the availability of capital spares required to support such work. Hydro uses historical data and engineering judgment to predict the magnitude of in-service failure expenditures.

As identified through the Reliability and Resource Adequacy Study – 2022 Update ("2022 Update"),[1] the Holyrood Thermal Generating Station ("Holyrood TGS") shall remain available for a Bridging Period until 2030, or until such time that sufficient alternative generation is commissioned, adequate performance of the Labrador-Island Link ("LIL") is proven, and generation reserves are met. At this time, capital investment related to the generation function of the Holyrood TGS, such as the overhaul of major pumps, is necessary to support system reliability and maintain Hydro's ability to meet customer demand during peak periods.

2.0 Program Description and Justification

Due to the operating conditions that thermal generating equipment and systems are subject to, such as high pressure and temperature, unanticipated failures and deterioration occur. Under the Thermal In-Service Failures Program, Hydro is proposing to undertake the immediate capital refurbishment and replacement work required for the Holyrood TGS, as needed, to maintain safe and reliable operations and to ensure the availability of capital spares required to support such work. At this time, Hydro does not have any planned capital spare acquisitions under this program; however, throughout 2026, Hydro may purchase capital spares identified by asset management personnel as requiring immediate procurement to offset deficiencies in its capital spares.

Deferral of work that is justified under this program could result in a detrimental impact to customer power supply or unacceptable risk to worker or public safety.

Depending on the relevant circumstances, the required work will be evaluated to determine the appropriate form of execution as an in-service failure, an allowance for unforeseen item or a supplemental project.

3.0 Asset Overview

3.1 Asset Background

The assets requiring immediate, unplanned replacement or refurbishment work in a given year cannot be identified in advance.

[1] "Reliability and Resource Adequacy Study – 2022 Update," Newfoundland and Labrador Hydro, October 3, 2022.

Information on project scopes of $750,000 or more executed under the Thermal In-Service Failures (2024) Program is included in Hydro's "Capital Expenditures and Carryover Report for the Year Ended December 31, 2024."[2] There was one project scope of this magnitude for the 2024 reporting year.

3.2 Asset Condition

Assets replaced or refurbished under this program have experienced unexpected failure or exhibit signs of incipient failure.

3.3 Condition-Based Remaining Life

As assets replaced or refurbished under this program have experienced unexpected failure or exhibit signs of incipient failure, these assets have reached the end of their serviceable life.

3.4 Asset Ages

The age of assets potentially covered under this program varies. Unplanned refurbishment or replacement activities due to failure or incipient failure may be necessary at any time during the asset life cycle.

4.0 Trending

Hydro implemented the Thermal In-Service Failures Program in 2018. Since that time, on average, Hydro has initiated 32 unplanned projects per year under this program.

4.1 Assets Installed/Replaced/Upgraded

The number of in-service failures projects initiated under this program over the past five years is provided in Chart 1. Details of each project, and the associated assets and costs, are filed with the Board within Hydro's annual Capital Expenditures and Carryover Report.

Hydro anticipates that in-service failures will continue to occur, given the age and number of thermal assets covered under this program. Hydro continues to plan the budget for this program based on historical information.

[2] Provided as Appendix B to Schedule 5 of this application.

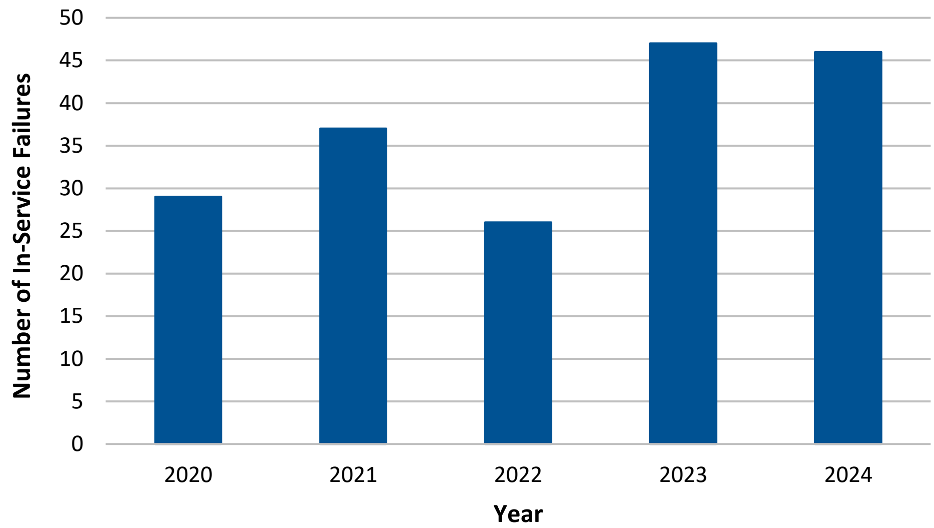

Chart 1: In-Service Failure Frequency

4.2 Historical and Forecast Average Unit Costs

Historical and forecast program costs are provided in Chart 2 in Section 6.1. Due to the nature of this program and the range of assets covered, average unit cost information is not applicable. An increase in program cost is forecast based on the anticipated escalation of both material and labour costs.

The level of expenditure ($5.8 million) in 2021 for this program was higher than in other years. Prior to the 2022 Update, Hydro's commitment to have the Holyrood TGS fully available for generation was extended several times in one-year increments, increasing the challenge to balance cost and reliability for an aging plant nearing the end of its service requirement as a generating facility.

4.3 Historical Reliability

Hydro tracks performance data for its thermal generation units using the Derated Adjusted Forced Outage Rate ("DAFOR");[3] this data is filed quarterly with the Board.[4] This program plays a key role in allowing Hydro to minimize the DAFOR of its thermal generation units to ensure the provision of reliable service to customers. In its 2024 Near-Term Reliability Update,[5] Hydro's modelling indicated that a

[3] DAFOR is a metric that measures the percentage of time that a unit or group of units is unable to generate at its maximum continuous rating due to forced outages or unit deratings.
[4] Most recent "Quarterly Report on Asset Performance in Support of Resource Adequacy for the Twelve Months Ended March 31, 2025," Newfoundland and Labrador Hydro, April 30, 2025.
[5] "*Reliability and Resource Adequacy Study Review* – 2024 Near-Term Reliability Report," Newfoundland and Labrador Hydro, November 20, 2024.

Derated Adjusted Utilization Forced Outage Probability ("DAUFOP")[6] in excess of 20%, coupled with a LIL forced outage rate of 5% would result in a violation of Hydro's generation planning criteria.[7] This program ensures Hydro can address failing components quickly to minimize forced outages that could impact the system.

5.0 Analysis

5.1 Evaluation of Alternatives

Depending on the nature of each failure or incipient failure, Hydro reviews viable technical alternatives to determine the most appropriate solution to address the unplanned event while balancing urgent safety and operational risks.

Due to the urgent nature of work executed under this program, seeking approval through a supplemental capital expenditures application or deferring the work for inclusion in the next CBA are not viable alternatives. The alternative of executing required unplanned work under the Allowance for Unforeseen Items Account is also considered on a case-by-case basis, subject to the requirements set out by the Board for use of the account.

5.1.1 Risk of Asset Stranding

The risk of asset stranding is less imminent as a result of the decision to extend Holyrood TGS to remain available through the Bridging Period. As Hydro expects continued operation of all three units at the Holyrood TGS through the Bridging Period until its capacity can be adequately replaced to ensure reliable operation for customers, capital expenditures for this facility to operate as a generator continue to be required. Depreciation is required to be calculated on an accelerated basis (i.e., monthly depreciation = capital investment ÷ remaining months of service life).[8]

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[6] "DAUFOP is the probability that a generating unit will not be available due to forced outages or forced deratings when there is demand on the unit to generate.

[7] "2024 Resource Adequacy Plan – An Update to the Reliability and Resource Adequacy Study," Newfoundland and Labrador Hydro, rev. August 26, 2024 (originally filed July 9, 2024), app. B, Table 7, p. 35.

[8] Due to the extension of the Holyrood TGS through the Bridging Period, Hydro submitted an application to the Board to extend the Holyrood Accelerated Depreciation Deferral Account. The Board approved the extension of the account and related amendments in Board Order No. P.U. 1(2024). Hydro was also directed to file a report on the account in its next general rate application.

5.1.2 Risk Mitigation

Hydro assessed the pre- and post-implementation risk of the scope of work for the 2026 program in accordance with Hydro's Capital Risk Assessment process as outlined in Section 7.0 of Schedule 1. The outcome of this assessment is provided in Table 1.

Table 1: Risk Scoring Pre- and Post-Implementation

	Impact	Likelihood	Score
Pre-Implementation	3	5	**15**
Post-Implementation	3	1	**3**
		Risk Mitigated	**12**
		Risk Mitigated per $1 Million	**3.1**

6.0 Scope of Work

Work executed under this program in 2026 will be reported to the Board in Hydro's 2026 Capital Expenditures and Carryover Report.[9]

6.1 Program Budget

The estimate for the 2026 program is shown in Table 2. The estimate is based on the average expenditures from 2022 to 2024. The details of each project covered under this program, including the associated assets and costs, as well as the total program expenditures for each year, are filed with the Board within Hydro's annual Capital Expenditures and Carryover Report.

Table 2: Program Estimate ($000)

Program Cost	2026	2027	Beyond	Total
Material Supply	850.0	0.0	0.0	**850.0**
Labour	981.5	0.0	0.0	**981.5**
Consultant	15.0	0.0	0.0	**15.0**
Contract Work	1,853.5	0.0	0.0	**1,853.5**
Other Direct Costs	0.0	0.0	0.0	**0.0**
Interest and Escalation	123.7	0.0	0.0	**123.7**
Contingency	0.0	0.0	0.0	**0.0**
Total	**3,823.7**	**0.0**	**0.0**	**3,823.7**

[9] Hydro's 2026 Capital Expenditures and Carryover Report is to be filed on or before April 1, 2027.

The Thermal In-Service Failures Program started in 2018. Chart 2 shows the historical expenditures in the last five years, the forecast 2025 expenditures, the proposed 2026 budget, and the forecast costs through 2030.[10] As Hydro cannot predict the quantity and the nature of failures to be addressed within this program for future years, Hydro has forecast future expenditures for this program based on the 2026 program budget with cost escalation applied.[11]

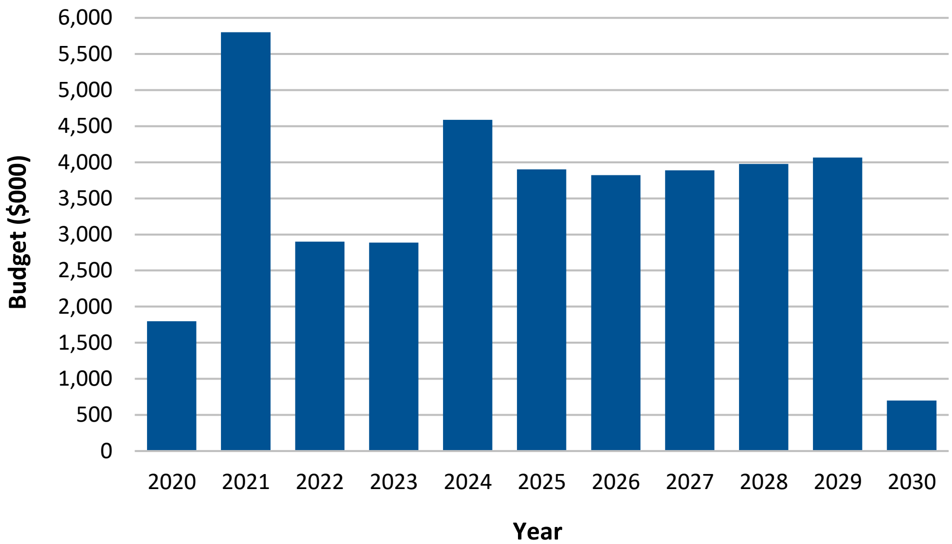

Chart 2: Historical and Forecast Program Budget

6.2 Program Schedule

Work schedules are established subsequent to an unplanned failure or incipient failure event. There are currently no planned capital spare acquisitions under this program for 2026.

7.0 Conclusion

The Thermal In-Service Failures Program allows Hydro to undertake timely refurbishment and replacement work that is not included in its preventive maintenance program, supporting Hydro's effort to maintain safe and reliable operations in an environmentally responsible manner. This program also

[10] The forecast for the costs of the thermal in-service failures was based on the assumption of continued operation of all generating units at the Holyrood TGS through the Bridging Period until its capacity can be adequately replaced. Hydro's capital projections assume all three generating units remain online until 2030.These projections are subject to change based on changes in operating regime.

[11] Forecast in 2030 is less than $1 million and assumes retirement of three generating units as of March 31, 2030.

allows Hydro to continue to proactively manage the pool of capital spare equipment to support thermal operations.

Terminal Station In-Service Failures

(2026)

Contents

Terminal Station In-Service Failures (2026)

Location: Various

Investment Classification: Renewal

Asset Category: Terminal Stations

Estimated Cost: $3,291,800

1.0 Introduction

Newfoundland and Labrador Hydro ("Hydro") conducts asset management activities to proactively identify, replace, repair, or refurbish equipment to minimize the disruption of service and to avoid unsafe working conditions due to equipment failure. An objective of Hydro's Asset Management Program is to identify refurbishment and replacement activities that require approval by the Board of Commissioners of Public Utilities ("Board") in time to be included in Hydro's annual capital budget application ("CBA"). The identification is done through the Preventive Maintenance Program using various condition-based assessments and testing procedures.

Hydro has had success in projecting the deterioration rate of equipment for submission of refurbishment or replacement work into CBAs. However, there are situations where immediate refurbishment or replacement must be completed due to the occurrence of an actual failure, the identification of an incipient failure, or the determination of faster-than-anticipated equipment deterioration. These situations can be caused by events such as vandalism, storm damage, lightning, accidental damage, abnormal system operations, corrosion, etc. Hydro uses historical data and engineering judgment to predict the magnitude of in-service failure expenditures.

2.0 Program Description and Justification

Due to the nature of terminal station equipment and infrastructure, unanticipated failures and deterioration will occur. Under the Terminal Station In-Service Failures Program, Hydro is proposing to undertake the immediate capital refurbishment and replacement work required for its terminal station assets, as needed, to maintain safe and reliable operation and to ensure the availability of capital spares required to support such work. Throughout 2026, Hydro may purchase capital spares identified as requiring immediate procurement to offset deficiencies in its capital spares.

Deferral of work justified under this program could result in a detrimental impact on customer power supply or an unacceptable risk to workers or public safety.

Depending on the relevant circumstances, the required work will be evaluated to determine the appropriate form of execution as an in-service failure, an Allowance for Unforeseen Item, or a supplemental project.

3.0 Asset Overview

3.1 Asset Background

The assets requiring immediate, unplanned replacement or refurbishment work in a given year cannot be identified in advance. The assets covered within the Terminal Station In-Service Failures Program are generally included in the following broad asset classes:[1]

- Instrument transformers;
- Disconnect switches;
- Surge arresters;
- Insulators;
- Grounding systems;
- Power transformers;
- Circuit breakers;
- Station service equipment;
- Battery banks and chargers;
- Station lighting;
- Synchronous condensers and associated equipment;
- Equipment foundations;
- Protection, control, and monitoring systems; and

[1] Historically, in-service failures to site buildings and services had been included in this program; however, this work will now be captured under the new Perform Facilities Refurbishment project going forward.

- Auxiliary equipment.

For further information on the work executed under the Terminal Station In-Service Failures (2024) program, please refer to Hydro's "Capital Expenditures and Carryover Report for the Year Ended December 31, 2024."[2]

3.2 Asset Condition

Assets replaced or refurbished under this program have experienced unplanned failure or exhibited signs of incipient failure.

3.3 Condition-Based Remaining Life

Assets replaced or refurbished under this program have experienced unplanned failure or exhibit signs of incipient failure; therefore, these assets have reached the end of their service life.

3.4 Asset Ages

The age of assets potentially covered under this program varies. Unplanned replacement or refurbishment activities due to failure may be necessary at any time during the asset lifecycle.

4.0 Trending

Hydro implemented the Terminal Station In-Service Failures Program in 2017. In the past five years, on average, Hydro has initiated 11 unplanned projects per year under the program.

4.1 Assets Installed/Replaced/Upgraded

The number of unplanned in-service failures projects initiated under the program over the past five years is provided in Chart 1. Details of each project, and the associated assets and costs, are filed with the Board within Hydro's annual Capital Expenditures and Carryover Report.

Hydro anticipates that unplanned failures will continue to occur, given the age and number of terminal station assets covered under the program. Hydro continues to plan the budget for this program based on historical information.

[2] Provided as Appendix B to Schedule 5 of this application.

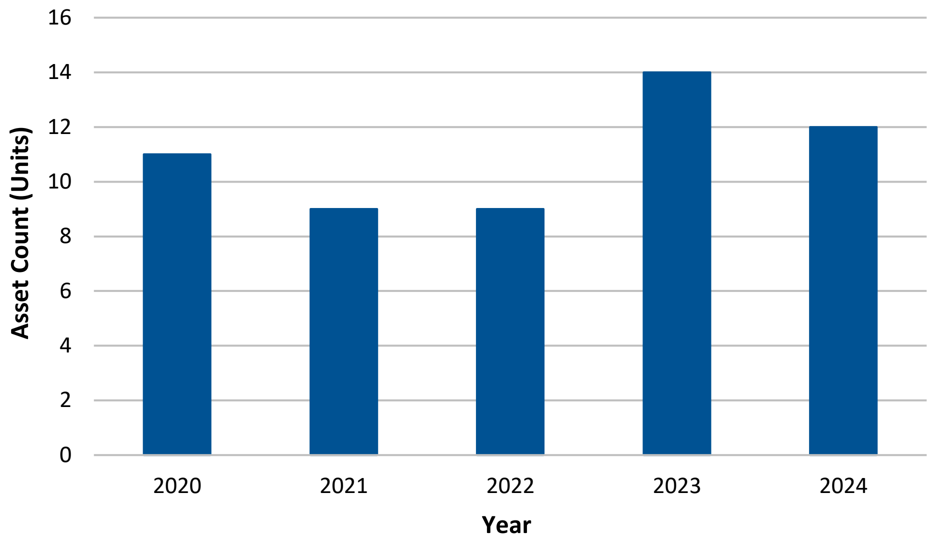

Chart 1: In-Service Failure Frequency

4.2 Historical and Forecast Average Unit Costs

Historical and forecast program costs are provided in Chart 2 in Section 6.1. Due to the nature of this program and the range of assets covered, average unit cost information is not applicable. An increase in program cost is forecast based on the anticipated escalation of both material and labour costs.

4.3 Historical Reliability

As this program addresses a wide range of asset types, the specific assets to be addressed within this program for 2026 are not known. As such, historical reliability data for the individual assets covered within this program is not applicable.

5.0 Analysis

5.1 Evaluation of Alternatives

Depending on the nature of each failure, or incipient failure, Hydro reviews viable technical alternatives to determine the most appropriate solution to address the unplanned event while balancing urgent safety and operational risks.

Due to the urgent nature of work executed under this program, seeking approval through a supplemental capital expenditures application or deferring the work for inclusion in the next CBA are not viable alternatives. The alternative of executing required unplanned work under the Allowance for

Unforeseen Items Account is also considered on a case-by-case basis, subject to the requirements set out by the Board for the use of the account.

5.1.1 Risk of Asset Stranding

Assets replaced or refurbished under this program have an inherently low risk of asset stranding. The assets covered under this program are critical to Hydro's ability to meet customer requirements. Hydro does not currently plan to retire any of its terminal stations. The risk of asset stranding would be considered on a case-by-case basis, if applicable.

5.1.2 Risk Mitigation

Hydro assessed the pre- and post-implementation risk of the scope of work for the 2026 program in accordance with Hydro's Capital Risk Assessment process, as outlined in Section 7.0 of Schedule 1.0. The outcome of this assessment is provided in Table 1.

Table 1: Risk Scoring Pre- and Post-Implementation

	Impact	Likelihood	Score
Pre-Implementation	3	5	**15**
Post-Implementation	3	1	**3**
		Risk Mitigated	**12**
		Risk Mitigated per $1 Million	**3.6**

6.0 Scope of Work

Work executed under this program in 2026 will be reported to the Board in Hydro's 2026 Capital Expenditures and Carryover Report.[3]

6.1 Program Budget

The estimate for the 2026 program is shown in Table 2. The estimate is based on the average expenditures from 2022 to 2024. The details of each project covered under this program, including the associated assets and costs, as well as the total program expenditures for each year, are filed with the Board within Hydro's annual Capital Expenditures and Carryover Report.

[3] Hydro's 2026 Capital Expenditures and Carryover Report is to be filed on or before April 1, 2027.

Table 2: Program Estimate ($000)

Program Cost	2026	2027	Beyond	Total
Material Supply	2,277.9	0.0	0.0	**2,277.9**
Labour	190.9	0.0	0.0	**190.9**
Consultant	91.0	0.0	0.0	**91.0**
Contract Work	600.0	0.0	0.0	**600.0**
Other Direct Costs	10.9	0.0	0.0	**10.9**
Interest and Escalation	121.1	0.0	0.0	**121.1**
Contingency	0.0	0.0	0.0	**0.0**
Total	**3,291.8**	**0.0**	**0.0**	**3,291.8**

The Terminal Station In-Service Failure Program started in 2017. Chart 2 provides the five-year historical expenditures since 2020, the forecast 2025 expenditures, the proposed 2026 program budget, and the forecast costs through 2030. As Hydro cannot predict the quantity and the nature of failures to be addressed within this program for future years, Hydro has forecast future expenditures for this program based on the 2026 program budget with cost escalation applied.

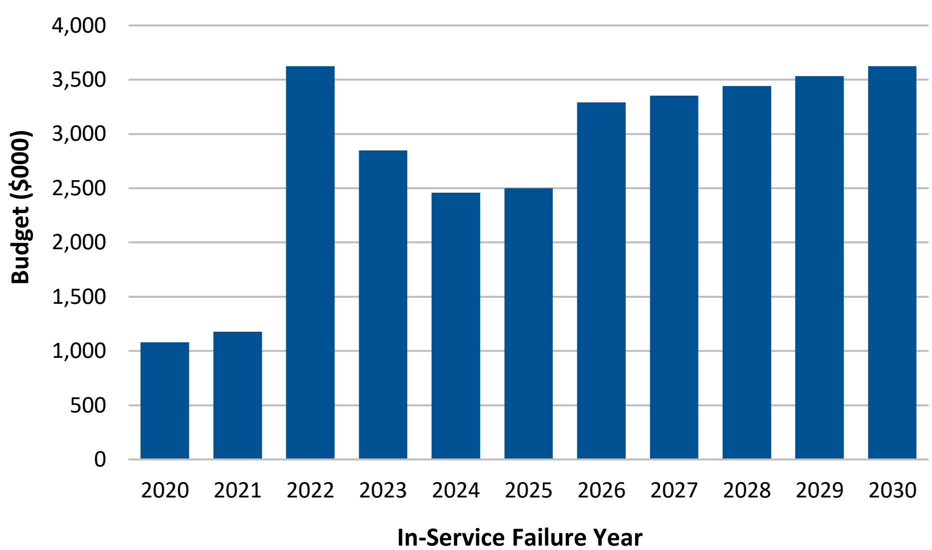

Chart 2: Historical and Forecast Program Budget

6.2 Program Schedule

Work schedules are established subsequent to an unplanned failure or incipient failure event. Hydro does not have any planned capital spare acquisitions identified under this program in 2026.

7.0 Conclusion

The Terminal Station In-Service Failures Program allows Hydro to undertake timely refurbishment and replacement work that is not included in its preventive maintenance program, supporting Hydro's effort to maintain safe and reliable operations in an environmentally responsible manner. This program will also allow Hydro to continue to proactively manage the pool of capital spare equipment to maintain the integrity and reliability of the electrical system.

Replace Light-Duty Vehicles

(2026–2027)

Contents

Replace Light-Duty Vehicles (2026–2027)

Location: Various

Investment Classification: General Plant

Asset Category: Transportation

Estimated Cost: $3,096,100

1.0 Introduction

Newfoundland and Labrador Hydro ("Hydro") operates a fleet of vehicles including approximately 235 light-duty vehicles distributed across Hydro's operating areas throughout the province. This fleet is utilized daily to support staff engaged in the operation and maintenance of the electrical system.

Hydro employees work throughout the province, and many cover different operating and geographical areas. As such, Hydro's staff requires reliable vehicles to effectively fulfill their duties. The fleet is utilized daily to support staff engaged in the operation and maintenance of the electrical system.

2.0 Program Description and Justification

Hydro's light-duty vehicle fleet is strategically distributed across Hydro's operating areas throughout the province. Vehicles are utilized daily by staff engaged in the maintenance and repair of the electrical system and shared amongst work groups as required.

Hydro operates its fleet of light-duty vehicles as required to maintain the safety and reliability of the electrical system. Hydro's key replacement criteria for light-duty vehicles are provided in Table 1. Age and odometer readings are common criteria for unit replacements; however, a review of asset condition and the criticality of the unit to operations is also considered in determining whether to replace a vehicle in the upcoming year.

Table 1: Replacement Criteria

Vehicle	Replacement Criteria
Light-Duty	7 years or 200,000 kilometres (odometer reading), dependent on condition/maintenance cost and reliability.

Historically, the replacement of light-duty vehicles was part of a larger program scope that also included heavy-duty vehicles, such as single-axle and tandem-axle trucks. In Board of Commissioners of Public Utilities ("Board") Order No. P.U. 28(2024), approving Hydro's 2025 Capital Budget Application ("CBA"), the Board had noted concerns with including scopes of light- and heavy-duty vehicles in the same program, stating:

> The Board finds that Hydro has not provided sufficient justification for the combining of light- and heavy-duty vehicles/assets. While there may be some efficiencies gained in grouping the different types of vehicles/assets together, the Board finds that separation will allow for greater transparency, clarity, and better reflect delivery time and cost.[1]

Upon further review of the program scopes and consideration of the Board's request, Hydro has separated light- and heavy-duty vehicles into separate proposals, beginning in this CBA.

Following the receipt of Board Order No. P.U. 28(2024), Hydro conducted a review of the classification of its programs within the 2025 CBA and determined that due to the nature of the assets being replaced (i.e., individual asset values higher than the lowest materiality threshold), the scope of work contained in Replace Heavy-Duty Vehicles proposal was more appropriately defined as a project.

Hydro has maintained the light-duty vehicle capital expenditures within a program, as the components have smaller individual asset costs.

3.0 Asset Overview

3.1 Asset Background

Entering 2026, the composition of Hydro's light-duty fleet is forecast to include approximately 175 pickup trucks, 20 specialized box vans, and 40 small vehicles, including SUVs,[2] cars, and minivans.[3] On average, Hydro's vehicles accumulate 25,000–30,000 kilometres per year or an average of 175,000–210,000 kilometres over the seven-year life of the vehicle. On occasion, a small number of vehicles receive greater usage, requiring replacement before the conclusion of their seven-year life, while other vehicles will incur significantly lower total kilometres driven and provide a longer service life.

[1] Board Order No. P.U. 28(2024), p. 7/19–22.
[2] Sport utility vehicle ("SUV").
[3] Fleet numbers may vary year-to-year depending on the specific timing of vehicle replacements and retirements.

These averages indicate that Hydro's vehicle replacement criteria are consistent with its operational experience and that Hydro's light-duty fleet is appropriately sized for its operation. Hydro continues to monitor practices of other Canadian utilities, as well as statistics on Hydro's vehicle usage rates, to ensure Hydro's criteria and vehicle replacement rates are appropriate and conducive to Hydro's operations.

3.2 Asset Condition

As equipment ages, failures and resulting downtime will impact response times for outages or planned maintenance. In many cases, light-duty vehicles are subjected to accelerated wear and tear due to operation in rough areas and premature corrosion from salt spray. Light-duty vehicles are inspected in accordance with the preventive maintenance schedule, and all maintenance and repairs are performed by third-party service providers as needed.

Assets identified for replacement align with the criteria specified in Table 1. These assets are replaced based on the age of the asset or kilometres accumulated, with consideration given to vehicle condition. Should an asset that has reached one of the replacement milestones be assessed and determined to be in adequate condition to remain as part of the fleet, Hydro does consider the option to extend the service life of the asset. This decision must weigh the increased chance of failure against its potential impact on utility reliability.

3.3 Condition-Based Remaining Life

Hydro evaluates assets as they reach retirement criteria to determine if it is appropriate to extend the life of the vehicles. This could include reassignment to an area with less or different usage, or usage in easier terrain, among other considerations.

3.4 Asset Ages

Chart 1 provides the light-duty vehicle asset age of the fleet, including those proposed for replacement, respectively. Replacements in the 0–5-year age range category are typically a result of the vehicles meeting the mileage and condition criteria.

For light-duty vehicles, the average age of the fleet entering 2026 will be just under four years, which is on target for the average seven-year service life.

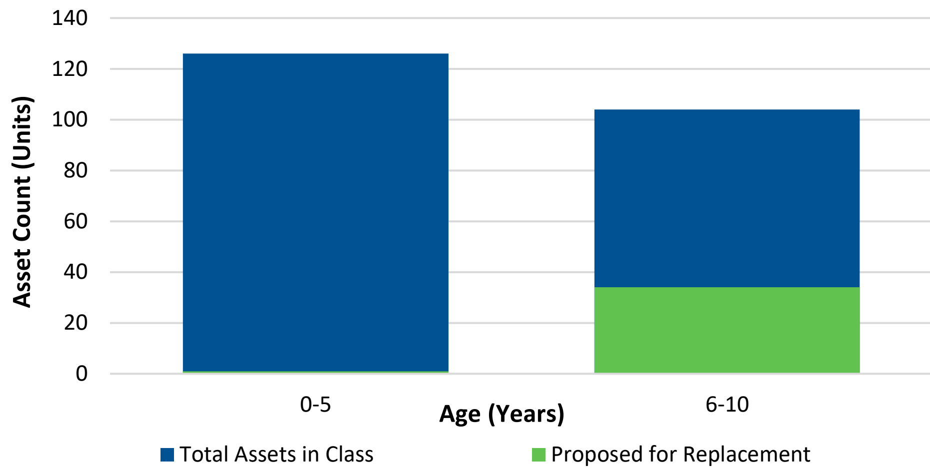

Chart 1: Asset Count by Asset Age

4.0 Trending

4.1 Assets Installed/Replaced/Upgraded

Chart 2 provides the five-year historical, current, and five-year forecast number of light-duty vehicles replaced under this program. Assets in service in 2020 and 2021 are below average due to global supply chain challenges. The forecast for future years is based on the outcome of Hydro's review of average age versus service life as discussed in Section 3.4 and reduces volatility in annual replacement rates. These projections are reflected and consider current fleet size requirements, with some variances observed due to uneven age distributions within the fleet.

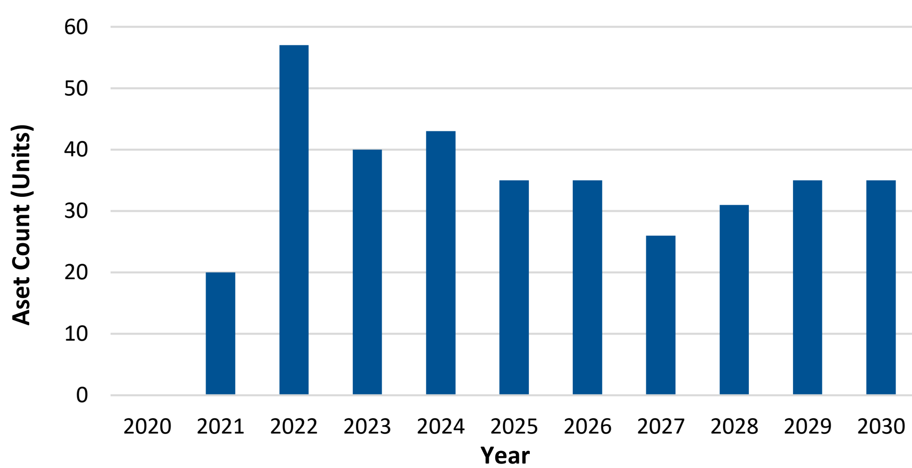

Chart 2: Historical and Forecast Number of Assets – Light-Duty Vehicles

4.2 Historical and Forecast Average Unit Costs

Chart 3 indicates the average cost of vehicles for replacement and is reflective of the average cost for light-duty vehicles. Substantial cost escalation has been experienced in the light-duty segments since 2020. The variation in average costs in light-duty vehicles is attributed to the procurement of varying types of vehicles under this program.

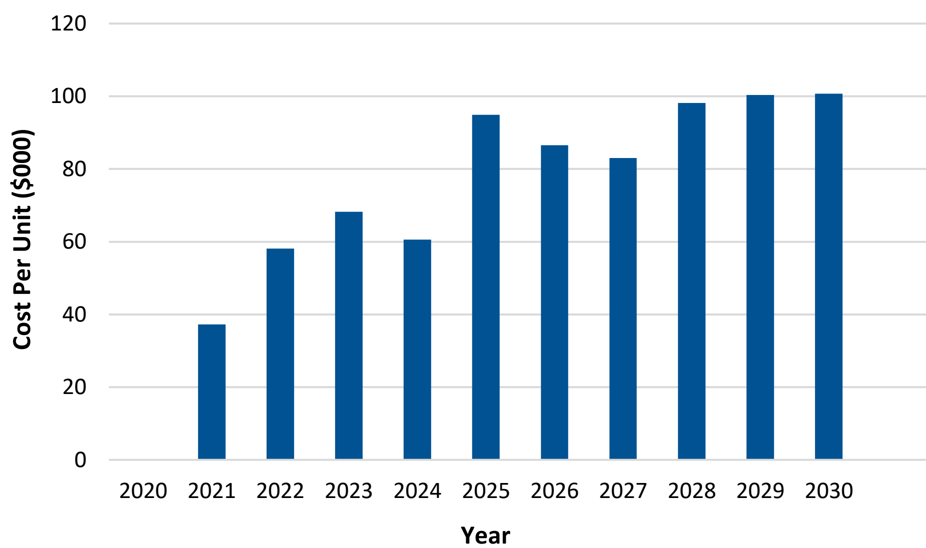

Chart 3: Historical and Forecast Average Unit Costs of Assets Installed/Replaced

4.3 Historical Reliability

Light-duty vehicles are inspected in accordance with the preventive maintenance schedule, and all maintenance and repairs are performed by third-party service providers, as needed.

5.0 Analysis

5.1 Evaluation of Alternatives

Hydro considered the following alternatives:

- Pace reduction;
- Pace advancement;
- Continue program at current pace; and
- Alternative strategies – vehicle rentals.

5.1.1 Pace Reduction

In 2020, Hydro re-evaluated its replacement criteria and reduced the pace based on a review of industry standards and the condition of the units upon replacement. Hydro's replacement criteria are consistent with utility counterparts across Canada, and, based on Hydro's current experience, further extending the timing of these replacements would present reliability risks. Unplanned pace reduction imposed by supply chain constraints from 2020 to present has confirmed an increased rate of vehicle failure that has resulted in challenges to completing required work. For this reason, pace reduction is not considered a viable option.

5.1.2 Pace Advancement

Advancing the pace of this program may result in premature retirement of existing, functional assets, requiring a level of investment that is not required for the continuation of safe, reliable, least-cost electricity in an environmentally responsible manner. Hydro is continuing to evaluate the appropriate pace for vehicle replacement, particularly light-duty vehicles, based on average asset age and service life as discussed in Section 3.4. For this reason, pace advancement is not considered a viable option at this time.

5.1.3 Continue Program at Current Pace

Hydro has determined that the current criteria is appropriate based on consultation with other utilities, the condition of the units upon replacement, and vehicle usage statistics. This approach allows Hydro to balance cost with the reliability of Hydro's vehicle fleet. These vehicles are required to facilitate required maintenance and timely response to system events, and as such, are required to be available and in appropriate working condition.

5.1.4 Alternative Strategies – Vehicle Rentals

Hydro has considered supplementing its fleet vehicle needs with rental vehicles. Hydro utilizes light-duty rental vehicles as much as is practical; however, they are frequently in short supply. Additionally, much of Hydro's light-duty fleet is customized to industrial work usage to the extent that there is no direct replacement option possible from the rental market. As such, Hydro does not consider this a viable alternative for this program.

5.2 Least-Cost Evaluation

Hydro has not identified any viable alternatives to facilitate a least-cost evaluation.

5.3 Recommended Alternative

Hydro's recommended alternative is to continue the program at the current pace and proceed with the identified replacements based on its replacement criteria.

5.3.1 Risk of Asset Stranding

This program is necessary to maintain a safe and reliable fleet. Failure to replace this equipment will lead to increased maintenance costs, less reliable equipment, delays in scheduled and unscheduled work, and possible safety issues for operators. Hydro does not foresee any changes in its requirements for light-duty vehicles; therefore, the risk of asset stranding is low.

5.3.2 Risk Mitigation

Hydro assessed the pre- and post-implementation risk of the scope of work for the 2026–2027 program in accordance with Hydro's Capital Risk Assessment process as outlined in Section 7.0 of Schedule 1. The outcome of this assessment is provided in Table 2.

Table 2: Risk Scoring Pre- and Post-Implementation

	Impact	Likelihood	Score
Pre-Implementation	3	4	**12**
Post-Implementation	3	1	**3**
		Risk Mitigated	**9**
		Risk Mitigated per $1 Million	**2.9**

6.0 Scope of Work

This program proposes the replacement of 35 light-duty mobile vehicles in accordance with Hydro's replacement criteria. This scope includes the procurement of the vehicles and accessorizing as required, based on the purpose of the vehicle.[4] This program also includes $100,000 in 2026 to address in-service failures for fleet vehicles. Hydro will evaluate the cost of repair or refurbishment versus replacement prior to executing in-service failure repairs.

[4] Where appropriate, Hydro will consider electric vehicles during the procurement process. Vehicles will be selected based on their suitability for their intended purpose, as well as life-cycle cost.

6.1 Program Budget

The estimate for this program is shown in Table 3.

Table 3: Program Estimate ($000)[5]

Program Cost	2026	2027	Beyond	Total
Material Supply	2,000.0	431.0	0.0	**2,431.0**
Labour	54.9	5.1	0.0	**60.0**
Consultant	0.0	0.0	0.0	**0.0**
Contract Work	0.0	0.0	0.0	**0.0**
Other Direct Costs	18.7	3.8	0.0	**22.5**
Interest and Escalation	66.6	21.6	0.0	**88.2**
Contingency	407.4	87.1	0.0	**494.4**
Total	**2,547.6**	**548.6**	**0.0**	**3,096.1**

Light-duty vehicles shall be requisitioned and received in 2026–2027.

For the purchase of vehicles, Hydro includes cost escalation contingency in its budget, typically about 10%, to accommodate potential price increases relating to an array of socioeconomic factors. Recent implementation and adjustments of tariffs on vehicles, as well as the components and materials used to fabricate vehicles, have increased uncertainty and potential volatility in the end unit price of these assets. To accommodate a larger range of price possibilities, Hydro has increased the amount of contingency included within this proposal to about 20%. As price effects relating to tariffs become more apparent, and in cases where tariffs are adjusted in the future, Hydro will reevaluate the amount of contingency included in future vehicle proposal budgets.

Chart 4 provides the five-year historical program expenditures, the forecast 2025 expenditures, the proposed 2026 program budget, and the forecast budget through 2030. Light-duty vehicles are replaced considering age, accumulated kilometres, and condition; as such, the makeup of types of vehicles replaced will vary from year to year. This will result in budget variability due to the type and quantity of equipment purchased. Increases in costs up to 2026 and beyond are not reflective of changes in Hydro's strategy regarding the replacement of light-duty vehicles, but rather are reflective of increasing costs due to supply chain constraints and inflationary pressure. This program budget provides data for the light-duty fleet scope of work. While the purchase of the vehicles can be broken down into categories,

[5] Numbers may not add due to rounding.

there are overheads and efficiencies gained from combining the scopes of work that are reflected below.

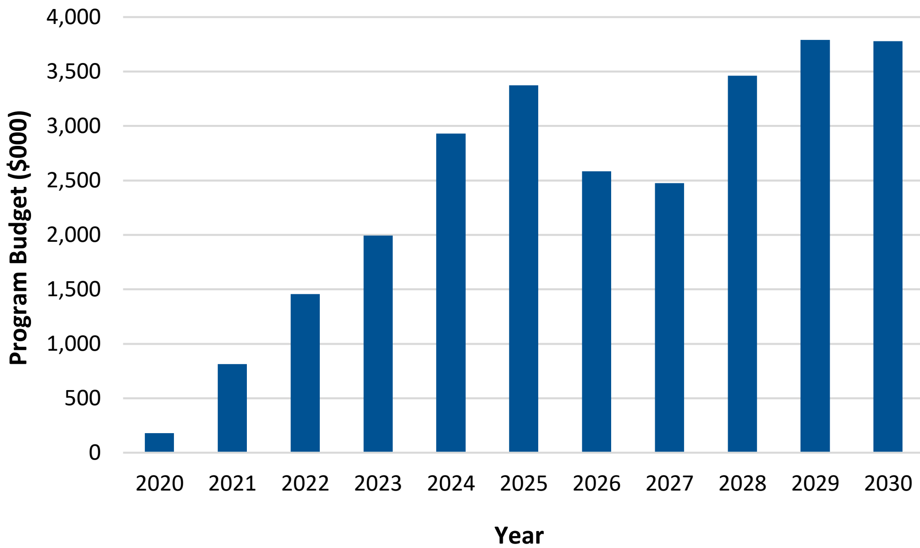

Chart 4: Historical and Forecast Program Budget

6.2 Program Schedule

The schedule for this program is shown in Table 4.

Table 4: Program Schedule

Activity	Start Date	End Date
Planning: Open work orders, plan, and develop detailed schedules.	January 2026	February 2026
Procurement: Tender and award contracts to purchase light-duty vehicles.	February 2026	April 2026
Commissioning: Receive and commission light-duty vehicles.	May 2026	November 2027
Closeout: Close work orders, complete all documentation, and complete lessons learned.	November 2027	December 2027

7.0 Conclusion

Hydro operates a fleet of light-duty vehicles to enable effective maintenance of the electrical system and timely response to system events. The established replacement guidelines have been determined to be appropriate. Hydro proposes to continue with the replacement of vehicles under this program for 2026.

Perform Facilities Refurbishments

(2026)

Contents

List of Appendices

Perform Facilities Refurbishments (2026)

Location: Various

Investment Classification: General Plant

Asset Category: Properties

Estimated Cost: $3,027,900

1.0 Introduction

Newfoundland and Labrador Hydro ("Hydro") owns, operates and maintains 342 buildings, which contain approximately 1 million gross square feet of usable space.

These facilities play a critical role in the support of the operation of Hydro's generation, transmission, and distribution systems. Hydro aims to refurbish its facility assets to restore their condition, ensure adherence to regulatory requirements, and extend the service life.

To achieve this, Hydro has developed a new annual capital program to refurbish its building class of assets as they reach the end of their design life or require attention due to obsolescence or anticipated failure. This program will consolidate its facility refurbishment projects, each of which carries an estimated value of less than the legislative threshold of $750,000, into the Perform Facilities Refurbishments program as part of its 2026 Capital Budget Application ("CBA").[1] This approach will promote proactive planning of capital investments in Hydro's facilities.

Historically, Hydro has submitted either individual projects for particular assets or programs for sustaining work related to its facility assets in its CBA, resulting in a segmented view of the expenditures to sustain these assets.[2] Combining these projects into the Perform Facilities Refurbishments program allows the opportunity to increase regulatory efficiency and provides a more focused, transparent presentation of Hydro's sustaining efforts for facilities assets.

[1] Individual refurbishment scopes of work with an estimated value of greater than $750,000 will continue to be filed as a stand-alone project. Hydro notes that its Modify Office Buildings and Procure Furniture, Fixtures, & Equipment program will continue as a stand-alone program to address office retrofits driven by changes in the organizational structure and unforeseen requests to accommodate departmental or individual employee needs.

[2] For example, in the last five years, there were 53 projects in the period 2020–2024 delivering 135 new assets, with investment classifications under mandatory or general plant.

To establish a prudent threshold for its refurbishment expenditures, Hydro applied a depreciation value of 2% against its current building systems inflation-adjusted original cost of $274.0 million.[3] This approach suggests an estimated annual renewal expenditure of approximately $5.5 million[4] is required in 2026 to adequately maintain Hydro's building assets. Once established, the proposed budget for this program will represent the approximate residual funds remaining from this annual renewal expenditure, following the deduction of other facilities-related projects with expenditures outside of this program.[5,6] As the first iteration of this program, and to ensure the work selected can be executed with the available resources, Hydro has proposed a lower program budget for 2026.

The refurbishment scope included in this program is selected utilizing Hydro's Enterprise Risk Management – Risk Rating, in conjunction with risk spend efficiency (risk mitigated per million dollars).[7] Following this approach, work is prioritized by assigning an overall risk rating to each item, ensuring that high-risk items are addressed first. After targeting high-risk items, risk spend efficiency is considered for all medium-risk items, thus enabling the scope of medium-risk refurbishment work to be prioritized or selected to capitalize on opportunities based on maximum value. This helps Hydro avails of execution efficiencies and maximizes risk reduction; all work scopes are selected with the ability to execute within the proposed program budget.[8]

For the 2026 CBA, work scopes and asset condition were primarily derived from existing assessments, which have been completed on a select number of facilities and provided as Appendices B through G.[9] As part of its initiative to continually improve its asset management strategy for facilities, Hydro intends to complete condition assessments for its remaining facilities and utilize this information to further develop the scope of this program for future applications.

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[3] Hydro will continue to assess the appropriateness of this depreciation methodology in future program scopes.

[4] The annual 2% straight line depreciation is calculated by dividing 1 by the assigned 50-year service life (1/50). This value is multiplied by the inflation-adjusted original asset value of $274.0 million to arrive at the targeted annual renewal spend.

[5] Hydro notes that the budget proposed for this project in 2026 is slightly lower than the estimated annual renewal expenditure minus the 2026 expenditures of other facilities-related projects, due to this being the first iteration of this program, and having a limited number of facility condition assessments completed to date.

[6] In 2026, other facilities-related projects with expenditures in 2026 include "Replace Roof (2026-2027) – Hopedale," included in this CBA.

[7] Hydro provides the assessed risk rankings for each item identified within the project scope in Appendix A.

[8] A complete listing of the currently identified work scopes and their proposed execution year is attached as Appendix A.

[9] Thus far, condition assessments have been completed for: Hydro Place; the Holyrood Thermal Generating Station ("Holyrood TGS") Pumphouse 1 and 2; St. Anthony Depot/Office and Storage Building; Stephenville Main Office Building, Garage, and Warehouse; Bishop's Falls Office/Warehouse Building; and Whitbourne Carpentry Shop, Depot/Office Building, Garage, and Storage Building.

Hydro will execute the proposed refurbishment work as a single-year program, with all activities scheduled for completion by the end of 2026.

The total program estimate is approximately $3,027,900.

2.0 Program Description and Justification

Hydro's facilities serve to house its employees, tools and critical equipment that support its generation and transmission operations. It is imperative that these facilities receive the necessary investment required to maintain occupant health and safety and extend their service life. The proposed program will promote enhanced facilities management oversight, thus ensuring that the built environment adequately supports the company's core activities.

Assets altered or modified (modernization) for building code statutory compliance or energy efficiency and sustainability reasons, and replaced or refurbished under this program, are critical building systems which have been identified as posing a risk to reliability, safety, or the environment. Replacement or refurbishment is required to improve the assets' condition, ensure adherence to regulatory requirements and extend the service life of Hydro's facilities. Unless otherwise stated, there are no viable alternatives for the proposed refurbishment work designated within this program, as continued deferral of this work could result in a reduced service life and/or place the facility's ability to remain operational at risk. Replacement of various equipment/components within the building will only be pursued if those respective components have exceeded their service life and corrective maintenance is no longer an option.

The assets designated for replacement, refurbishment, or modernization herein have been selected to improve occupant health and safety, loss prevention, and renewal, to extend the service life of a facility.

The facility components subject to refurbishment under this program have been divided into four categories (Uniformat II Level 1 – Major Group Elements), derived from the Uniformat II Classification System,[10] and include the substructure, shell, interiors, and services, as follows:

[10] Uniformat II is a standard classification system for building elements and related site work. It provides a consistent means for categorizing building components.

2.1.1 Substructure

Includes all work below the lowest floor construction and the enclosing horizontal and vertical elements required to form a basement, together with the necessary mass excavation and backfill. Typical work consists of foundation construction/repairs, perimeter drainage installation/replacement, basement wall construction, installation of moisture protection systems, and installation of insulation, etc.

2.1.2 Shell

This system includes elements of the building superstructure, consisting of structural slabs, columns, beams, structural walls, and the building's exterior envelope. Typical work includes, but is not limited to, floor construction, exterior stairways and fire escapes, roof construction, exterior wall construction, exterior windows and doors.

2.1.3 Interiors

Interiors include building components inside the exterior walls and enclosure, excluding structural walls. Interiors are comprised of partitions, interior doors, stairs, and finishing systems for walls, ceilings and floors. Typical work consists of partition wall construction, installation and replacement of interior doors, installation and refurbishment of interior stairs and railings, and installation and refurbishment of interior finish materials, such as paint, flooring, and drywall.

2.1.4 Services

Services include all systems intended for the purpose of conveying, plumbing, electrical, heating, ventilation and air conditioning ("HVAC"), and fire protection. Typical work consists of:

- **Conveying**: refurbishment of conveyance systems such as elevators.
- **Plumbing**: installation and/or replacement of plumbing fixtures, domestic water supply equipment, floor drains, and vent piping.
- **Electrical**: Installation and/or replacement of lighting, communication and security systems, fire alarm, and emergency lighting systems.
- **HVAC**: Installation and/or replacement of heat-generating systems, ventilation systems, cooling systems, fume collectors, and associated controls and instrumentation.
- **Fire Protection**: Installation and/or replacement of sprinkler systems, extinguishers, dry chemical fire suppression systems, and other related assets.

3.0 Asset Overview

3.1 Asset Background

Hydro owns and operates 342 buildings, located at 100 sites, across its operations. The majority of these facilities were constructed in the late 1960s and have not undergone any major refurbishment throughout their service life.

For the 2026 CBA, work scopes and asset condition were primarily derived from existing assessments for: Hydro Place; Holyrood TGS Pumphouse 1 and 2; St. Anthony Depot/Office and Storage Building; Stephenville Main Office Building, Garage, and Warehouse; Bishop's Falls Office/Warehouse Building; and Whitbourne Carpentry Shop, Depot/Office Building, Garage, and Storage Building, which are detailed herein.[11]

3.2 Asset Condition

3.2.1 Hydro Place

Constructed in 1988, Hydro Place is a six-storey office building which serves as the corporate headquarters for Hydro. At 37 years of age, the building's exterior envelope is reaching the end of its service life and is in need of refurbishment.

Building condition assessments completed in 2018 and 2024[12] have stated that the windows and/or curtain wall systems at Hydro Place are in fair to poor condition. Several areas of the curtain wall frequently leak during wind-driven rain events, resulting in water infiltration, which damages interior finishes and increases the risk of mold formation. These leaks indicate that the exterior and concealed seals have failed.

Additionally, numerous fogged insulating glass units ("IGU") are present throughout the facility.[13] As the glazing systems continue to age, IGU failure, as well as air and moisture leakage, will continue to occur at an accelerated rate.

[11] As part of its initiative to continually improve its asset management strategy for facilities, Hydro intends to complete condition assessments for its remaining facilities and utilize this information to further develop the scope of this project for future applications.
[12] Provided as Appendix B of this proposal.
[13] An IGU commonly consists of two panes of glass separated by a spacer material and sealed together at the edge.

A $250,000 allowance will be budgeted for 2026 to address the most critical locations where the above-curtain wall issues have been identified in the facade. This allowance will serve to address problematic leaks and provide cost information to enable the proper planning for the refurbishment of the remaining window units. The costs of this program relating to Hydro Place will be allocated to applicable lines of business using Hydro's Intercompany Transactions Guidelines under a common service Hydro Place administration fee allocated based on square footage. Hydro's regulated business segment will be responsible for approximately 57% of the total cost, the entities related to the Muskrat Falls assets will be responsible for approximately 6% of the cost, and the remaining lines of business will accrue the remainder.

3.2.2 Holyrood Thermal Generating Station – Pumphouse 1 and Pumphouse 2

The Stage 1 Pumphouse was constructed in 1969 and supplies circulating water to thermal units 1 and 2, and contains the fire pumps for the site's fire protection system. The Stage 2 Pumphouse, followed in 1979 and supplies water to the third thermal generating unit, in addition to providing a cooling water supply for the unit to operate as a synchronous condenser. Both facilities are comprised of structural reinforced concrete foundations, structural steel framing, metal siding, and built-up and inverted roofing systems, respectively.

At 20 years old, the Pumphouse 2 roofing system has reached the end of its service life and replacement is required.[14] A 2022 roof audit,[15] completed by Flynn Canada, noted that the roof composite has little integrity and there are several areas where the wind has swept the ballast, and where the roof composite is blown off completely, exposing sections of insulation.

Additionally, failing roof drains on Pumphouse 1 and 2 have resulted in a number of issues in recent years. Attempts to repair the drains have been unsuccessful and include general maintenance, replacement of leaking sections (elbow connections), installing interior liners to restore the pipe, and replacing large sections of the downspouts and roof drain sumps.

[14] The Pumphouse 2 roofing system was last replaced in 2005.
[15] Provided as Appendix C of this proposal.

The recommendation for the Pumphouse 2 roofing system replacement and drainage upgrade is also consistent with the Life Extension Condition Assessment ("LECA") refresh conducted as part of the *Reliability and Resource Adequacy Study Review* proceeding.[16]

3.2.3 St. Anthony Depot/Office and Storage Building

The St. Anthony Office was originally constructed circa 1995 as a combined employee office, customer service department, and line depot facility, and remains in good condition. It has been renovated and currently houses the administrative and customer service functions, along with a small line depot.[17] The single-level, on-grade, pre-engineered steel structure has approximately 390 m^2 in gross floor area, with exterior walls of steel frame with vertical metal siding, vinyl-faced glass fibre insulation, and drywall interior finish. Partitions are metal stud, and drywall and masonry block, with ceilings principally made of acoustic tile.

The facility does not comply with current code requirements, which presents a risk to its occupants. Deficiencies include inferior fire separations, inadequate building egress, and an antiquated electrical service, which prevents the proper de-energization of the building. Additionally, the building's plumbing and ventilation require upgrades to improve the air quality of the building and reduce the potential for sickness. Vent piping and exhaust fan configurations in the washrooms are creating condensation and promoting mold growth. Domestic water piping is not properly supported in some areas, risking its integrity and increasing the risk potential for leaks. As well, portions of hot and cold-water copper piping remain uninsulated, which can lead to condensation and energy waste.

The Storage Building is a single, open storage room building measuring 37 m^2 in area, constructed of wood stud frame with horizontal vinyl siding, vinyl-clad eaves, and asphalt shingle roofing. It is uninsulated with a principally unfinished interior, with the exception of a small area of plywood wall finish, with one vinyl window. Access is via one residential steel door with a pair of steel doors at the front for loading. The floor is of wood joists with a plywood finish; the supporting joists must be reinforced due to noticeable sag. The building is mounted on concrete patio blocks, is some 500 mm above finish grade, and is in good condition, other than the floor sag and overly-high mount above finish grade.

[16] "*Reliability and Resource Adequacy Study Review* – Holyrood Thermal Generating Station Capital Plan Refresh," Newfoundland and Labrador Hydro, March 7, 2025, att. 1.

[17] The original, larger line depot section was converted into office spaces.

The miscellaneous architectural, mechanical and electrical refurbishments proposed under this program were derived from a 2018 condition assessment.[18] These refurbishments are necessary to restore the facilities to the service level to which they were designed, improve occupant health and safety, and maximize their service life.

3.2.4 Stephenville Main Office Building, Garage, and Warehouse

The Stephenville Main Office is a single-storey, steel-frame building, which was constructed in 1942. The building currently houses Transmission and Rural Operations administration, staff training, small warehousing space, and three workshops.[19] The building has a sloped hip roof with asphalt shingles, which was added in recent years, and exterior wall cladding of vertical pre-painted steel siding. Windows are fixed over projected aluminum with double hermetically sealed glazing, and are in good condition. The main entrance door is glazed aluminum in an aluminum frame, with other exterior steel doors in pressed steel frames. The exterior envelope has been upgraded in recent years and is in good condition. Interiors consist of demountable type vinyl wallcovering, finished drywall partitions with vinyl battens on metal studs, some masonry partitions, and suspended acoustical tile ceilings, except for the warehouse, which has an exposed steel original roof structure. Flooring is generally vinyl tile, with carpeting in the meeting/training room, all of which are in good condition.

The garage building is a single-level, on-grade, pre-engineered steel structure of 166 m^2 area with an insulated envelope and bare interior finish. The space is principally a three-bay repair garage, with a service pit located in the center bay of the building, and seven ancillary rooms.[20] The building is estimated to be 20–25 years old and is in good condition.[21]

The warehouse is a single-level, on-grade, pre-engineered steel structure of approximately 134 m^2 area, over 30 years old. It is subdivided into three rooms used for line crew equipment storage, each with metal demising partitioning walls. Two rooms have sectional overhead doors plus a single swing steel personnel door; the third room has a pair of steel swing doors. The roof is low-slope gable metal clad; windows are steel with corroded steel security screening; and personnel doors are metal in pressed steel frames with commercial hardware.

[18] Provided as Appendix D of this proposal.
[19] Workshops include protection and controls, transmission, and terminals.
[20] Ancillary rooms are primarily masonry construction and include: washroom, office, employee break room, parts, storage, and two small ceiling storage lofts.
[21] The Stephenville buildings were not originally constructed by Hydro; as such, the exact year of construction is unknown.

The facilities are generally in good condition; however, code upgrades related to fire separations, ratings, alarm systems and exit lighting are required. Additionally, building mechanical and electrical systems requires upgrades or has reached the end of their useful lives. The proposed refurbishments are required to restore the facilities to the service level to which they were designed, improve occupant health and safety, maximize the service life of the assets, and address code non-compliance issues. A condition assessment is provided as part of this application.[22]

3.2.5 Bishop's Falls Office/Warehouse Building

This 3,100 m^2, two-level office/warehouse building was constructed circa 1980. The building is a combination of pre-engineered metal and conventional steel frame structure, housing a large office wing with staff lunch areas, plus a warehouse which supplies Hydro's operations throughout most of the province. The building envelope is exhibiting signs of aging and requires upgrading, including replacement of windows and siding, repair of canopies, and more. The building interiors are in good condition, but require code upgrades related to fire separations, ratings, and exiting between offices and the warehouse, and within office and warehouse spaces. Many of the building mechanical systems, while currently operational, are also approaching the end of their useful lives. A condition assessment is provided as part of this application.[23]

3.2.6 Whitbourne Carpentry Shop, Depot/Office Building, Garage, and Storage Building

This 800 m^2 depot is a pre-engineered metal building, which was originally constructed circa 1974. A twelve-meter extension was added to the warehouse many years later. The building sits atop concrete foundations and houses offices, a training room, staff break rooms, washrooms, a warehouse, and various individual workshop units. The building has pre-formed metal siding and a steel roof. The building is in good condition, but the envelope is exhibiting signs of aging.

This maintenance garage has a 133 m^2 first-floor area, plus a small 18.4 m^2 second floor. The facility was constructed in 1982 and is 43 years old. On the first floor, the building houses a repair garage with an in-floor repair pit and equipment workspace, and a single washroom/laundry and storage room. The second floor, accessed via open wooden stairs, houses an office and a storage room. Interior finishes of the walls and ceilings consist of painted hardboard. The building is of wood frame with a sloped roof

[22] Provided as Appendix E of this proposal.
[23] Provided as Appendix F of this proposal.

clad in asphalt shingles, with vertical pre-painted metal siding. Exterior doors include one hollow metal personnel door in a pressed steel frame, which requires repainting. One large pre-painted insulated steel overhead door provides vehicle access. Foundations are of poured concrete, with the first floor being poured-in-place concrete slabs. The building is in fair condition, with recommendations to upgrade interior and exterior finishes, fire ratings, and egress deficiencies.

The storage building is fabricated with the arched shape of self-supporting galvanized steel panels. The 41 m^2 single-level, on-grade structure is founded on a concrete foundation and slab-on-grade floor. The building is uninsulated and acts as a storage space for ATVs,[24] snowmobiles and other line equipment. The building has a single uninsulated pre-painted steel overhead door and a single hollow metal person door in a pressed steel frame. One turbine-type roof exhaust ventilator sits atop the center of the roof. The building is in good condition, requiring only minor refurbishments.

The 37 m^2 carpentry shop is a wood frame building which consists of a single open interior space, which was formerly a workshop, but now acts as storage for grounds maintenance equipment, tires, line tools, and other equipment. The building has a sloped roof with asphalt shingles, vinyl siding, one residential-type metal access door, vinyl sliding windows, and is founded on what appears to be wood blocks with skirted space between the floor and grade. The building is in fair to good condition with minor architectural upgrades recommended.

A condition assessment is provided as part of this application.[25]

4.0 Trending

As part of its initiative to continually improve its asset management strategy for facilities, Hydro intends to complete condition assessments for its remaining buildings. As such, the forecast trending data outlined below is subject to change.

4.1 Assets Installed/Replaced/Upgraded

In 2026, Hydro intends to address 53 high-risk and 55 medium-risk items under this program, as outlined in Appendix A. Chart 1 provides the five-year historical, current, and five-year forecast number of assets installed/replaced/upgraded per year. Five-year historical and current data have been compiled based on

[24] All-terrain vehicle ("ATV").
[25] Provided as Appendix G of this proposal.

individual projects and programs for sustaining work related to Hydro's facilities assets in its CBA. Beginning in 2026, work scopes have been prioritized by assigning an overall risk rating to each item; this approach will ensure that high-risk items are addressed first. After incorporating the high-risk items, risk spend efficiency is considered for all medium-risk items, thus enabling the scope of medium-risk refurbishment work to be selected.

For the 2026 CBA, work scopes and asset condition were primarily derived from existing assessments, which have been completed on a select number of facilities, and provided as Appendices B through G. As part of its initiative to continually improve its asset management strategy for facilities, Hydro intends to complete condition assessments for its remaining facilities, and utilize this information to further develop the scope of this program for future applications. Hydro anticipates having additional condition assessments completed to inform the scope of this program in 2027; however, until that time, there are limited-risk items identified beyond 2026.

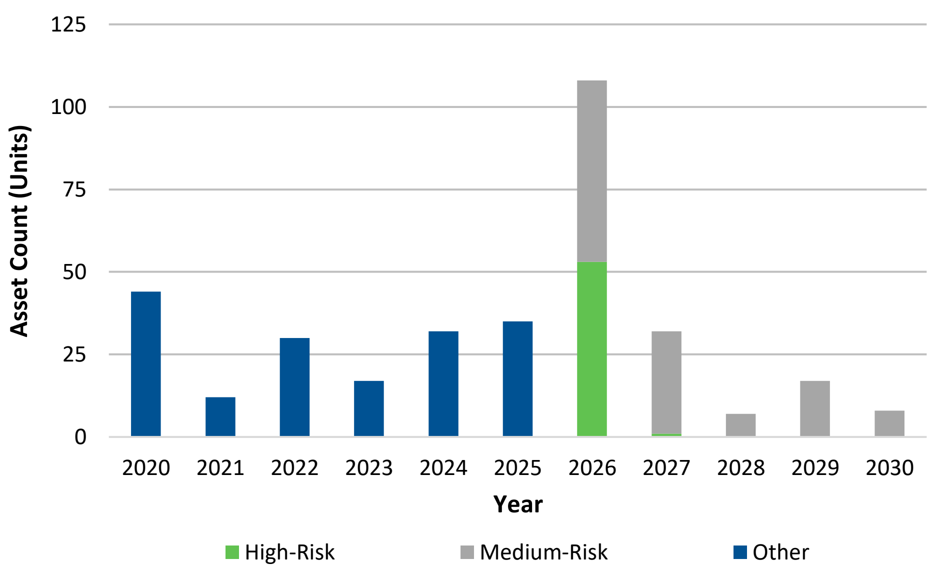


Chart 1: Historical and Forecast Number of Assets Installed/Replaced/Upgraded

4.2 Historical and Forecast Average Unit Costs

The current average unit cost of asset installation/replacement/upgrades in 2026 is approximately $28,000. Due to the varying materiality of work scopes completed within this program, unit costs vary considerably.

5.0 Analysis

5.1 Evaluation of Alternatives

Hydro evaluated the following alternatives:

- Perform refurbishments at reduced pace; and
- Pace advancement to targeted baseline investment.

5.1.1 Perform Refurbishments at Reduced Pace

This program is for the completion of miscellaneous refurbishment work on Hydro's facility asset base. The proposed scope will serve to improve the assets' condition, ensure adherence to regulatory requirements, and extend the service life of Hydro's facilities. This program will support regular investment to conduct critical facilities management activities, extend the service life of the asset, and defer holistic replacement costs.

Hydro has proposed a reduced budget for 2026, below its targeted baseline annual building renewal investment for 2026 of $5.5 million, to ensure the scope of work proposed can be executed with the available resources. Hydro may adjust the pace of this program in future years depending on resource availability, and the quantity and nature of risk items identified.

5.1.2 Pace Advancement to Targeted Baseline Investment

In the interest of balancing cost and reliability, Hydro has carefully considered its capital investment portfolio for this program in 2026 to be achievable and contains the most critical work to support the safe, reliable operation of Hydro's system in an environmentally responsible manner. As such, Hydro does not consider advancing the pace of this program to be a viable alternative at this time.

5.2 Least-Cost Evaluation

Hydro has not identified any viable alternatives to facilitate a least-cost evaluation.

5.3 Recommended Alternative

Hydro is recommending the completion of the refurbishments proposed as part of this program at a reduced pace. This will serve to address or improve occupant health and safety, loss prevention, capital renewal or recapitalization, climate change mitigation, and adaptation needs to restore or extend the service life of a facility while ensuring the work proposed can be executed with the available resources.

5.3.1 Risk of Asset Stranding

The facilities which comprise the scope of refurbishment work under this program are critical building systems. These buildings are essential to Hydro's operations and will remain in service for the foreseeable future. Assets replaced or refurbished under this program have an inherently low risk of asset stranding.

5.3.2 Risk Mitigation

Hydro assessed the pre- and post-implementation risk of the scope of work for the 2026–2027 program in accordance with Hydro's Capital Risk Assessment process, as outlined in Section 7.0 of Schedule 1. The outcome of this assessment is provided in Table 1.

Table 1: Risk Scoring Pre- and Post-Implementation

	Impact	Likelihood	Score
Pre-Implementation	4	4	**16**
Post-Implementation	4	1	**4**
		Risk Mitigated	**12**
		Risk Mitigated per $1 Million	**4.0**

6.0 Scope of Work

The scope of work for this program is comprised of the completion of necessary refurbishments to various facilities in Hydro's building asset base. The proposed refurbishments were recommended following the completion of a series of condition assessments from 2017 to 2024.

Additionally, the program includes a $250,000 "Facilities In-Service Failures" allowance, which has been established to cover the replacement or refurbishment of failed assets, or incipient failures to property requiring immediate action. Hydro proposes a proactive Asset Management Program to address deficiencies so that the necessary refurbishments can be incorporated into the CBA. However, there are situations where immediate refurbishment, which has not been included in a CBA, must be undertaken due to the occurrence of an unanticipated failure or the recognition of an incipient failure. This is necessary to maintain the delivery of safe, reliable electricity at least cost in an environmentally responsible manner, and will be addressed within this program. With aging assets, unanticipated failures are expected to increase.

For the 2026 CBA, work scopes and asset condition were primarily derived from existing assessments for: Hydro Place; Holyrood TGS Pumphouse 1 and 2; St. Anthony Depot/Office and Storage Building; Stephenville Main Office Building, Garage, and Warehouse; Bishop's Falls Office/Warehouse Building; and Whitbourne Carpentry Shop, Depot/Office Building, Garage and Storage Building. Hydro does not intend to complete each scope item identified in the condition assessments in 2026, as work scopes have been prioritized by assigning an overall risk rating to each item; this approach will ensure that high-risk items are addressed first. After incorporating the high-risk items, risk spend efficiency is considered for all medium-risk items, thus enabling the scope of medium-risk refurbishment work to be selected. A summary of the facilities and their respective refurbishments is provided in Table 2.[26]

[26] A detailed listing of the scope of refurbishment is contained is attached to this document as Appendix A.

Table 2: 2026 Program Scope and Consultant Recommendation

Building	2026 Program Scope	Consultant Recommendation
Hydro Place Office	•Rehabilitation of leaking exterior window units.	Hydro Place Building Envelope Assessment, Read Jones Christofferson Ltd. – Appendix B, p. 9 of 40.
Holyrood TGS Stage 1 and 2 Pumphouse	•Replace roof Stage 2 Pumphouse; and •Replace plumbing/roof drain system Stage 1 and 2 Pumphouses.	Building and Infrastructure Condition Assessment Bishops Falls Office/Warehouse, CBCL Ltd. – Appendix C, p. 15–18 of 18.[27]
St. Anthony Depot/Office and Storage	•Miscellaneous interior refurbishments (Depot, Storage Building); •Miscellaneous fire rating enhancements (Depot); •Miscellaneous plumbing refurbishments (Depot); •Miscellaneous electrical refurbishments (Depot, Storage Building); and •HVAC upgrades (Depot).	Building and Infrastructure Condition Assessment St. Anthony Office Facility, CBCL Ltd. – Appendix D, pp. 10–12 of 110, pp. 34–36 of 110.
Stephenville Main Office Building, Garage and Warehouse	•Miscellaneous interior refurbishments (Office, Garage, Warehouse); •Miscellaneous fire rating enhancements (Office, Warehouse); •Exterior envelope refurbishments (Warehouse); •Miscellaneous plumbing refurbishments (Office, Garage); •Miscellaneous electrical refurbishments (Main Office, Garage, Warehouse); •Miscellaneous HVAC refurbishments (Office, Garage); and •Service Pit Refurbishment (Garage).	Building and Infrastructure Condition Assessment Stephenville Office Facility, CBCL Ltd. – Appendix E, pp. 14–17 of 238, pp. 66–69 of 238.
Bishop's Falls Office/Warehouse	•Exterior envelope refurbishments; •Miscellaneous interior refurbishments; •Miscellaneous plumbing refurbishments; •Miscellaneous electrical refurbishments; and, •Miscellaneous HVAC refurbishments.	Building and Infrastructure Condition Assessment Bishops Falls Office/Warehouse, CBCL Ltd. – Appendix F, pp. 8–11 of 156, pp. 40–42 of 156.
Whitbourne Carpentry Shop, Depot/Office Building, Garage and Storage	•Exterior envelope refurbishments (Office); •Miscellaneous interior refurbishments (Office, Carpentry Shop, Garage); •Miscellaneous plumbing refurbishments (Office, Garage); •Miscellaneous electrical refurbishments (Carpentry Shop, Office, Garage, Storage); and •Miscellaneous HVAC refurbishments (Garage, Office).	Building and Infrastructure Condition Assessment Whitbourne Eastern Area Depot, CBCL Ltd., pp. 13–17 of 213, pp. 64–69 of 213.

[27] As included in LECA Refresh "*Reliability and Resource Adequacy Study Review* – Holyrood Thermal Generating Station Capital Plan Refresh," Newfoundland and Labrador Hydro, March 7, 2025, att. 1.

6.1 Program Budget

The estimate for the 2026 program is shown in Table 3.

Table 3: Program Estimate ($000)[28]

Program Cost	2026	2027	Beyond	Total
Material Supply	0.0	0.0	0.0	**0.0**
Labour	278.0	0.0	0.0	**278.0**
Consultant	451.3	0.0	0.0	**451.3**
Contract Work	1,938.0	0.0	0.0	**1,938.0**
Other Direct Costs	19.7	0.0	0.0	**19.7**
Interest and Escalation	72.3	0.0	0.0	**72.3**
Contingency	268.7	0.0	0.0	**268.7**
Total	**3,027.9**	**0.0**	**0.0**	**3,027.9**

Chart 2 provides the proposed 2026 program budget and the forecast budget for the next five years. As this is a new program beginning in 2026, five-year historical program expenditures are not applicable.[29] The forecast budget over the next five years is expected to remain stable as Hydro seeks to balance cost and reliability while undertaking this program, and to ensure it represents an achievable level of execution success.

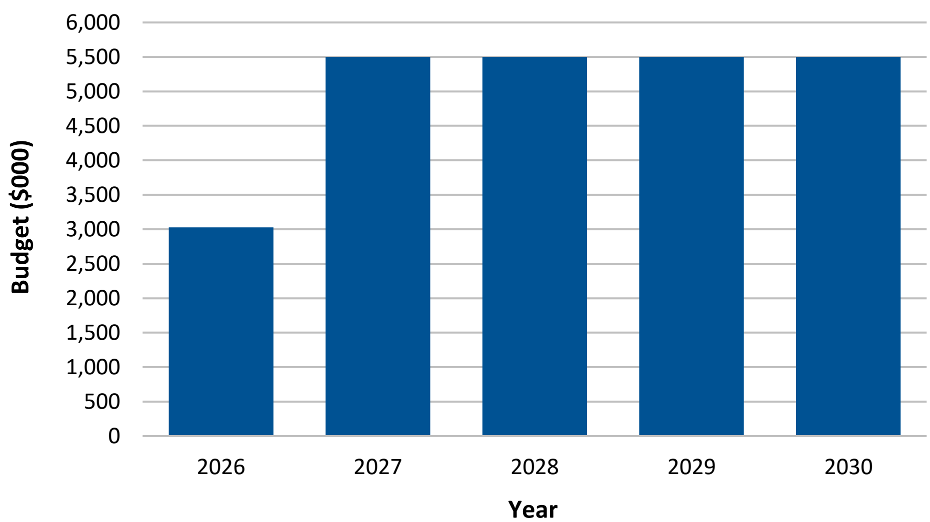


Chart 2: Forecast Program Budget

[28] Numbers may not add due to rounding.

[29] Historically, related to its facilities, Hydro has submitted either individual projects for particular assets or programs for sustaining work in its CBA. This approach has resulted in a segmented view of the expenditures to sustain facility assets. For example, in the last five years, there were 53 projects in the period 2020–2024 delivering 135 new assets.

6.2 Program Schedule

The schedule for this program is shown in Table 4.

Table 4: Program Schedule

Activity	Start Date	End Date
Planning: Open work orders, review scope statement, develop detailed schedules.	January 2026	February 2026
Design: Complete detailed design, prepare tender packages.	February 2026	July 2026
Procurement: Tender and award work scopes.	March 2026	August 2026
Construction: Complete facility refurbishments.	June 2026	November 2026
Closeout: Close work orders, complete all documentation, and complete lessons learned.	November 2026	December 2026

7.0 Conclusion

This program will support regular investment to conduct critical facilities maintenance activities. Facility maintenance is crucial for protecting investments, ensuring safety, and maintaining operational efficiency, ultimately leading to cost savings, extended equipment life, and ensuring an adequate work environment for occupants.

Deferral of the proposed program is unacceptable as it poses several risks, including system failure, increased lifecycle costs, increased safety hazards, reduced efficiency, and reputational damage.

Appendix A

Risk Ranking Summary

Risk Ranking Summary

Expense Type	Capital
Status	Planning

Risk Rank	RM/M	Risk Year	Materiality	Project	Portfolio	Building	Item Desc	Impact Type
1. High	7843	2026	1. Under $750k	Facility Refurbishment Reserve Fund	TRO Regional Services	WHB Carpentry Shop (1971)	Install one dual head emergency battery unit in the building	Safety
1. High	3160	2026	1. Under $750k	Facility Refurbishment Reserve Fund	TRO Regional Services	STA Storage Building (2009)	Install emergency light unit in the storage shed	Safety
1. High	3160	2026	1. Under $750k	Facility Refurbishment Reserve Fund	TRO Regional Services	STA Storage Building (2009)	Modify side personnel entry door steps to those with rise to meet code	Safety
1. High	2966	2026	1. Under $750k	Facility Refurbishment Reserve Fund	TRO Regional Services	SVL MAIN OFFICE BLDG (1942)	Continue main corridor through existing kitchen to create continuous dedicated exit path to eliminate current dead ending	Safety
1. High	781	2026	1. Under $750k	Facility Refurbishment Reserve Fund	TRO Regional Services	SVL Warehouse Building (1976)	Add fire rated interior finish, and doors proximate to the main building due to limiting distance issues	Safety
1. High	781	2026	1. Under $750k	Facility Refurbishment Reserve Fund	TRO Regional Services	SVL Warehouse Building (1976)	Install emergency lighting units in all rooms	Safety
1. High	704	2026	1. Under $750k	Facility Refurbishment Reserve Fund	TRO Regional Services	STA Storage Building (2009)	All concrete pads have fractured and should be replaced with more suitable units	Safety
1. High	704	2026	1. Under $750k	Facility Refurbishment Reserve Fund	TRO Regional Services	STA Storage Building (2009)	Floor beams were severely deflected and should be provided with additional support	Safety
1. High	357	2026	1. Under $750k	Facility Refurbishment Reserve Fund	TRO Regional Services	STA Depot/Office (1975)	Eliminate existing corridor door to remove one-way dead ended emergency exiting	Safety
1. High	357	2026	1. Under $750k	Facility Refurbishment Reserve Fund	TRO Regional Services	STA Depot/Office (1975)	Upgrade the existing electrical service from a dual service to a single service	Safety
1. High	240	2026	1. Under $750k	Facility Refurbishment Reserve Fund	TRO Regional Services	WHB Depot/Office (1975)	Correct code exiting and fire ratings deficiencies	Safety
1. High	240	2026	1. Under $750k	Facility Refurbishment Reserve Fund	TRO Regional Services	WHB Depot/Office (1975)	Replace any ABS piping present in the office area return air plenum with copper or plenum rated plastic DWV	Safety
1. High	240	2026	1. Under $750k	Facility Refurbishment Reserve Fund	TRO Regional Services	WHB Depot/Office (1975)	Provide correct code to code guards and stair rails in shops and warehouse	Safety
1. High	209	2026	1. Under $750k	Facility Refurbishment Reserve Fund	TRO Regional Services	SVL MAIN OFFICE BLDG (1942)	Revise clothes washer standpipe to include a trap	Safety
1. High	209	2026	1. Under $750k	Facility Refurbishment Reserve Fund	TRO Regional Services	SVL MAIN OFFICE BLDG (1942)	Replace Male Washroom exhaust fan with a higher capacity unit. Not required if a heat recovery system is installed	Safety
1. High	209	2026	1. Under $750k	Facility Refurbishment Reserve Fund	TRO Regional Services	SVL MAIN OFFICE BLDG (1942)	Provide a heat recovery system to service areas of the building not provided with ventilation	Safety
1. High	178	2026	1. Under $750k	Facility Refurbishment Reserve Fund	TRO Regional Services	SVL Garage (1990)	Repair or replace the inoperative south end rooftop exhaust fan	Safety
1. High	178	2026	1. Under $750k	Facility Refurbishment Reserve Fund	TRO Regional Services	SVL Garage (1990)	Increase general exhaust rates if required and provide tempered make-up air system for general exhaust capacity and pit and welding exhaust systems	Safety
1. High	178	2026	1. Under $750k	Facility Refurbishment Reserve Fund	TRO Regional Services	SVL Garage (1990)	Provide a heat recovery unit to meet minimum ventilation requirements	Safety
1. High	165	2026	1. Under $750k	Facility Refurbishment Reserve Fund	TRO Regional Services	SVL Garage (1990)	Provide nitrogen dioxide gas detection system if diesel vehicles are serviced in the garage	Safety
1. High	165	2026	1. Under $750k	Facility Refurbishment Reserve Fund	TRO Regional Services	SVL Garage (1990)	Provide explosion proof wiring and lighting in the service pit if it will be kept functional	Safety
1. High	165	2026	1. Under $750k	Facility Refurbishment Reserve Fund	TRO Regional Services	SVL Garage (1990)	Replace existing service pit sump pump with one rated for hazardous location	Safety
1. High	165	2026	1. Under $750k	Facility Refurbishment Reserve Fund	TRO Regional Services	SVL Garage (1990)	Replace the service pit exhaust fan with one of non-spark construction and suitable for conveyance of combustible gases. Provide visual system operation proving light	Safety
1. High	165	2026	1. Under $750k	Facility Refurbishment Reserve Fund	TRO Regional Services	SVL Garage (1990)	Upgrade gas detection system with additional sensors, visual and audible alarm indication, and interlock with exhaust and make-up air systems	Safety
1. High	165	2026	1. Under $750k	Facility Refurbishment Reserve Fund	TRO Regional Services	SVL Garage (1990)	Modify service pit to meet code by adding guard rails and second exit stair, or delete it and infill the pit	Safety
1. High	136	2026	1. Under $750k	Facility Refurbishment Reserve Fund	TRO Regional Services	STA Depot/Office (1975)	Provide exhaust ducting to outside and wall cap for Female Washroom exhaust fan	Safety
1. High	136	2026	1. Under $750k	Facility Refurbishment Reserve Fund	TRO Regional Services	STA Depot/Office (1975)	Extend washroom group plumbing vent through roof	Safety
1. High	136	2026	1. Under $750k	Facility Refurbishment Reserve Fund	TRO Regional Services	STA Depot/Office (1975)	Vent lunch room sink properly	Safety
1. High	136	2026	1. Under $750k	Facility Refurbishment Reserve Fund	TRO Regional Services	STA Depot/Office (1975)	Provide heat recovery ventilation system throughout building	Safety
1. High	123	2026	1. Under $750k	Facility Refurbishment Reserve Fund	TRO Regional Services	WHB Garage BLDG (1982)	Provide emergency egress from opposite end of repair pit plus electrical and ventilation to code	Safety
1. High	117	2026	1. Under $750k	Facility Refurbishment Reserve Fund	TRO Regional Services	WHB Garage BLDG (1982)	Increase general exhaust rates if required and provide tempered make-up air system for general exhaust capacity and pit and welding exhaust systems	Safety
1. High	117	2026	1. Under $750k	Facility Refurbishment Reserve Fund	TRO Regional Services	WHB Garage BLDG (1982)	Provide a heat recovery unit to meet minimum ventilation requirements	Safety
1. High	117	2026	1. Under $750k	Facility Refurbishment Reserve Fund	TRO Regional Services	WHB Garage BLDG (1982)	Provide welding fume extraction exhaust system	Safety
1. High	115	2026	1. Under $750k	Facility Refurbishment Reserve Fund	TRO Regional Services	WHB Garage BLDG (1982)	Provide nitrogen dioxide gas detection system if diesel vehicles are serviced in the garage	Safety
1. High	115	2026	1. Under $750k	Facility Refurbishment Reserve Fund	TRO Regional Services	WHB Garage BLDG (1982)	Upgrade gas detection system with additional sensors, visual and audible alarm indication, and interlock with exhaust and make-up air systems	Safety
1. High	115	2026	1. Under $750k	Facility Refurbishment Reserve Fund	TRO Regional Services	WHB Garage BLDG (1982)	Modify plumbing vent piping to be code compliant	Safety
1. High	115	2026	1. Under $750k	Facility Refurbishment Reserve Fund	TRO Regional Services	WHB Garage BLDG (1982)	Replace exhaust fan with one of non-spark construction and suitable for conveyance of combustible gases. Provide visual system operation proving light	Safety
1. High	115	2026	1. Under $750k	Facility Refurbishment Reserve Fund	TRO Regional Services	WHB Garage BLDG (1982)	Service pit receptacles and wiring should be removed or replaced with suitable material for hazardous locations	Safety
1. High	115	2026	1. Under $750k	Facility Refurbishment Reserve Fund	TRO Regional Services	WHB Garage BLDG (1982)	Replace existing service pit sump pump with one rated for hazardous location including associated wiring	Safety
1. High	115	2026	1. Under $750k	Facility Refurbishment Reserve Fund	TRO Regional Services	WHB Garage BLDG (1982)	Service pit lighting and wiring to be replaced with suitable material for hazardous locations	Safety
1. High	115	2026	1. Under $750k	Facility Refurbishment Reserve Fund	TRO Regional Services	WHB Garage BLDG (1982)	Reconstruct stairs to meet code	Safety
1. High	115	2026	1. Under $750k	Facility Refurbishment Reserve Fund	TRO Regional Services	WHB Garage BLDG (1982)	Fire rate the second floor and the exit from it to the exterior	Safety
1. High	104	2026	1. Under $750k	Facility Refurbishment Reserve Fund	TRO Regional Services	WHB Depot/Office (1975)	Provide a dedicated cooling system for the Electrical/Server Room	Safety
1. High	104	2026	1. Under $750k	Facility Refurbishment Reserve Fund	TRO Regional Services	WHB Depot/Office (1975)	Provide heat recovery ventilation system to provide minimum outside air to warehouse/shop area of building	Safety
1. High	92	2026	1. Under $750k	Facility Refurbishment Reserve Fund	TRO Regional Services	BIF Office/Warehouse (1971)	Some old emergency lighting units and exit signs have to be replaced	Safety
1. High	92	2026	1. Under $750k	Facility Refurbishment Reserve Fund	TRO Regional Services	BIF Office/Warehouse (1971)	Provide new fire exits and upgrade existing deficient exits	Safety
1. High	92	2026	1. Under $750k	Facility Refurbishment Reserve Fund	TRO Regional Services	BIF Office/Warehouse (1971)	Provide fire rated floors for mezzanines	Safety
1. High	64	2026	1. Under $750k	Facility Refurbishment Reserve Fund	TRO Regional Services	BIF Office/Warehouse (1971)	Modify Lunch Room sink vent piping to be code compliant	Safety
1. High	64	2026	1. Under $750k	Facility Refurbishment Reserve Fund	TRO Regional Services	BIF Office/Warehouse (1971)	Replace the workshop through the wall air conditioner unit or connect room to main office system	Safety
1. High	64	2026	1. Under $750k	Facility Refurbishment Reserve Fund	TRO Regional Services	BIF Office/Warehouse (1971)	Modify plumbing vent piping that penetrates exterior walls to penetrate roof	Safety
1. High	64	2026	1. Under $750k	Facility Refurbishment Reserve Fund	TRO Regional Services	BIF Office/Warehouse (1971)	Replace the front office extension split air conditioning unit. Consider extending the system to include the unconditioned office	Safety
1. High	64	2026	1. Under $750k	Facility Refurbishment Reserve Fund	TRO Regional Services	BIF Office/Warehouse (1971)	Provide proper ventilation and make-up air systems to the majority of the building in accordance with ASHRAE 62.1. Consider using heat recovery technology	Safety
1. High	10	2026	2. Under $1M	HPD Generating Station (1991) - Roofing and Pen	Diesel Generation	HPD Generating Station (1991)	Replace roofing and roofmount fans to wallmount	Reliability
1. High	10	2027	2. Under $1M	HPD Generating Station (1991) - Roofing and Pen	Diesel Generation	HPD Generating Station (1991)	Replace roofing and roofmount fans to wallmount	Reliability
2. Med	2510	2026	1. Under $750k	Facility Refurbishment Reserve Fund	TRO Regional Services	WHB Carpentry Shop (1971)	Provide attic hatch	Safety
2. Med	1961	2026	1. Under $750k	Facility Refurbishment Reserve Fund	TRO Regional Services	WHB Garage BLDG (1982)	Replace hot water tank	Reliability
2. Med	1648	2026	1. Under $750k	Facility Refurbishment Reserve Fund	TRO Regional Services	SVL Garage (1990)	Replace hot water tank and provide with drain pan	Reliability
2. Med	1506	2026	1. Under $750k	Facility Refurbishment Reserve Fund	TRO Regional Services	WHB Depot/Office (1975)	Provide insulation on uninsulated domestic water piping	Safety
2. Med	1483	2026	1. Under $750k	Facility Refurbishment Reserve Fund	TRO Regional Services	STA Depot/Office (1975)	Insulate remainder of accessible domestic water piping	Safety
2. Med	1413	2026	1. Under $750k	Facility Refurbishment Reserve Fund	TRO Regional Services	SVL Garage (1990)	Provide a backflow preventer on the water entrance to the building	Safety
2. Med	1413	2026	1. Under $750k	Facility Refurbishment Reserve Fund	TRO Regional Services	SVL Garage (1990)	Insulate accessible domestic hot and cold water piping	Safety
2. Med	1413	2026	1. Under $750k	Facility Refurbishment Reserve Fund	TRO Regional Services	SVL Garage (1990)	Consider connection the existing pull station to the recommended new fire alarm panel for the office building. Install new fire alarm system detectors and alarm devices as required	Safety
2. Med	1391	2026	1. Under $750k	Facility Refurbishment Reserve Fund	TRO Regional Services	STA Depot/Office (1975)	Provide proper pipe supports for domestic water piping	Safety
2. Med	1070	2026	1. Under $750k	Facility Refurbishment Reserve Fund	TRO Regional Services	WHB Carpentry Shop (1971)	Install photocell controlled building exterior lighting	Environment
2. Med	1070	2026	1. Under $750k	Facility Refurbishment Reserve Fund	TRO Regional Services	WHB Storage Building (2009)	Install exterior lighting with photocell control	Environment
2. Med	761	2026	1. Under $750k	Facility Refurbishment Reserve Fund	TRO Regional Services	SVL Warehouse Building (1976)	Replace the old receptacles, outlet boxes and faceplates	Safety
2. Med	707	2026	1. Under $750k	Facility Refurbishment Reserve Fund	TRO Regional Services	SVL MAIN OFFICE BLDG (1942)	Replace Female Washroom hot water tank and pipe relief discharge piping to code	Reliability
2. Med	692	2026	1. Under $750k	Facility Refurbishment Reserve Fund	TRO Regional Services	WHB Garage BLDG (1982)	All old interior and exterior lighting fixtures to be replaced. Install new photocell control for the exterior lighting	Safety
2. Med	692	2026	1. Under $750k	Facility Refurbishment Reserve Fund	TRO Regional Services	WHB Garage BLDG (1982)	Fire rate laundry room	Safety
2. Med	625	2026	1. Under $750k	Facility Refurbishment Reserve Fund	TRO Regional Services	STA Depot/Office (1975)	Provide electronic hands free flush valves on urinals	Environment
2. Med	540	2027	1. Under $750k	Facility Refurbishment Reserve Fund	TRO Regional Services	SVL Garage (1990)	Replace T12 fluorescent light fixtures with T8 or LED fixtures	Environment
2. Med	521	2026	1. Under $750k	Facility Refurbishment Reserve Fund	TRO Regional Services	STA Depot/Office (1975)	Enclose janitor area, creating an enclosed fire rated room of 60 minutes to NBCC	Safety
2. Med	489	2026	1. Under $750k	Facility Refurbishment Reserve Fund	TRO Regional Services	SVL MAIN OFFICE BLDG (1942)	Add attic access hatch	Safety
2. Med	489	2026	1. Under $750k	Facility Refurbishment Reserve Fund	TRO Regional Services	SVL MAIN OFFICE BLDG (1942)	Add upper area attic vents	Safety
2. Med	489	2026	1. Under $750k	Facility Refurbishment Reserve Fund	TRO Regional Services	SVL MAIN OFFICE BLDG (1942)	Revise trap piping on Male Washroom lavatory to be a P trap	Safety
2. Med	489	2026	1. Under $750k	Facility Refurbishment Reserve Fund	TRO Regional Services	SVL MAIN OFFICE BLDG (1942)	Insulate remainder of accessible copper domestic water piping	Safety
2. Med	456	2026	1. Under $750k	Facility Refurbishment Reserve Fund	TRO Regional Services	WHB Depot/Office (1975)	Add gutter and downspout systems	Reliability
2. Med	410	2026	1. Under $750k	Facility Refurbishment Reserve Fund	TRO Regional Services	WHB Garage BLDG (1982)	Insulate accessible domestic hot and cold water piping	Safety
2. Med	410	2026	1. Under $750k	Facility Refurbishment Reserve Fund	TRO Regional Services	WHB Garage BLDG (1982)	Extend hot water tank relief piping to within 300mm of floor or less providing an air break	Safety
2. Med	410	2026	1. Under $750k	Facility Refurbishment Reserve Fund	TRO Regional Services	WHB Garage BLDG (1982)	Provide attic access hatch and study attic condition and attic ventilation. Add ventilation and insulation to code if required (Hatch)	Safety
2. Med	410	2026	1. Under $750k	Facility Refurbishment Reserve Fund	TRO Regional Services	WHB Garage BLDG (1982)	Provide attic access hatch and study attic condition and attic ventilation. Add ventilation and insulation to code if required (Ventilation/Insulation)	Safety
2. Med	381	2026	1. Under $750k	Facility Refurbishment Reserve Fund	TRO Regional Services	SVL Warehouse Building (1976)	Replace the existing incandescent lighting fixtures with T8 fluorescent or LED lighting fixtures	Environment
2. Med	380	2026	1. Under $750k	Facility Refurbishment Reserve Fund	TRO Regional Services	WHB Depot/Office (1975)	Replace domestic hot water tank	Reliability

Expense Type	Capital
Status	Planning

Risk Rank	RM/M	Risk Year	Materiality	Project	Portfolio	Building	Item Desc	Impact Type
2. Med	270	2027	1. Under $750k	Facility Refurbishment Reserve Fund	TRO Regional Services	SVL Warehouse Building (1976)	Replace T12 lighting with T8 or LED	Environment
2. Med	260	2027	1. Under $750k	Facility Refurbishment Reserve Fund	TRO Regional Services	WHB Carpentry Shop (1971)	Replace baseboard heaters	Reliability
2. Med	260	2027	1. Under $750k	Facility Refurbishment Reserve Fund	TRO Regional Services	WHB Carpentry Shop (1971)	Replace door	Reliability
2. Med	260	2027	1. Under $750k	Facility Refurbishment Reserve Fund	TRO Regional Services	WHB Carpentry Shop (1971)	Replace roof shingles	Reliability
2. Med	250	2026	1. Under $750k	Facility Refurbishment Reserve Fund	TRO Regional Services	BIF Office/Warehouse (1971)	Replace [7 EA] aluminum window glazing units which have delaminated film	Reliability
2. Med	218	2026	1. Under $750k	Facility Refurbishment Reserve Fund	TRO Regional Services	SVL MAIN OFFICE BLDG (1942)	Provide an electronic hands free flush valve on the urinal	Environment
2. Med	209	2027	1. Under $750k	Facility Refurbishment Reserve Fund	TRO Regional Services	SVL MAIN OFFICE BLDG (1942)	Replace copper domestic water piping	Reliability
2. Med	209	2027	1. Under $750k	Facility Refurbishment Reserve Fund	TRO Regional Services	SVL Warehouse Building (1976)	Replace overhead doors	Reliability
2. Med	207	2027	1. Under $750k	Facility Refurbishment Reserve Fund	TRO Regional Services	WHB Carpentry Shop (1971)	Replace all old receptacles and lighting switches, including the outlet boxes and faceplates	Reliability
2. Med	207	2027	1. Under $750k	Facility Refurbishment Reserve Fund	TRO Regional Services	WHB Carpentry Shop (1971)	Install new main disconnect and main load center with sufficient spare capacity	Reliability
2. Med	188	2026	1. Under $750k	Facility Refurbishment Reserve Fund	TRO Regional Services	BIF Office/Warehouse (1971)	Provide proper supports for domestic water piping	Safety
2. Med	188	2026	1. Under $750k	Facility Refurbishment Reserve Fund	TRO Regional Services	BIF Office/Warehouse (1971)	Provide supports for unsupported data and communications cables in ceiling space	Safety
2. Med	182	2026	1. Under $750k	Facility Refurbishment Reserve Fund	TRO Regional Services	SVL MAIN OFFICE BLDG (1942)	Replace both outdoor standard duplex receptacles and faceplates with new GFCI receptacles c/w weatherproof faceplates	Safety
2. Med	182	2026	1. Under $750k	Facility Refurbishment Reserve Fund	TRO Regional Services	SVL MAIN OFFICE BLDG (1942)	Consider installation of new fire alarm system panel with detectors and alarm devices. Reuse existing fire alarm pull stations	Safety
2. Med	182	2026	1. Under $750k	Facility Refurbishment Reserve Fund	TRO Regional Services	SVL MAIN OFFICE BLDG (1942)	Enclose janitorial supplies in 60 minute fire rated room	Safety
2. Med	163	2026	1. Under $750k	Facility Refurbishment Reserve Fund	TRO Regional Services	BIF Office/Warehouse (1971)	Replace any hot water tanks older than 10 years of age	Reliability
2. Med	153	2026	1. Under $750k	Facility Refurbishment Reserve Fund	TRO Regional Services	WHB Depot/Office (1975)	All outdoor receptacles, including the outlet boxes and the weather protective covers need replacement	Safety
2. Med	153	2026	1. Under $750k	Facility Refurbishment Reserve Fund	TRO Regional Services	WHB Depot/Office (1975)	Installation of visual alarms in fire alarm system for aiding any potential hearing impaired occupants	Safety
2. Med	153	2026	1. Under $750k	Facility Refurbishment Reserve Fund	TRO Regional Services	WHB Depot/Office (1975)	The old exterior lights and associated controls should be replaced	Safety
2. Med	153	2026	1. Under $750k	Facility Refurbishment Reserve Fund	TRO Regional Services	WHB Depot/Office (1975)	Relocate fire alarm annunciator/control panel next to the main entrance as required by NBCC	Safety
2. Med	142	2026	1. Under $750k	Facility Refurbishment Reserve Fund	TRO Regional Services	SVL Warehouse Building (1976)	Replace corroded siding, fascia, gutters windows and window screens	Reliability
2. Med	135	2027	1. Under $750k	Facility Refurbishment Reserve Fund	TRO Regional Services	SVL MAIN OFFICE BLDG (1942)	Replace hot water tank and provide hinged door on tank enclosure	Reliability
2. Med	135	2027	1. Under $750k	Facility Refurbishment Reserve Fund	TRO Regional Services	SVL MAIN OFFICE BLDG (1942)	Panels A, B, and the hallway loadcenters should be replaced within the next five (5) years	Reliability
2. Med	128	2027	1. Under $750k	Facility Refurbishment Reserve Fund	TRO Regional Services	WHB Garage BLDG (1982)	All old receptacles and lighting switches, including the outlet boxes and faceplates to be replaced	Reliability
2. Med	128	2027	1. Under $750k	Facility Refurbishment Reserve Fund	TRO Regional Services	WHB Garage BLDG (1982)	New main disconnect and panelboard with sufficient spare capacity to be installed	Reliability
2. Med	125	2026	1. Under $750k	Facility Refurbishment Reserve Fund	Thermal Generation	HRD STAGE 1 PUMPHOUSE (1969)	Replace Roof Drains	Safety
2. Med	125	2027	1. Under $750k	Facility Refurbishment Reserve Fund	TRO Regional Services	SVL MAIN OFFICE BLDG (1942)	Replace T12 fluorescent light fixtures with T8 or LED fixtures	Environment
2. Med	108	2027	1. Under $750k	Facility Refurbishment Reserve Fund	TRO Regional Services	SVL Garage (1990)	Replace overhead doors	Reliability
2. Med	100	2027	1. Under $750k	Facility Refurbishment Reserve Fund	TRO Regional Services	WHB Garage BLDG (1982)	Replace roof shingles	Reliability
2. Med	100	2027	1. Under $750k	Facility Refurbishment Reserve Fund	TRO Regional Services	WHB Garage BLDG (1982)	Replace metal siding	Reliability
2. Med	92	2026	1. Under $750k	Facility Refurbishment Reserve Fund	TRO Regional Services	BIF Office/Warehouse (1971)	Upgrade office block washrooms finishes, vanities, cubicles partitions, accessories	Reliability
2. Med	84	2029	1. Under $750k	Facility Refurbishment Reserve Fund	Thermal Generation	HRD MAIN POWERHOUSE (1969)	Perform Level 2 Condition Assessment - Site Buildings (2029) - Holyrood	Reliability
2. Med	70	2026	1. Under $750k	Facility Refurbishment Reserve Fund	TRO Regional Services	BIF Office/Warehouse (1971)	Provide backflow preventer on water barrel fill pipe	Safety
2. Med	70	2026	1. Under $750k	Facility Refurbishment Reserve Fund	TRO Regional Services	BIF Office/Warehouse (1971)	Provide backflow prevention on domestic water takeoff	Safety
2. Med	70	2026	1. Under $750k	Facility Refurbishment Reserve Fund	TRO Regional Services	BIF Office/Warehouse (1971)	Provide backflow prevention on the firewater at the water entrance	Safety
2. Med	70	2026	1. Under $750k	Facility Refurbishment Reserve Fund	TRO Regional Services	BIF Office/Warehouse (1971)	Properly insulate domestic water piping	Safety
2. Med	48	2027	1. Under $750k	Facility Refurbishment Reserve Fund	HYP Corporate Services	HYP Hydro Place (1989)	Fire Panel and Devices Upgrade (2027) - Hydro Place	Safety
2. Med	48	2028	1. Under $750k	Facility Refurbishment Reserve Fund	HYP Corporate Services	HYP Hydro Place (1989)	Fire Panel and Devices Upgrade (2027) - Hydro Place	Safety
2. Med	29	2026	1. Under $750k	Facility Refurbishment Reserve Fund	Thermal Generation	HRD STAGE 2 PUMPHOUSE (1979)	Replace Roof Drains	Safety
2. Med	29	2026	1. Under $750k	Facility Refurbishment Reserve Fund	Thermal Generation	HRD STAGE 2 PUMPHOUSE (1979)	Replace Roof	Safety
2. Med	28	2026	1. Under $750k	Facility Refurbishment Reserve Fund	TRO Regional Services	BIF Office/Warehouse (1971)	Enclose janitor area, creating an enclosed fire rated room of 60 minutes to NBCC	Safety
2. Med	28	2026	1. Under $750k	Facility Refurbishment Reserve Fund	TRO Regional Services	BIF Office/Warehouse (1971)	All outdoor receptacles need to be replaced including the weather protective covers	Safety
2. Med	28	2026	1. Under $750k	Facility Refurbishment Reserve Fund	TRO Regional Services	BIF Office/Warehouse (1971)	Some of the electrical equipment inside the main electrical room has exceeded its service life expectancy and should be replaced	Safety
2. Med	25	2026	1. Under $750k	Facility Refurbishment Reserve Fund	HYP Corporate Services	HYP Hydro Place (1989)	Replace Failed IGUs and Restore Curtain Wall Seals	Reliability
2. Med	19	2027	1. Under $750k	Facility Refurbishment Reserve Fund	HYP Corporate Services	HYP Hydro Place (1989)	HYP Replace/Upgrade Fire Suppression Sys (2028) - IS Server Room	Safety
2. Med	18	2028	1. Under $750k	Facility Refurbishment Reserve Fund	NWS	DLO Office (1982)	Refurbish Office - Energy Efficiency and HVAC (2026–2027) - Deer Lake	Reliability
2. Med	18	2029	1. Under $750k	Facility Refurbishment Reserve Fund	NWS	DLO Office (1982)	Refurbish Office - Energy Efficiency and HVAC (2026–2027) - Deer Lake	Reliability
2. Med	17	2027	1. Under $750k	Facility Refurbishment Reserve Fund	TRO Regional Services	WHB Depot/Office (1975)	Replace metal siding	Reliability
2. Med	17	2027	1. Under $750k	Facility Refurbishment Reserve Fund	TRO Regional Services	WHB Depot/Office (1975)	Replace remaining three fibreglass overhead doors	Reliability
2. Med	17	2027	1. Under $750k	Facility Refurbishment Reserve Fund	TRO Regional Services	WHB Depot/Office (1975)	Install new panelboards with sufficient spare capacity	Reliability
2. Med	17	2027	1. Under $750k	Facility Refurbishment Reserve Fund	TRO Regional Services	WHB Depot/Office (1975)	Replace metal roofing	Reliability
2. Med	17	2029	1. Under $750k	Facility Refurbishment Reserve Fund	TRO Regional Services	WHB Depot/Office (1975)	Replace copper domestic water piping throughout facility	Reliability
2. Med	16	2027	1. Under $750k	Facility Refurbishment Reserve Fund	TRO Regional Services	BIF Office/Warehouse (1971)	Replace exterior doors, frames and hardware	Reliability
2. Med	16	2027	1. Under $750k	Facility Refurbishment Reserve Fund	TRO Regional Services	BIF Office/Warehouse (1971)	Replace the server room split air conditioning unit	Reliability
2. Med	16	2027	1. Under $750k	Facility Refurbishment Reserve Fund	TRO Regional Services	BIF Office/Warehouse (1971)	Replace the second floor split air conditioning unit	Reliability
2. Med	16	2029	1. Under $750k	Facility Refurbishment Reserve Fund	TRO Regional Services	BIF Office/Warehouse (1971)	Replace metal siding	Reliability
2. Med	16	2029	1. Under $750k	Facility Refurbishment Reserve Fund	TRO Regional Services	BIF Office/Warehouse (1971)	Replace the original building domestic water piping	Reliability
2. Med	15	2029	1. Under $750k	Facility Refurbishment Reserve Fund	TRO Regional Services	SVL Garage (1990)	Panels should be replaced within the next ten (10) years	Reliability
2. Med	14	2026	1. Under $750k	Facility Refurbishment Reserve Fund	TRO Regional Services	BIF Office/Warehouse (1971)	As an option utilize variable volume in the new rooftop unit and install variable volume air terminal zone units with digital controls	Environment
2. Med	14	2026	1. Under $750k	Facility Refurbishment Reserve Fund	TRO Regional Services	BIF Office/Warehouse (1971)	Replace the existing building automation system and expand the system throughout the building to existing and new HVAC equipment	Environment
2. Med	14	2027	1. Under $750k	Facility Refurbishment Reserve Fund	TRO Regional Services	BIF Office/Warehouse (1971)	Replace all old exterior lights under canopies and above exterior doors with new LED fixtures	Environment
2. Med	12	2027	1. Under $750k	Facility Refurbishment Reserve Fund	Diesel Generation	CTW Powerhouse (1987)	Replace Roof (2027) - Cartwright	Reliability
2. Med	12	2028	1. Under $750k	Facility Refurbishment Reserve Fund	Diesel Generation	CTW Powerhouse (1987)	Replace Roof (2027) - Cartwright	Reliability
2. Med	11	2028	2. Under $1M	BDE Powerhouse 2 (1966) - Roofing and Penetratic	Hydro Generation	BDE Powerhouse 2 (1966)	Replace Powerhouse 2 Roof (2028) - Bay d'Espoir	Reliability
2. Med	10	2027	1. Under $750k	CBC Control Building (1972) - Fire Protection Up	Terminals	CBC Control Building (1972)	Design, supply, installation, commissioning and startup of fire detection and clean gas suppression systems (Install Fire Protection in 230 kV Stations (2025–2026) - Come by Chance)	Reliability
2. Med	9	2028	1. Under $750k	Facility Refurbishment Reserve Fund	HYP Corporate Services	HYP Hydro Place (1989)	Replace HVAC Equipment (2028-2029) - Hydro Place [Chiller L1 MECH RM / AHU-9 ECC]	Reliability
2. Med	9	2029	1. Under $750k	Facility Refurbishment Reserve Fund	HYP Corporate Services	HYP Hydro Place (1989)	Replace HVAC Equipment (2028-2029) - Hydro Place [Chiller L1 MECH RM / AHU-9 ECC]	Reliability
2. Med	8	2027	1. Under $750k	Facility Refurbishment Reserve Fund	Terminals	CONTROL BUILDING, BBK TS1 (1968)	Install Fire Protection in 230 kV Stations (2026–2027) - Bottom Brook	Reliability
2. Med	8	2028	1. Under $750k	Facility Refurbishment Reserve Fund	Terminals	CONTROL BUILDING, BBK TS1 (1968)	Install Fire Protection in 230 kV Stations (2026–2027) - Bottom Brook	Reliability
2. Med	8	2029	1. Under $750k	Facility Refurbishment Reserve Fund	HYP Corporate Services	HYP Hydro Place (1989)	HYP Straight Fluorescent Lamps Replacement - 2,345 FT Plus Occupancy Sensors	Reliability
2. Med	7	2029	2. Under $1M	HLK Powerhouse (1980) - Roofing and Penetrations	Hydro Generation	HLK Powerhouse (1980)	Replace Powerhouse Roofs (2027–2028) - Hinds Lake	Reliability
2. Med	7	2030	2. Under $1M	HLK Powerhouse (1980) - Roofing and Penetrations	Hydro Generation	HLK Powerhouse (1980)	Replace Powerhouse Roofs (2027–2028) - Hinds Lake	Reliability
2. Med	6	2029	1. Under $750k	Facility Refurbishment Reserve Fund	TRO Regional Services	BIF Office/Warehouse (1971)	Replace electric heating equipment	Reliability
2. Med	6	2029	1. Under $750k	Facility Refurbishment Reserve Fund	TRO Regional Services	BIF Office/Warehouse (1971)	Replace roof finishes	Reliability
2. Med	5	2029	3. BTW $1M & $5M	HRD MAIN POWERHOUSE (1969) - Roofing and	Thermal Generation	HRD MAIN POWERHOUSE (1969)	Replace Roof Drains	Safety
2. Med	5	2029	3. BTW $1M & $5M	HRD MAIN POWERHOUSE (1969) - Roofing and	Thermal Generation	HRD MAIN POWERHOUSE (1969)	Replace Roof (WTP Lab Section)	Safety
2. Med	5	2029	3. BTW $1M & $5M	HRD MAIN POWERHOUSE (1969) - Roofing and	Thermal Generation	HRD MAIN POWERHOUSE (1969)	Replace Roof (Original Worshop - Machine/Mechanical Shop)	Safety
2. Med	5	2029	3. BTW $1M & $5M	HRD MAIN POWERHOUSE (1969) - Roofing and	Thermal Generation	HRD MAIN POWERHOUSE (1969)	Replace Roof Drains (Worshop Extension - Welding Shop)	Safety
2. Med	5	2029	3. BTW $1M & $5M	HRD MAIN POWERHOUSE (1969) - Roofing and	Thermal Generation	HRD MAIN POWERHOUSE (1969)	Replace HVAC Exhaust Fans (Unit 2)	Safety
2. Med	5	2030	3. BTW $1M & $5M	HRD MAIN POWERHOUSE (1969) - Roofing and	Thermal Generation	HRD MAIN POWERHOUSE (1969)	Replace Roof Drains	Safety
2. Med	5	2030	3. BTW $1M & $5M	HRD MAIN POWERHOUSE (1969) - Roofing and	Thermal Generation	HRD MAIN POWERHOUSE (1969)	Replace Roof (WTP Lab Section)	Safety
2. Med	5	2030	3. BTW $1M & $5M	HRD MAIN POWERHOUSE (1969) - Roofing and	Thermal Generation	HRD MAIN POWERHOUSE (1969)	Replace Roof (Original Worshop - Machine/Mechanical Shop)	Safety
2. Med	5	2030	3. BTW $1M & $5M	HRD MAIN POWERHOUSE (1969) - Roofing and	Thermal Generation	HRD MAIN POWERHOUSE (1969)	Replace Roof Drains (Worshop Extension - Welding Shop)	Safety
2. Med	5	2030	3. BTW $1M & $5M	HRD MAIN POWERHOUSE (1969) - Roofing and	Thermal Generation	HRD MAIN POWERHOUSE (1969)	Replace HVAC Exhaust Fans (Unit 2)	Safety
2. Med	4	2030	3. BTW $1M & $5M	CAT Powerhouse (1982) - Roofing and Penetration	Hydro Generation	CAT Powerhouse (1982)	Replace Powerhouse Roof (2029) - Cat Arm	Reliability
2. Med	4	2031	3. BTW $1M & $5M	CAT Powerhouse (1982) - Roofing and Penetration	Hydro Generation	CAT Powerhouse (1982)	Replace Powerhouse Roof (2029) - Cat Arm	Reliability
2. Med	2	2027	4. Over $5M	HYP Hydro Place (1989) - Envelope Renewal - Ope	HYP Corporate Services	HYP Hydro Place (1989)	Replace Failed IGUs and Restore Curtain Wall Seals	Reliability
2. Med	2	2028	4. Over $5M	HYP Hydro Place (1989) - Envelope Renewal - Ope	HYP Corporate Services	HYP Hydro Place (1989)	Replace Failed IGUs and Restore Curtain Wall Seals	Reliability
2. Med	2	2029	4. Over $5M	HYP Hydro Place (1989) - Envelope Renewal - Ope	HYP Corporate Services	HYP Hydro Place (1989)	Replace Failed IGUs and Restore Curtain Wall Seals	Reliability
2. Med	2	2030	4. Over $5M	HYP Hydro Place (1989) - Envelope Renewal - Ope	HYP Corporate Services	HYP Hydro Place (1989)	Replace Failed IGUs and Restore Curtain Wall Seals	Reliability
2. Med	2	2031	4. Over $5M	HYP Hydro Place (1989) - Envelope Renewal - Ope	HYP Corporate Services	HYP Hydro Place (1989)	Replace Failed IGUs and Restore Curtain Wall Seals	Reliability
2. Med	1	2031	4. Over $5M	HRD MAIN POWERHOUSE (1969) - Space Heate	Thermal Generation	HRD MAIN POWERHOUSE (1969)	Install Plant Heating System (2026–2027) - Holyrood	Reliability

Appendix B

Hydro Place Building Envelope Assessment (2024)

newfoundland labrador hydro

rjc Engineers

Hydro Place Building Envelope Assessment

500 Columbus Drive, St. John's, NL Toronto, ON

Prepared for:

Steven Drew
Facilities LTAP Specialist
Newfoundland and Labrador Hydro
Hydro Place, 500 Columbus Drive,
St. John's, NL A1B 4K7

Prepared by:

Read Jones Christoffersen Ltd.
100 University Ave, North Tower, Suite 300
Toronto, ON M5J 1V6

TABLE OF CONTENTS

EXECUTIVE SUMMARY

Read Jones Christoffersen Ltd. (RJC) was retained by Newfoundland and Labrador Hydro (HNL) to assist with the building envelope assessment at 500 Columbus Dr. in St. John's, Newfoundland. This report is a summary of our observations, conclusions, recommendations and opinions of probable costs findings.

Hydro Place, the building located at 500 Columbus Dr. in St. John's, Newfoundland, is a 6-commercial office building using reinforced cast-in-place concrete structure including foundation walls, piers, columns, floor slabs and roof slabs. The building was constructed circa 1988 and the building management has experienced leaking and water infiltration around the windows for several years. The precast panels were face-sealed in 2018 with reports that leaks have continued.

In general, the curtain walls and punched windows are in fair-to-poor condition commensurate with their age. Based on our review of available documents, we understand several areas of curtain wall are experiencing leakage indicating that the exterior and concealed seals have failed. Additionally, our visual review identified numerous fogged insulating glass units (IGU's) that should be replaced as part of the window replacement.

As the glazing systems continue to age, IGU failure as well as air and moisture leakage will continue to occur at an accelerated rate. As such, the following repair options are recommended to restore their original design intent and prevent leaks. RJC recommends Options 1, 2, and 3 be considered for a baseline rehabilitation for the building.

Option	Description	Timeline	Opinion of Probable Cost
1	Wholesale Curtain Wall Rehabilitation (excluding IGUs)	0-2 years	$2,800,000
2	Targeted IGU Replacement	0-2 years	$150,000
3	Lobby Curtain Wall Rehabilitation	0-2 years	$110,000
4	Wholesale IGU Replacement	0-2 years	$4,900,000
5	Replace precast seals with 2-stage joint	0-2 years	$400,000

1.0 INTRODUCTION

Read Jones Christoffersen Ltd. (RJC) was retained by Newfoundland and Labrador Hydro (HNL) to assist with the building envelope assessment at 500 Columbus Dr. in St. John's, Newfoundland. This report is a summary of our observations, conclusions, recommendations and opinions of probable costs findings.

The following scope of work was undertaken by RJC during the pre-design assessment:

.1 Detailed review of available architectural drawing(s) and report(s) to acquire a general understanding of the as-built construction and conditions.

.2 Visual review of the curtain wall exterior to identify the presence and extent of any visually obvious deterioration and/or deficiencies. In particular, a visual review of the exterior weather seals, glazing units, pressure plates, gaskets, etc. was undertaken.

.3 Visual review of 100% the interior of the building to identify the location of leaks, fogged units, cracked glass, vent operation, and to identify any patterns in failures.

.4 Thermographic scans of the building to correlate visual findings.

The date and weather conditions at the time of our visits were as follows:

- Visual Review January 16, 2024 Sunny, -2°C

Duncan Rowe, M.Eng., P.Eng., performed the exterior visual review and exterior exploratory opening reviews for Read Jones Christoffersen (RJC). ANDI performed the thermographic scans.

This report was prepared in accordance with generally accepted engineering practices. No other warranties, either expressed or implied, are made as to the professional services provided under the terms of our contract and included in this report.

Services performed and outlined in this report were based, in part, upon visual observations of the site and attendant structures. Our opinion cannot be extended to portions of the building that were not reviewed by RJC.

This report is exclusively for the use and benefit of the client identified on the first page of this report and is not for the use and benefit of, nor may it be relied upon by, any other person or entity. The contents of this report may not be quoted in whole or in part or distributed to any person or entity other than the client.

2.0 BACKGROUND INFORMATION

2.1 SITE DESCRIPTION

500 Columbus Drive is located southwest of the Captain Whelan Drive and Columbus Drive intersection in St John's, Newfoundland. The building is bound by parking lots to the west, greenbelt to the south, Columbus Drive to the east, and Captain Whelan Drive to the north.

(Refer to Photo No. 1 in Appendix A for the aerial view of the Hydro Place)

2.2 BUILDING DESCRIPTION

Hydro Place, the building located at 500 Columbus Dr. in St. Paul, Newfoundland, is a 6-commercial office building, constructed circa 1988. The building has an approximate area of 14,631 square meters and has 421 parking spaces. Internal finishes for ceilings, floors, and walls adhere to conventional standards for office occupancy.

The building structure consists of normally reinforced cast-in-place concrete foundations, columns, floor slabs that support the exterior cladding. The primary exterior cladding is precast concrete panels with an exposed stone aggregate finish that surround punched window openings. The windows are stick-built thermally-broken aluminum-framed curtain walls with double-glazed thermally-broken punched windows and hopper-style operable vents.

The roofs were recently replaced in 2015-2017 and are a conventional 2-ply modified bitumen system.

(Refer to Photo Nos. 2-5 in Appendix A)

2.3 DOCUMENT REVIEW

The following documents were made available for review:

.1 Partial Set of Architectural Drawings prepared by Beaton Sheppard Associates Limited, dated November 23, 1988.

These drawings were used to obtain a general understanding of the building layout and construction. In particular, the details included information on the arrangement of the cladding elements to help verify some concealed conditions and likely construction methodologies.

.2 Professional Services Request Building Envelope – Building Condition Assessment Report by SNC LAVALIN dated October, 2018.

This report was used to acquire a general understanding of the as-built construction and conditions as well as the history of reported leaks and repairs. In particular the 2018 report notes:

- Leaks have been reported at various locations, operable hopper units are not weather tight, numerous double glazed window seals have failed, metal spacers in sealed units are bending, anodizing has faded, insect screens are damaged. Major portion of problematic areas are occurring on building elevations facing south and west.
- Aluminum storefront and steel doors reported air and water infiltration at multiple locations and the anodizing has faded.
- Localized cladding sealant has replaced, with the replacement on the joints between the panels. However, the sealant around the windows has not replaced.

2.4 INTERVIEW

The following history and information was obtained through an interview with Steven Drew and Gerrard Waterman of HNL.

.1 Roof replacements were carried out from 2013-2017 and there have been no roof issues reported since replacement.

.2 When leaks occur, which is often, they occur from the wind-driven rain direction.

.3 The leak issues have prompted previous repairs that have included resealing at the precast. Leaks were reported to have continued since the resealing.

.4 Repairs to the interior of the operable windows, via caulking the interior or repairing the lever arms has been performed on an as-needed basis.

3.0 OBSERVATIONS

3.1 VISUAL OBSERVATIONS

A visual review of the building was performed from grade, select roofs, and the interior to identify the existing conditions and any visually obvious deficiencies with the building. The following observations were noted:

.1 The curtain walls consist of stick-built thermal broken aluminum frames with a 4-sided captured insulating glass units (IGUs), along with single-pane tempered glass spandrels insulated with mineral fiber. The IGUs noted to contain 1989 date stamps and they are generally in fair to poor condition with several windows cracked and showing an annealed breakage pattern. Based on their age and the increasing number of failed (fogged) units, the IGU's have reached the end of their useful service lives *(Refer to Photo No. 5-7 and 28 in Appendix A)*.

.2 In particular, we noted many smaller IGU failures around the building. The location of failures suggests that the system is retaining water in and around the glazing cavity accelerating IGU seal failures as well as being an increased risk for leaks. The fogging appears to have been experienced for an extended time as the interstitial spacer was found to be corroded in many locations. RJC noted 68 failed smaller and 6 larger IGU's from the interior review. These failures account for roughly 4.8% of the small units (~1,315) and 0.8% of the larger units (~789). *(Refer to Photo No. 8, and 14, 15 in Appendix A)*.

.3 The curtain wall seals, while generally concealed, are in poor condition overall due to the reported leaks during driving rain events. Additionally, the exterior gaskets and seals were found to have shrunk and allow for pooling of water. The interior gaskets appeared to be in poor condition overall and have reached the end of their service lives with visible signs of wear and tear, including cracking, degradation, and compromised elasticity. Failures of the interior seals can impact air leakage, as well as increase the risk of leaks in driving rain by creating failures of the pressure equalization cavity *(Refer to Photo No. 8-11 in Appendix A)*.

.4 The snap caps were noted to be in poor condition with visible signs of wear and deterioration including chalking of the coating and peeling of the coating indicating the exterior finish has failed *(Refer to Photo No. 18, 26 and 27 in Appendix A)*.

.5 The pressure plates noted to be in fair condition where visible, however, it was noted that they have been installed upside down in some areas *(Refer to Photo No. 16 in Appendix A)*.

.6 The lever arms on the operable hopper vents were noted to be in poor condition with visible corrosion and reports from the operations staff of many failures over the life of the building (*Refer to Photo No. 17 and 18 in Appendix A*).

.7 The weather stripping at the operable hopper vents appears to be in in poor condition with notable deficiencies including discontinuous, missing sections and fractures, particularly at the corners of the metal frame. (*Refer to Photo No. 12 and 13 in Appendix A*).

.8 Localized precast panel joints appeared to be in fair-to-poor condition overall with some areas of crazing and initial cohesive failures. While there was replacement of the joints between the concrete panels in 2018, it was noted that the sealant around the windows was not part of that program. Further, no weep holes were noted in the precast joints indicating the building is face-sealed *(Refer to Photo No. 19 to 21 in Appendix A).*

.9 Local areas of spalled precast where noted during the review. *(Refer to Photo No. 22 in Appendix A)*.

.10 Overall, the sealants between the window and precast, as well as metal-to-metal seals, are in poor condition which increases risk of leaks (*Refer to Photo No. 26 and 27 in Appendix A*).

.11 Some doors appeared in poor condition with potential for air and water infiltration at the sill with exposed aluminum shims visible at one door (*Refer to Photo No. 23 to 25 in Appendix A*).

3.2 THERMOGRAPHIC OBSERVATIONS

.1 The exterior thermographic observations noted the operable windows are a significant heat-loss component, with several of them appearing to be compromised. The majority of the remaining windows also exhibit signs of heat loss around the perimeter seals indicating a lack of air control continuity. Further, the doors also show thermal irregularities, particularly around perimeter seals, indicating a lack of airtightness *(Refer to ANDI Report in Appendix B)*.

.2 The interior thermographic observations continued to note poor air seals around the doors, window frames and the mechanical opening windows. This infiltration can impact surrounding walls and resulting in heat loss and possible condensation, though none was noted during the review. Condensation may be being managed through the hot air washing the windows from the heaters *(Refer to ANDI Report in Appendix B)*.

4.0 CONCLUSIONS/RECOMMENDATIONS AND OPINIONS OF PROBABLE COSTS

Based on our interview, visual review, the existing curtain wall and punched windows are not functioning as intended due to failed seals, both exterior and concealed. Additionally, there is a concern about poor tie-ins and original concealed detailing between the face-sealed precast and drained window systems. Based on our review, we also noted numerous IGU failures that correlate with a curtain wall system that is not draining well. This is supported by our visual findings as the curtain wall and punched window components, including the exterior and interior weather seals, were noted to be in poor condition overall.

Based on our review, wholesale rehabilitation of the curtain wall and IGUs is recommended to restore the original design intent. This work would re-use the existing curtain wall framing, minimizing disruption and costs, and would revitalize the concealed seals. This would include replacing snap caps, gaskets, fasteners, resealing back pans, and the concealed seals. This work is recommended to include targeted IGU replacement, though wholesale IGU replacement could be considered if budgets permit.

Further, precast joint replacement is another item that could be considered to bring the whole exterior system into a rain-screen design. If implemented that would require removing the existing precast sealant joints and adding a dual-seal system to create a rain-screen at the precast that could tie-in to the rehabilitated curtain wall. This would mean some premature replacement of the recently done sealant, however this added work would provide a full rain-screen assembly for the building greatly improving the leakage resistance and minimizing future life-cycle costing.

4.1 Wholesale Curtain Wall Rehabilitation

<table>
<tr><th colspan="2">Description of Work:</th></tr>
<tr><td colspan="2">Wholesale removal and replacement of snap caps, gaskets, and concealed seals. Wholesale re-sealing of back-pans with removal of the spandrel glass/metal
Removal and reinstatement of pressure plates.
Wholesale installation of corner plugs at mullion T-sections to promote drainage.
Removal and replacement of existing operable hopper windows with new awning window to improve airtightness.</td></tr>
<tr><th>Advantages</th><th>Disadvantages</th></tr>
<tr><td>Restore original design intent
Reduces the potential for air and moisture leakage.
Long-Term Durability
Reduced Maintenance Costs</td><td>Initial cost.
Tenant Disruption
Excludes the lobby</td></tr>
<tr><th colspan="2">Discussion:</th></tr>
<tr><td colspan="2">This rehabilitation focuses on a comprehensive overhaul of the building's window system to address leakage. The wholesale removal and replacement of snap caps, pressure plates (reused), fasteners, gaskets, and concealed seals, coupled with the wholesale re-sealing of back-pans, form a fundamental step in restoring the integrity of the windows. The addition of corner plugs at mullion T-sections aims to enhance drainage, contributing to long-term durability. This also includes the replacement of the existing hopper units with awning-style units to improve water resistance and minimize drafts.</td></tr>
<tr><td>Opinion of Probable Cost:</td><td>$2,800,000
Can be phased over 2 years with small mobilization premium</td></tr>
</table>

4.2 Targeted IGU Replacement

Description of Work:	
▪ Removal and replacement of the noted failed IGUs with a contingency for some additional units. ▪ Work includes the removal, disposal, and replacement to match existing and is concentrated at the smaller IGUs which have 63 failed units.	
Advantages	**Disadvantages**
▪ Restore original design intent ▪ Reduces the potential for air and moisture leakage. ▪ Long-Term Durability ▪ Reduced Maintenance Costs	▪ Initial cost. ▪ Tenant Disruption ▪ Older units remain at majority of buildings
Discussion:	
This scope includes for the targeted replacement of noted failed units. Based on the age of the building it wholesale IGU replacement can be undertaken, however targeted is a more cost-effective approach and is recommend to be included in the baseline scope to realize economies of scale.	
Opinion of Probable Cost:	**$150,000**

4.3 Lobby Curtain Wall Rehabilitation

Description of Work:	
▪ Wholesale removal and replacement of snap caps, gaskets, and concealed seals. Wholesale re-sealing of back-pans with removal of the spandrel glass/metal at the lobby ▪ Removal and reinstatement of pressure plates. ▪ Wholesale installation of corner plugs at mullion T-sections to promote drainage.	
Advantages	**Disadvantages**
▪ Restore original design intent ▪ Reduces the potential for air and moisture leakage. ▪ Long-Term Durability ▪ Reduced Maintenance Costs	▪ Initial cost. ▪ Tenant Disruption
Discussion:	
Simialr to 4.1 with this scope of work focused on the lobby zone specifically. This area is not currently experiencing leaks and could be deferred to reduce some capital expenditure.	
Opinion of Probable Cost:	**$110,000**

4.4 Wholesale IGU Replacement

Description of Work:	
▪ Removal and replacement of all IGUs to restore the full service life of the curtain wall assemblies. ▪ The existing IGUs are approaching the end of their useful life and replacing them in conjunction with the work in Option 1 will allow for a reset of the whole system with a new 30 year service life.	
Advantages	**Disadvantages**
▪ Restore original design intent ▪ Reduces the potential for air and moisture leakage. ▪ Long-Term Durability ▪ Reduced Maintenance Costs	▪ Very high capital cost ▪ Tenant Disruption
Discussion:	
This work would allow for a complete restoration of the curtain wall system and remove any maintenance cost for roughly 15 years. Proceeding with only a targeted IGU replacement address the current needs however ongoing replacement of the remaining older IGUs will be an on-going issue.	
Opinion of Probable Cost:	**$4,900,000**

4.5 Precast Joint Replacement

Description of Work:	
▪ Wholesale removal and replacement of the existing precast face-seal with a new 2-stage sealant joint and tie-in to the rehabilitated curtain wall system. ▪	
Advantages	**Disadvantages**
▪ Improves original design intent ▪ Creates full rain-screen assembly ▪ Long-Term Durability ▪ Reduced Maintenance Costs	▪ Costly as recently replaced ▪ Tenant Disruption
Discussion:	
This replacement includes for the removal and replacement of the precast seals, which have recently been replaced. This would improve the system to a rain-screen design, from the existing face-sealed design, and provide for a more durable system.	
Opinion of Probable Cost:	**$400,000**

4.1 OPTION SUMMARY

The table below summarizes all the available options in a total cost summary.

Option	Description	Timeline	Opinion of Probable Cost
1	Wholesale Curtain Wall Rehabilitation (excluding IGUs)	0-2 years	$2,800,000
2	Targeted IGU Replacement	0-2 years	$150,000
3	Lobby Curtain Wall Rehabilitation	0-2 years	$110,000
4	Wholesale IGU Replacement	0-2 years	$4,900,000
5	Replace precast seals with 2-stage joint	0-2 years	$400,000

The table below summarizes the recommended Options, which are 1-3 and 5. Option 4, Wholesale IGU Replacement, can be considered but is not critical to restoration of the overall air and water performance of the curtain wall system. Instead a yearly allowance for replacement as the IGUs continue to age has been carried below. The table below assumes the construction work be phased over 2 years to reduce cash flow impacts and thus carries a slight mobilization premium for splitting the work.

Option	Year 1	Year 2	Year 3	Year 4	Year 5
1	$1,500,000	$1,500,000	--	--	--
2	$150,000	--	--	--	--
3	$110,000	--	--	--	--
5	$200,000	$200,000	--	--	--
IGU Annual Allowance	--	--	$30,000	$30,000	$30,000
Total	$1,960,000	$1,700,000	$30,000	$30,000	$30,000

A contingency amount of 10% should be included in all construction budgets to allow for the following items:

- Variation in estimated unit prices due to competitive bidding.

- Additional work required due to hidden and/or unforeseen conditions uncovered during construction.

Please note that the options regarding the probable cost of repairs are in 2024 dollars and based upon the present extent of deterioration, historical unit prices from similar projects and conceptual repair strategies. Detailing of the various items for each design concept has not been fully developed, not have phasing or implementation schemes been selected. Probable costs do not include “soft costs,” extended warranties, permits, H.S.T or engineering fees. No allowance has been made for escalation beyond this time due to unknown construction commencement. The opinions of probable costs should be considered Class “C” amounts[1].

[1] Class “C” probable costs – an outline description of overall scope sufficient for making investment decisions (degree of accuracy +/- 25%).

5.0 CLOSING COMMENTS

Thank you for selecting Read Jones Christoffersen Ltd. for this project. RJC would be pleased to assist you with the implementation of our recommendations. Should you have any questions or concerns, please do not hesitate to contact the people below.

Yours truly,

READ JONES CHRISTOFFERSEN LTD.

Duncan Rowe, M.Eng., P.Eng., LEED AP, CPHD
Principal
Building Science and Restoration

APPENDIX A

VISUAL REVIEW PHOTOGRAPHS

Photo No. 1: Aerial view of 500 Columbus Drive, St. John's, NL (highlighted in red)

Photo No. 2: Overview of the west elevation

Photo No. 3: Overview of the south elevation

Photo No. 4: Overview of the west elevation

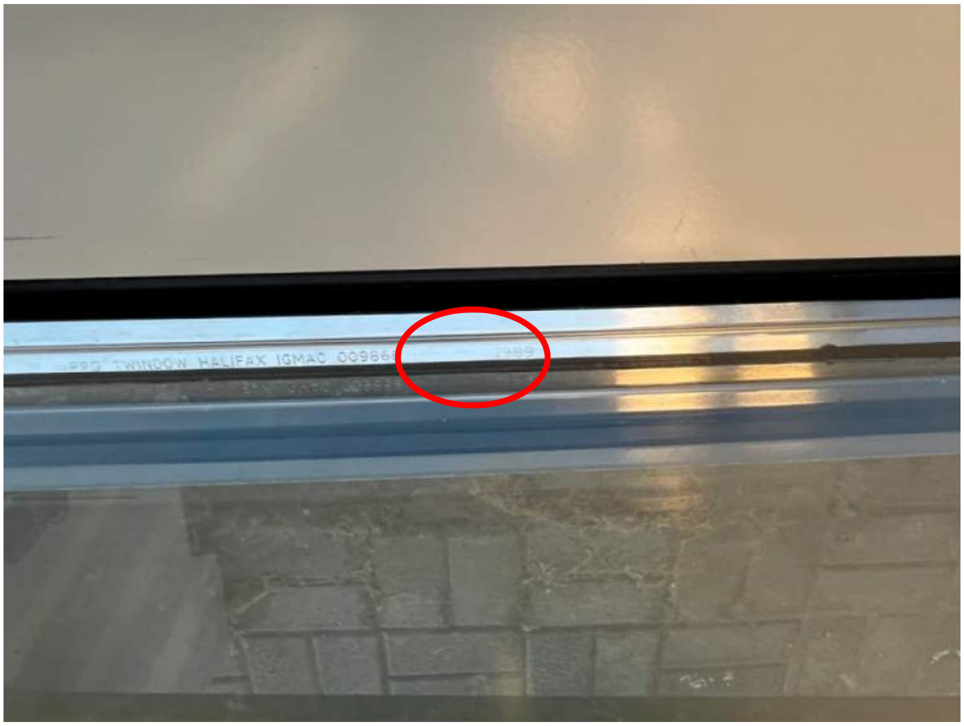


Photo No. 5: Typical view of a 1989 IGU date stamp (red circle)

Photo No. 6: Typical view of cracked and showing an annealed breakage pattern windows (red arrows)

Photo No. 7: Typical view of cracked and showing an annealed breakage pattern windows (red arrow)

Photo No. 8: Typical view of curtain wall is in fair-to-poor condition overall (red arrows)

Photo No. 9: Overview of curtain wall is in fair-to-poor condition overall

Photo No. 10: Typical view of curtain wall is in fair-to-poor condition overall

Photo No. 11: Typical view of curtain wall is in fair-to-poor condition overall with fading of the exterior caps

Photo No. 12: Typical view of weather stripping appears in poor condition with gaps

Photo No. 13: Typical view of weather stripping appears in poor condition (red arrow)

Photo No. 14: Typical view of interior glass-to-metal gasket is noted to be poor condition and failed IGU (red arrow)

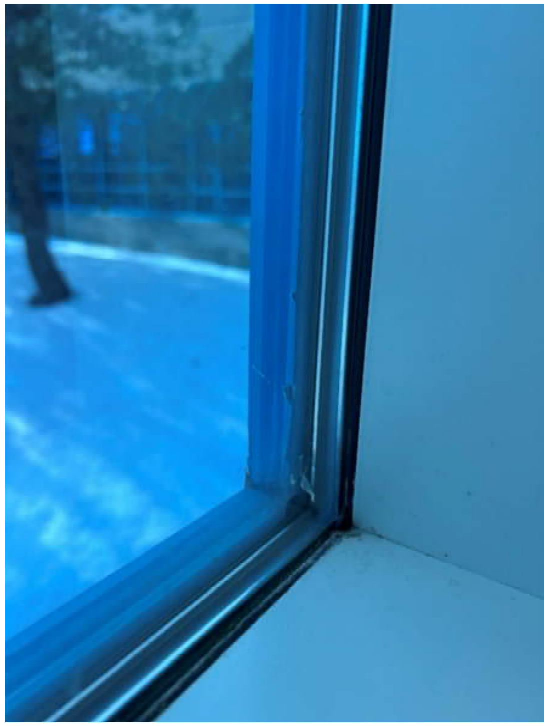


Photo No. 15: Typical view of interior glass-to-metal sealant is noted to be poor condition

Photo No. 16: Typical view of pressure plates that have been installed upside down (red arrow)

Photo No. 17: Typical view of roto gear on hopper windows was noted to be in poor condition with obvious signs of rust and corrosion (red arrow)

Photo No. 18: Typical view of rusted roto gear (red arrow)

Photo No. 19: View of the localized precast panel joints has been repaired (red arrows)

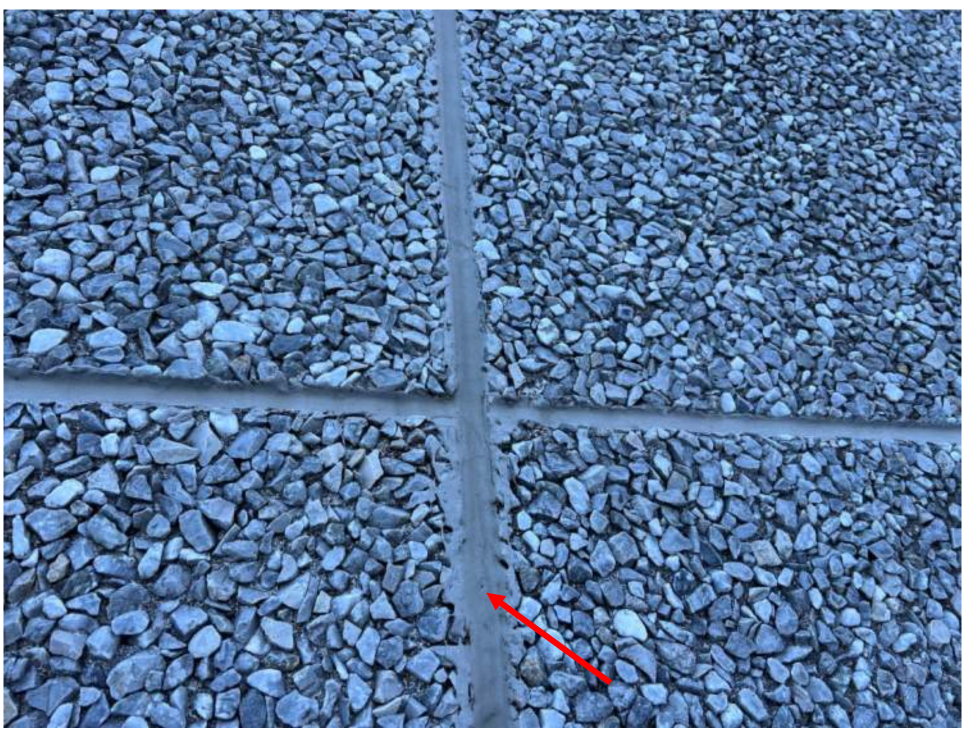


Photo No. 20: Typical view of localized precast panel joints crazing, and cohesive failures (red arrow)

Photo No. 21: Typical view of localized precast panel joints crazing, and cohesive failures

Photo No. 22: View of the precast panel surfaces was noted to be peeling or failing (red arrow)

Photo No. 23: Typical view of anodizing is noted faded, and there is rust formation at the bottom of the doors (red arrow)

Photo No. 24: Typical view of rust formation at the bottom of the doors (red arrow)

Photo No. 25: Typical view of aluminum storefront doors with exposed aluminum shims

Photo No. 26: Typical view of sealant in poor condition (red arrow)

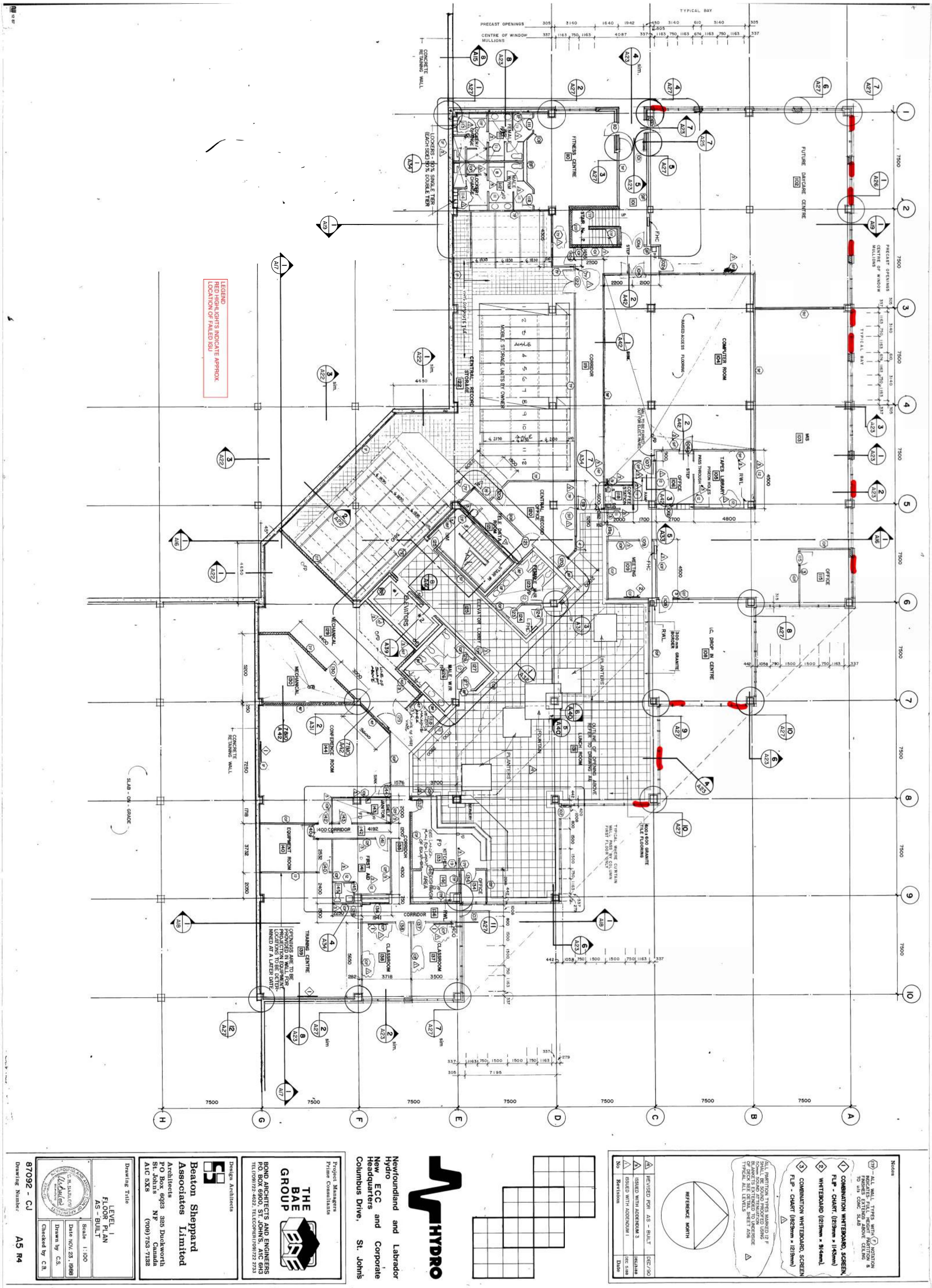
Photo No. 27: Typical view of adhesive sealant (red arrow)

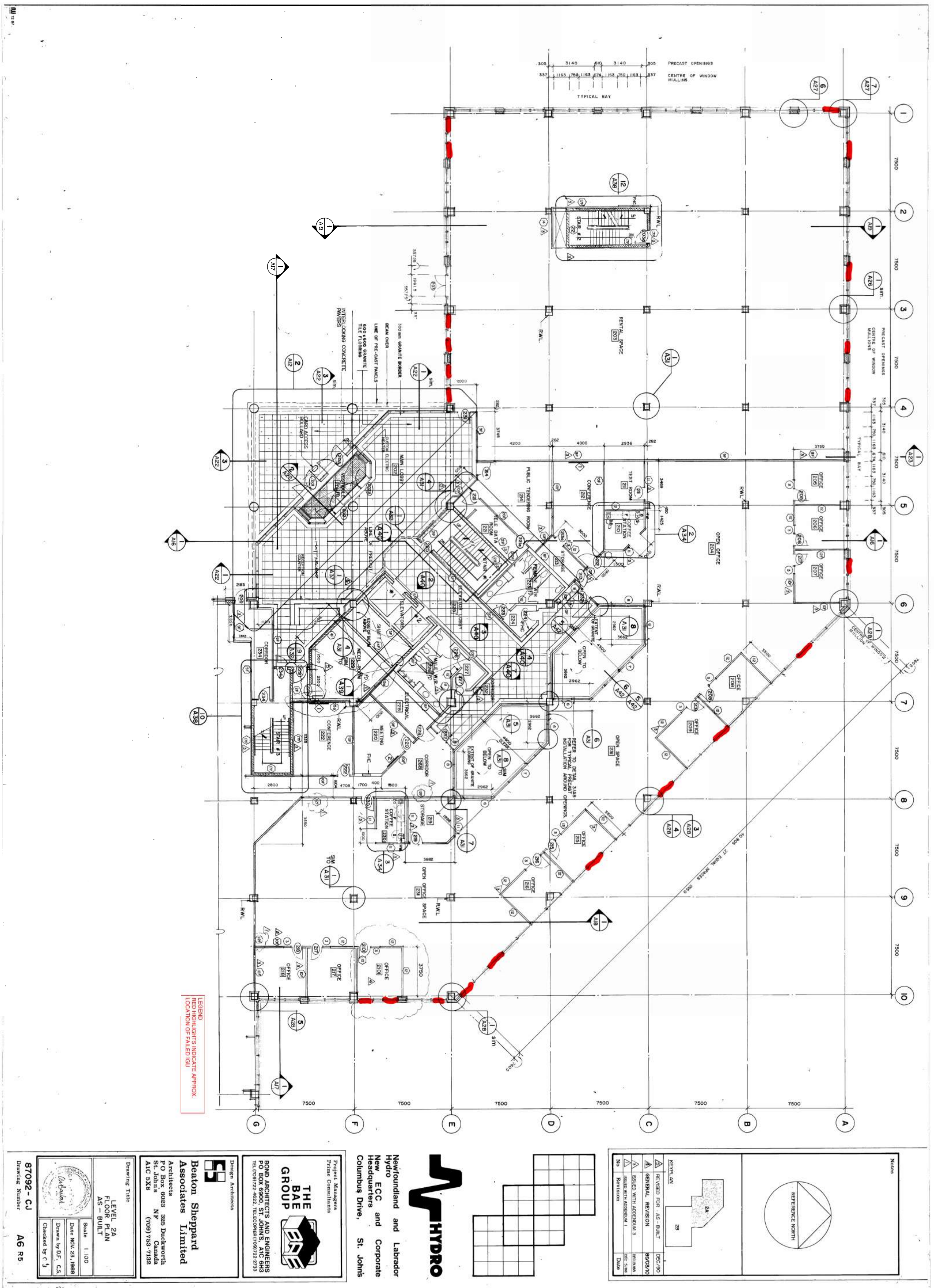
Photo No. 28: Typical view of punched windows in fair to poor condition with a missing snap cap (red arrow)

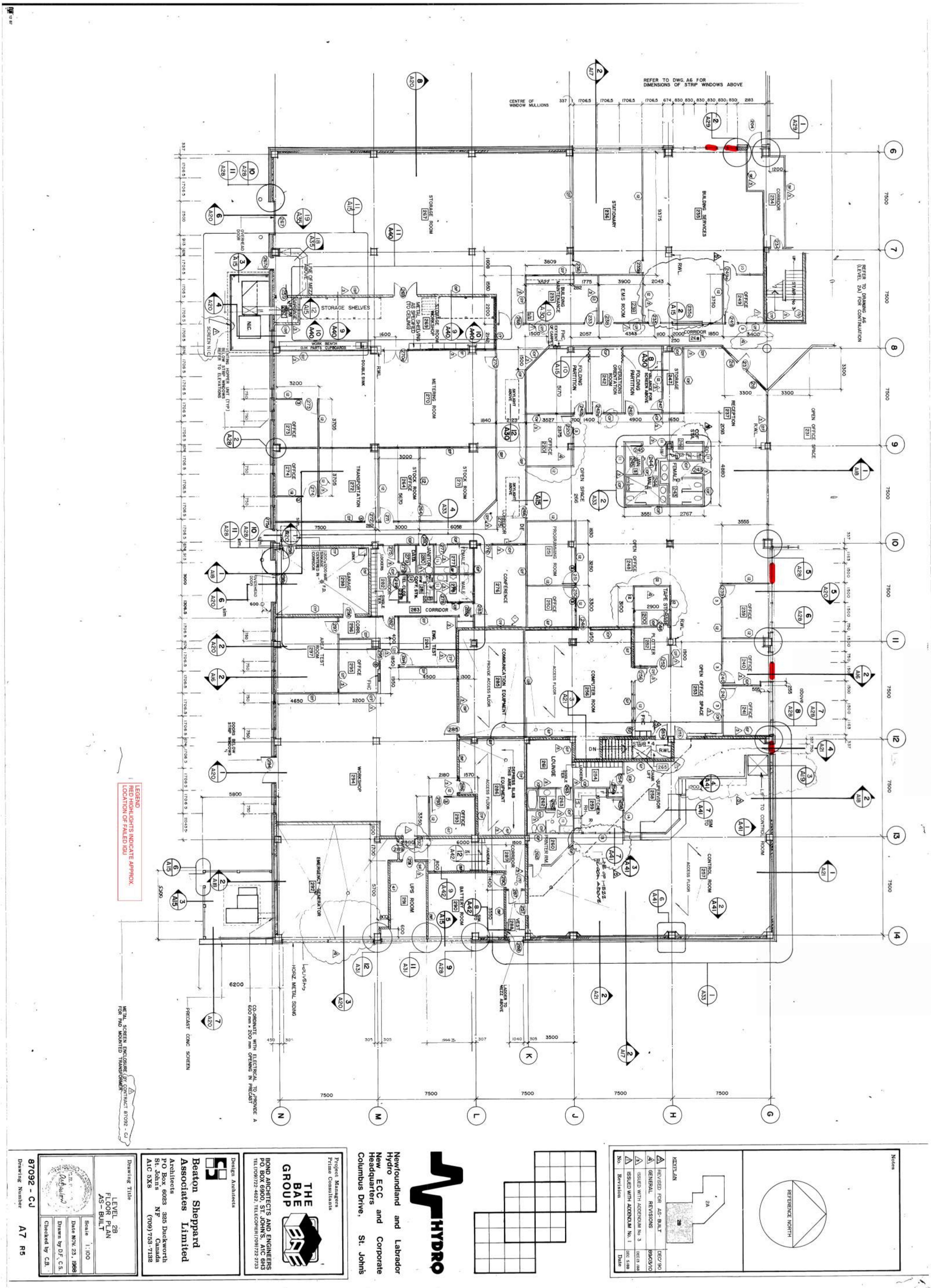
Engineers

Appendix B

Approximate IGU Failure Locations


LEGEND
RED HIGHLIGHTS INDICATE APPROX. LOCATION OF FAILED IGU
Notes
ALL WALL TYPES WITH (F) NOTATION INDICATES FULL HEIGHT PARTITION & FINISHES EXTENDS ABOVE CEILING TO u/s CONC. SLAB
COMBINATION WHITEBOARD, SCREEN, FLIP - CHART. (1219mm x 1143mm)
WHITEBOARD (1219mm x 914mm).
COMBINATION WHITEBOARD, SCREEN FLIP - CHART (1829mm x 1219mm)
ALL PARTITION TYPES MARKED 12 F SHALL BE SOUND PROOFED USING 50mm SOUND ATTENUATION BLANKETS EXTENDED TO UNDERSIDE OF DECK SEE DETAIL SHEET A56 TYPICAL ALL LEVELS
REFERENCE NORTH
REVISED FOR AS - BUILT DEC/90
ISSUED WITH ADDENDUM 3 DEC.13/88
ISSUED WITH ADDENDUM 1 DEC. 5/88
No Revision Date
HYDRO
Newfoundland and Labrador Hydro
New ECC and Corporate Headquarters
Columbus Drive, St. John's
Project Managers
Prime Consultants
THE BAE GROUP
BOND ARCHITECTS AND ENGINEERS
P.O. BOX 6900, ST. JOHN'S, A1C 6H3
TEL (709) 722-4622, TELECOPIER (709) 722 2733
Design Architects
Beaton Sheppard Associates Limited
Architects
P.O Box 6023 325 Duckworth
St. John's NF Canada
A1C 5X8 (709) 753-7132
Drawing Title
LEVEL 1
FLOOR PLAN
AS - BUILT
Scale 1:100
Date NOV. 23, 1988
Drawn by C.S.
Checked by C.B.
87092 - CJ
Drawing Number
A5 R4


LEGEND
RED HIGHLIGHTS INDICATE APPROX. LOCATION OF FAILED IGU
HYDRO
Newfoundland and Labrador Hydro
New ECC and Corporate Headquarters
Columbus Drive, St. John's
THE BAE GROUP
Beaton Sheppard Associates Limited
Architects
LEVEL 2A FLOOR PLAN AS – BUILT
Scale 1:100
Date NOV. 23, 1988
87092-CJ
A6
REFERENCE NORTH
KEYPLAN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New ECC and Corporate Headquarters
Columbus Drive, St. John's
HYDRO
Project Managers
Prime Consultants
THE BAE GROUP
BOND ARCHITECTS AND ENGINEERS
Design Architects
Beaton Sheppard Associates Limited
Architects
Drawing Title
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87092 - CJ
Drawing Number
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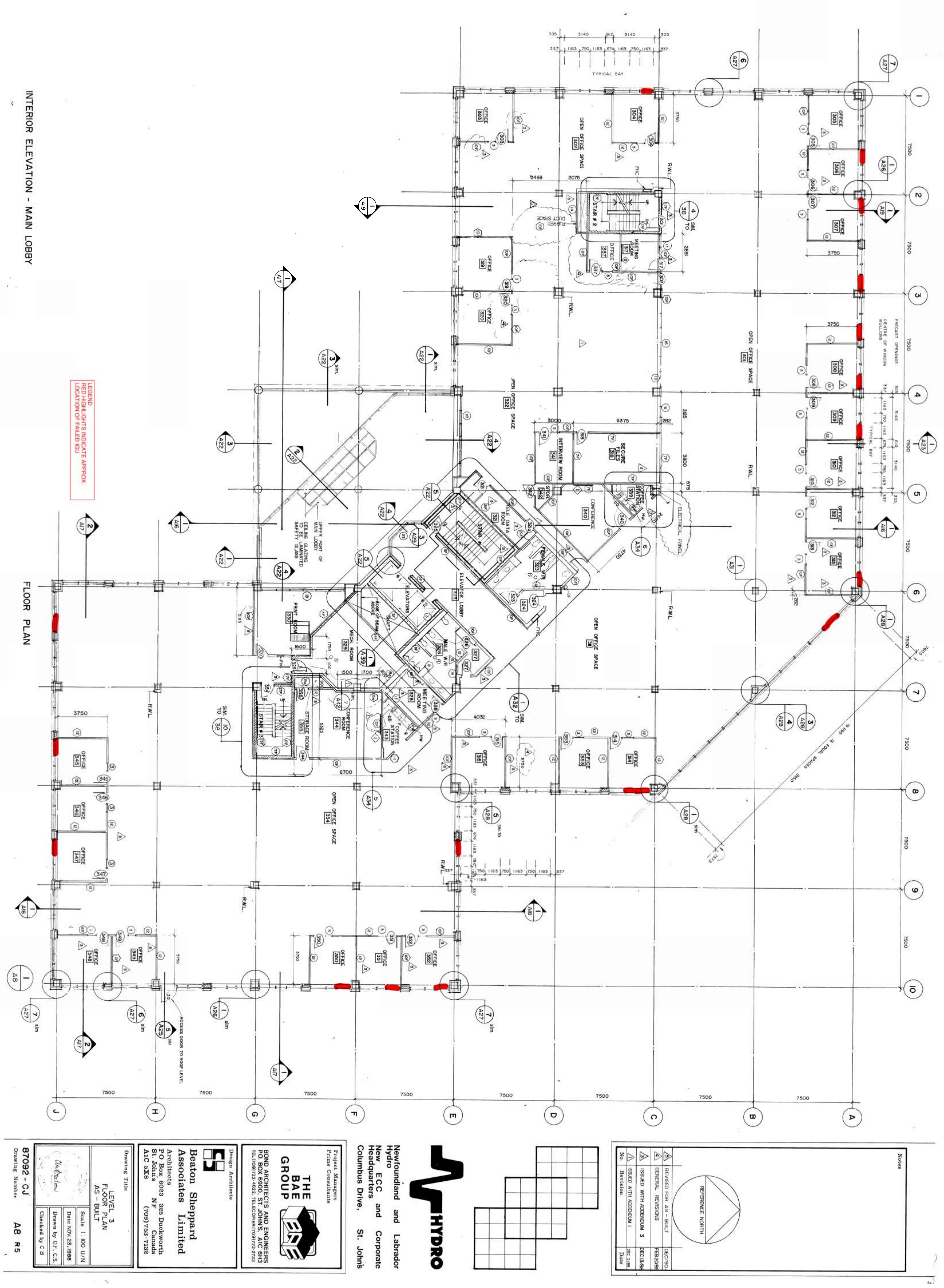
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FLOOR PLAN
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GENERAL REVISIONS
ISSUED WITH ADDENDUM 3
ISSUED WITH ADDENDUM 1
No. Revision Date
HYDRO
Newfoundland and Labrador Hydro
New ECC and Corporate Headquarters
Columbus Drive, St. John's
Project Managers
Prime Consultants
THE BAE GROUP
BOND ARCHITECTS AND ENGINEERS
PO BOX 6900, ST. JOHN'S, A1C 6H3
Design Architects
Beaton Sheppard Associates Limited
Architects
PO Box 6023 325 Duckworth
St. John's NF Canada
A1C 5X8 (709) 753-7132
Drawing Title
LEVEL 3
FLOOR PLAN
AS - BUILT
Scale 1:100 U/N
Date NOV. 23, 1988
Drawn by D.F. C.S.
Checked by C.B.
87092 - CJ
Drawing Number
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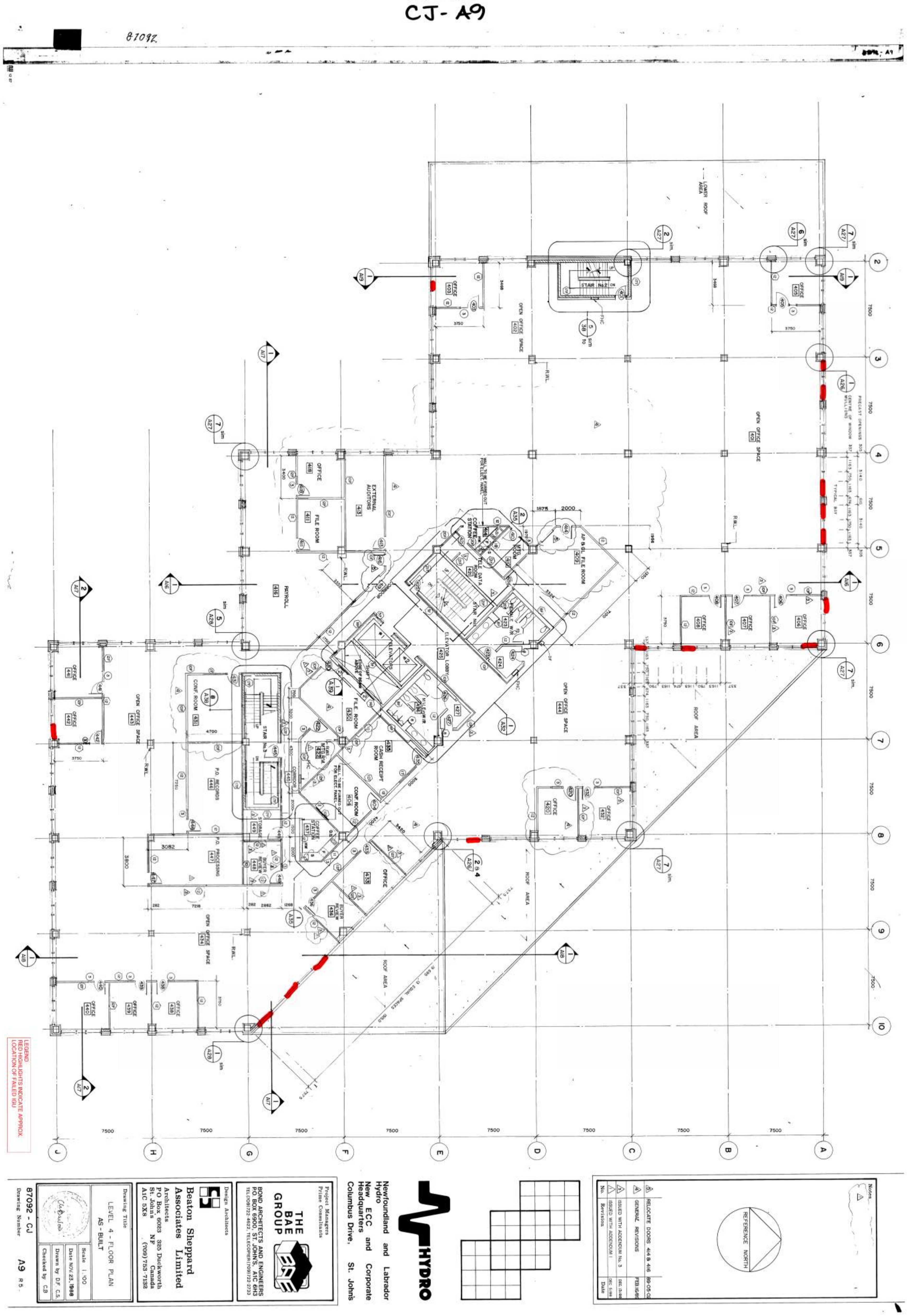
CJ- A9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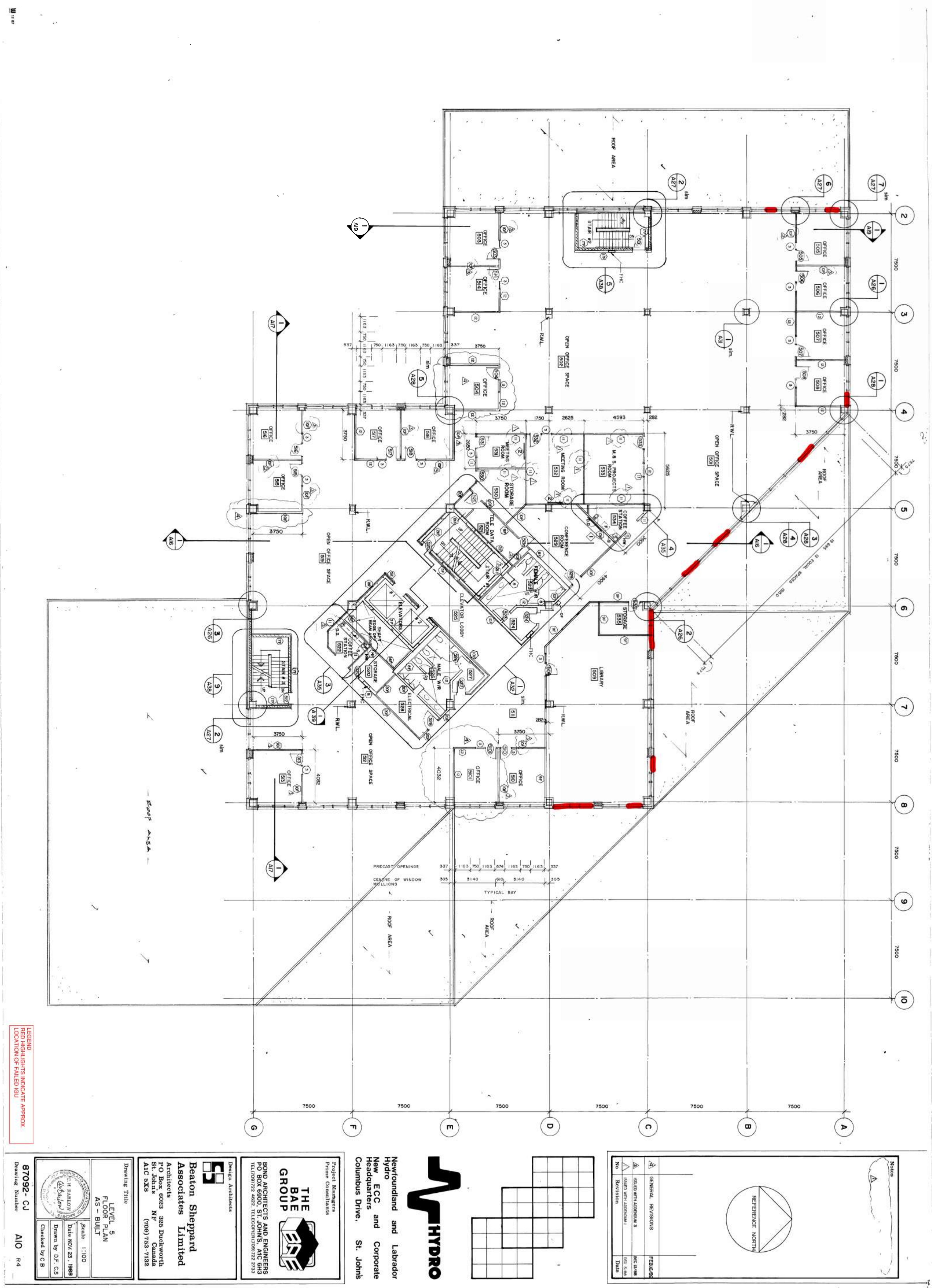
THE BAE GROUP
BOND ARCHITECTS AND ENGINEERS
Beaton Sheppard Associates Limited
LEVEL 4 - FLOOR PLAN
AS - BUILT
87092 - CJ
A9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Columbus Drive, St. John's
HYDRO
Project Managers
Prime Consultants
THE BAE GROUP
BOND ARCHITECTS AND ENGINEERS
Design Architects
Beaton Sheppard Associates Limited
Architects
Drawing Title
LEVEL 5
FLOOR PLAN
AS - BUILT
Scale 1:100
Date NOV 23, 1988
87092-CJ
Drawing Number
A10 R4
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GENERAL REVISIONS
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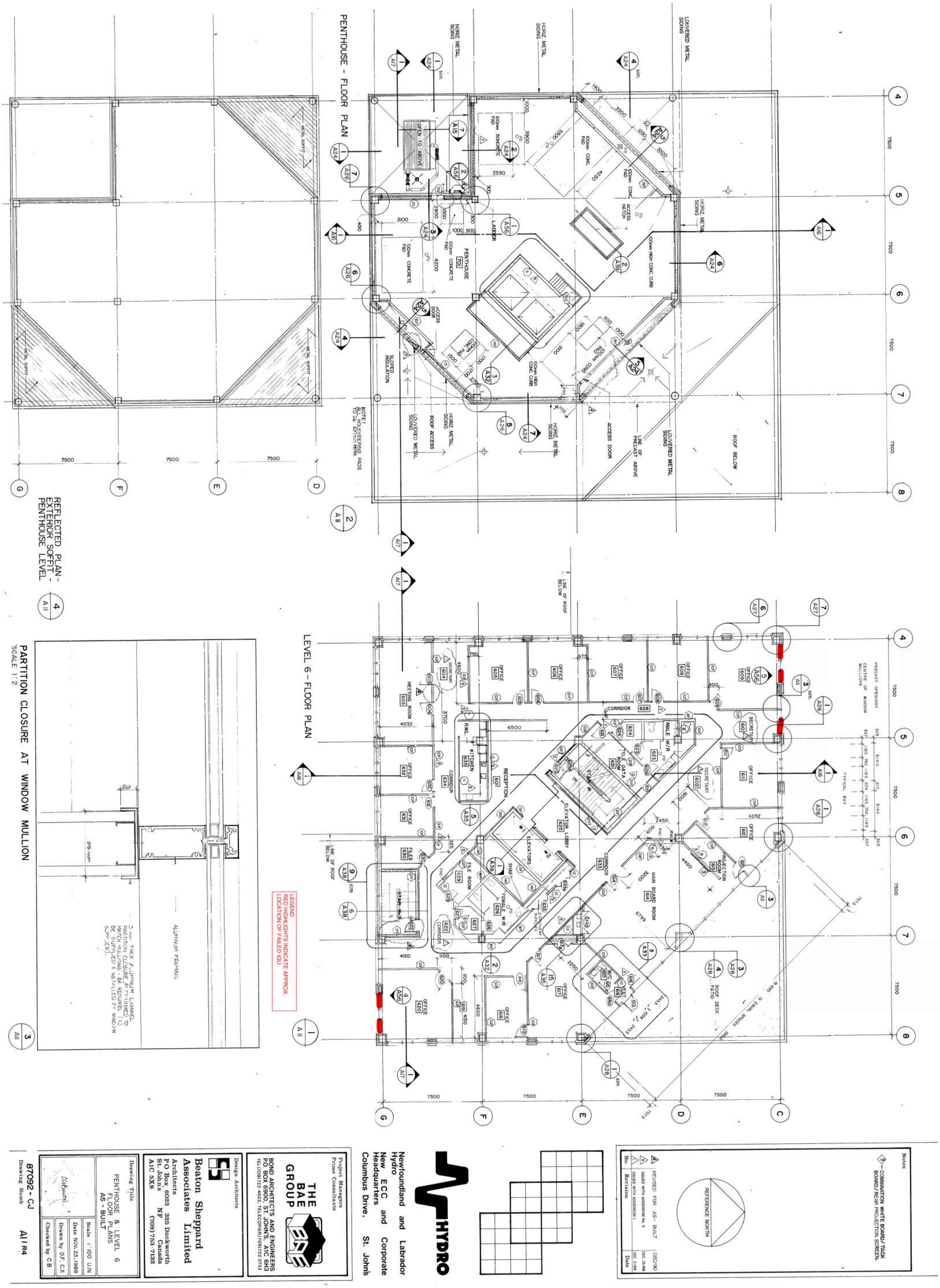
ROOF AREA
LIBRARY
ELEVATOR LOBBY
CONFERENCE ROOM
MEETING ROOM
TYPICAL BAY
PRECAST OPENINGS
CENTRE OF WINDOW MULLIONS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LEVEL 6 - FLOOR PLAN
REFLECTED PLAN - EXTERIOR SOFFIT - PENTHOUSE LEVEL
PARTITION CLOSURE AT WINDOW MULLION
SCALE 1:2
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REFERENCE NORTH
REVISED FOR AS - BUILT
Newfoundland and Labrador Hydro
New ECC and Corporate Headquarters
Columbus Drive, St. John's
HYDRO
Project Managers
Prime Consultants
THE BAE GROUP
BOND ARCHITECTS AND ENGINEERS
P.O. BOX 6900, ST. JOHN'S, A1C 6H3
Design Architects
Beaton Sheppard Associates Limited
Architects
325 Duckworth St. John's NF Canada
(709) 753-7132
Drawing Title
PENTHOUSE & LEVEL 6 FLOOR PLANS AS - BUILT
Scale 1:100 U/N
Date NOV. 23, 1988
Drawn by D.F. C.S
Checked by C.B.
87092-CJ
Drawing Numb
A11 R4

Engineers

Appendix C

Thermography Report (Exterior) - Hydro Building

Thermography Report (Interior) - Hydro Building

rjc Engineers

Locations

Canada
Vancouver, BC
Surrey, BC
Victoria, BC
Nanaimo, BC
Kelowna, BC

Calgary, AB
Edmonton, AB

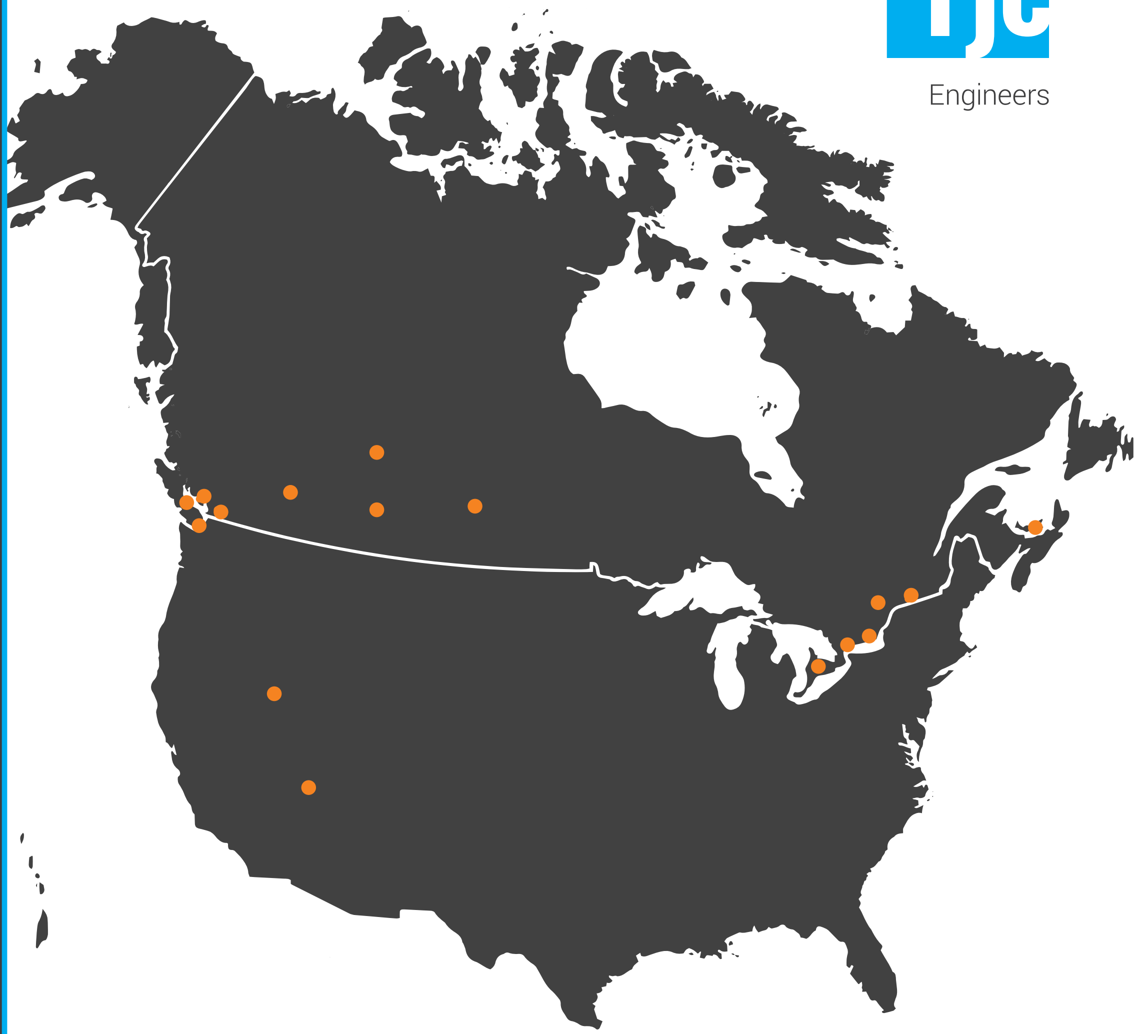
Saskatoon, SK

Toronto, ON
Ottawa, ON
Kitchener, ON
Kingston, ON

Montreal, QC

Stratford, PEI

USA
Las Vegas, NV
Reno, NV



Engineering Services

- Bridge Design & Rehabilitation
- Building Envelope
- Cold-Formed Steel Design
- Condition Assessments
- Depreciation Reports & Reserve Fund Studies
- Façade Engineering
- Fall Protection & Travel Restraint
- Forensic Engineering
- Energy Modelling
- Heritage Conservation
- Parking Facility Design
- Parking Structure Restoration
- Pavement Rehabilitation
- Performance Assessment
- Post-Tensioned Concrete
- Prime Consulting
- Rendering & Interactive Visualization
- Roofs & Plaza Decks
- Seismic Risk Mitigation
- Specialty & Supplementary Engineering
- Structural Engineering
- Structural Glass Engineering
- Structural Restoration
- Sustainable Design
- Traffic Deck Protection & Replacement
- Waterproofing
- Wood Design

rjc.ca

Appendix C

Roof Condition Report & Proposal – Holyrood (2022)

Front of Building:
View of pump house #2

pump house #2:
Area of wind swept ballast at corner of building

pump house #2:
View of exposed insulation

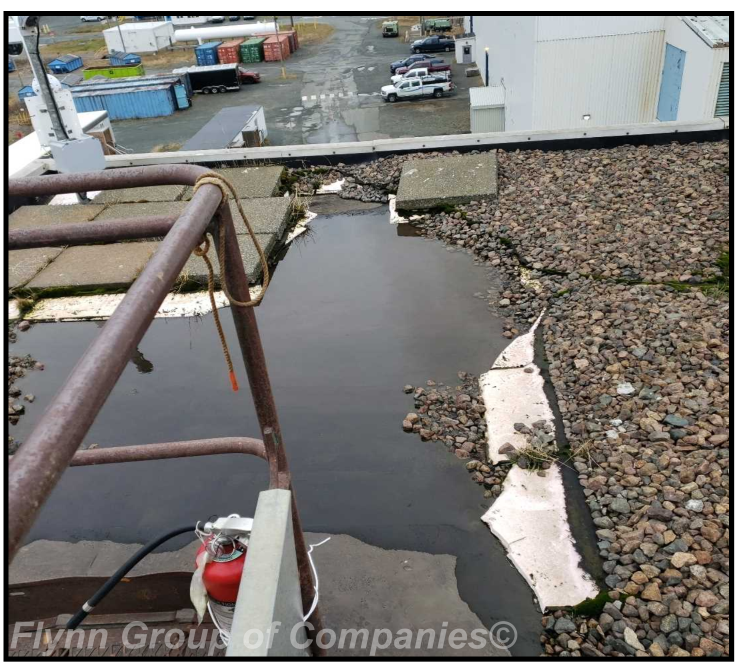
pump house #2:
Roof composite

pump house #2:
Overall clean

pump house #2:
Penetration flashings

pump house #2:
Curd detail flashing

pump house #2:
Fasteners



pump house #2:
View of wind blown area to be addressed

pump house #2:
Areas of open seams to be caulked on fan curbs and parapet metal

pump house #2:
Area of wind damage

pump house #2:
Areas of detail flashing with exposed mesh to be resealed

pump house #2:
Areas of damaged metal

pump house #2:
Drains clear of debris

Section A:
View of area of wind damage around one drain

Section A:
Area of rusted fan top

pump house #2:
View of area of open seams around fan curb top

pump house #2:
View of area of paving stones at corner of parapet

pump house #2:
View of wind damaged area

pump house #2:
Overview of roof area

pump house #2:
Overview of roof area

pump house #2:
View of area of roof on pump house #2 at lower roof drain plugged and wind damage to roofing

Front of Building:
View of pump house #1

pump house #1:
Area of roof 4 ply tremco rubberized and gravel

pump house #1:
Overview of roof surfacing

pump house #1:
Areas of detail flashing in need of some sealant

pump house #1:
Overview of roof area - clean of debris

pump house #1:
Area of lower roof level walls in good condition

pump house #1:
Areas of detail flashing in need of some sealant

pump house #1:
View of fasteners in good condition

pump house #1:
View of area of missing hood from fan unit to be addressed

pump house #1:
View overall condition of roof in good condition

pump house #1:
Overview of roof area

pump house #1:
Overview of roof area

pump house #1:
Area of lower roof level walls in good condition

pump house #1:
Overview of roof area - in good condition

Day#1:
Overview of roof area - in good condition

Disclaimer, Terms and Conditions of Use:

We have conducted and performed a roof audit at this site. The results and findings from this report are based solely and exclusively on the observations of the inspector at the specific time of the inspection and are intended exclusively for the above noted client. Nonetheless, there may have been hidden issues and unforeseen deficiencies and defects, including those which may not have been visible at the time due to various conditions (ie. weather; mechanical; other contractor work; etc) . Performing this roof audit does not guarantee that the observations noted have and/or will remain identical beyond the time that they were made, nor does it provide a warranty or promise of the roof being in the same condition beyond such time. Changes on roof structure and conditions can and do occur over time. The indication of the age of a roof is just an approximation based solely from visual observations. To verify the age of a roof, the owner/buyer should review all records and permits on file for the site in question with the local building department to determine when the roof was installed and the dates of any prior approved repairs.

FLYNN GROUP OF COMPANIES

ROOF CONDITION REPORT & PROPOSAL

2 Thermal Plant Rd.
Holyrood, NL

Disclaimer:

Flynn Group of Companies has conducted and performed a roof audit at this site. The results and findings from this report are based solely and exclusively on the observations of the inspector at the specific time of the inspection and are intended exclusively for the above noted client. Nonetheless, there may have been hidden issues and unforeseen deficiencies and defects, including those which may not have been visible at the time due to various conditions (ie. weather; mechanical; other contractor work; etc) . Performing this roof audit does not guarantee that the observations noted have and/or will remain identical beyond the time that they were made, nor does it provide a warranty or promise of the roof being in the same condition beyond such time. Changes on roof structure and conditions can and do occur over time. The indication of the age of a roof is just an approximation based solely from visual observations. To verify the age of a roof, the owner/buyer should review all records and permits on file for the site in question with the local building department to determine when the roof was installed and the dates of any prior approved repairs.

Roof Condition Report

Name: NL Hydro - Roof Inspections **Job Number:** 028-462337-310 **Inspection Date:** 12/6/2022

Address Line1: 2 Thermal Plant Rd.

Building Name/Address Line2:

City: Holyrood **Province/State:** NL **Postal/Zip Code:** A0A 2R0

Roof Composition

Section A

Deck:	Metal;	**Membrane:**	Metal; inverted roof 4ply 2in insulation fabric and stone;
Insulation:	Roofmate; Thickness: 2;	**Surfacing:**	Roofmate/fabrene/ballast;
Vapor Retarder:	Not known;	**Was cut test performed:**	No
Resaturated:	No	**Roof Height:**	85
Caulking:	Poor(cracking)	**Approximate Age:**	30
Masonry Adjoining:	N/A	**Life Remaining:**	1-2
Walls Adjoining:	N/A	**Cleanliness:**	Clean
Penetration Flashing:	Good	**Leaking:**	
Fasteners:	Good	**Exposed Areas:**	Yes - displaced ballast, 256 SQF
Drainage & Drains:	Fair, Qty: 4	**Roof Drain Strainers Control Weirs:**	Secured, Qty: 4
Blisters/Ridges:	No	**Mastic Pans:**	Good, Qty: 4
Splits:	No	**Skylights:**	N/A
Membrane Flashing:	Damaged	**Roof Mounted Units:**	Good, Qty: 3
Metal Flashing:	Fair	**Curbs/Sleepers:**	Damaged
Approximate Area:	4096		

Work Done and Comments

visual inspection of pump house #2
areas of roof to be addressed due to wind blown area

Further Work Recommended

Minor preventative maintenance recommended immediately to fix open wind swept areas as well as additional minor preventative maintenance

Roof replacement required in 1-2 years due to age of existing roof system

Roof Condition Report

Name: NL Hydro - Roof Inspections **Job Number:** 028-462337-310 **Inspection Date:** 12/6/2022

Address Line1: 2 Thermal Plant Rd.

Building Name/Address Line2:

City: Holyrood **Province/State:** NL **Postal/Zip Code:** A0A 2R0

Roof Composition

pump house #1

Deck:	Metal;	**Membrane:**	Built Up Asphalt and Felt;
Insulation:	not known;	**Surfacing:**	Gravel;
Vapor Retarder:	Not known;	**Was cut test performed:**	No
Resaturated:	No	**Roof Height:**	85
Caulking:	Good	**Approximate Age:**	25
Masonry Adjoining:	N/A	**Life Remaining:**	15
Walls Adjoining:	Good	**Cleanliness:**	Clean
Penetration Flashing:	Fair	**Leaking:**	No
Fasteners:	Good	**Exposed Areas:**	No
Drainage & Drains:	Good/Clean	**Roof Drain Strainers Control Weirs:**	Secured
Blisters/Ridges:	No	**Mastic Pans:**	N/A
Splits:	No	**Skylights:**	N/A
Membrane Flashing:	Good	**Roof Mounted Units:**	Good
Metal Flashing:	Good	**Curbs/Sleepers:**	Good
Approximate Area:	4069		

Work Done and Comments

Further Work Recommended

Roof Condition Report

Name: NL Hydro - Roof Inspections **Job Number:** 028-462337-310 **Inspection Date:** 12/6/2022

Address Line1: 2 Thermal Plant Rd.

Building Name/Address Line2:

City: Holyrood **Province/State:** NL **Postal/Zip Code:** A0A 2R0

Roof Composition

pump house #2

Deck:	Metal;	**Membrane:**	inverted roof;
Insulation:	Roofmate;	**Surfacing:**	Gravel;
Vapor Retarder:	Not known;	**Was cut test performed:**	No
Resaturated:	No	**Roof Height:**	85
Caulking:	Good	**Approximate Age:**	30
Masonry Adjoining:	N/A	**Life Remaining:**	1–2
Walls Adjoining:	N/A	**Cleanliness:**	Clean
Penetration Flashing:	Good	**Leaking:**	
Fasteners:	Good	**Exposed Areas:**	Yes - displaced ballast
Drainage & Drains:	Poor/Clogged, Qty: 4	**Roof Drain Strainers Control Weirs:**	, Qty: 4
Blisters/Ridges:	No	**Mastic Pans:**	N/A
Splits:	No	**Skylights:**	N/A
Membrane Flashing:	Damaged	**Roof Mounted Units:**	Good, Qty: 2
Metal Flashing:	Fair	**Curbs/Sleepers:**	Damaged, Qty: 2
Approximate Area:	4069		

Work Done and Comments

visual inspection of roof area
lower roof flooded due to drain plugged with debris and area of wind damage on upper roof level to be addressed

Further Work Recommended

Minor preventative maintenance recommended immediately to fix open wind swept areas as well as additional minor preventative maintenance. Plugged drain needs to be cleared.

Roof replacement required in 1-2 years due to age of existing roof system

Appendix D

Building and Infrastructure Condition Assessment – St. Anthony Office Facility (2018)

Building and Infrastructure Condition Assessment St. Anthony Office Facility

(St. Anthony, NL)

173034.00 ● Final Report ● February 2018

ISO 9001
Registered Company

Prepared for:

nalcor energy

Prepared by:

CBCL LIMITED
Consulting Engineers

Final Report	Paul Sceviour	Feb 12, 2018	Paul Sceviour
Draft Report	Paul Sceviour	Nov 21, 2017	Paul Sceviour
Issue or Revision	***Reviewed By:***	***Date***	***Issued By:***

CBCL LIMITED
Consulting Engineers

ISO 9001
Registered Company

REGISTERED PROFESSIONAL ENGINEER
PAUL SCEVIOUR
SIGNATURE
FEB 12, 2018
DATE
NEWFOUNDLAND & LABRADOR

CBCL Project No 173034.00

Contents

Appendices

A	Site Photos – St. Anthony Office Building
B	Site Photos – St. Anthony Storage Shed
C	Site Photos – Site/Civil
D	Site Photos – Environmental
E	Existing Floor Plans
F	Concept Floor Plans

CHAPTER 1 REPORT OVERVIEW

1.1 RFP and Consultant Group

In March 2017, the Newfoundland and Labrador Hydro (referred to as the "NLH" hereafter) issued a Request for Proposals to undertake the building and infrastructure condition assessments for various line depots and office facilities in the province. The sites included:

- Line Depots
    - Burgeo
- Office Facilities
    - Stephenville Office Facility
    - St. Anthony Office Facility

CBCL Limited responded to the request on April 3, 2017, and was subsequently awarded the project on May 3, 2017.

The consultant team that performed this assessment consisted of a multi-disciplined engineering team with CBCL Limited performing structural, mechanical, electrical, and environmental tasks, and Glenn Barnes Architecture Inc. performing architectural and functional programming tasks.

This report contains the results of those exercises and provides our professional assessments, recommendations as to the current condition, suitability of use, required code upgrades, recommended upgrades, recommendations to suit future needs, and opinion of probable construction cost for recommendations.

1.2 Scope of Work

The Request for Proposals document contained the terms of reference which outlined the objectives and scope of the project. The assessment has several objectives:

- to review the general condition of the building and site infrastructure including architectural, structural, mechanical, electrical, and environmental;
- provide recommendations of renovations to continue operating existing facilities in view of present and future needs, and

- provide preliminary functional programming based on the client current needs (for storage, operations, etc.) and future needs to determine the most efficient uses of the assessed facilities.

1.3 Site Audits

Site audits were carried out during the week of July 24th. Prior to the site work, CBCL requested any available plans and prior documents or information on the facilities. Limited information was available so the bulk of the information contained in this report was obtained from onsite review and from information provided by on site personnel. Upon arriving at the various sites the consultant team checked in with site personnel and undertook site specific safety orientation were required.

1.3.1 St. Anthony Office Building

The building was originally constructed circa 1995 as a combined office/customer service/line depot facility. It has been renovated and currently houses administrative, customer service functions, and a small line depot. The original larger line depot section was converted into office spaces. The building is in excellent condition.

The single level on grade pre-engineered steel structure is some 390m^2 in gross floor area. Interior finished ceiling height is 2580 mm. Exterior walls are of steel frame with vertical metal siding, vinyl faced glass fibre insulation with drywall interior finish. Partitions are metal stud and drywall and masonry block with ceilings principally acoustic tile. The building is drafty as reported by staff but is in excellent condition with little upgrading required.

The building is fully utilized and does not meet current space requirements for the number of staff. Additional space was requested by staff, which can be achieved through a building addition to the left side as well as some re-configuring of the existing interiors. Suggestions include an addition for a new line shop and larger meeting/training room with existing meeting room/training room and line crew areas converted into six offices. Currently 37 persons work from the building. Refer to conceptual floor plan.

Site utilities include municipal water and sewer. The site itself is a combination of asphalt and gravel and slopes to lower elevation towards the street. The depot yard is fully fenced with all structures within the perimeter.

1.3.2 St. Anthony Storage Shed

The building is of contemporary vintage. The single open storage room building is some 37m^2 in area. It is constructed of 38 x 140 mm wood stud frame with horizontal vinyl siding, vinyl clad eaves and asphalt shingle roofing. The floor is of wood joists with plywood finish. The building has pre-engineered wood roof trusses. It is uninsulated and principally unfinished at the interior with the exception of a small area of plywood wall finish. Access is via one residential steel door with a pair of steel doors at the front for loading. The building has one vinyl window which is in good condition. The floor has sagged noticeably. It is mounted on concrete patio blocks and is some 500 mm above finish grade. Other than the floor sag and overly high steps rise the building is in good condition.

The storage garage is not provided with any water and sewer services.

1.4 Findings and Recommendations

1.4.1 St. Anthony Office Building Findings

The building is contemporary in design and is in excellent condition. It is not accessible to persons with mobility challenges and does not meet The Accessibility Act. Given its original construction date circa 1995 accessibility ought to have been provided. However, no firm recommendation is made at this time. Accessibility retrofit is only a suggestion. Staff advise that the building is of insufficient size to accommodate all 37 staff as well as to accommodate large staff meetings, training etc. This report includes a single line conceptual floor plan illustrating graphically our interpretation of the staff's suggested layout changes and building addition.

1.4.2 St. Anthony Office Building Recommendations

Near term recommendations that should be planned to be undertaken within the next two years have been put forward for architectural, site, mechanical and electrical and are summarized as follows.

Architectural:

- Enclose janitor area, creating an enclosed fire rated room of 60 minutes to NBCC.
- Eliminate existing corridor door to remove one-way dead ended emergency exiting.
- Repair one leaking window in boardroom.

Site/Civil:

- Remove section of asphalt on right side, infill depression and compact, and resurface with asphalt.
- Bring in gravel to infill various depressions in gravel way on left side of building.
- Repair minor issues in site fencing.

Mechanical:

- Vent lunch room sink properly.
- Extend washroom group plumbing vent through roof.
- Adjust hot water temperature to be above 50°C.
- Provide drain pan for hot water tank.
- Provide hub drain above ceiling for drainage from hot water tank.
- Insulate remainder of accessible domestic water piping.
- Provide proper pipe supports for domestic water piping.
- Tighten toilet seat in Female Washroom.
- Provide electronic hands free flush valves on urinals.
- Provide exhaust ducting to outside and wall cap for Female Washroom exhaust fan.
- Remove abandoned insulated ducting above Line Crew office and associated wall caps and seal exterior wall penetrations.
- Provide heat recovery ventilation system throughout building.

Electrical:

- Upgrade the existing electrical service from a dual service to a single service.
- Remove the materials stored in the electrical room and install warning sign on electrical room door "Electrical Room – No storage permitted".

Mid-term recommendations that should be planned to be done in the next 3-10 years are architectural and electrical and are summarized as follows.

Architectural:

- Consider modification of building to meet The Accessibility Act as follows:
    - Add exterior ramped sidewalk to right side public entrance.
    - Add power door operator to side entrance.
    - Modify public reception counter to meet The Accessibility Act.
    - Upgrade doors, fixtures, and fittings at both existing washrooms to meet the Accessibility Act.
    - Change out any remaining knob door handles and fit with levers (six assumed).
    - Identify accessible parking space.
- Add an extension to the left side and re-configure parts of the existing floor plan to better accommodate staff and functions.
    - New extension to house a new line crew area and larger training room/meeting room.
    - Modify existing training room/boardroom into offices.
    - Convert existing line crew areas into offices and storage.
- Re-paint exposed concrete floor slabs.
- Provide gaskets at fascia edge of steel roof panels to mitigate against drafts and snow entry.

- Re-paint exterior doors and frames.

Electrical

- Replace emergency lighting unit's batteries.

1.4.3 St. Anthony Storage Shed Building Findings

This small wood frame single space storage shed is contemporary in its construction. It is in excellent condition.

1.4.4 St. Anthony Storage Shed Building Recommendations

Near term recommendations that should be planned to be undertaken within the next two years have been put forward for architectural, structural, mechanical, and electrical and are summarized as follows.

Architectural:

- Modify side personnel entry door steps to those with rise to meet code.

Structural:

- Floor beams were severely deflected and should be provided with additional support
- All concrete pads have fractured and should be replaced with more suitable units.

Mechanical:

- A fire extinguisher should be provided.

Electrical:

- Install receptacle faceplates for the storage shed receptacles.
- Install emergency light unit in the storage shed.

CHAPTER 2 FACILITY AUDITS

2.1 Office Building

2.1.1 Architectural Assessment

The building was originally constructed circa 1995 as a combined office/customer service/line depot facility. It has been renovated and currently houses administrative, customer service functions, and a small line depot. The original larger line depot section was converted into office spaces. The building is in excellent condition.

The single level on grade pre-engineered steel structure is some 390 m^2 in gross floor area. Interior finished ceiling height is 2580 mm. Exterior walls are of steel frame with vertical metal siding, vinyl faced glass fibre insulation with drywall interior finish. Partitions are metal stud and drywall and masonry block with ceilings principally acoustic tile. The building is drafty as reported by staff but is in excellent condition with little upgrading required.

The building is fully utilized and does not meet current space requirements for the number of staff. Additional space was requested by staff, which can be achieved through a building addition to the left side as well as some re-configuring of the existing interiors. Suggestions include an addition for a new line shop and larger meeting room/training room with existing meeting room/training room and line crew areas converted into offices. Currently 37 persons work from the building. Refer to conceptual floor plan.

2.1.1.1 BUILDING EXTERIOR ENVELOPE

Exterior walls (where the internal construction is visible) are constructed of pre-painted vertical corrugated steel siding on steel girts with metal stud back-up wall and vinyl film coated roll type glass fibre thermal insulation with drywall interior finish. Minor wear and tear scratches and dents are noted on the cladding, which do not require action. The interior finish of exterior walls in the line crew spaces are finished with pre-painted vertical steel liner panel. Roofing consists of low slope gable style standing seam metal sheets on steel girts with roll type vinyl film clad glass fibre thermal insulation. Exposed ends of roof panels at facias are open, without flashings or gaskets. Ceilings are principally of suspended acoustical tile with no ceilings in service rooms such as the electrical room. There is approximately 1.2-1.5m of space above finish ceilings under the roofing. Windows are replacement type vinyl fixed over projected along the rear and right side and fixed over projected bronze finish aluminum which appear to be original to the building elsewhere. Windows are in good condition with caulking replacement needed at several aluminum windows at the interface between glazing and frames. Glazing is double hermetically sealed style and is also in good condition. Exterior personnel doors are metal in pressed steel frames, some with half glass. All exterior doors are fitted with commercial hardware including panic type exit devises. Doors and frames require re-painting and some weather stripping replacement but are otherwise in good condition.

Roof leaks were not noted or reported. An aged water stain was noted on the suspended tile ceiling in the female washroom, new tile is recommended. This stain is likely from the domestic hot water tank which is located directly above this stain. It is noted in the mechanical section that the tank is not provided with a drain pan as required.

Envelope caulking other than the previously noted window sealants are in good condition.

2.1.1.2 Building Interior

Interior finish of exterior walls generally consists of studs with drywall. The line crew spaces at the front of the building and the main electrical room exterior walls interior finish is of vertical pre-painted corrugated steel liner panels to an approximate height of 2.7 m. Those finishes are generally in good condition. Partitions are generally of metal stud and drywall. The original main partitions that separated the offices from the original line depot that runs parallel to the building left to right as well as some short transverse partitions in that area are of painted masonry block.

Interior doors are generally solid core wood in pressed steel frames with a mix of commercial and residential hardware. Latches are knob style.

Flooring finish is for the most part vinyl tile, with rubber wall base. A small number of offices and the meeting room/training room have carpeting, all of which are in good condition. Vinyl tile flooring would benefit from a cleaning and waxing.

Ceilings are generally of suspended acoustical tile with the exception of the electrical room which has no ceiling.

Millwork in the kitchen is oak with upper and lower cabinets and plastic laminate counter which are in good condition. Re-finishing would be desirable. Appliances are in good condition.

The customer service counter is in fair condition and is not handicap accessible. To make the counter accessible it would have to modified to provide a lower section at 864mm height and 914 mm clear length with drive under each side to accommodate wheelchairs in accordance with the Accessibility Act of NL.

Washroom fittings are in fair to good condition.

The building has some staff lockers which are in good condition.

2.1.1.3 Building Code

The building is classified as F-3 Low Hazard – Industrial and Group "D" - Offices by the NBCC 2010.

The building generally appears to meet code, with the exception of one dead ended corridor, non-compliance with the Accessibility Act and lack of fire rating of the janitors' room. The building appears to generally meet code.

2.1.1.4 Accessibility

Despite being constructed circa 1995, after The Accessibility Act was made law the building is not accessible to persons with mobility challenges and is not compliant with the Act. The facility could be made compliant with a reasonably moderate effort such as installing sloped sidewalks to entrances, motorized door operator at the public entrance, reception counter changes, some door hardware upgrades and some washroom upgrades. However given the current age no recommendation is being made.

2.1.1.5 Selected NBCC 2010/ LSC 101 Requirements

The following provides an overview of several National Building Code 2010/Life Safety Code NFPA 101 requirements and applicable sections for this facility.

Requirements	**Compliance / Action**
1) <u>Building Occupancy</u> Group F-3 – Low Hazard Industrial Group D – Business and Person Services – Office Areas *NBCC A-3.1.3.1*	Compliant
2) <u>Group D, Up To Two Storeys</u> 1. A building classified as Group D, is permitted to conform to Sentence (2), provided: a. It is not more than 2 storeys in building height, and has a building area not more than 1000 m^2 when facing 1 street. 2. Construction is permitted to be of combustible or non-combustible construction. *NBCC 3.2.2.60*	Multiple Occupancy Building Group D – Offices Group F3 – Warehouse / Workshop Group D is most restrictive therefore governs the entire building. Compliant
3) <u>Occupant Load (Based on LSC)</u> Group F3 - Low Hazard Industrial: 106 m^2/46 m^2 per person = 2.3 persons Group D – Offices: 142 m^2/9.3 m^2 per persons = 15 persons Total Occupant Load = 18 persons (Service rooms, storage, circulation and washrooms are excluded)	Compliant
4) Rooms for storage of janitorial supplies shall have a 60 minute fire resistance rating *(NBCC 3.2.1.21)*	Provide 45 minute ULC rated door frame, provide door closer, fire caulk partitions to the steel roof deck or rated ceiling.

Requirements	Compliance / Action
5) The minimum width of a public corridor shall be 1100 mm. *NBCC 3.3.1.9*	Compliant
6) Travel Distance shall be maximum of 30 metres. *NBCC 3.4.2.5*	Compliant. Remove corridor door to eliminate dead ending.
7) Exit capacity 18 persons x 6.1 mm per person = 110 mm *NBCC 3.4.3.2*	Compliant
8) Washroom Fixture Calculation Group F-3 – 3 persons Group D – 15 person 2 washrooms provided *NBCC 3.7.2.2*	Compliant
9) The building ought to have been designed to meet the NL Accessibility Act given its size and function.	No action is recommended given the building age.
10) In a building with more than one major occupancy, the requirement of the most stringent occupancy shall apply to the entire building.	Compliant
11) Limiting distance:	Compliant

2.1.1.6 Conclusions and Recommendations

The following immediate term actions are recommended:

- Repair one leaking boardroom window.
- Remove corridor door to eliminate dead ending.
- Modify janitor room to meet fire ratings of NBCC.
- Re-paint exterior doors and frames.
- Re-paint exposed concrete floors.

Mid-term recommendations include:

- Expand the footprint and re-configure selected existing areas.

2.1.2 Structural Assessment

The line depot building is a single story steel pre-engineered structure supplied by the manufacturer ‘American Buildings’. The exterior of the building is sheathed in metal cladding. The building rests on a perimeter concrete foundation wall. The building is laterally supported by rigid frames in one direction and with rod bracing in the other direction.

2.1.2.1 Foundation and Floor Systems

The perimeter consist of a concrete foundation frost wall and a concrete slab-on-grade interior.

There is only approximately 200mm of the wall visible above grade. This portion of the wall is free from any visible cracks, delamination, spalling or any otherwise deterioration of the concrete.

The concrete floor slab is only exposed in the Line Shop area and is covered by flooring in all other areas. The slab that is exposed appeared to be in good condition.

2.1.2.2 Roof Systems

The building has a gable roof structure constructed with standing seam metal decking. The decking is supported by 200mm deep Z-shaped purlins at 1200mm spacing. The underside of the roof was inspected on the interior with access through the ceiling tiles. However, the roof insulation which was draped between the purlins, obstructed any visible inspection of the underside of the decking. From the exterior inspection of the roof, there were no visible dips or corrosion present. Overall the roof appears to be in good condition.

2.1.2.3 Framing Systems

The building is constructed from a set of five rigid steel frames featuring tapered wide flange columns and sloped prismatic wide flange beams. The beams are approximately 750mm deep with 200mm wide flange. The bottom half of the columns are concealed in the interior wall finishes and hence could not be inspected. The top portion of the column and beams are visible above the ceiling tiles. All of the frames appeared to be in good condition with no signs of overstress or corrosion. The wall girts supporting the metal cladding were concealed behind the interior wall finish and not visible for inspection.

2.1.2.4 Conclusions and Recommendations

Overall the main building of the St. Anthony Office site is in good condition No defects were noted during the inspection.

2.1.3 Mechanical Assessment

2.1.3.1 Plumbing – Drainage, Waste, and Venting

The facility is provided with two washrooms. The male washroom contains one water closet, two urinals, and one lavatory. The female washroom contains one water closet and one lavatory (see Mechanical Photos 1 to 3).

The Lunch Room is provided with a countertop stainless steel sink (see Mechanical Photo 4). It was observed that the sink is vented with an air admittance valve (see Mechanical Photo 5). This valve should not be installed as the sink is located near other plumbing groups where it can be vented through the roof with the other fixtures.

The washroom group venting terminates above the ceiling and not through the roof as per the plumbing code (see Mechanical Photo 6).

A clothes washer is located adjacent to the Line Shop and is provided with a standpipe for drainage. The washer drainage is properly vented through the roof.

Visible sanitary drainage and vent piping is ABS.

The sloped roof of the building is not provided with any roof drains. A gutter and downspout system is provided on the front of the building.

2.1.3.2 Plumbing – Domestic Water Piping and Systems

Domestic water is provided from the municipal system. The water is believed to enter the building near the washroom group though no water entrance was observed.

Hot water is generated by a 143 Litre (30 Imp Gal) electric hot water tank (see Mechanical photo 7). The tank is a 3 kW GSW model number SS40SDE. The tank was manufactured in 2005 based on its serial number. Based on its date of manufacture this tank has served its useful life. The hot water heater appeared to work properly. Hot water temperature was measured to be 46.6°C. It is recommended to adjust the existing water heater thermostat to have hot water heated to a minimum 50°C to prevent the possible formation of Legionella bacteria (until such time as the water heater is replaced). The hot water tank is located on a platform above the Female Washroom. The tank is not provided with a drain pan and drain line as per the plumbing code. It is recommended that a hub drain complete with trap guard be installed above the ceiling to allow drainage from the hot water tank.

Hot and cold water piping within the building is copper and only partially insulated. The piping appears to be in good condition however it is not properly supported in a number of areas (see Mechanical photo 7). No exterior hose bibs were observed on the building.

2.1.3.3 Plumbing – Fixtures

Water closets are floor mounted type with flush box. The water closets worked properly. The seat on the water closet in the Female Washroom was observed to be very loose and should be tightened.

Urinals are wall hung china units with manual flush valves. The urinals worked properly. It is recommended that electronic hands free flush valves be fitted to the urinals.

Lavatories are wall hung china units with two handle faucets. The faucet worked properly.

The Lunch Room is provided with a double bowl countertop stainless steel sink. The sink and two handle faucet are in good condition and operated properly.

2.1.3.4 HVAC – Air Handling Systems

The facility is provided with three exhaust fans. The Lunch Room is provided with a microwave with built in fan which is ducted through the exterior wall to the outside with a wall cap to service the range (see Mechanical Photo 4). The fan operated properly.

The Male Washroom is provided with a residential type ceiling exhaust fan (see Mechanical photo 9). The fan is a Nutone model 672SP. The fan is likely original to the building and in good condition. The fan is ducted to the outside with a wall cap.

The Female Washroom is provided with a residential type ceiling exhaust fan. The fan is a Nutone Model Q1-110CA. The fan is likely original to the building and in good condition. It was observed that the fan is not ducted to the outside but exhausts into the ceiling space (see Mechanical photo 10)

Two through the wall air conditioning units are provided, one located in the Line Shop and the second in the Boardroom. Both units are Comfort-Aire model BG-123J and utilize R410a refrigerant. The ages of the units are unknown. Both units operated well when tested.

Two insulated vent ducts were observed in the ceiling space above the Line Crew office that were provided with wall caps. The ducts are open ended above the ceiling and currently serve no purpose. It is believed they originally served the lunch room and washroom which were located in this area of the building. They should be removed to prevent drafts from entering the ceiling space.

2.1.3.5 HVAC – Ventilation Air

There is no source of ventilation air for the building other than what infiltrates through cracks in the building envelope and around openings such as doors and windows. This building is not compliant with the National Building Code of Canada which required all buildings to be ventilated in accordance with ASHRAE 62.1.

It is recommended that a ventilation system be installed in the building to bring in outside air. Use of heat recovery ventilator is recommended for energy savings. The existing washroom exhaust fans could be removed and washroom and lunch room exhaust ducted to the new heat recovery unit. The new system would be provided with an outside air intake, exhaust air discharge, supply air electric tempering coil, associated controls, and distribution ductwork and grilles. There is sufficient space above the suspended ceiling to locate the unit. Ductwork would run concealed above the existing suspended ceilings.

2.1.3.6 HVAC – Controls

There are no HVAC controls present. Existing fans are controlled by toggle switches.

2.1.3.7 Fire Protection

The facility is provided with four dry chemical fire extinguishers. One extinguisher is located near the front entrance and is rated 10A80BC and is a 9.1 kg (20 lb) size. A second extinguisher is located in the Lunch Room is rated 1A5BC and is a 1.1 kg (2.5 lb) size. A third extinguisher located in the reception area is rated 6A80BC and is a 4.5 kg (10 lb) size. The fouth extinguisher is located in the Corridor near the Female Washroom and is a 4.5 kg (10 lb). The extinguishers are regularly inspected and are up to date.

2.1.3.8 Conclusions and Recommendations

The following recommendations are made for mechanical improvements to the depot building.

Plumbing:

- Vent lunch room sink properly.
- Extend washroom group plumbing vent through roof.
- Adjust hot water temperature to be above 50°C.
- Provide drain pan for hot water tank.
- Provide hub drain above ceiling for drainage from hot water tank.
- Insulate remainder of accessible domestic water piping.
- Provide proper pipe supports for domestic water piping.
- Tighten toilet seat in Female Washroom.
- Provide electronic hands free flush valves on urinals.

HVAC:

- Provide exhaust ducting to outside and wall cap for Female Washroom exhaust fan.
- Remove abandoned insulated ducting above Line Crew office and associated wall caps and seal exterior wall penetrations.
- Provide heat recovery ventilation system throughout building.

2.1.4 Electrical Assessment

2.1.4.1 Service and Distribution

2.1.4.1.1 Description

The electrical service enters the office building overhead from a single phase pole mounted distribution transformer located near the office building. There are two (2) building service entrances originating from the same overhead transformer (Refer to Electrical photo 1).

Revenue metering is performed at 120/240V, single phase, 200A service. Both meters (N&L Hydro Meter #A12566 and #A12567) are located building wall outside the electrical room.

The main incoming service conductors to the building are connected to two (2) 200A, 120/240V, 1 PH, 3W, 42 CCT service entrance panelboards LP1 and LP2 (Refer to Electrical photo 2). The panelboards feeds all building lighting, receptacles, heaters, fans and other general loads.

Service entrance grounding is provided at the building service entrance panels using grounding rods driven in the ground outside the building.

2.1.4.1.2 Observations

The incoming 2 x 200A service capacity appears to be adequate based on the loads observed in the building. However the installation of two separate services of the same voltage is not permitted under the Canadian Electrical Code.

Panelboards are surface mounted on building interior wall. The panelboards are Federal Pioneer, NBLP42B-3AB, twenty two (22) years old and are in good condition. There were no visible signs of excessive wear or corrosion.

There is no sufficient spare capacity on panelboard LP1 and more than 50% spare capacity on panelboard LP2.

There are stored materials in the electrical room that restrict the access to the electrical equipment.

2.1.4.1.3 CONCLUSIONS

Overall condition of the service entrance and the electrical distribution system appears to be in good condition.

The existing dual service entrance is required to be upgraded to a single entrance. A single new service entrance including new main disconnect and splitter should be provided to feed both existing 200A, 120/240V service entrance panelboards LP1 and LP2. The jumper between neutral and ground bar for both existing service entrance panelboards shall be removed. The neutral for the new service entrance shall be bonded to ground at the new main disconnect. The new equipment would include a 400A splitter, 400A main disconnect with fuses, service mast, and a new cabinet with CT's.

2.1.4.2 EMERGENCY POWER SYSTEM

There is no emergency power diesel generator.

2.1.4.3 LIGHTING

2.1.4.3.1 DESCRIPTION

The building office area is illuminated by 4 ft. recessed acrylic lens fluorescent fixtures with a T8 Lamps. (Refer to Electrical photo 3). The electrical room is illuminated by 4 ft. suspended and surface mounted acrylic lens fluorescent fixtures with a T8 Lamps (Refer to Electrical photo 4).

Building exterior lighting is provided by seven (7) HID wallpacks c/w integral photocells (Refer to Electrical photo 5).

The building lighting is fed from the 120/240V panelboard LP1.

2.1.4.3.2 OBSERVATIONS

The building interior observed to have adequate lighting levels as required by the latest edition of the NBCC. The interior and exterior lighting fixtures appear to be in good condition.

2.1.4.3.3 EXIT AND EMERGENCY LIGHTING

The building emergency lighting is provided by dual head incandescent battery-backed emergency lighting units (Refer to Electrical photo 6).

The building is equipped with self-luminous exit signs located throughout (Refer to Electrical photo 7).

2.1.4.3.4 Observations
Emergency lighting units and exit signs are adequate and are in good condition. The emergency lighting units and exit signs are relatively new and in good physical condition. All tested emergency lighting units operated properly.

2.1.4.3.5 Conclusions
Provide 30-second monthly functional test. Consider battery replacement for 10 years old lead acid battery or for 15 years old nickel cadmium battery.

2.1.4.4 Heating System
2.1.4.4.1 Description
The whole building is heated by electric heaters c/w wall mounted line voltage thermostats. Most of the building is heated by baseboard heaters. There are also some wall fan heaters in the corridor c/w integral thermostats (Refer to Electrical photo 8).

2.1.4.4.2 Observations
The electric heaters are in good physical condition. There were no visible signs of excessive wear or corrosion.

2.1.4.5 Wiring Devices
2.1.4.5.1 Description
U-grounded, duplex receptacles are installed throughout the building. Receptacles are recessed. The outdoor receptacles are weather protected type duplex receptacles.

The lighting control for interior and exterior lighting is provided by individual lighting switches.

2.1.4.5.2 Observations
Building receptacles and lighting switches appear to be original. They are sufficient quantity and are in good condition. The outdoor receptacles are relatively new and in good physical condition.

2.1.4.6 Wiring Methods

2.1.4.6.1 Description
Wiring system appears to be a combination of AC-90 cabling and building wires in EMT installed exposed in the electrical room and concealed in walls and above ceiling in the rest of the building (Refer to Electrical photo 9).

2.1.4.6.2 Observations
The observed branch circuit wiring was in overall good condition.

2.1.4.7 Fire Alarm
The fire alarm system is ten (10) zone EST FireShield, relatively new and in good physical condition. The fire alarm panel is located near the main building entrance. (Refer to Electrical photo 10)

The fire alarm system devices including smoke detectors, horns/strobes and pull station are adequate and are in good condition.

2.1.4.8 Data and Communications

2.1.4.8.1 Description

The building telecommunication cables enters the building in the electrical room overhead supported to dedicated service mast on building exterior wall. The cables enters telecommunication box located next to service entrance panel board LP2. All telecom equipment including but not limited to telephone BIX blocks, telecom racks, patch panels, Ethernet switches, etc. and cabling is not more than 10 years old and is in good condition. Refer to Electrical photos 11 and 12.

The telephone system including the telephone equipment is relatively new, VoIP type and in good condition.

2.1.4.9 CCTV / Security System

There is a proximity card access control system that controls access to the building during afterhours. The card access system is in good condition. There is no CCTV system only camera integrated in the intercom Aiphone model JF-DA (Refer to Electrical photo 13).

2.1.4.10 PA System

There is public address (PA) system in the building integrated with the telephone system. The loudspeakers are surface mounted on building exterior walls (Refer to Electrical photo 14). The speakers are in good physical condition.

2.1.4.11 Conclusions and Recommendations

Remove the materials stored in the electrical room and install warning sign on electrical room door “Electrical Room – No storage permitted”. There are no any other critical issues with systems or equipment that require immediate action.

2.1.5 Environmental Review

2.1.5.1 Air Emissions

No air emissions are present from the facility from fuel burning equipment or processes using chemicals.

2.1.5.2 Asbestos Containing Materials

Based on the age of the facility the presence of asbestos containing materials is unlikely. Asbestos survey reports provided to the consultant did not indicate the presence of asbestos in this building.

2.1.5.3 Lead Containing Materials

Based on the age of the facility the presence of lead containing materials is unlikely.

2.1.5.4 PCB Containing Materials

Fluorescent lighting in the facility is not old enough to be of concern for presence of PCB’s that were commonly used in older lighting ballasts.

2.1.5.5 Ozone Depleting Substances

There was no presence of ozone depleting substances such as CFC refrigerants or Halon fire extinguishing systems.

2.1.5.6 Indoor Air Quality
While no indoor air quality issues were noticed while on site, as the facility is not provided with a proper ventilation system, any odours, or VOC's from off gassing cannot be removed from the building.

2.1.5.7 Mould and Mildew
No signs of mould or mildew were present throughout the building.

2.1.5.8 Spills and Contaminated Areas
No signs of spills were observed either inside the depot building or around the site. A film was observed on water in the ditching along the highway (see Environmental photo 1) which is located off of the subject property.

2.1.5.9 Flammable and Combustible Liquids Storage
No flammable or combustible liquids were observed in the building or within the fenced area of the building.

2.1.5.10 Compressed Gases Storage
One cylinder of compressed sulfur hexafluoride gas was observed on site near the north east corner of the building (see Environmental photo 2).

2.1.5.11 Conclusions and Recommendations
Indoor air quality should be addressed as per the recommendation in the mechanical section of this report.

2.1.6 Energy Usage Review
Knowing the energy consumption of a facility from all sources (electricity, petroleum fuels, etc.) an energy use intensity (EUI) can be calculated which can be compared to benchmark EUI's for various types of buildings in Canada. These benchmarks represent median EUIs for various types of facilities. Energy usage information was provided for the years 2012 to 2016 for this site. Based on the Office building area and the energy consumption the EUI was calculated for each of these years to be 0.81, 0.83, 0.88, 0.86, and 0.88 respectively.

Based on the EUI tables for various building uses, the median Site EUI for a utility building is 0.91. Based on this the St. Anthony office building would appear to be slightly better energy efficient wise than the national median value. However the building is not provided with a proper ventilation system which would increase the EUI to greater than 0.91. Allowing for this factor it can be concluded that the building is somewhat less efficient than the benchmark building of this type.

2.2 Storage Shed
2.2.1 Architectural Assessment
The building is of recent construction. The single open storage room building is some 37m^2 in area. It is constructed of 38 x 140 mm wood stud frame with horizontal vinyl siding, vinyl clad eaves and asphalt shingle roofing. The floor is of wood joists with plywood finish. The building has pre-engineered wood roof trusses. It is uninsulated and principally unfinished at the interior except for a small area of plywood wall finish. Access is via one residential steel door with a pair of steel doors at the front for loading. The floor has sagged noticeably due to the large loading from the rack

storage. It is mounted on concrete patio blocks and is some 500 mm above finish grade. The building has one vinyl window which is in good condition. Other than the floor sag and overly high steps rise the building is in good condition.

2.2.1.1 Building Exterior Envelope

The building is of 38 x 140 mm wood stud, plywood, air barrier and horizontal vinyl siding. Eaves are clad with perforated vinyl soffit and fascia. Roofing is of asphalt shingles on a sloped gable style roof. Roof structure is of pre-engineered wood trusses. The exterior envelope is not insulated and has no vapour retarder and limited interior finishes. Exterior side personnel door is residential steel in residential wood frames, double front loading doors are commercial steel in pressed steel frames with commercial hardware. One vinyl window is present. The floor consists of wood joists and plywood on support blocks some 500 mm above grade. The floor structure is noticeably sagged.

2.2.1.2 Building Interior

The interior consists on one open space with only a limited finish of plywood on studs. Studs, roof trusses and plywood flooring are exposed.

2.2.1.3 Building Code

The building is classified as F-3 – Low Hazard Industrial - Storage Shed by NBCC 2010

With the exception of the height of the access door step risers the building appears to meet code.

2.2.1.4 Accessibility

The building is not, in accordance with The Accessibility Act required to be accessible to persons with mobility challenges due to its small size and use.

2.2.1.5 Selected NBCC 2010/LSC 101 Requirements

The following provides an overview of several National Building Code 2010/Life Safety Code NFPA 101 requirements and applicable sections for this facility.

Requirements	**Compliance / Action**
1) <u>Building Occupancy</u> Group F-3 *NBCC A-3.1.3.1*	Compliant
2) <u>Group F, Division 3, Up To Two Storeys</u> 3. A building classified as Group F, Division 2 is permitted to conform to Sentence (2) provided: b. It is not more than 2 storeys in building height, and c. It has a building area not more than 1600 m^2 when facing 1 street 2. The building referred to in Sentence (1) is permitted to be of combustible construction or non-combustible construction used singly or in combination. *NBCC 3.2.2.83*	Compliant
3) <u>Occupant Load (Based on LSC)</u> Group F3 - Low Hazard Industrial: 37 m^2/46 m^2 per person	Compliant

Requirements	Compliance / Action
= 1 person Total Occupant Load = 1 person	
4) Exit Capacity The maximum size of rooms or suites with one exit are as follows: Group F-3 – 200 m^2 with a 15 metre travel distance to the egress door. *NBCC 3.4.2.1.A*	Compliant
5) Travel Distance shall be maximum of 30 metres. *NBCC 3.4.2.5*	Compliant
6) Exit capacity 1 person x 6.1 mm per person = 6.1 mm *NBCC 3.4.3.2*	Compliant
7) Washroom Fixture Calculation *NBCC 3.7.2.2*	Building is used for storage only. No washroom required.
8) The building need not be designed to meet the NL Accessibility Act requirements due to its size and function.	
9) Limiting distance:	Compliant
10) Maximum height of exterior stair risers shall be 200 mm Modify risers to comply. Currently they are 230 mm in height. *NBCC 9.8.4.1*	Modify risers to comply

2.2.1.6 Conclusions and Recommendations

The building is in excellent and requires only minor improvements . Items to be addressed include:

- Upgrade side door entry steps and landing to make riser to code.

2.2.2 Structural Assessment

The small storage shed located on site at St. Anthony Office site is a timber framed structure with a timber truss gable roof. The building is supported on timber sleepers on concrete pads resting on grade.

2.2.2.1 Foundation and Floor Systems

The floor system consists of 20mm plywood over 38 mm x 184 mm wood floor joists at 400 mm on center. The floor joists rest on 140 mm x 140 mm pressure treated beams. The beams run parallel along the two outside edges and in the middle. Each beam line consists of two beams butted together in the middle of the shed over a support. The beams are supported on 140 mm x 140 mm x 600 mm long blocks at each end of the shed and in the middle. The blocks, in turn sit on 600 mm x 600 mm x 50 mm unreinforced concrete patio blocks.

All of the concrete patio blocks are cracked at the center due to improper bearing and overloading. The rear beams along the three lines are all deflected with the most severe deflection occurring in the middle beam. The deflection in the beams has caused a large sag in the floor at the rear of the shed under the storage racks.

The floor joists are in good condition with no signs of any decay.

2.2.2.2 Roof Systems

The roof system of the equipment shed is timber framed gable trusses at 600mm spacing sheathed in plywood. The top and bottom chords and web members are constructed from 38mm x 89mm wood studs and joined together with plywood gusset plates. The roof trusses and sheathing are in very good condition.

2.2.2.3 Framing Systems

The walls of the equipment shed are constructed of 38mm x 140mm wood studs at 400mm on center and sheathed with plywood on the outer face. The walls are in good condition.

2.2.2.4 Conclusions and Recommendations

The superstructure of the storage shed (i.e. floor joists, walls and roof) are in very good condition but the substructure (beams and blocking) is in poor condition due to loading of materials stored in the building. Based on the defects noted the following recommendation is given.

- Consideration should be given to the replacement of the concrete pavers and adding more intermediate supports at the rear of the shed where the beams are deflected most severely.

2.2.3 Mechanical Assessment

2.2.3.1 Plumbing – Drainage, Waste, and Venting

No drainage waste or vent systems are present in the building.

2.2.3.2 Plumbing – Domestic Water Piping and Systems

No domestic water systems are present in the building.

2.2.3.3 Plumbing – Fixtures

No plumbing fixtures are present in the building. A self-contained eyewash unit was observed laying on the floor. The unit would not be suitable for the shed as it is not heated.

2.2.3.4 HVAC – Air Handling Systems

No air handling systems are present in the building.

2.2.3.5 HVAC – Ventilation Air

No ventilation air systems are present in the building. Natural ventilation can be achieved through use of building openings.

2.2.3.6 HVAC – Controls

No HVAC controls are present in the building.

2.2.3.7 Fire Protection

The facility is not provided with any fire extinguisher s. One should be provided.

2.2.3.8 Conclusions and Recommendations

Based on the intended use of this building no mechanical systems are required. A fire extinguisher should be provided.

2.2.4 Electrical Assessment

2.2.4.1 Service and Distribution

2.2.4.1.1 Description

The electrical service enters the storage shed underground from Panelboard LP1 located in office building electrical room. The storage shed is fed from 30A, 2P circuit breaker on panel circuits #29/31.

There is no dedicated revenue metering for the storage shed.

The main incoming service conductors to the building are connected to a 125A, 120/240V, 1 PH, 3W Cutler-Hammer CMP116 load center (Refer to Electrical photo 1). The load center feeds building lighting and receptacles.

Service entrance grounding is provided at the building load center through bonding conductor connected to office building grounding system.

2.2.4.1.2 Observations

The incoming 30A service capacity appears to be adequate based on the loads observed in the building.

The load center is relatively new, surface mounted and in good physical condition.

There is sufficient spare capacity available on the panelboard.

2.2.4.2 Emergency Power System

There is no emergency power diesel generator.

2.2.4.3 Lighting

2.2.4.3.1 Description

The storage shed interior is illuminated by four (4) surface mounted incandescent lighting fixtures (Refer to Electrical photo 2). There is no building exterior lighting.

The shed lighting is fed from the 120/240V load center.

2.2.4.4 Exit and Emergency Lighting
Not Available.

2.2.4.5 Heating System
2.2.4.5.1 Description
The building is not heated. There is no reason electric heater to be added because the building is not insulated.

2.2.4.6 Wiring Devices
2.2.4.6.1 Description
U-grounded, duplex receptacles are installed throughout the building. The receptacles are new, in fair condition but without faceplates (Refer to Electrical photo 3).

2.2.4.7 Wiring Methods

2.2.4.7.1 Description
Wiring system is completed with exposed AC-90 cabling. There are no building interior wall finishes or ceiling.

2.2.4.7.2 Observations
The wiring appears to be in good condition.

2.2.4.8 Fire Alarm
Not available.

2.2.4.9 Data and Communications
Not available.

2.2.4.10 CCTV / Security System
Not available.

2.2.4.11 PA System
Not available.

2.2.4.12 Conclusions and Recommendations
1. Install receptacle faceplates for the storage shed receptacles.
2. Install emergency light unit in the storage shed.

2.2.5 Environmental Review
2.2.5.1 Air Emissions
No air emissions are present from the facility from fuel burning equipment or processes using chemicals.

2.2.5.2 Asbestos Containing Materials
Based on the age of the facility the presence of asbestos containing materials is unlikely. Asbestos survey reports provided to the consultant did not indicate the presence of asbestos in this building.

2.2.5.3 Lead Containing Materials
Based on the age of the facility the presence of lead containing materials is unlikely.

2.2.5.4 PCB Containing Materials
Based on the age of the facility the presence of PCB materials is unlikely.

2.2.5.5 Ozone Depleting Substances
No ozone depleting substances were identified in the building.

2.2.5.6 Indoor Air Quality
No indoor air quality issues were noticed while on site.

2.2.5.7 Mould and Mildew
No signs of mould or mildew were present throughout the building.

2.2.5.8 Spills and Contaminated Areas
One spill was observed on the wood floor See Environmental photo 3).

2.2.5.9 Flammable and Combustible Liquids Storage
No flammable or combustible liquids storage was present.

2.2.5.10 Compressed Gases Storage
No compressed gas storage was present.

2.2.5.11 Conclusions and Recommendations
There are no environmental concerns to report.

2.2.6 Energy Usage Review
Knowing the energy consumption of a facility from all sources (electricity, petroleum fuels, etc.) a energy use intensity (EUI) can be calculated which can be compared to benchmark EUI's for various types of buildings in Canada. These benchmarks represent median EUIs for various types of facilities. As no specific energy usage information was provided to the consultant for this building a EUI could not be calculated and compared to benchmark data.

As power is limited to occasionally used lights and receptacle loads with no heat and the building is not insulated there is no reason to evaluate this building from an energy performance perspective.

2.3 Civil/Site Assessment
2.3.1 Asphalt and Concrete Surfaces
The site is largely asphalt surface with gravel present on the left side and rear of the building (see Site Civil photos 1 to 8). Concrete surfaces are provided at all building entrances (see Site Civil photos 9 to 11). Both the asphalt and concrete surfaces are in good condition with no serious cracks or undermining present. There is asphalt surface on the right hand side of the building that appears to have been excavated and infilled at some point that has settled significantly and there is a large depression present (see Site Civil photo 12). The reason why this area was excavated is not known.

2.3.2 Water and Sewer

Water supply for the building is from the municipal system. Water supply likely enters the building near the left side washroom group. The facility is connected to the municipal sanitary system. Based on the original site drawings a 25mm water and 100mm sewer enter the building on the left side near the washroom group and are heat traced. It was observed that a heat trace controller is present on the side of the building in this area (see Site Civil photo 13).

No issues were reported with the water and sewer systems.

2.3.3 Drainage

The site generally slopes from the rear to the front where a drainage ditch is present. Storm water runs over the surface as no underground storm system is present. Standing water was observed in a couple of gravel locations on the left side of the building and on the right hand side of the building and at the asphalt depression noted previously in this section (see Site Civil photos 14, 15, and 12).

Original site drawings indicate the right hand side of the building is provided with foundation drainage to a rock sump.

2.3.4 Site Fencing

The depot yard is surrounded by a chain link fence. The depot building forms a portion of the physical barrier at the front of the site. Access gates are located on the left side and front right side.

Inspection of the fencing revealed minor issues including (see Site Civil Photos 16 to 22):

- The gates at the left side need to be realigned.
- A cross brace at the left side is detached and the bracket is missing.
- One strand of barbed security wire is off on the left side.
- Three sections of fencing is pushed back off the bottom and held on with plastic tie wraps at the rear.
- Cross braces at the right side are detached from their brackets in three locations.

2.3.5 Conclusions and Recommendations

The following issues were identified that should be addressed in the near term.

- Remove section of asphalt on right side, infill depression and compact, and resurface with asphalt.
- Bring in gravel to infill various depressions in gravel way on left side of building.
- Repair minor issues in site fencing.

CHAPTER 3 REHABILITATION EXPANSION UPGRADE ASSESSMENT

3.1 St. Anthony Office Building

Based on current usage, and beyond repairs and code upgrades identified in Chapter 2 of this report, expansion is recommended for this facility. Over the past few years through two iterations this facility has been transformed from a warehouse/line shop to essentially a full office building. Personnel on site indicated that they have inadequate space and that an expansion of the building would be required to accommodate their needs. To accommodate future expansion it is proposed to add a 137m^2 extension to the left side and re-configure parts of the existing floor plan to better accommodate staff and functions. Work would specifically include a new extension to house a new line crew area and larger training room/meeting room, reconfigure the existing training room/boardroom into offices, and convert existing line crew areas into offices and storage. A concept plan of the proposed extension and renovations is provided in Appendix F.

The building extension would be slab on grade construction with concrete foundation wall and footings, wood frame construction, pre-engineered roof trusses, batt insulation, wood sheeting, metal roofing, and commercial metal siding. Alternatively, a pre-engineered steel extension could be provided to match the existing structure complete with metal roofing and commercial metal siding. A suitably sized overhead door with electric operator would allow easy access to the line shop area. A single man door would also be provided for this space. Interior finishes would be a combination of drywall and painted plywood in low areas of the line shop and suspended acoustical ceilings

Mechanically the extension would be fitted with potable water distribution and sanitary drainage for the new janitor space and clothes washer. These would be tied into existing services. The proposed heat recovery ventilation system would be extended to this area or an independent one provided if the extension construction occurred after the existing building was serviced. Fire extinguishers would be provided for fire protection.

Electrically the extension would be serviced through the existing service. A new 120/240 volt sub panel would be provided if required for additional circuits. Interior lighting would be T8 fluorescent or LED. Exterior lighting would be LED with photocell control. New battery powered emergency lighting units would be provided. Sufficient receptacles would be provided throughout. Heating would be with electric unit heaters and baseboards. New data and communications outlets would be provided and the fire alarm system expanded to the new area.

3.2 St. Anthony Storage Shed

Based on current usage, and beyond repairs and code upgrades identified in Chapter 2 of this report, no major rehabilitation, expansion, or upgrades are recommended for this facility.

CHAPTER 4 COST ESTIMATES

4.1 Recommended Renovations and Improvements to Existing Facilities

4.1.1 Purpose

This section provides an overview of the costs associated to complete the recommended repairs and upgrades outlined above for each building to maintain current operations and functionality and comply with current codes. New construction and extension cost estimates include incorporation of expansion, and upgrading of facilities to service future operational requirements.

Renovation, maintenance and repair costs are grouped into three categories: Immediate; Mid-Term; and Long-Term. The work considered for immediate repairs would include all things which pose a threat to life safety and would also include correcting deficiencies with structural, civil, environmental, mechanical, and electrical. For the regularly occupied buildings, and buildings intended for long-term use, these renovations would be very important to complete for the safety, well-being, and comfort of occupants. For buildings determined to be unsuitable for long-term future use, only repairs which are deemed absolutely necessary would be considered.

Mid-term repairs would be intended for completion in the 3 to 10 year range, assuming the repairs listed as immediate are completed. This could include such items as architectural finishes replacement, end of serviceable life equipment replacement or upgrading of equipment to better service the facility. The long-term repair category would also only apply to buildings intended for extended use as these repairs would fall in the range of 10 to 20 years. These long-term repairs also require the immediate and mid-term repairs to be completed as intended.

4.1.2 Cost Estimating Accuracy

The estimates contained in this report are intended to provide order of magnitude construction costs only and are accurate to Class 3 (-10 to +30%) standards as per generally recognized industry practices. Estimates are based on the site observations (repairs & upgrades) and with the owner's future use and operations considered (new construction/extension). The estimates include appropriate contractor overhead, design contingency and location factors. All estimates are intended to provide an order of magnitude indication of the final project cost and are considered to be sufficient for the purpose of analyzing the redevelopment options under consideration. The figures listed below are an indication of the probable construction cost at the time of this report and are intended to represent fair market value of the scope of work assuming that such work is grouped into reasonably sized contract packages. Unless noted otherwise, architectural and

engineering design fees are not included, nor are value-added taxes. All costs are expressed in Canadian dollars.

4.1.3 St. Anthony Office Building

4.1.3.1 Immediate Maintenance and Repairs

The following renovations, repairs, and/or upgrades are recommended to be completed within the next two years, assuming the facility is intended to continue operations.

Architectural:

- Enclose janitor area, creating an enclosed fire rated room of 60 minutes to NBCC - $4,500
- Eliminate existing corridor door to remove one-way dead ended emergency exiting - $1,500
- Repair one leaking window in boardroom - $1,500

Site/Civil:

- Remove section of asphalt on right side, infill depression and compact, and resurface with asphalt - $4,000
- Bring in gravel to infill various depressions in gravel way on left side of building - $1,200
- Repair minor issues in site fencing - $5,500

Mechanical:

- Vent lunch room sink properly - $1,500
- Extend washroom group plumbing vent through roof - $1,000
- Adjust hot water temperature to be above 50°C - $200
- Provide drain pan for hot water tank - $300
- Provide hub drain above ceiling for drainage from hot water tank - $1,200
- Insulate remainder of accessible domestic water piping - $2,500
- Provide proper pipe supports for domestic water piping - $1,000
- Tighten toilet seat in Female Washroom - $200
- Provide electronic hands free flush valves on urinals - $4,400
- Provide exhaust ducting to outside and wall cap for Female Washroom exhaust fan - $500
- Remove abandoned insulated ducting above Line Crew office and associated wall caps and seal exterior wall penetrations - $1,200
- Provide heat recovery ventilation system throughout building - $38,000

Electrical:

- Upgrade the existing electrical service from a dual service to a single service - $18,000
- Remove the materials stored in the electrical room and install warning sign on electrical room door “Electrical Room – No storage permitted” - $500

Estimated total cost for immediate repairs and upgrades:
$88,700 sub-total cost x 10% contingency = $97,600 total cost

4.1.3.2 Mid-Term Maintenance and Repairs

The following list contains recommended renovations and repairs for completion in the next 3 to 10 years, again assuming the building will remain in operation. These repairs would progress after the items listed in the immediate repair category are complete.

Architectural:

- Modification of building to meet The Accessibility Act - $31,000
- Re-paint exposed concrete floor slabs - $3,500
- Provide gaskets at fascia edge of steel roof panels to mitigate against drafts and snow entry - $6,000
- Re-paint exterior doors and frames - $1,800

Electrical

- Replace emergency lighting unit's batteries - $800

Estimated total cost for mid-term repairs and upgrades:
$43,100 sub-total cost x 10% contingency = $47,400 total cost

4.1.4 St. Anthony Storage Shed

4.1.4.1 Immediate Maintenance and Repairs

The following renovations, repairs, and/or upgrades are recommended to be completed within the next two years, assuming the facility is intended to continue operations.

Architectural:

- Modify side personnel entry door steps to those with rise to meet code - $1,200

Structural

- Floor beams were severely deflected and should be provided with additional support - $4,500
- All concrete pads have fractured and should be replaced with more suitable units - $3,400

Mechanical:

- A fire extinguisher should be provided - $300

Electrical:

- Install receptacle faceplates for the storage shed receptacles - $300
- Install emergency light unit in the storage shed - $1,000

Estimated total cost for immediate repairs and upgrades:
$10,700 sub-total cost x 10% contingency = $11,800 total cost

4.2 New and Expanded Building Options

4.2.1 New Depot Building

The opinion of probable cost to construct the proposed building extension is presented in the table below.

Item	Probable Cost ($)
Demolition of left side siding, openings, floor cutting, etc	13,000
Site grading, foundation drainage	18,000
Substructure and slab on grade	66,300

Item	Probable Cost ($)
Roof structure	23,700
Framing and exterior envelope	92,900
Roof coverings	19,700
Openings - doors, windows	27,500
Plumbing	5,000
HVAC	19,800
Electrical	54,000
Subtotal	339,900
Contractor travel, accommodations, bonding, insurance, project management, general contractor mark-ups.	102,000
Design and project management costs	88,400
Total	530,300

CHAPTER 5 CAPITAL COST SUMMARY AND COMPARISON OF SCENARIOS

5.1 Capital Cost Summary

5.1.1 Table 2: Capital Cost Summary

Building/Action	Construction Costs
Office Building	
Immediate (1-2 years)	$97,600
Mid-Term (3-10 years)	$47,400
Long-Term (10-20 years)	$0
Storage Shed	
Immediate (1-2 years)	$11,800
Mid-Term (3-10 years)	$0
Long-Term (10-20 years)	$0
New extension to existing building	$530,300

Costs provided in these tables do not include HST. Costs provided are in current Canadian dollars and escalation values may have to be applied to renovations in future years to account for such factors as inflation, exchange rate, and competitiveness of construction industry.

This opinion of probable costs is presented on the basis of experience, qualifications, and best judgment. It has been prepared in accordance with acceptable principles and practices. Sudden market trend changes, non-competitive bidding situations, unforeseen labour and material adjustments and the like are beyond the control of CBCL Limited. We cannot warrant or guarantee that actual costs will not vary significantly from the opinion provided.

FINAL REPORT

Issued by:

Paul Sceviour, MASc., P.Eng.
Senior Mechanical Engineer

APPENDIX A

Site Photos – St. Anthony Office Building

APPENDIX A

ARCHITECTURAL PHOTOS

Left façade with storage shed in background.

Right façade with public entrance.

Rear façade and partial left.

Front and left facades.

Front facade and partial right.

Roofing

Front façade.

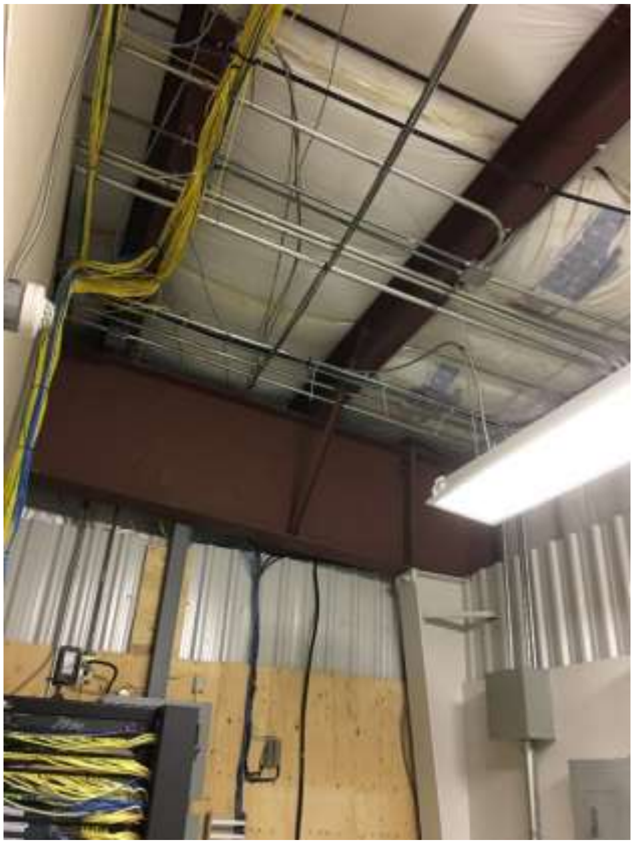
Left façade kitchen door and cladding damage.

Public entrance.

Kitchen/lunch.

Meeting/training room.

Main corridor looking towards staff entrance at front of building. Kitchen at right.



Electrical/communications room.

Electrical/communications room.

Male washroom.

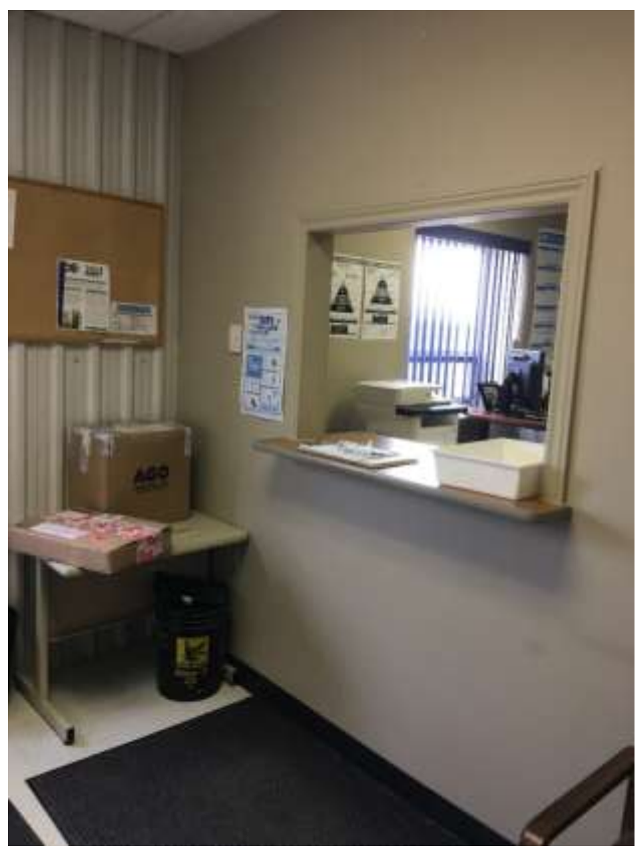
Male washroom.

Main corridor looking towards public entrance to building.

Interior public vestibule door.

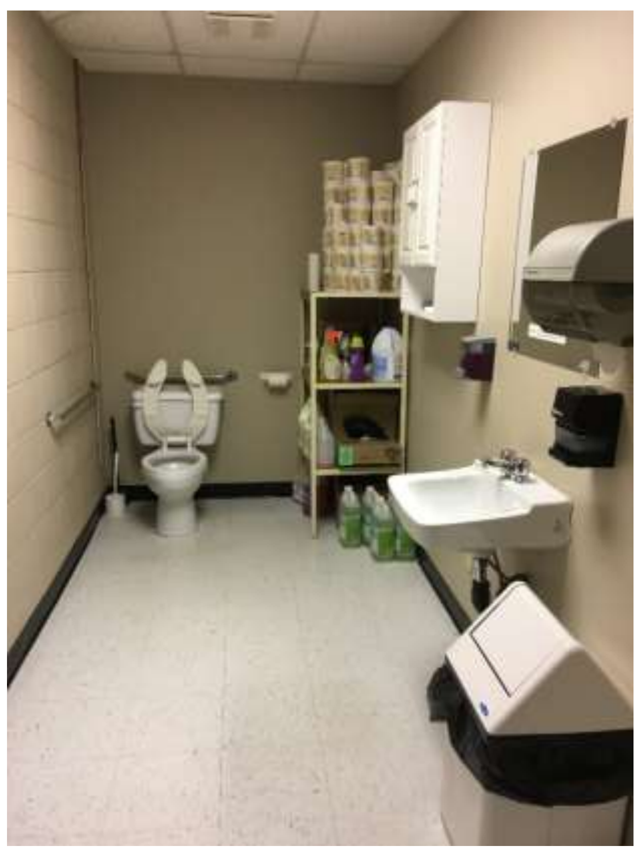
Public reception, general office beyond.

Public vestibule and reception counter.



Public vestibule.

Female washroom.



APPENDIX A

STRUCTURAL PHOTOS

Nalcor Assessments – St. Anthony
Structural – Office Building

Photo 1

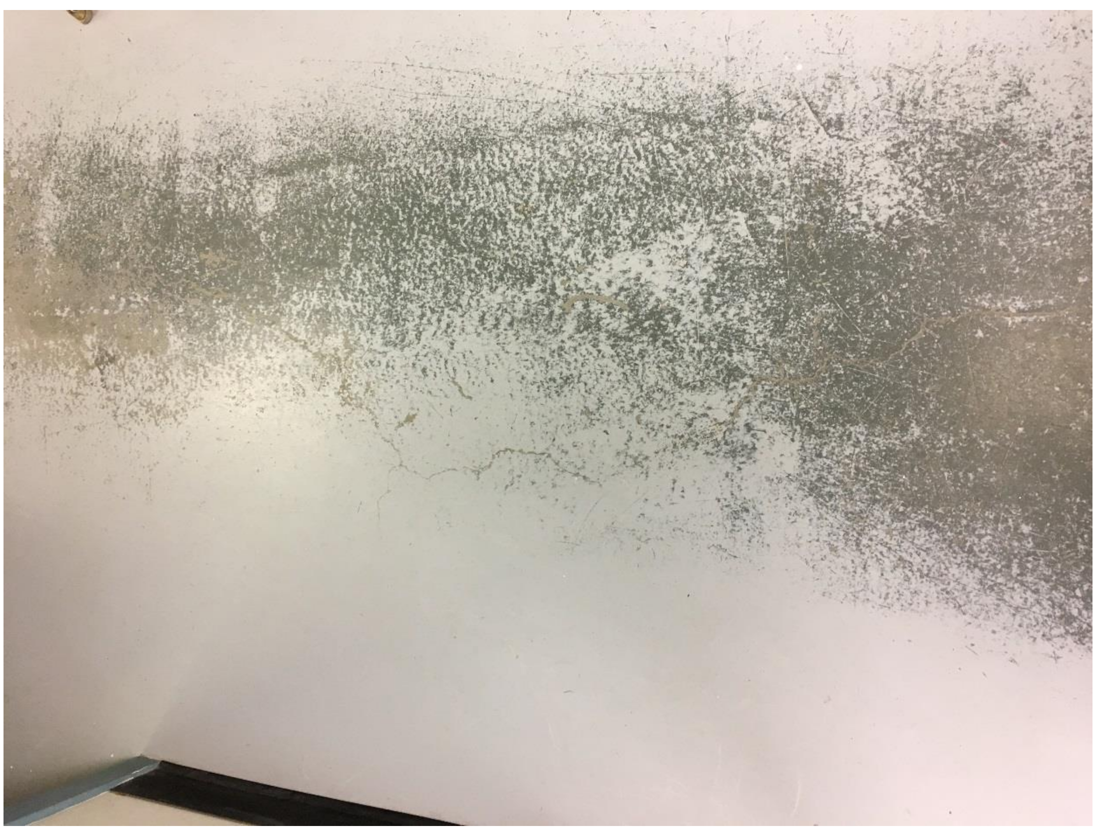


Photo 2

Nalcor Assessments – St. Anthony
Structural – Office Building

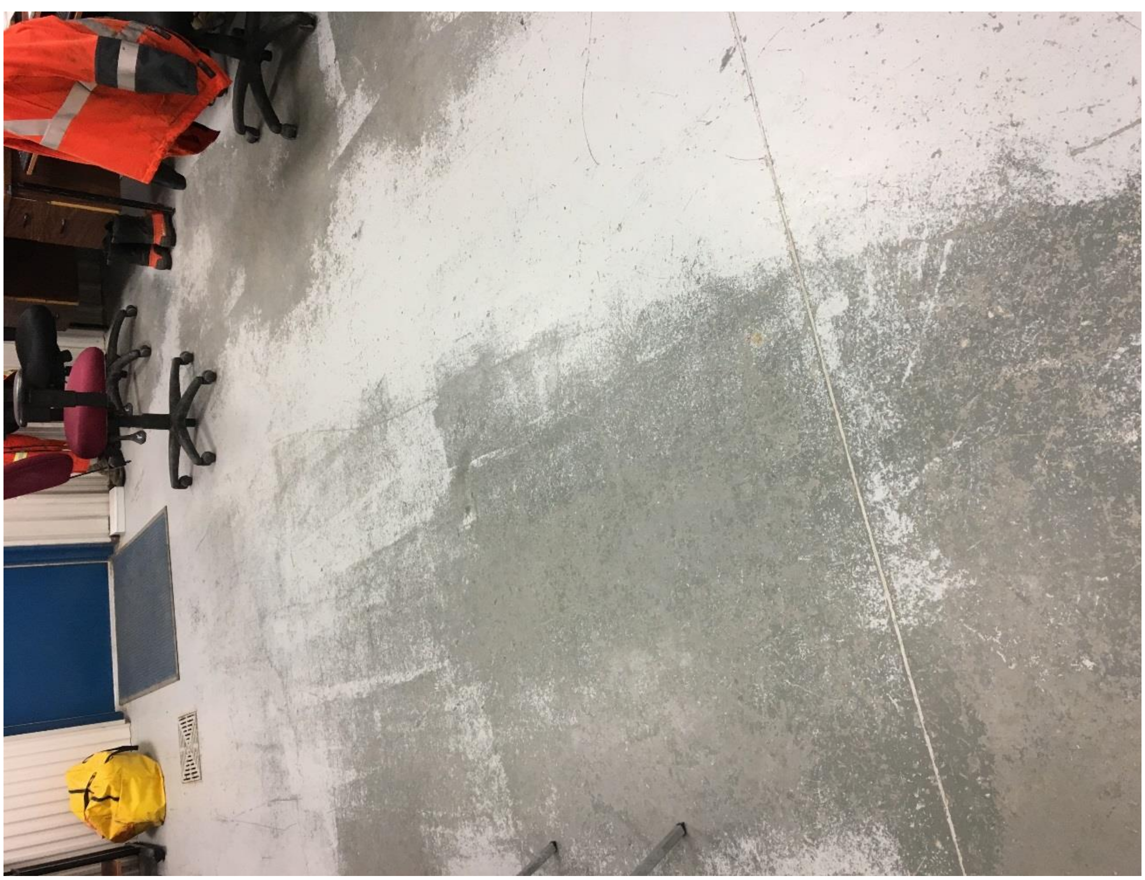


Photo 3

Photo 4

Nalcor Assessments – St. Anthony
Structural – Office Building

Photo 5

Photo 6

Nalcor Assessments – St. Anthony
Structural – Office Building

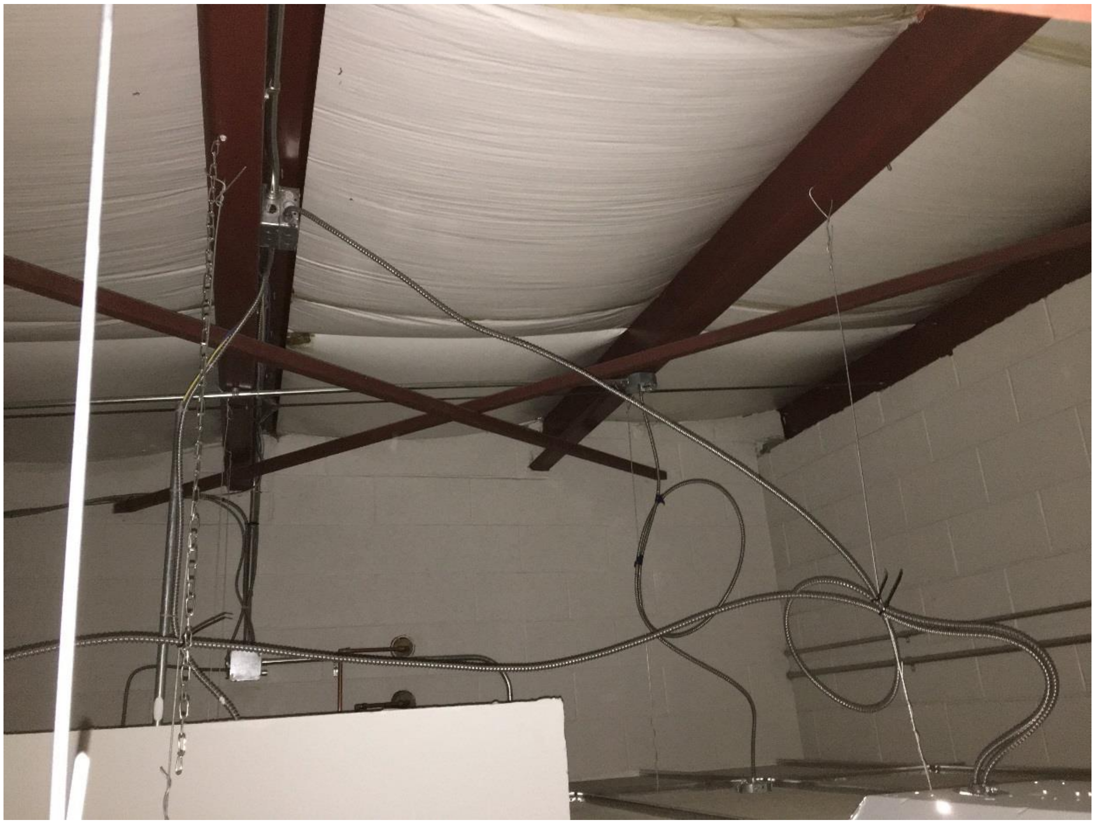


Photo 7

Photo 8

Nalcor Assessments – St. Anthony
Structural – Office Building

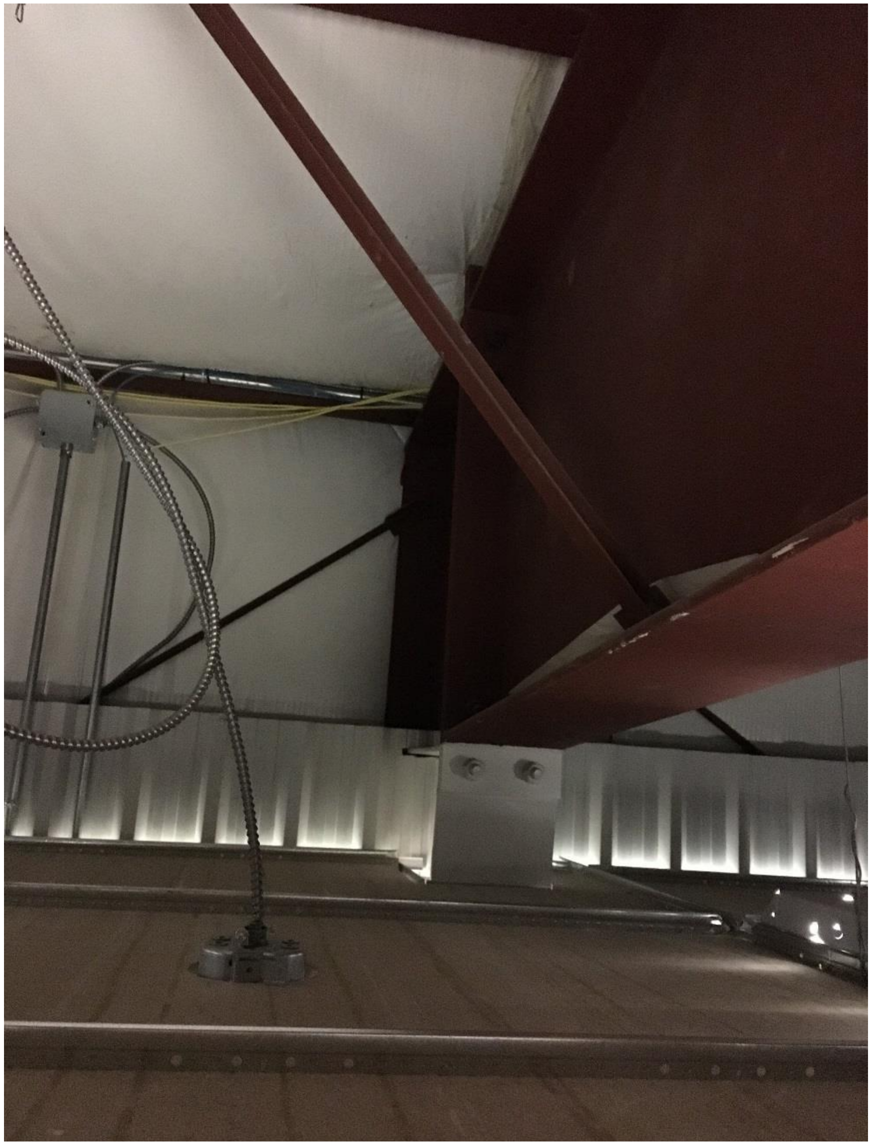


Photo 9

Photo 10

APPENDIX A

MECHANICAL PHOTOS

Nalcor Assessments – St. Anthony
Mechanical – Office Building

Photo 1

Photo 2

Nalcor Assessments – St. Anthony
Mechanical – Office Building

Photo 3

Photo 4

Nalcor Assessments – St. Anthony
Mechanical – Office Building

Photo 5

Photo 6

Photo 7

Photo 8

Nalcor Assessments – St. Anthony
Mechanical – Office Building

Photo 9

Photo 10

Nalcor Assessments – St. Anthony
Mechanical – Office Building

Photo 11

Photo 12

APPENDIX A

ELECTRICAL PHOTOS

Nalcor Assessments – St. Anthony
Electrical – Office Building

Photo 1

Photo 2

Nalcor Assessments – St. Anthony
Electrical – Office Building

Photo 3

Photo 4

Nalcor Assessments – St. Anthony
Electrical – Office Building

Photo 5

Photo 6

Nalcor Assessments – St. Anthony
Electrical – Office Building

Photo 7

Photo 8

Nalcor Assessments – St. Anthony
Electrical – Office Building

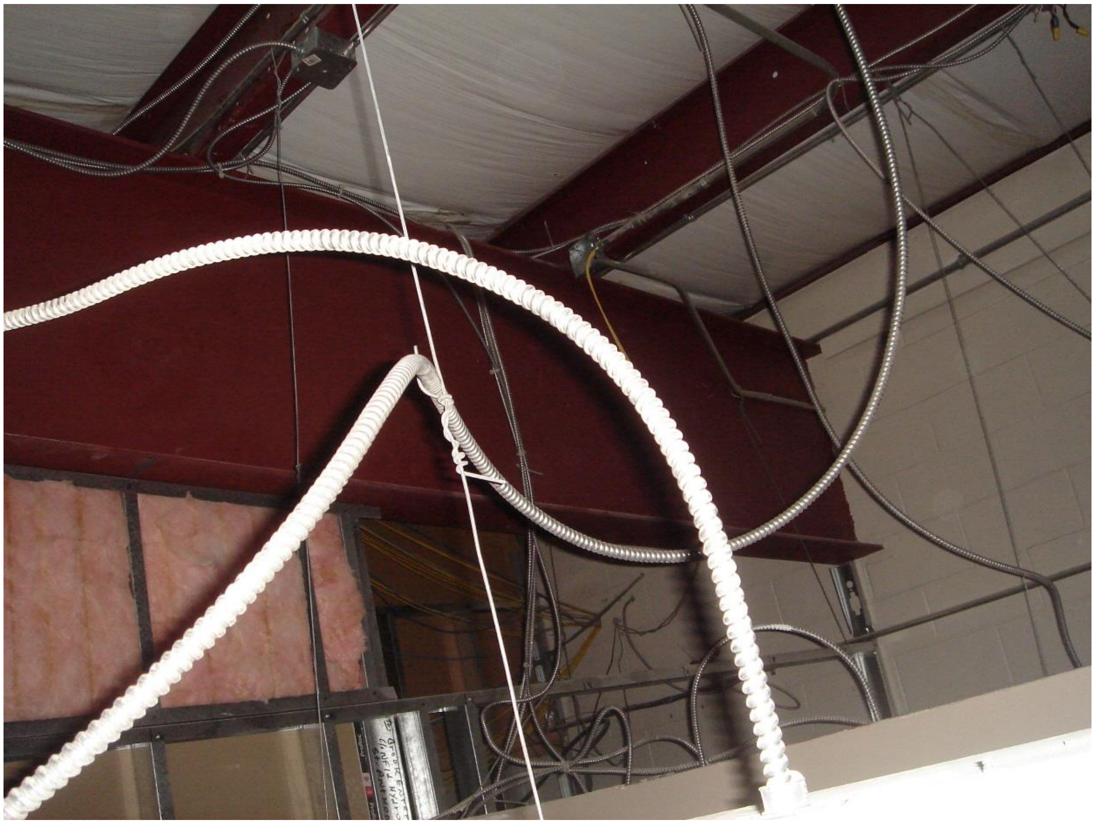


Photo 9

Photo 10

Nalcor Assessments – St. Anthony
Electrical – Office Building

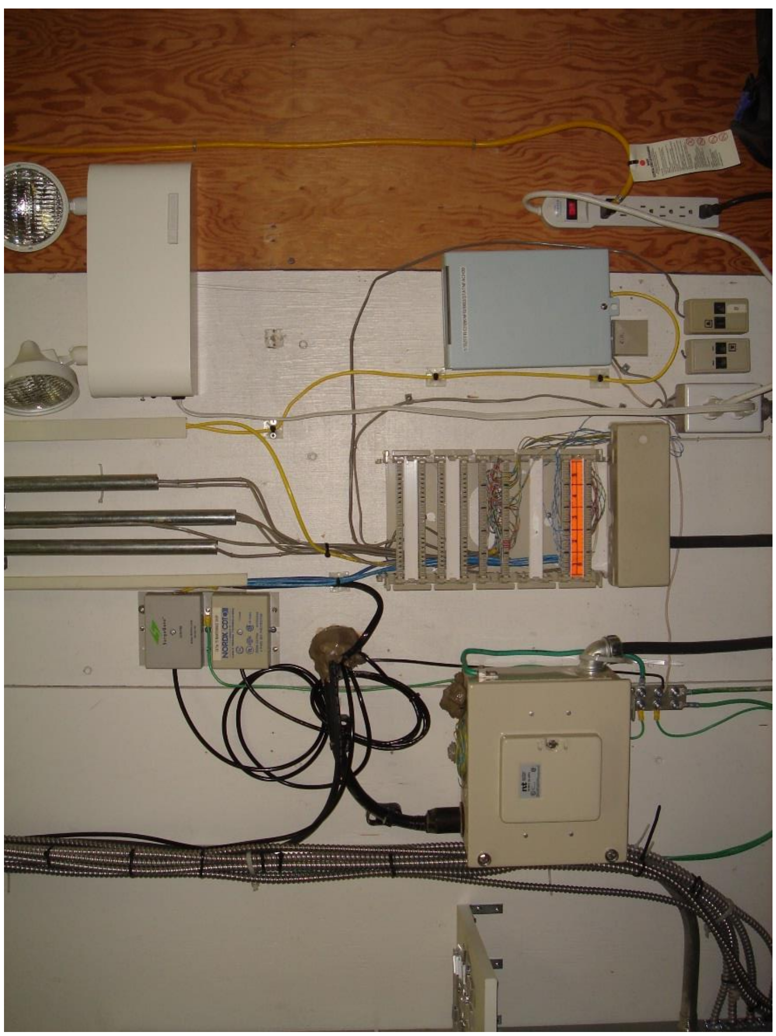


Photo 11

Photo 12

Nalcor Assessments – St. Anthony
Electrical – Office Building

Photo 13

Photo 14

APPENDIX B

Site Photos – St. Anthony Storage Shed

APPENDIX B

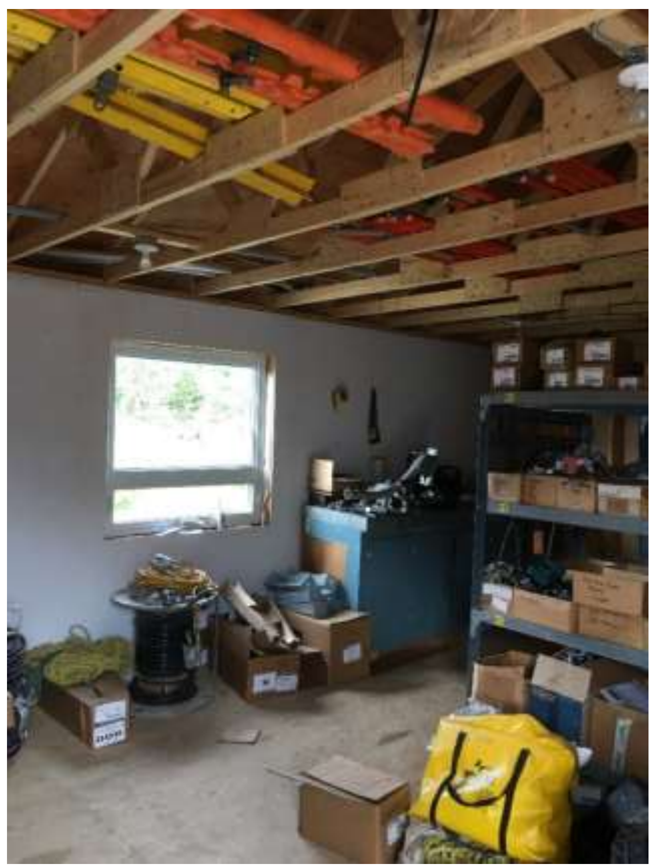
ARCHITECTURAL PHOTOS

Front façade. Right side façade.

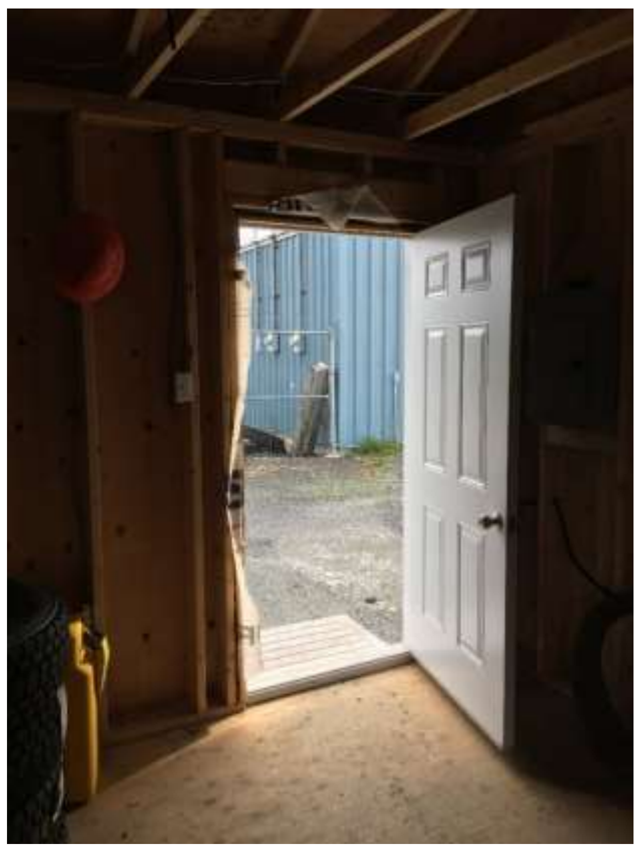
Loading doors.

Personnel door. Note risers height.

Interior



Loading doors.



Entrance - note risers height.

APPENDIX B

STRUCTURAL PHOTOS

Nalcor Assessments – St. Anthony
Structural – Storage Shed

Photo 1

Photo 2

Nalcor Assessments – St. Anthony
Structural – Storage Shed

Photo 3

Photo 4

Nalcor Assessments – St. Anthony
Structural – Storage Shed

Photo 5

Photo 6

Nalcor Assessments – St. Anthony
Structural – Storage Shed

Photo 7

Photo 8

APPENDIX B

MECHANICAL PHOTOS

Nalcor Assessments – St. Anthony
Mechanical – Storage Shed

Photo 1

APPENDIX B

ELECTRICAL PHOTOS

Nalcor Assessments – St. Anthony
Electrical – Storage Shed

Photo 1

Photo 2

Nalcor Assessments – St. Anthony
Electrical – Storage Shed

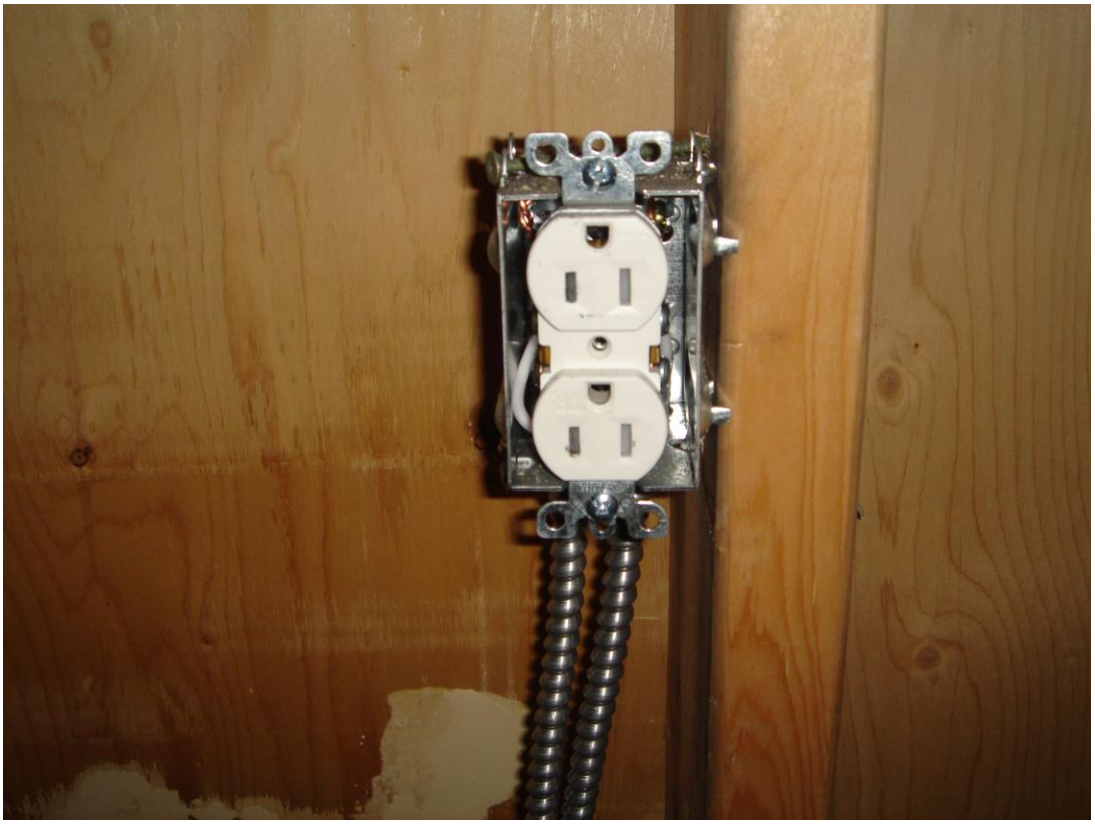


Photo 3

APPENDIX C

Site Photos – Site/Civil

Nalcor Assessments – St. Anthony
Site Civil Photos

Photo 1

Photo 2

Nalcor Assessments – St. Anthony
Site Civil Photos

Photo 3

Photo 4

Nalcor Assessments – St. Anthony
Site Civil Photos

Photo 5

Photo 6

Nalcor Assessments – St. Anthony
Site Civil Photos

Photo 7

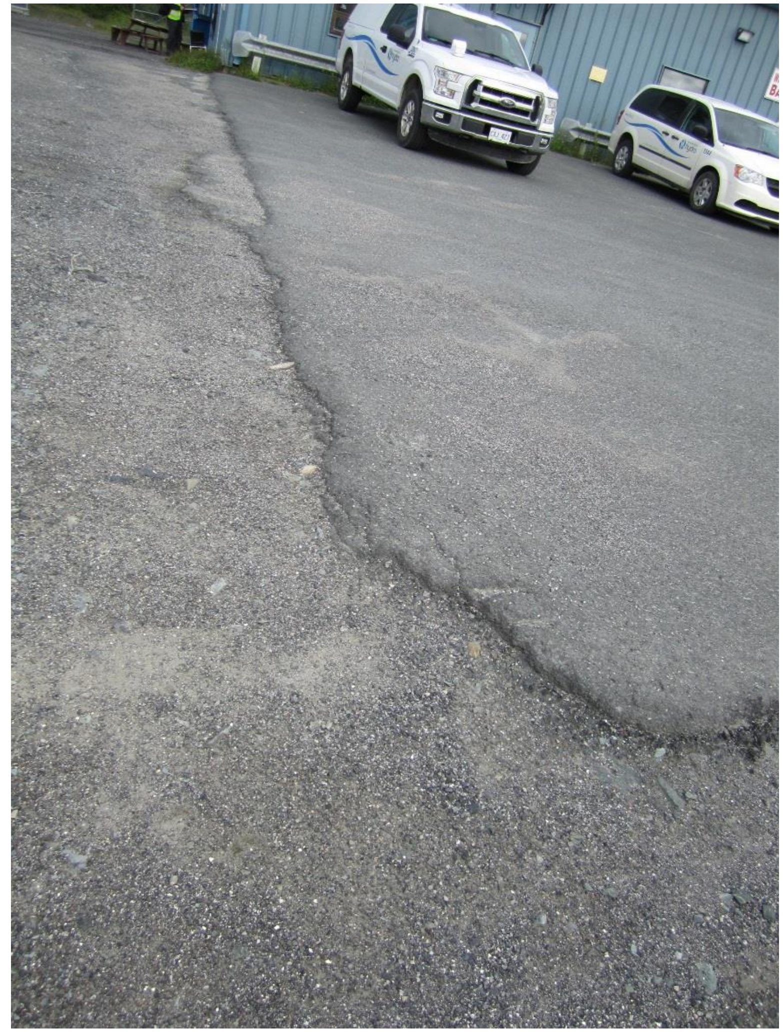


Photo 8

Nalcor Assessments – St. Anthony
Site Civil Photos

Photo 9

Photo 10

Nalcor Assessments – St. Anthony
Site Civil Photos

Photo 11

Photo 12

Nalcor Assessments – St. Anthony
Site Civil Photos

Photo 13

Photo 14

Nalcor Assessments – St. Anthony
Site Civil Photos

Photo 15

Photo 16

Nalcor Assessments – St. Anthony
Site Civil Photos

Photo 17

Photo 18

Nalcor Assessments – St. Anthony
Site Civil Photos

Photo 19

Photo 20

Nalcor Assessments – St. Anthony
Site Civil Photos

Photo 21

Photo 22

APPENDIX D

Site Photos - Environmental

Nalcor Assessments – St. Anthony
Environmental Photos

Photo 1

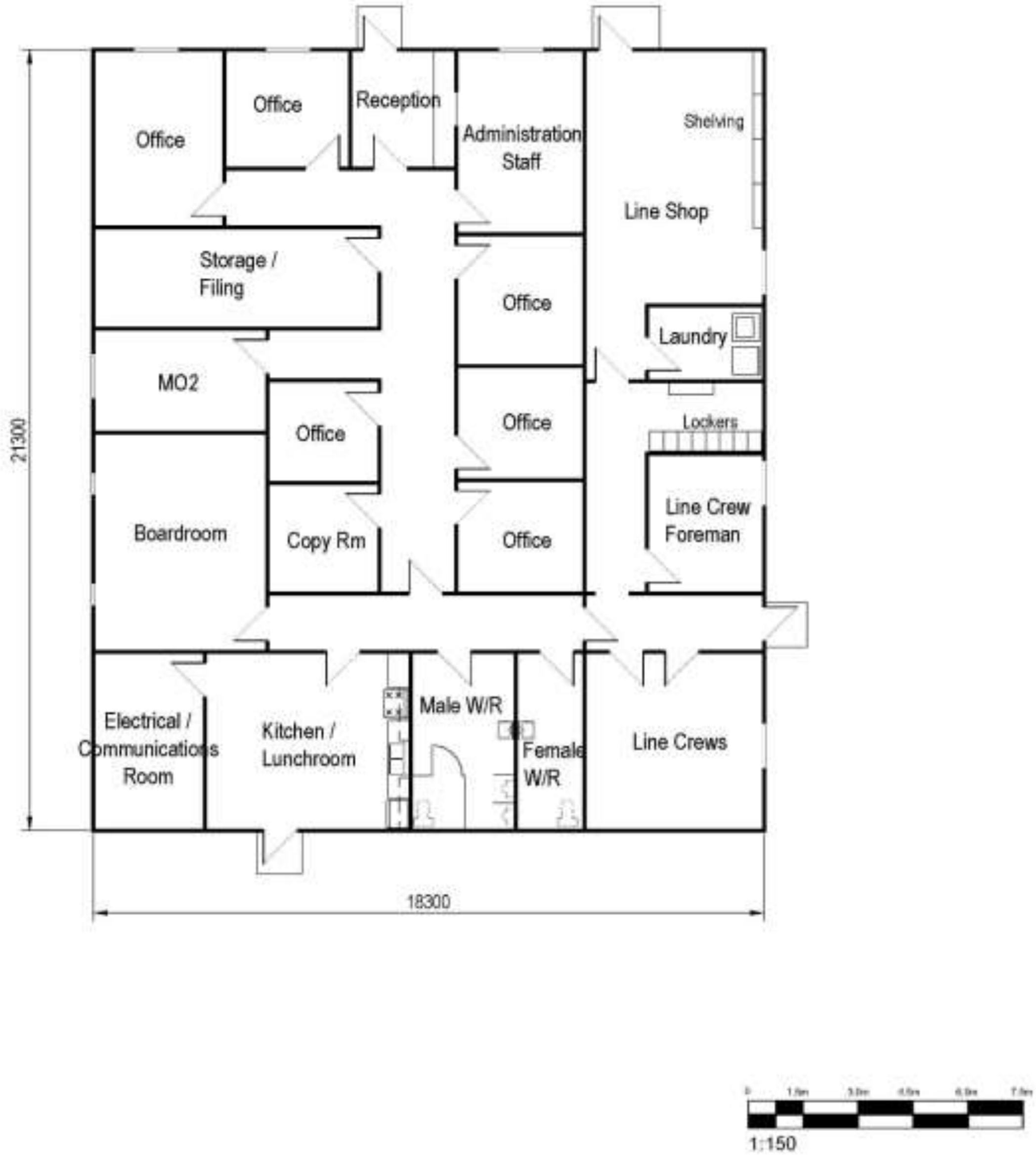
Photo 2

Nalcor Assessments – St. Anthony
Environmental Photos

Photo 3

APPENDIX E

Existing Floor Plans



PRIME CONSULTANT:
CBCL LIMITED
Consulting Engineers

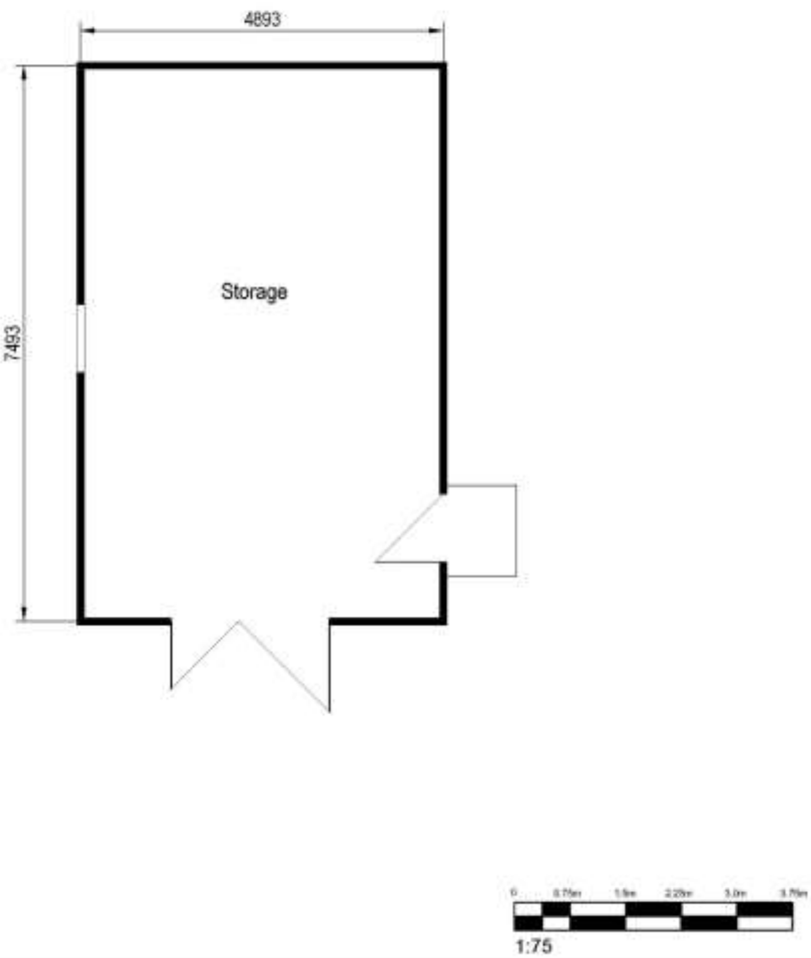
ARCHITECTURAL CONSULTANT:
GLENN BARNES
ARCHITECTURE INC.

PROJECT:
BUILDING & INFASTRUCTURE CONDITION ASSESSMENTS FOR LINE DEPOTS, OFFICE FACILITIES AND CONTROL BUILDINGS

DRAWING TITLE:
SCHEMATIC AS-BUILT PLAN
OFFICE BUILDING
ST. ANTHONY NL

CLIENT:
NL HYDRO

SCALE:	DATE:	CLIENT NO.:	PROJECT NO.:	DRAWING NO.:
1:150	AUG./17	70249 AB	173034.00	SK-8 RA

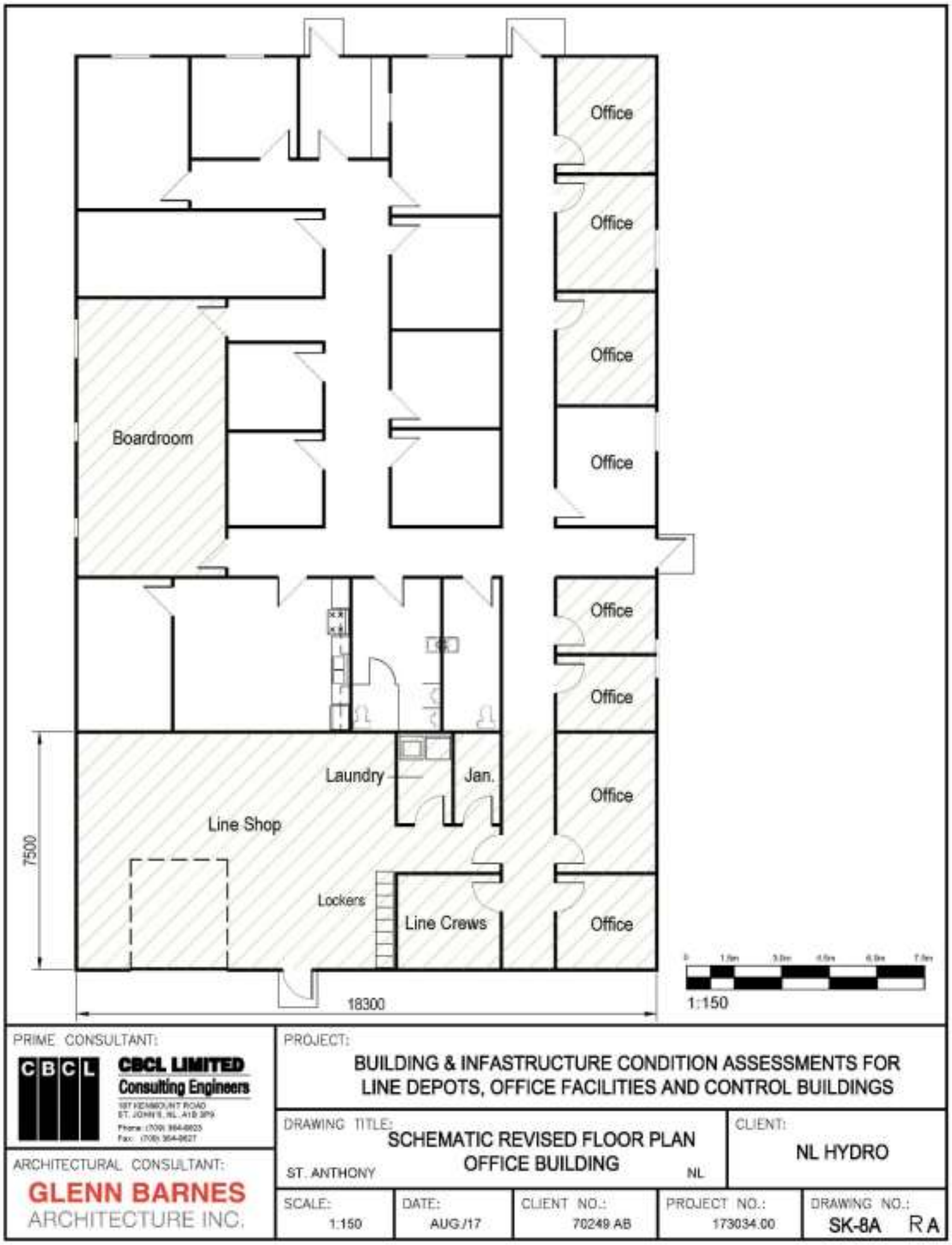


PRIME CONSULTANT: CBCL LIMITED Consulting Engineers	PROJECT: BUILDING & INFASTRUCTURE CONDITION ASSESSMENTS FOR LINE DEPOTS, OFFICE FACILITIES AND CONTROL BUILDINGS
ARCHITECTURAL CONSULTANT: GLENN BARNES ARCHITECTURE INC.	DRAWING TITLE: SCHEMATIC AS-BUILT PLAN STORAGE SHED — ST. ANTHONY NL; CLIENT: NL HYDRO

SCALE:	DATE:	CLIENT NO.:	PROJECT NO.:	DRAWING NO.:
1:75	AUG./17	70249 AB	173034.00	SK-7 RA

APPENDIX F

Concept Floor Plans


Office
Office
Office
Office
Boardroom
Office
Office
Laundry
Jan.
Office
Line Shop
7500
Lockers
Line Crews
Office
18300
1:150
PRIME CONSULTANT:
CBCL
CBCL LIMITED
Consulting Engineers
ARCHITECTURAL CONSULTANT:
GLENN BARNES
ARCHITECTURE INC.
PROJECT:
BUILDING & INFASTRUCTURE CONDITION ASSESSMENTS FOR
LINE DEPOTS, OFFICE FACILITIES AND CONTROL BUILDINGS
DRAWING TITLE:
SCHEMATIC REVISED FLOOR PLAN
OFFICE BUILDING
ST. ANTHONY
NL
CLIENT:
NL HYDRO
SCALE:
1:150
DATE:
AUG./17
CLIENT NO.:
70249 AB
PROJECT NO.:
173034.00
DRAWING NO.:
SK-8A
RA

Appendix E

Building and Infrastructure Condition Assessment - Stephenville Office Facility (2018)

Building and Infrastructure Condition Assessment Stephenville Office Facilty

(Stephenville, NL)

173034.00 ● Final Report ● February 2018

ISO 9001
Registered Company

Prepared for:

nalcor energy

Prepared by:

CBCL LIMITED
Consulting Engineers

Final Report	Paul Sceviour	Feb 12, 2018	Paul Sceviour
Draft Report	Paul Sceviour	Dec 15, 2017	Paul Sceviour
Issue or Revision	***Reviewed By:***	***Date***	***Issued By:***

CBCL LIMITED
Consulting Engineers

ISO 9001
Registered Company

REGISTERED PROFESSIONAL ENGINEER
PAUL SCEVIOUR
SIGNATURE
Feb 12, 2018
DATE
NEWFOUNDLAND & LABRADOR

CBCL Project No 173034.00

Contents

Appendices

CHAPTER 1 REPORT OVERVIEW

1.1 RFP and Consultant Group

In March 2017, the Newfoundland and Labrador Hydro (referred to as the "NLH" hereafter) issued a Request for Proposals to undertake the building and infrastructure condition assessments for various line depots and office facilities in the province. The sites included:

- Line Depots
  - Burgeo
- Office Facilities
  - Stephenville Office Facility
  - St. Anthony Office Facility

CBCL Limited responded to the request on April 3, 2017, and was subsequently awarded the project on May 3, 2017.

The consultant team that performed this assessment consisted of a multi-disciplined engineering team with CBCL Limited performing structural, mechanical, electrical, and environmental tasks, and Glenn Barnes Architecture Inc. performing architectural and functional programming tasks.

This report contains the results of those exercises and provides our professional assessments, recommendations as to the current condition, suitability of use, required code upgrades, recommended upgrades, recommendations to suit future needs, and opinion of probable construction cost for recommendations.

1.2 Scope of Work

The Request for Proposals document contained the terms of reference which outlined the objectives and scope of the project. The assessment has several objectives:

- to review the general condition of the building and site infrastructure including architectural, structural, mechanical, electrical, and environmental;
- provide recommendations of renovations to continue operating existing facilities in view of present and future needs, and

- provide preliminary functional programming based on the client current needs (for storage, operations, etc.) and future needs to determine the most efficient uses of the assessed facilities.

1.3 Site Audits

Site audits were carried out during the week of July 24th. Prior to the site work, CBCL requested any available plans and prior documents or information on the facilities. Limited information was available so the bulk of the information contained in this report was obtained from onsite review and from information provided by on site personnel. Upon arriving at the various sites the consultant team checked in with site personnel and undertook site specific safety orientation were required.

1.3.1 Office Building

The 445m^2 single level on grade steel frame building appears to have been originally constructed circa 1942 by the US Air Force as part of Harmon Air Force Base. Extensive modification and upgrades have taken place since its original construction. The building currently houses Newfoundland and Labrador Hydro's administration, staff training, small warehouse and three workshops namely; Protection and Control, Transmission, and Terminals shops. The building has a contemporary sloped hip roof with asphalt shingles which was added in recent years and exterior walls cladding is of vertical pre-painted steel siding. Windows are fixed over projected aluminum with double hermetically sealed glazing, which are contemporary and in good condition. The main entrance door is glazed aluminum in aluminum frame, other exterior doors are steel in pressed steel frames. The exterior envelope appears to have been upgraded in recent years and is in excellent condition.

Interiors consist of demountable type vinyl wallcovering, finished drywall partitions with vinyl battens on metal stud, some masonry partitions (in the warehouse and corridor separating the shops wing from the remainder of the building), and suspended acoustical tile ceilings with the exception of the warehouse which has an exposed steel original roof structure. Flooring is generally vinyl tile with carpeting in the meeting/training room, all are in good condition.

The building is not accessible to persons with mobility challenges and due to its age would not be required to meet the Accessibility Act.

Shops appear to be undersized as reported by staff and as observed, building expansion is recommended. *(Refer to conceptual floor plan drawing.*)

Site utilities include municipal water and sanitary sewer. The site itself is primarily asphalt covered at the higher elevations where the buildings are located with the remainder gravel. The site generally slopes to lower elevations to the north side of the site. The depot yard is fully fenced with the south and east sides of the office building forming part of the perimeter.

1.3.2 Garage

The building is a single level on grade pre-engineered steel structure of 166m^2 area with insulated envelope and bare interior finish. The space is principally a three bay repair garage. Ancillary rooms include; washroom, office, lunch, parts, storage and two small low ceiling storage lofts. Interior rooms are primarily masonry construction. A service pit is located in the center bay of the building. The building is estimated to be 20-25 years of age. It is in good condition.

Site utilities include a water supply and sanitary sewer connected to the municipal system.

1.3.3 Warehouse Building

The building is a single level on grade pre -engineered steel structure of 134m^2 area. It is sub-divided into three rooms each with metal demising partitioning walls, two rooms have sectional overhead doors plus a single swing steel personnel door. The third room has a pair of steel swing doors. Each room is used for line crew equipment storage. The roof is low slope gable metal clad. Windows are steel with corroded steel security screening. Personnel doors are metal in pressed steel frames with commercial hardware. The building exterior should be painted. The building is in better condition than it first appears. Its age appears to be 30 plus years.

The Storage Building does not have any site services.

1.3.4 Storage Shed

The building is a single level on grade pre-engineered loadbearing steel skinned structure by Armco. The 22m^2 building is comprised of a single storage room for tire and other storage. Galvanized steel walls and roof cladding are double skinned with an approximately 25 mm thick glass fibre insulation sandwich. The roof is a low slope standing seam gable style sheet steel design. The ceiling is metal and there is a vented attic with gable end vents. The door is a single swing type steel in pressed steel frame. An unused side door exists. The building is used for storage.

The Storage Shed does not have any site services.

1.4 Findings and Recommendations

1.4.1 Office Building Findings

The building is in good condition but upgrades should be considered in the next 3-5 years. Some codes upgrading work is also required.

1.4.2 Office Building Recommendations

Near term recommendations that should be planned to be undertaken within the next two years have been put forward for architectural, structural, site, mechanical, electrical, and environmental and are summarized as follows.

Architectural:

- Enclose janitorial supplies in 60 minute fire rated room.
- Continue main corridor through existing kitchen to create continuous dedicated exit path to eliminate current dead ending.
- Eliminate existing lean to flammable storage shed at rear of building.
- Replace male washroom and lunch flooring.
- Removed loose stored items from electrical and data rooms.
- Add upper area attic vents.
- Add attic access hatches.

Structural:

- Access should be provided to the hip-truss roof attic in order to properly assess the condition of the roof structure.

Site/Civil:

- Regrade east and west access roads to lower yard.
- Make repairs to site fencing.

Mechanical:

- Revise trap piping on Male Washroom lavatory to be a P trap.
- Revise clothes washer standpipe to include a trap.
- Replace corroded and uneven sewer cleanout in Women's Washroom.
- Insulate remainder of accessible copper domestic water piping.
- Raise Female Washroom hot water tank setpoint temperature to between 50°C and 60°C.
- Replace Female Washroom hot water tank and pipe relief discharge piping to code.
- Provide an electronic hands free flush valve on the urinal.
- Have an inspection/testing/routine maintenance service call for the split air conditioning system completed.
- Have an inspection/testing/routine maintenance service call for the humidification system completed.
- Replace Male Washroom exhaust fan with a higher capacity unit. Not required if a heat recovery system is installed.
- Update time, day, and schedules on HVAC system master controller.

- Provide a heat recovery system to service areas of the building not provided with ventilation.

Electrical:

- Consider installation of new fire alarm system panel with detectors and alarm devices. Reuse existing fire alarm pull stations.
- Remove the materials stored in the electrical room and install warning sign on electrical room door "Electrical Room – No storage permitted".
- Install the panel cover on the panelboard in the space above the electrical room.
- Relocate the communication rack installed in front of the main disconnect to provide a 1 m working space.
- Replace missing acrylic lenses on wraparound fluorescent lighting fixtures.
- Replace both outdoor standard duplex receptacles and faceplates with new GFCI receptacles c/w weatherproof faceplates.

Environmental:

- Provide a rated vented safety cabinet in the Warehouse for storage of flammable/combustible liquids.
- Indoor air quality should be addressed as per the recommendation in the mechanical section of this report.
- The presence of asbestos and potentially lead containing materials are to be made aware to anyone undertaking work that may disturb these materials.
- Ozone depleting substances (refrigerants) should be properly recovered prior to disposing of equipment.
- Stained soil in the depot yard should be removed and properly disposed of.
- Stored propane cylinders should be moved to an outdoor storage area.

Mid-term recommendations that should be planned to be done in the next 3-10 years are architectural, mechanical, and electrical and are summarized as follows.

Architectural:

- Expand the building to increase the sizes of the shops. *(Refer to suggested conceptual design floor plan.)*

Mechanical:

- Replace copper domestic water piping.
- Replace hot water tank and provide hinged door on tank enclosure.

Electrical:

- Panels A, B, and the hallway loadcenters should be replaced within the next five (5) years.
- Replace T12 fluorescent light fixtures with T8 or LED fixtures.
- Replace batteries in emergency lighting units.

1.4.3 Garage Findings

The building is in good condition with minor upgrades recommended as well as some code issues.

1.4.4 Garage Recommendations

Near term recommendations that should be planned to be undertaken within the next two years have been put forward for architectural, mechanical, electrical, and environmental and are summarized as follows.

Architectural:

- Modify service pit to meet code by adding guard rails, second exit stair, explosion proof fixtures, or delete it and infill the pit.
- Re-paint interiors as well as exterior doors and frames.
- Replace main entry door threshold.
- Sand and re-paint corroded cladding.
- Clean and wax tile floors. Replace washroom and kitchen flooring.
- Paint steel liner panel in washroom.

Mechanical:

- Replace existing service pit sump pump with one rated for hazardous location including associated wiring.
- Revise the venting on the oil interceptor to be code compliant.
- Provide a backflow preventer on the water entrance to the building.
- Insulate accessible domestic hot and cold water piping.
- Index the lavatory cold water faucet handle.
- Replace hot water tank and provide with drain pan.
- Increase the hot water temperature setpoint on the hot water tank to between 50°C and 60°C.
- Repair or replace the inoperative south end rooftop exhaust fan.
- Provide a heat recovery unit to meet minimum ventilation requirements.
- Replace the service pit exhaust fan with one of non-spark construction and suitable for conveyance of combustible gases. Provide visual system operation proving light.
- Increase general exhaust rates if required and provide tempered make-up air system for general exhaust capacity and pit and welding exhaust systems.
- Upgrade gas detection system with additional sensors, visual and audible alarm indication, and interlock with exhaust and make-up air systems.
- Provide nitrogen dioxide gas detection system if diesel vehicles are serviced in the garage.
- Provide service visit by qualified gas detection system representative to assess system and calibrate existing sensor.

Electrical:

- Provide filler plates on spare breaker spaces in power panels.
- Replace one (1) more than twenty (20) year old emergency lighting unit and one (1) old Exit sign.
- Provide explosion proof wiring in the service pit if it will be kept functional.
- Consider connection the existing pull station to the recommended new fire alarm panel for the office building. Install new fire alarm system detectors and alarm devices as required.

Environmental:

- Stored propane and acetylene cylinders should be moved to an outdoor storage area.

Mid-term recommendations that should be planned to be done in the next 3-10 years are architectural and electrical and are summarized as follows.

Architectural:

- Replace overhead doors.

Electrical:

- Panels should be replaced within the next ten (10) years.
- Replace T12 fluorescent light fixtures with T8 or LED fixtures.

1.4.5 Warehouse Building Findings

The building is in fair condition, requiring exterior envelope upgrades and code issues to be addressed.

1.4.6 Warehouse Building Recommendations

Near term recommendations that should be planned to be undertaken within the next two years have been put forward for architectural, electrical, and environmental and are summarized as follows.

Architectural:

- Replace corroded siding, fascia, gutters windows and window screens.
- Paint cladding and doors.
- Add fire rated interior finish, and doors proximate to the main building due to limiting distance issues.

Electrical:

- Replace the existing incandescent lighting fixtures with T8 fluorescent or LED lighting fixtures.
- Replace the old receptacles, outlet boxes and faceplates.
- Install emergency lighting units in all rooms.

Environmental:

- Stored propane cylinders should be moved to an outdoor storage area.

Mid-term recommendations that should be planned to be done in the next 3-10 years are architectural and electrical and are summarized as follows.

Architectural:

- Replace overhead doors.

Electrical:

- Replace T12 lighting with T8 or LED.

1.4.7 Storage Shed Findings

The building is in fair condition, requiring exterior envelope upgrades and minor electrical issues to be addressed.

1.4.8 Storage Shed Recommendations

Near term recommendations that should be planned to be undertaken within the next two years have been put forward for mechanical and electrical and are summarized as follows.

Mechanical:

- The existing fire extinguisher should be replaced with one rated 4A80BC.

Electrical:

- Install an emergency lighting unit inside the storage shed.
- Replace the outdoor GFCI receptacle including the weatherproof faceplate.

Mid-term recommendations that should be planned to be done in the next 3-10 years are architectural and are summarized as follows.

Architectural:

- Replace existing galvanized steel roof panels.
- Paint door and frame.

1.4.9 Stephenville Pole Ramps and Equipment Platforms

Near term recommendations that should be planned to be undertaken within the next two years have been put forward for the yard pole ramps and equipment platforms are summarized as follows.

Structural

- Equipment storage platforms should be replaced.

CHAPTER 2 FACILITY AUDITS

2.1 Office Building

2.1.1 Architectural Assessment

The 445m^2 single level on grade steel frame building appears to have been originally constructed circa 1942 by the US Air Force as part of Harmon Air Force Base. Extensive modification and upgrades have taken place since its original construction. The building currently houses Newfoundland and Labrador Hydro's administration, staff training, small warehouse and three workshops namely; Protection and Control, Transmission, and Terminals shops. The building has a contemporary sloped hip roof with asphalt shingles which was added in recent years and exterior walls cladding is of vertical pre-painted steel siding. Windows are fixed over projected aluminum with double hermetically sealed glazing, which are contemporary and in good condition. The main entrance door is glazed aluminum in aluminum frame, other exterior doors are steel in pressed steel frames. The exterior envelope appears to have been upgraded in recent years and is in excellent condition.

Interiors consist of demountable type vinyl wallcovering, finished drywall partitions with vinyl battens on metal stud, some masonry partitions (in the warehouse and corridor separating the shops wing from the remainder of the building), and suspended acoustical tile ceilings with the exception of the warehouse which has an exposed steel original roof structure. Flooring is generally vinyl tile with carpeting in the meeting/training room, all are in good condition.

The building is not accessible to persons with mobility challenges and due to its age would not be required to meet the Accessibility Act.

Shops appear to be undersized as reported by staff and as observed, building expansion is recommended. *(Refer to conceptual floor plan drawing.*)

2.1.1.1 BUILDING EXTERIOR ENVELOPE

Exterior walls are clad with pre-painted vertical steel siding of contemporary vintage. The condition is excellent. Given the deep recesses at windows and doors we assume that thermal insulation was added under the siding at the time it was applied to the original building.

The roof is a hip style sloped roof with asphalt shingle finish which appears in good condition however attic ventilation appears to be limited to perforated vinyl soffits without ridge venting as required by code. Access to attics is limited, with the building appearing to include both the original flat roof and the new sloped roof. Improved attic access to code is recommended. Facias are clad in pre-painted aluminum with vented vinyl soffit. Staff advised that the hip roof was added in 1991, with asphalt shingles having been replaced 2 years ago. One leak remains in the centre right exterior office. Attic access is limited and did not provide adequate ability to confirm roof construction, insulation, and ventilation etc. from the inside of the building.

Exterior doors include glazed aluminum in aluminum frame at the main public entrance with others being commercial metal in pressed steel frames with commercial hardware.

Windows are contemporary and are aluminum in fixed over projected styles. Glazing is double hermetically sealed and is in good condition.

2.1.1.2 Building Interior

Partitions are steel stud with demountable vinyl wall covering clad drywall with removable battens. Shops partitions are stud and drywall with the dividing corridor being masonry.

Ceilings are suspended acoustical tile, with the warehouse having exposed roof structure.

Flooring is generally vinyl tile with carpeting in the meeting room/training room and painted concrete in the shops, which is generally in good condition with the exception of the lunch room and male washroom which should be replaced.

Interior doors are generally hollow core wood with stain finish in demountable style metal frames. Hardware is residential. Doors are in good condition.

Millwork in the kitchen is oak and is in good condition with re-finishing recommended. Appliances are in good condition. Washroom vanities, toilet stalls and accessories are in good condition. Male washroom flooring needs replacement and the room needs re-painting.

Both the electrical and data rooms have extensive quantities of loose items of storage. These items should be removed to reduce flammable fuel sources as well as to allow heat to circulate and permit clear access to equipment.

Janitorial supplies are stored on open shelves in the warehouse. They shall be stored in a 60-minute fire rated room to meet NBCC.

Given the fact that the shops cannot be used as storage garages the 90 minute fire rating is not required in this building. They are considered to be workshops which are not required to have a fire rating or fire separation from office areas.

2.1.1.3 Building Code

The building is classified as F-3 – Low Hazard Industrial and "D" Offices by the NBCC 2010.

The building is generally in reasonable compliance to code. There are some modifications required including door swings, elimination of dead ending, hardware, fire rating and/or removal of the attached flammable storage lean to shed.

2.1.1.4 Accessibility

The building is not accessible to persons with mobility challenges. Due to its age (pre-dating 1981 and with cumulative renovations not exceeding 50% of its replacement cost) it is not required to meet the Accessibility Act.

2.1.1.5 Selected NBCC 2010/ LSC 101 Requirements

The following provides an overview of several National Building Code 2010/Life Safety Code NFPA 101 requirements and applicable sections for this facility.

Requirements	**Compliance / Action**
1) Building Occupancy Group F-3 – Low Hazard Industrial Group D – Business and Person Services – Office Areas *NBCC A-3.1.3.1*	Compliant
2) Group D, Up To Two Storeys 1. A building classified as Group D, is permitted to conform to Sentence (2) provided a. It is not more than 2 storeys in building height, and b. It has a building area not more than 1000 m^2 when facing 2 streets. 2. The building referred to in Sentence (1) is permitted to be of combustible construction or non-combustible construction used singly or in combination, and a. Floor assemblies shall be fire separations and, if of combustible construction, shall have a fire resistance rating not less than 45 minutes, and i) Have a fire resistance rating not less than 45 minutes, and ii) be of combustible construction. *NBCC 3.2.2.50*	Multiple Occupancy Group D – Offices Group F-3 – Low Hazard Industrial Group D is the most restrictive, therefore governs. Compliant
3) Occupant Load (Based on LSC) Group F3 - Low Hazard Industrial: 137 m^2/46 m^2 per person = 3 persons Group D – Offices: 154 m^2/9.3 m^2 per person = 17 Total Occupant Load = 20 persons (Service rooms, storage, circulation and washrooms are excluded)	Compliant
4) Exit Capacity	Suites are compliant

Requirements	Compliance / Action
The maximum size of rooms or suites with one exit are as follows: Group D – 200 m^2 with a 25 metre travel distance to the egress door. Group F-3 – 200 m^2 with a 15 metre travel distance to the egress door. *NBCC 3.4.2.1.A*	
5) Except if exits are located along the perimeter of the floor area and each main aisle in the floor area leads directly to an exit, the travel distance may be 60 metres maximum. NBCC 3.4.2.5	Compliant
6) The minimum width of a public corridor shall be 1100 mm. *NBCC 3.3.1.9*	Compliant
7) Travel Distance shall be maximum of 30 metres. *NBCC 3.4.2.5*	Travel distance compliant
8) Exit capacity persons x 6.1 mm per person = 122 mm *NBCC 3.4.3.2*	Compliant (with the exception of dead ending at the main corridor).
9) Exits shall be separated from the remainder of the building by a fire separation having a fire resistance rating of not less than 45 minutes. *NBCC 3.4.4.1*	N/A
10) Electrical rooms, if housing oil type transformers, shall have a fire resistance rating of not less than 60 minutes. *NBCC 3.6.2.1*	N/A
11) Washroom Fixture Calculation Group F-3 - 3 persons Group D - 17 persons: 1 male, 1 female *NBCC 3.7.2.2*	Compliant
12) The building need not be designed to meet the NL Accessibility Act requirements due to its age.	
13) In a building with more than one major occupancy, the requirement of the most stringent occupancy shall apply to the entire building.	Group D governs
14) Rooms for storage of janitorial supplies shall be constructed with a 60 minute fire rated fire separation. *NBCC 3.3.21.2*	Non-compliant Fire rated room required.
15) Limiting distance	Compliant

2.1.1.6 Conclusions and Recommendations

The building is in generally good condition with minor maintenance and codes upgrading required.

The following short term recommendations are made:

- Enclose janitorial supplies in 60 minute fire rated rooms.
- Continue main corridor through existing kitchen to create continuous dedicated exit path to eliminate current dead ending.

- Eliminate existing lean to flammable storage shed at rear of building.
- Replace male washroom and lunch flooring.
- Removed loose stored items from electrical/data room.
- Add upper area attic vents.
- Add attic access hatches.

The following mid- term recommendations are made:

- Expand the building to increase the sizes of the shops. *(Refer to suggested conceptual design floor plan.)*

2.1.2 Structural Assessment

The main depot building at the Stephenville Depot is a pre-engineered steel building supported on a concrete foundation wall. The building can be split up into the office area, the work shop/ warehouse area.

2.1.2.1 Foundation and Floor Systems

The building foundation system consists of a perimeter foundation wall with interior spread footings underneath the columns. At the maximum point there is only approximately 150 mm of the foundation wall that is exposed and in many areas none the wall can be seen. Therefore, a complete assessment of its condition could not be determined. The slight portions that were exposed appeared to be in good condition.

On the interior the slab-on-grade is approximately 150 mm below the top of the spread footings. The footings are coated in safety yellow paint and appear to be in good condition. There were no deficiencies observed other than that they posed a tripping hazard to workers walking past them. As they are a part of the building structure they must remain.

The interior ground floor of the office building consists of a concrete slab on grade. The office portions slab was concealed by floor and carpet tile, and therefore could not be inspected. The concrete slabs that were visible appear to be in good condition. There was some minor abrasions but otherwise free of any cracking.

2.1.2.2 Roof Systems

The main building has a hip-truss roof system with asphalt shingles. The original roof appears to have been a flat roof framed with steel beams and decking. The new hip roof appears to be an add-on over top of the existing steel roof. There is no access to the inside of the new hip-truss attic space to inspect the trusses. Access above the ceiling tiles is limited to the steel beams and covered with a liner panel obscuring any view into the attic. The steel beams were all visible and in excellent condition.

It is unclear how the trusses are supported or attached. Typically, on a building of this size, the roof trusses will span between the exterior walls. However, in this case the original exterior beams were not designed to receive half of the tributary width of the roof because there were two lines on interior beams/columns. It would be prudent to know if the hip-trusses are also supported on these interior beam lines. A follow-up inspection should be conducted with access into the attic space to determine how the trusses are supported.

An attached lean to used for storage has utilizes wood rafter roof framing. The rafters are generally in good condition however water staining was observed on them and the roof plywood sheeting.

2.1.2.3 Framing Systems

The building is constructed using a traditional stick-built steel framing system. There are four rows of steel wide flange beams supported on wide-flange steel columns. Each framing bay is divided by one wide flange beam. All of the steel that was observed was in very good condition. The wall structural system was not exposed but the cladding appeared to be in good shape which would suggest that there is no overstress on the girt system.

The attached lean to has wood stud framing with plywood sheeting. No rot or other issues were identified.

2.1.2.4 Conclusions and Recommendations

Overall the main building is in good condition. Based on the observations made during the inspection the following is recommended.

- Access should be provided to the hip roof attic space to complete a full structural inspection.

2.1.3 Mechanical Assessment

2.1.3.1 Plumbing – Drainage, Waste, and Venting

The office facility is equipped with one Male Washroom, one Female Washroom, and a Lunchroom. A clothes washer and dryer are provided in the Male Washroom.

Waste and vent piping in the building is primarily ABS (see Mechanical photo 1), though some copper vent piping was observed above the Female Washroom (See Mechanical photo 2). It was observed that one of the Male Washroom lavatories is not properly trapped. It effectively utilizes an S trap and not a P trap as required by code (See Mechanical photo 3). The clothes washer drain standpipe is not provided with a trap as required (See Mechanical photo 4). The washer hose appears to be sealed to the standpipe.

A cleanout located in the Female Washroom has a steel cover plate that is corroded and is not flush with the surface creating a trip hazard (See Mechanical photo 5). It is recommended that this cover be replaced.

Condensate drains from indoor HVAC equipment was observed to be copper.

No floor drains were observed in the facility.

2.1.3.2 Plumbing – Domestic Water Piping and Systems

Domestic water for the facility is provided from municipal services. A water entrance into the building could not be located though a curb stop was observed on the east side of the building.

The domestic water piping is copper throughout the facility. Domestic water piping is partially insulated with preformed pipe insulation and canvas jacketing (see Mechanical photo 6). Some areas of the piping are not insulated (see Mechanical photo 7).

The age of the domestic water piping could not be determined. It is likely a mixture of original and newer piping provided in renovations over the building history. Any original piping has exceeded it's life expectancy. It is recommended that all copper piping be replaced in the mid-term.

Domestic hot water for the Male Washroom is produced in an electric hot water tank located in a sealed enclosure in the Male Washroom (see Mechanical photo 8). A partial view of the rear of the tank was possible (see Mechanical photo 4). The enclosure was not accessible so data on the hot water tank or of its piping arrangement is up to code could not be fully obtained. Due to the relatively short lifespan of these units it would be prudent to recommend replacing it in the mid-term. The enclosure should also be fitted with a hinged door to allow the tank to be inspected and serviced if required. Measured hot water temperature was 52.2°C which is satisfactory.

The Female Washroom is provided with its own hot water tank located in the corner of the washroom (see Mechanical photo 9). The tank is a 36 Litre (10 US Gal) electric unit with a 3 kW element. The tank is a Rheem model number RE10. The hot water heater appeared to work properly. The tank was manufactured in 2013 based on its serial number. Based on its serial number the tank was manufactured in 2003 resulting in it exceeding its life expectancy. The tank should be replaced in the near term. The hot water tank temperature/pressure relief piping is not installed to code with too many elbows and it being piped into the adjacent wall without a visible air gap. Hot water temperature was measured to be 47.6°C. The water temperature setpoint should be raised to between 50°C and 60°C to control the formation of legionella bacteria.

2.1.3.3 Plumbing – Fixtures

As mentioned previously the facility has two washrooms, and a lunch room. Water closets are generally commercial grade floor mounted tank type (see Mechanical photos 10 and 11). Water closets were generally in good condition.

The one urinal is a wall hung commercial grade vitreous china unit with a flush tank (see Mechanical photo 12). The urinal is in good conditions with no issues noted. It is recommended that the flush tank be removed and replaced with a hands free electronic flush valve.

Washroom lavatories are drop in countertop type (see Mechanical photos 13 and 14). Lavatory faucets were two handle residential grade. Lavatories were in good condition with no issues noted.

The Lunch Room sink is a single bowl stainless steel type. Sink faucets are residential grade two handle type. Sinks were in good condition with no issues noted.

2.1.3.4 HVAC – Air Handling Systems

The facility is provided with minimal air handling systems. The office area is provided with a built up system with cooling and humidification as described below. Exhaust fans are present in washrooms and the lunch room.

The main office area is provided with a split air conditioning system. The condenser is located outdoors on the north side of the office area and the evaporator is an indoor air handler unit located in the ceiling above the Male Washroom. The condenser is manufactured by Carrier, however its nameplate information was so faded that specific model information could not be read (see Mechanical photo 15). The indoor air handler unit is a Carrier model 42BHC20 rated for 5 tons of cooling capacity (see Mechanical photo 16). The units are believed to be manufactured in 2005 and utilize R22 refrigerant. This system is provided with supply ducting throughout this office area. A return air fan (see Mechanical photo 17) located above the Male Washroom ceiling takes air from ducted returns and flows a portion to the indoor unit and expels a portion to the outside through an exhaust hood. Supply ducting, outside air ducting, and exhaust air ducting is insulated with foil faced blanket type insulation. Return ductwork is not insulated. At 12 years of age this system should have 5 to 10 years of life remaining. The system outside air intake and exhaust air hoods are located on the north side of the building (see Mechanical photo 18). It should be noted that access to the indoor unit and return fan is very difficult due to its location over the washroom.

Downstream of the indoor air handler is an electric duct heater which tempers the air in non-cooling mode when required (see Mechanical photo 16). The duct heater is a Thermolec model SC-CTPBX with 26 kW capacity. The discharge temperature of the duct heater is controlled by a duct temperature sensor and thermostat located off the Male Washroom near the washer/dryer.

Air distribution is through bypass type terminal units and square cone diffusers and return air grilles into the ceiling cavity (see Mechanical photo 19). The air distribution system appeared to be in good condition. The terminal units are controlled by zone thermostats which control the airflow to the space to maintain space temperature and also control the space baseboard heat.

A master controller is located in the alcove off of the Male Washroom which turns the systems fans on and off, controls the outdoor condenser cooling stage, and enables/disables the duct heater operation (see Mechanical photo 20). It was observed on site that the master controller settings were not properly set including the time and day. The controller should be properly set as this system is intended to provide ventilation air to this part of the building and should operate continuously during occupied periods.

The system is provided with an electric steam humidification system to maintain proper humidity levels in winter conditions. The humidifier was manufactured by DriSteam (see Mechanical photo 21). It is a model VM99-10 and has a steam generation capacity of 13.6 kg/hr. Based on the age of this unit it should have a remaining expected lifespan of 10 to 15 years. Steam from the unit is injected into the supply air ductwork downstream of the indoor air handling unit. Humidifier output is controlled by a humidity sensor located in the return air ductwork. Regular inspection and maintenance should be performed on this unit.

The Lunch Room is provided with a domestic style range hood ducted to the outside.

Washrooms are provided with residential grade ceiling mounted exhaust fans ducted to the outside. The Male Washroom fan did not operate (see Mechanical photo 22). Based on the type of fan present it is unlikely that this fan is of sufficient capacity for this washroom.

2.1.3.5 HVAC – Ventilation Air

The office area built up air handling system is configured to provide ventilation air. When the system is running a quantity of outside air taken in through a hood mixes with return air and is distributed throughout the office area. Excess return air is exhausted to the outside from a hood (see Mechanical photo 18 for intake and exhaust air hoods). It should be noted that some spaces in the office area are not connected to this ventilation system including the warehouse, storage rooms, and corridors which should be to be in compliance with ASHRAE 62.1 - Ventilation for Acceptable Indoor Air Quality.

The shops area of the building has no means of proving ventilation air in accordance with ASHRAE 62.1. It is recommended that a heat recovery system be installed to provide ventilation air to spaces in accordance with ASHRAE.

Use of heat recovery ventilator is recommended for energy savings. The existing washroom exhaust fans could be removed and washroom and lunch room exhaust ducted to the new heat recovery unit. The heat recovery unit would service the workshops, associated offices, corridors, and storage rooms. The new system would be provided with an outside air intake, exhaust air discharge, supply air electric tempering coil, associated controls, and distribution ductwork and grilles. The unit could be installed on an existing mezzanine level in one of the workshops. Ductwork would be run above the existing office area ceiling and exposed high in the workshop areas.

2.1.3.6 HVAC – Controls

The office area air handling system is provided with a master control unit (Viconics T7652A1000) located in an alcove off of the Male Washroom as per part 2.1.3.4 (see Mechanical photo 20). System zone bypass terminal units and perimeter heat as described in part 2.1.3.4 are controlled by non-networked thermostats (see Mechanical photo 23). Refer to section 2.1.3.4 for a more detailed description of these controls.

Washroom and other miscellaneous fans are controlled by simple toggle switches.

2.1.3.7 Fire Protection

No sprinkler system is present in the building.

The building is provided with portable fire extinguishers throughout. The majority of the extinguishers are dry chemical type suitable for class A, B, and C fires. All extinguishers had up to date inspections. There appeared to be sufficient fire extinguishers for the hazard classification of the building.

2.1.3.8 Conclusions and Recommendations

The following recommendations are made for mechanical improvements to the depot building.

Plumbing:

- Revise trap piping on Male Washroom lavatory to be a P trap.
- Revise clothes washer standpipe to include a trap.
- Replace corroded and uneven sewer cleanout in Women's Washroom.
- Insulate remainder of accessible copper domestic water piping.
- Raise Female Washroom hot water tank setpoint temperature to between 50°C and 60°C.
- Replace Female Washroom hot water tank and pipe relief discharge piping to code.
- Replace copper domestic water piping in the mid-term.
- Replace hot water tank and provide hinged door on tank enclosure in the mid-term.
- Provide an electronic hands free flush valve on the urinal.

HVAC:

- If not already routinely done, schedule an inspection/testing/routine maintenance service call for the split air conditioning system complete with service report.
- If not already routinely done, schedule an inspection/testing/routine maintenance service call for the humidification system complete with service report.
- Replace Male Washroom exhaust fan with a higher capacity unit. Not required if a heat recovery system is installed.
- Update time, day, and schedules on HVAC system master controller.
- Provide a heat recovery system to service areas of the building not provided with ventilation.

2.1.4 Electrical Assessment

2.1.4.1 Service and Distribution

2.1.4.1.1 Description

The electrical service enters the main building overhead from three (3) pole mounted single phase distribution transformers (Refer to Electrical photo 1).

The main incoming service conductors are connected to a 400A, 3P, 120/208V Siemens ID425 disconnect switch (Refer to Electrical photo 2). The main disconnect feeds 400A, 120/208V, 3ϕ, 4W, 42CCT main panelboard Siemens Type P2 c/w 400A main circuit breaker.

Revenue metering is performed at building entrance after the main disconnect (Newfoundland Power #539394). The utility meter is installed inside the electrical room.

120/208V electricity is distributed through the facility is distributed through four (4) distribution panels fed from the main panelboard as follows:

- Panel A located in electrical Room (Refer to Electrical photo 3)
- Panel B located in electrical Room (Refer to Electrical photo 3)

- Panel located in the storage space above the electrical room (Refer to Electrical photo 4)
- Small load center in the hallway (Refer to Electrical photo 5)

Panels A, B, and the one located in the storage space above the electrical room are fed from the main panelboard through a splitter (Refer to Electrical photo 3).

2.1.4.1.2 Observations

The incoming 400A at 120/208V service capacity appears to be adequate.

Panels A, B and the load center in the hallway appears to be more than thirty (30) years old and are in fair physical condition. There were no visible signs of excessive wear or corrosion. Cabling/conduit runs also appeared to be in good condition with no apparent deficiencies.

Surface mounted panels in the electrical room and the recessed load center in the hallway feed all building lighting, heating and receptacle loads. There is no spare capacity on panels A, B and the hallway load center.

The panelboard located in the space above the electrical room is relatively new. It was observed that the front cover has been removed and is laying on the floor nearby.

The electrical room is used as storage space and access to the electrical equipment is blocked.

2.1.4.1.3 Conclusions

Based on the visual inspection of the facility, panels A, B, and the hallway loadcenters have exceeded their service life expectancy. New panels with sufficient spare capacity have to be installed in the next five (5) years.

The cover on the panel located above the electrical room must be reinstalled.

The communication rack is installed in front of the main disconnect and conflict with the required by CEC Rule 2-308(1) 1 m working space with secure footing.

2.1.4.2 Emergency Power System

There is no emergency power distribution system.

2.1.4.3 Lighting

2.1.4.3.1 Description

The majority of the office areas are illuminated by 4 ft. recessed acrylic lens florescent fixture with T12 Lamps (Refer to Electrical photo 6).

Some service and storage rooms are lit with 4 ft. surface mounted wraparound fluorescent fixtures (Refer to Electrical photo 7).

The warehouse area is primarily illuminated by suspended open industrial fluorescent fixtures.

The exterior building lighting is provided by two (2) HID wallpacks c/w integral photocell control (Refer to Electrical photo 8).

The building lighting is fed from the 120/208V panelboards.

2.1.4.3.2 Observations

Office areas, corridors and warehouses were observed to have adequate lighting levels as required by the latest edition of the NBCC.

The lighting fixture in the office area, corridors and warehouses and the exterior lighting fixtures are in good condition.

Some wraparound fluorescent lighting fixtures are with missing acrylic lenses (Refer to Electrical photo 7).

As fluorescent lighting is T12 it should be replaced with T8 or LED fixtures in the mid-term due to the eventual phase out of T12 lamps and ballasts.

2.1.4.4 Exit and Emergency Lighting

2.1.4.4.1 Description

The building emergency lighting consists of dual head emergency battery units (Refer to Electrical photo 9). The battery units are of various age and are in relatively good condition.

The building is equipped with lighted exit signs located throughout (Refer to Electrical photo 10). The exit signs are battery backed-up and are lit with incandescent lamps.

2.1.4.4.2 Observations

Emergency lighting units and exit signs are adequate and are in good condition.

2.1.4.4.3 Conclusions

Provide 30-second monthly functional test. Consider battery replacement for 10 years old lead acid battery or for 15 years old nickel cadmium battery.

2.1.4.5 Heating System

2.1.4.5.1 Description

The whole building is heated by electrical heaters. The office area is heated by electric baseboard heaters c/w wall mount thermostats (Refer to Electrical photo 11). The workshops are heated by electric unit heaters c/w wall mount thermostats (Refer Electrical photos 12 and 13).

2.1.4.5.2 Observations

The electric heater in office area and warehouses area are in relatively good physical condition. There were no visible signs of excessive wear or corrosion. The heaters worked properly when operated.

2.1.4.6 Wiring Devices

2.1.4.6.1 Description

U-grounded, duplex receptacles are installed throughout the building. Receptacles are recessed. The outdoor receptacles are weather protected type duplex receptacles.

The lighting control in offices, service rooms and warehouses is provided by individual lighting switches for each circuit.

2.1.4.6.2 Observations

The indoor receptacles and lighting switches are sufficient quantity and in good condition.

There are three (3) outdoor receptacles, two old standard duplex receptacles and one new duplex GFCI receptacle. The GFCI receptacle is new and in good physical condition.

2.1.4.7 Wiring Methods

2.1.4.7.1 Description

Wiring system appears to be a combination of conductors run in EMT conduit, AC-90 and NMD90 cabling installed concealed in walls and above ceiling (Refer to Electrical photo 14).

2.1.4.7.2 Observations

The observed wiring appears to be in good condition.

2.1.4.8 Fire Alarm

2.1.4.8.1 Description

There is no fire alarm panel observed near the main entrance or in any other location in the office building. There are some fire alarm system devices such as pull stations and smoke detectors installed throughout the building but no one on site was aware of where they are connected (Refer to Electrical photo 15).

2.1.4.8.2 Observations

Wiring of the existing fire alarm devices is concealed and not visible. Pull stations are old but in relatively good condition. The smoke detectors are old and need replacement. No visual or audible signal alarms were apparent throughout the building.

2.1.4.8.3 Conclusions

Consider installation of the fire alarm annunciator/control panel next to the main entrance as required by NBCC, Clause 3.2.4.9. Connect the existing devices in good condition to the new fire alarm panel. Install new fire alarm system detectors and alarm devices as required.

2.1.4.9 Data and Communications

The building telecommunication cables enters the building in the electrical/telecommunication room. All telecom equipment including but not limited to telephone BIX blocks, telecom racks, patch panels, Ethernet switches, etc. and cabling is not more than 10 years old and is in good condition (Refer to Electrical photo 16).

2.1.4.10 CCTV / Security System

2.1.4.10.1 Description

There is a proximity card access control system that controls access to the building and building security system including keypad, sensors and controls. Both systems are relatively new and in good condition (refer to Electrical photos 17 and 18).

There is no CCTV system only camera integrated in the intercom Aiphone model JF-DA (Refer to Electrical photo 17).

2.1.4.11 PA System

There is public address (PA) system in the building integrated with the telephone system. The loudspeakers are surface mounted on building exterior walls (Refer to Electrical photo 8). The speakers are in good physical condition.

2.1.4.12 Conclusions and Recommendations

1. Consider installation of new fire alarm system panel with detectors and alarm devices. Reuse existing fire alarm pull stations.
2. Remove the materials stored in the electrical room and install warning sign on electrical room door "Electrical Room – No storage permitted".
3. Install the panel cover on the panelboard in the space above the electrical room.
4. Relocate the communication rack installed in front of the main disconnect switch in order to provide 1 meter working space required by CEC.
5. Relocate the communication rack installed in front of the main disconnect to provide a 1 m working space.
6. Replace missing acrylic lenses on wraparound fluorescent lighting fixtures.
7. Replace both outdoor standard duplex receptacles and faceplates with new GFCI receptacles c/w weatherproof faceplates.
8. Panels A, B, and the hallway loadcenters should be replaced within the next five (5) years.
9. Replace T12 fluorescent light fixtures with T8 or LED fixtures in the mid-term.
10. Replace batteries in emergency lighting units in the mid-term.

2.1.5 Environmental Review

2.1.5.1 Air Emissions

No air emissions are present from the facility from fuel burning equipment or processes using chemicals.

2.1.5.2 Asbestos Containing Materials

An asbestos survey provided to the consultant indicated the presence of asbestos in drywall joint filler. The presence of these asbestos containing materials shall be made aware to any personnel undertaking work in the facility that could disturb these materials.

2.1.5.3 Lead Containing Materials

Lead is likely present in plumbing solder and possibly in oil based paints used in the facility. The potential presence of lead containing materials shall be made aware to any personnel undertaking work in the facility that could disturb these materials.

2.1.5.4 PCB Containing Materials
Fluorescent lighting in the facility is not old enough to be of concern for presence of PCB's that were commonly used in older lighting ballasts.

2.1.5.5 Ozone Depleting Substances
The office air conditioning system utilizes the recognized ozone depleting refrigerants R22. Older refrigerators may also contain ozone depleting refrigerants. Ozone depleting refrigerants must be recovered and properly documented prior to equipment being disposed of.

There was no Halon fire extinguishing systems identified in the facility.

2.1.5.6 Indoor Air Quality
While no indoor air quality issues were noticed while on site, a portion of the facility is not provided with proper ventilation and make-up air systems. Any odours, VOC's from off gassing, and other airborne pollutants cannot be effectively removed from the building.

2.1.5.7 Mould and Mildew
No signs of mould or mildew were present throughout the building.

2.1.5.8 Spills and Contaminated Areas
No signs of spills were observed inside the main office building. Some small spills were observed around the site based on stains (see Environmental Photos 1 to 5).

2.1.5.9 Flammable and Combustible Liquids Storage
Flammable and combustible liquids were found to be present in the Office Building.

Liquids found on open shelving or in cabinets other than rated safety cabinets in the Warehouse included (see Environmental Photos 6 to 9):

- Motor oil;
- Aerosol spray lubricants;
- Aerosol brake cleaner.

Liquids found on open shelving or in cabinets other than rated safety cabinets in the Workshops included (see Environmental Photos 10 to 12):

- Aerosol contact cement;
- Aerosol spray cleaners;
- Oil based paints;
- Compressor oil (low flammability).

Liquids found in the lean to adjacent to the building included (see Environmental Photos 13 to 15):

- Gasoline containers;
- Two stroke engine oil;
- Diesel fuel containers (in a safety Cabinet);

Liquids found outdoors included numerous 205 L drums of transformer oil and 205L drums marked as waste oil (see Environmental Photos 16 to 18). The waste oil drums were empty at the time of the site visit.

Quantities present do not exceed maximum amounts allowable for incidental use, however it is recommended that all flammable and combustible liquids inside the building be kept in rated safety cabinets.

2.1.5.10 Compressed Gases Storage

Quantities of compressed gases were observed within the building and in the yard (see Environmental Photos 19 to 21). Items found inside the building included:

- Single use propane cylinders stored on shelving in the Warehouse;
- One cylinder of nitrogen in the Protection and Control Shop Stock Room;
- Eight cylinders in the yard missing labels. It appeared the cylinders were empty and awaiting return.

The National Fire Code of Canada prohibits the indoor storage of Class 2.1 flammable gases of which propane is one unless the storage is in a specially designed room and not within a specified distance of other flammable and combustible liquids.

2.1.5.11 Conclusions and Recommendations

The following recommendations are made regarding environmental issues identified.

- Provide a rated vented safety cabinet in the Warehouse for storage of flammable/combustible liquids.
- Indoor air quality should be addressed as per the recommendation in the mechanical section of this report.
- The presence of asbestos and potentially lead containing materials are to be made aware to anyone undertaking work that may disturb these materials.
- Ozone depleting substances (refrigerants) should be properly recovered prior to disposing of equipment.
- Stained soil in the depot yard should be removed and properly disposed of.
- Stored propane cylinders should be moved to an outdoor storage area.

2.1.6 Energy Usage Review

Knowing the energy consumption of a facility from all sources (electricity, petroleum fuels, etc.) an energy use intensity (EUI) can be calculated which can be compared to benchmark EUI's for various types of buildings in Canada. These benchmarks represent median EUIs for various types of facilities. No energy consumption information was provided for this building so a EUI could not be calculated and the building compared with benchmarks.

2.2 Garage

2.2.1 Architectural Assessment

The building is a single level on grade pre-engineered steel structure of 166m^2 area. The space is principally a three bay open repair garage. Ancillary rooms include; washroom, office, lunch, parts, storage and two small low ceiling storage lofts. The building is estimated to be 20-25 years of age. It is in good condition.

2.2.1.1 Building Exterior Envelope

The exterior walls consist of a pre-engineered steel frame with steel girts and vertical pre-painted steel cladding. Backup consists of vinyl faced roll type glass fibre thermal insulation and pre-painted vertical steel liner panel at floor level.

Cladding exhibits localized surface corrosion near grade in several locations, sanding and painting is recommended.

Roofing consists of a standing seam low sloped gable steel panels with vinyl clad glass fibre roll type insulation.

Exterior doors include contemporary insulated pre-painted steel sectional overhead doors, two of which have personnel doors cut into them, two with motorized operators. Personnel doors are commercial metal in pressed steel frames with commercial hardware.

Windows are fixed and projected aluminum and are in good condition.

2.2.1.2 Building Interior

The interior finish of exterior walls in the garage area consists of pre painted vertical steel liner panel to an approximate height of 2.7-3.0 metres. Ancillary rooms exterior walls are finished with liner panel and some drywall. Partitions are of painted masonry block.

Ceilings are exposed roof structure vinyl clad insulation.

Interior doors are a combination of steel and solid core wood, painting is recommended.

Two small storage lofts exist. It is recommended that they be encased and not used since ceilings are low and access is not to code.

Lunch room equipment and millwork are in good condition. Flooring in the kitchen and washroom should be replaced and the office flooring would benefit from cleaning and waxing.

2.2.1.3 Building Code

The building is classified as F-2 Medium Hazard Industrial by the NBCC 2010.

The building generally appears to meet code with the exception of the existing in floor service pit which is missing guard rails, second egress, and explosion proof electrical. The pit appears to be abandoned as there is a significant amount of water in it.

2.2.1.4 Accessibility

The building is not accessible to persons with mobility challenges. Based on its estimated original construction date it ought to have been compliant with the Accessibility Act. However given the current age and use it is not recommended to modify the building to meet the Act.

2.2.1.5 Selected NBCC 2010/LSC 101 Requirements

The following provides an overview of several National Building Code 2010/Life Safety Code NFPA 101 requirements and applicable sections for this facility.

Requirements	Compliance / Action
1) <u>Building Occupancy</u> Group F-2 – Medium Hazard Industrial *NBCC A-3.1.3.1*	Compliant
2) <u>Group F, Division 2, Up To Two Storeys</u> 1. A building classified as Group F, Division 2 is permitted to be of combustible construction or non-combustible construction used singly or in combination, provided: a. It has a building are not more than i. 1000 m² if facing 1 street, b. It is not more than two storeys in building height; c. Floor assemblies are fire separations and if of combustible construction, rated 45 minutes, and d. Loadbearing walls, columns, and arches supporting a rated assembly shall also be rated for 45 minutes or be of non-combustible construction. *NBCC 3.2.2.76*	Compliant
3) <u>Occupant Load (Based on LSC)</u> Group F2 - Medium Hazard Industrial: 166 m²/46 m² per person = 3.6 persons Total Occupant Load = 3.6 persons (Service rooms, storage, circulation and washrooms are excluded)	Compliant
4) Exit Capacity The maximum size of rooms or suites with one exit are as follows: Group F-2 – 150 m² with a 10 metre travel distance to the egress door. *NBCC 3.4.2.1.A*	Compliant
5) Except if exits are located along the perimeter of the floor area and each main aisle in the floor area leads directly to an exit, the travel distance may be 60 metres maximum. NBCC 3.4.2.5	Compliant
6) The minimum width of a public corridor shall be 1100 mm. *NBCC 3.3.1.9*	N/A
7) Travel Distance shall be maximum of 30 metres. *NBCC 3.4.2.5*	Compliant
8) Exit capacity 4 persons x 6.1 mm per person = 24 mm *NBCC 3.4.3.2*	Compliant
9) Exits shall be separated from the remainder of the building by a fire separation having a fire resistance rating of not less than 45 minutes.	Compliant/N/A

Requirements	Compliance / Action
NBCC 3.4.4.1	
10) Washroom Fixture Calculation Group F2 – 4 persons: 1 washroom *NBCC 3.7.2.2*	Compliant
11) The building need not be designed to meet the NL Accessibility Act due to its function and age.	Compliant
12) Limiting distance:	Compliant

2.2.1.6 Conclusions and Recommendations

The building is in fair condition. Carryout code and finishes upgrades.

The following short term recommendations are made:

- Modify service pit to meet code by adding guard rails, second exit stair, explosion proof fixtures, or delete it and infill the pit.
- Re-paint interiors as well as exterior doors and frames.
- Replace main entry door threshold.
- Sand and re-paint corroded cladding.
- Clean and wax tile floors. Replace washroom and kitchen flooring.
- Paint steel liner panel in washroom.

The following mid- term recommendations are made:

- Replace overhead doors.

2.2.2 Structural Assessment

The garage is a pre-engineered steel structure with three vehicle bays. The building features a concrete foundation wall and an interior concrete slab on grade floor. The building is enclosed with metal siding and metal roofing.

2.2.2.1 Foundation and Floor Systems

The foundation wall that is exposed at grade level is in good condition. There are no signs of any deterioration.

The ground floor of the maintenance garage consists of a concrete slab on grade with a large service pit in the center vehicle bay. Both the pit and slab on grade appear to be in good condition. The only defects noted on the concrete was minor shrinkage cracks and typical marks due to equipment abrasion. There were no cracks observed in the slab under the vehicle lift.

The concrete pads outside of the garage doors are in fair condition with normal abrasions but no signs of cracking or settlement.

2.2.2.2 Roof Systems

The roof system is constructed of metal decking supported on steel Z-purlins spanning across rigid steel frames. The purlins were in excellent condition. The decking from the inside was not visible for inspection due to insulation covering. There were no signs of water stains or damage to the insulation to suggest that the decking was damaged in anyway.

2.2.2.3 Framing Systems

The building is a pre-engineered steel building with tapered wide flange columns and beams. There are two lines of interior rigid frames that provide the lateral bracing for the building. All of the steel structure is exposed on the inside of the building. The condition of the steel is very good with no signs of corrosion or distress.

2.2.2.4 Mezzanines

Two mezzanines are present. The mezzanine on the left side houses a lunch room and washroom with equipment storage at the mezzanine level. The mezzanine on the right side houses an office and storage room with dry storage at the mezzanine level. The floor systems of the mezzanines could not be viewed as it was concealed by ceiling finishes on the underside of the floor framing. While walking over the floor there did not appear to be any large deflections or sags in the system. Since the floor system could not be visually inspected, it will be classified as being in fair condition.

2.2.2.5 Hoist

The garage area is equipped with a jib crane with a maximum lifting capacity of 17.8kN (4000lbs). The jib crane is mounted to the floor. The structure is also in very good condition and recently inspected (2017) by Atlantic Crane.

2.2.2.6 Conclusions and Recommendations

Overall the maintenance garage is considered to be in very good condition. No recommended repairs are required at this time.

2.2.3 Mechanical Assessment

2.2.3.1 Plumbing – Drainage, Waste, and Venting

The facility is provided with one washroom containing a water closet and lavatory, and a lunch room with one sink (see Mechanical photo 1).

Visible sanitary drainage and vent piping is ABS. The fixtures are vented through the roof above the mezzanine (see Mechanical photo 2).

The sloped roof of the building is not provided with any roof drains.

The service pit in the garage is equipped with a sump pump (see Mechanical photo 3). The pump was not accessible so it could not be determined if it does not work or needed to be manually operated. A significant volume of water was present in the pit. The water appears to have petroleum products floating on it. If it is intended to continue use of the pit then the pump should be verified to be operational and explosion rated. If not then the pump should be replaced with one suitable for hazardous areas.

An oil interceptor is located behind the garage and is provided with electronic monitoring in the garage (see Mechanical photos 4 and 5). The interceptor venting is not to code as one vent should terminate 300mm higher than the second vent and the vent terminations must be at least 2m above ground.

A wash down pad is provided adjacent to the garage and has a drain at its center (see Mechanical photo 6). It could not be confirmed if this pad drains to the nearby oil interceptor.

2.2.3.2 Plumbing – Domestic Water Piping and Systems

The source of domestic water is unknown as it may be an independent municipal service or taken from the office building. The water entrance is located near the main building entrance door (see Mechanical photo 7). The entrance is composed of a gate valve and pressure gauge. It is recommended that a backflow preventer be installed at the water entrance to prevent back siphonage.

Hot water is generated by a 43 Litre (10 Imp Gal) electric hot water tank (see Mechanical Photo 8). The tank is a 1.5 kW GSW model number SS12SEB. The tank was manufactured in 2004 based on its serial number. Based on its date of manufacture this tank has served its useful life. Under the plumbing code this tank should be provided with a drain pan. The hot water heater appeared to work properly. Hot water temperature was measured to be 44.4°C. The water temperature setpoint should be raised to between 50°C and 60°C to control the formation of legionella bacteria.

Hot and cold water piping within the building is copper and is not insulated. The piping appears to be in good condition though its age is unknown. A hose bib is provided at the side of the building near the main access door. The hose bibb is provided with an isolation valve inside the building to allow the outdoor portion to be drained. Two hose bibbs are provided inside the building.

2.2.3.3 Plumbing – Fixtures

The facility is provided with a water closet, lavatory, and sink in the lunch room. The water closet is a floor mounted type with flush box. The water closet worked properly.

The lavatory is a wall hung type china unit with two handle faucet. The lavatory worked properly however the cold water handle should be indexed properly.

The lunch room sink is a part of the one piece kitchenette unit. The sink and two handle faucet are in good condition and operated properly.

A self-contained wall mounted eyewash unit is provided in the Garage (see Mechanical Photo 9). The unit is inspected and maintained on a regular basis.

2.2.3.4 HVAC – Air Handling Systems

The facility is provided with four exhaust fans. The service bay area is provided with two roof mounted down blast type exhaust fans. The north side fan operated properly during the site visit, however the south side fan would not operate. It was not confirmed if this fan has the capacity to meet general ventilation requirements for this space. There is no source of make-up air present when these fans are operating other than what would come in through open doors or windows or around cracks in the building envelope. Without a source of make-up air there is no way to determine if exhaust rates are in accordance with NBCC and ASHARE codes and standards.

The service pit is equipped with an exhaust air duct which runs to an inline exhaust fan located above one of the overhead doors (see Mechanical photo 10). This fan could not be operated during the site visit. This fan is required to operate continuously when the building is occupied. The fan should be replaced with a unit of non-sparking construction and suitable for conveyance of combustible gases and provided with a visible indication of system operating. There is no source of make-up air present when this fan is operating other than what would come in through open doors or windows or around cracks in the building envelope. Without a source of make-up air there is no way to determine if exhaust rates are in accordance with NBCC and ASHARE codes and standards.

The washroom is equipped with a ceiling exhaust fan (see Mechanical photo 11).

A welding fume capture system composed of a articulating arm and exhaust fan is located on the left side wall of the building (see Mechanical photo 12). The system operated properly.

2.2.3.5 HVAC – Ventilation Air

There is no source of ventilation air for the building other than what infiltrates through cracks in the building envelope and around openings such as doors and windows. This building is not compliant with the National Building Code of Canada which required all buildings to be ventilated in accordance with ASHRAE 62.1.

It is recommended that a ventilation system be installed in the building to bring in minimum required outside air. Use of heat recovery ventilator is recommended for energy savings. The existing washroom could be ducted to the new heat recovery unit in lieu of a washroom exhaust fan. The new system would be provided with an outside air intake, exhaust air discharge, supply air electric tempering coil, associated controls, distribution ductwork and grilles, zone isolation dampers, and fire dampers. The heat recovery unit should be provided with face and bypass capability or preheat to enable continuous operation (no recirculation or supply fan shutdown type defrost). The unit could be located in the mezzanine level over the storage room and office. Ductwork would be run exposed high in the service bays and down to the lower floor spaces.

A tempered make-up air system should be provided to allow additional air as required to enter the building when general exhaust, welding, and pit exhaust systems are operational.

2.2.3.6 HVAC – Controls

There are no HVAC controls present. The existing rooftop exhaust fans are controlled by motor starters. The washroom exhaust fan is controlled by a toggle switch.

A carbon monoxide (CO) gas detector unit is located on the stock room wall (see Mechanical photo 13). The detector is a Critical Environmental Technologies Honeywell Vulcain 201M provided with a visible and audible alarm. The CO detector is not wired in to control the building exhaust fans. A nitrogen dioxide (NO2) sensor should also be provided as diesel powered vehicles may also be serviced in the garage. No gas sensing was present in the service pit. A CO sensor should be located here. Additional gas detection signaling in the form of audible and visual (strobe) should be provided. The upgraded gas detection system should be interlocked with general exhaust and make-up air system to automatically operate these in the event of low gas levels being detected. Upon high gas levels detected the audible and visual alarms would be triggered.

2.2.3.7 Fire Protection

The facility is provided with two dry chemical fire extinguishers rated 10A120BC and 6A60BC. The extinguishers are regularly inspected and are up to date.

2.2.3.8 Conclusions and Recommendations

The following recommendations are made for mechanical improvements to the depot building.

Plumbing:

- Replace existing service pit sump pump with one rated for hazardous location including associated wiring.
- Revise the venting on the oil interceptor to be code compliant.
- Provide a backflow preventer on the water entrance to the building.
- Insulate accessible domestic hot and cold water piping.
- Index the lavatory cold water faucet handle.
- Replace hot water tank and provide with drain pan.
- Increase the hot water temperature setpoint on the hot water tank to between 50°C and 60°C.

HVAC:

- Repair or replace the inoperative south end rooftop exhaust fan.
- Provide a heat recovery unit to meet minimum ventilation requirements.
- Replace the service pit exhaust fan with one of non-spark construction and suitable for conveyance of combustible gases. Provide visual system operation proving light.
- Increase general exhaust rates if required and provide tempered make-up air system for general exhaust capacity and pit and welding exhaust systems.
- Upgrade gas detection system with additional sensors, visual and audible alarm indication, and interlock with exhaust and make-up air systems.
- Provide nitrogen dioxide gas detection system if diesel vehicles are serviced in the garage.
- Provide service visit by qualified gas detection system representative to assess system and calibrate existing sensor.

2.2.4 Electrical Assessment

2.2.4.1 Service and Distribution

2.2.4.1.1 Description

The electrical service enters the maintenance garage building overhead from three (3) 50 kVA pole mounted overhead transformers located near the building.

The main incoming service conductors to the building are connected to 225A, 120/208V, 3ϕ, 4W, 42 CCT Federal Pioneer service entrance rated panelboard c/w 200A main circuit breaker (Refer to Electrical Photo 1).

Revenue metering is performed at 120/208V, three phase, 200A service. The meter (Newfoundland Power Meter #538916) is located outside on building wall.

Service entrance grounding is provided at the building service entrance rated panelboard using grounding rod driven in the ground outside the building.

The service entrance panelboard feed 225A, 120/208V, 3ϕ, 4W, 24 CCT panelboard c/w 100A main circuit breaker.

2.2.4.1.2 Observations

The incoming 200A at 120/208V service capacity appears to be adequate based on observed building loads.

Both panelboards appear to be more than twenty (20) years old and are in fair physical condition. The panelboards are surface mounted in the garage area and feeds all building lighting, heating, power tools and receptacle loads. There are three (3) spaces for circuit breakers available at main panelboard and (2) spaces in the subpanel for future loads. There are no filler plates on the available circuit breaker spaces.

2.2.4.1.3 Conclusions

Overall condition of the service entrance and the electrical distribution system appears to be in relatively good condition and don't need upgrade in the next ten (10) years.

2.2.4.2 Emergency Power System

There is no emergency power distribution system.

2.2.4.3 Lighting

2.2.4.3.1 Description

The building interior is illuminated by 4 ft. surface mounted florescent fixtures in the office, lunch room, washroom, storage areas, and at the workshop bench. The workshop area is illuminated by nine (9) high bay metal halide lighting fixtures (Refer to Electrical photo 2).

Building exterior lighting is provided by seven (7) HID photocells controlled wallpacks (Refer to Electrical photo 3).

The building lighting is fed from the 120/240V panelboard.

2.2.4.3.2 OBSERVATIONS

The building interior was observed to have adequate lighting levels as required by the latest edition of the NBCC.

The fluorescent lighting fixture are around twenty (20) years old and are in fair condition. The high bay lighting fixture are relatively new and in good condition.

2.2.4.4 EXIT AND EMERGENCY LIGHTING

2.2.4.4.1 DESCRIPTION

The building emergency lighting is provided by dual head incandescent battery-backed emergency lighting units.

The building is equipped with self-luminous exit signs located throughout.

2.2.4.4.2 OBSERVATIONS

There is one (1) more than twenty (20) years old emergency lighting unit and one (1) old Exit sign that need replacement.

2.2.4.5 HEATING SYSTEM

2.2.4.5.1 DESCRIPTION

The building office, storage room, washroom, and lunch room are heated by electrical baseboard heaters and convection wall heaters c/w wall mounted thermostats (Refer to Electrical photo 4). The workshop area is heated with unit heaters c/w wall mounted thermostats.

2.2.4.5.2 OBSERVATIONS

The electric heaters are in relatively good physical condition. There were no visible signs of excessive wear or corrosion.

2.2.4.6 WIRING DEVICES

2.2.4.6.1 DESCRIPTION

U-grounded, recessed duplex receptacles are installed throughout the building. The outdoor receptacles are weather protected type duplex receptacles.

The interior lighting control is provided by individual lighting switches.

2.2.4.6.2 OBSERVATIONS

The indoor and outdoor receptacles and lighting switches are sufficient quantity. Most of the receptacles and lighting switches are original and are in fair condition.

2.2.4.7 Wiring Methods

2.2.4.7.1 Description

Wiring system appears to be a combination of AC-90 and NMD90 cabling concealed in walls and above ceiling in the office, storage room, washroom, and lunch room and building wires in surface mounted metallic conduits in the service bay area.

2.2.4.7.2 Observations

The observed wiring appears to be in good condition. Electrical equipment located in the service pit was observed not to be explosion proof (Refer to Electrical photo 5).

2.2.4.8 Fire Alarm

There is no fire alarm panel observed near the main entrance or in any other location in the maintenance garage building. There are two (2) pull stations at building exit doors but on site personnel did could not confirm where they are connected (Refer to Electrical photo 6).

Consider connection the existing pull station to new fire alarm panel installed in the office building. Install new fire alarm system detectors and alarm devices as required.

2.2.4.9 Data and Communications

2.2.4.9.1 Description

The building telecommunication cables enters the building in the workshop area overhead. All telecom equipment including but not limited to telecommunication rack, patch panels, Ethernet switches, etc. and cabling is not more than 10 years old and is in good condition.

The telephone system including the telephone equipment is relatively new, VoIP type and in good condition.

2.2.4.10 CCTV / Security System

2.2.4.10.1 Description

The maintenance garage building is connected to the main office building proximity card access control system. Panels are located adjacent to the distribution panels (Refer to Electrical photo 7). The card access system is relatively new and in good condition. There is building security system with motion detectors.

There is no CCTV system.

2.2.4.11 PA System

There is public address (PA) system in the building integrated with the telephone system. The loudspeakers are surface mounted on building exterior walls. The speakers are in good physical condition.

2.2.4.12 Conclusions and Recommendations

1. Replace one old emergency lighting unit and one old exit sign.
2. Install new fire alarm system devices and connect to new proposed fire alarm system panel in the office building as a separate zone.
3. Install filler plates on the empty circuit breaker spaces in both panelboards.

4. The garage pit is a hazardous area. The control station and any wiring located inside shall be replaced with an explosion proof type.
5. Panels should be replaced in the mid-term.
6. Replace T12 fluorescent light fixtures with T8 or LED fixtures in the mid-term

2.2.5 Environmental Review

2.2.5.1 Air Emissions

No air emissions are present from the facility from fuel burning equipment or processes using chemicals. The building appeared to have a oil burning appliance at one time as there is still a section of abandoned chimney present on the rear of the building.

2.2.5.2 Asbestos Containing Materials

An asbestos survey provided to the consultant indicated no presence of asbestos in this building.

2.2.5.3 Lead Containing Materials

Lead is likely present in plumbing solder and possibly in oil based paints used in the facility. The potential presence of lead containing materials shall be made aware to any personnel undertaking work in the facility that could disturb these materials.

2.2.5.4 PCB Containing Materials

Fluorescent lighting in the facility is not old enough to be of concern for presence of PCB's that were commonly used in older lighting ballasts.

2.2.5.5 Ozone Depleting Substances

No potential ozone depleting substances were observed.

There was no Halon fire extinguishing systems identified in the facility.

2.2.5.6 Indoor Air Quality

While no indoor air quality issues were noticed while on site, the facility is not provided with proper ventilation and make-up air systems. Any odours, fumes, VOC's from off gassing, and other airborne pollutants cannot be effectively removed from the building.

2.2.5.7 Mould and Mildew

No signs of mould or mildew were present throughout the building.

2.2.5.8 Spills and Contaminated Areas

No signs of spills were observed inside on the Garage floor. Water in the service pit appeared to have petroleum products floating on the surface (see Environmental Photo 22).

2.2.5.9 Flammable and Combustible Liquids Storage

Flammable and combustible liquids were found to be present in the Garage. These were primarily lubricants in small drums connected to a pneumatic dispenser system located on the mezzanine over the Washroom/Lunch Room (see Environmental Photo 23).

Access to the storage room and safety cabinet were not available so products and quantities in these locations could not be verified.

2.2.5.10 Compressed Gases Storage

Quantities of compressed gases were observed within the building (see Environmental photos 24 and 25). Items found inside the building included:

- Propane cylinders for a fork lift (one mounted on the fork lift and second one on floor);
- Oxygen / acetylene cylinders;

The National Fire Code of Canada prohibits the indoor storage of Class 2.1 flammable gases of which acetylene and propane are examples unless the storage is in a specially designed room and not within a specified distance of other Class 1 and Class II flammable and combustible liquids.

Access to the storage room and safety cabinet were not available so products and quantities in these locations could not be verified.

2.2.5.11 Conclusions and Recommendations

The following recommendations are made regarding environmental issues identified.

- Indoor air quality should be addressed as per the recommendation in the mechanical section of this report.
- The potential presence of lead containing materials is to be made aware to anyone undertaking work that may disturb these materials.
- Stored propane and acetylene cylinders should be moved to an outdoor storage area.

2.2.6 Energy Usage Review

Knowing the energy consumption of a facility from all sources (electricity, petroleum fuels, etc.) an energy use intensity (EUI) can be calculated which can be compared to benchmark EUI's for various types of buildings in Canada. These benchmarks represent median EUIs for various types of facilities. No energy consumption information was provided for this building so a EUI could not be calculated and the building compared with benchmarks.

2.3 Warehouse Building

2.3.1 Architectural Assessment

The building is a single level on grade pre -engineered steel structure of 134m^2 area. It is sub-divided into three rooms each with metal demising partitioning walls, two rooms have sectional overhead doors plus a single swing steel personnel door. The third room has a pair of steel swing doors. Each room is used for line crew equipment storage. The roof is a low slope gable with metal panels. Windows are steel with corroded steel security screening. Personnel doors are metal in pressed steel frames with commercial hardware. The building exterior should be painted. The building is in better condition than it first appears. Its age appears to be 30 plus years.

2.3.1.1 Building Exterior Envelope

Exterior walls consist of vertical pre-painted corrugated steel siding on steel girts and backed up by roll type vinyl clad glass fibre thermal insulation retained by steel mesh and exposed to the building interior. The standing seam steel panels sloped gable roof includes roll type vinyl clad glass fibre thermal insulation exposed to the interior. Siding is dented, corroded near grade and most paint has peeled away. Eave soffits are also corroded in several localized areas. Repair and painting is recommended.

Overhead doors are sectional steel and appear to have been in existence for some years. One unit has double swing commercial steel doors in pressed steel frames with commercial hardware. The other two units have in addition to one overhead door a swing type commercial steel door in pressed steel frame with commercial hardware.

Doors and siding are corroded near grade requiring replacement. All siding needs to be painted. Security window screens should be removed and replaced. Rain gutter system is present along the front and it is corroded, requiring replacement.

Overhead doors should be replaced in the mid-term due to dents.

2.3.1.2 Building Interior

The interior finish of exterior roof and walls consists of exposed vinyl clad insulation. Floors are exposed concrete slabs.

2.3.1.3 Building Code

The building is classified as F-3 – Low Hazard industrial by the NBCC 2010.

The building appears to meet code with the possible exception of the proximity to the main office/line crew building. Addition of 120 minute rated drywall inside part of the building as well as 90 minute rated doors close to the main building are required.

2.3.1.4 Accessibility

The building is not formally accessible to persons with mobility challenges and due to its age and use is not required to meet the Accessibility Act.

2.3.1.5 Selected NBCC 2010/LSC 101 Requirements

The following provides an overview of several National Building Code 2010/Life Safety Code NFPA 101 requirements and applicable sections for this facility.

Requirements	**Compliance / Action**
1) <u>Building Occupancy</u> Group F-3 – Low Hazard Industrial *NBCC A-3.1.3.1*	Compliant
2) <u>Group F, Division 3, Up To Two Storeys</u> 3. A building classified as Group F, Division 3 is permitted to be of combustible construction or non-combustible construction used singly or in combination, provided: c. It has a building are not more than 1600 m^2 when facing one street d. It is not more than one storey in building height. *NBCC 3.2.2.83*	Compliant

Requirements	**Compliance / Action**
3) Occupant Load (Based on LSC) Group F3 - Low Hazard Industrial: 134m^2/46 m^2 per person = 2.9 persons Total Occupant Load = 3 person	Compliant
4) Exit Capacity The maximum size of rooms or suites with one exit are as follows: Group F-3 – 150 m^2 with a 10 metre travel distance to the egress door. *NBCC 3.4.2.1.A*	Compliant
5) Except if exits are located along the perimeter of the floor area and each main aisle in the floor area leads directly to an exit, the travel distance may be 60 metres maximum. NBCC 3.4.2.5	Compliant
6) The minimum width of a public corridor shall be 1100 mm. *NBCC 3.3.1.9*	N/A
7) Travel Distance shall be maximum of 30 metres. *NBCC 3.4.2.5*	Compliant
8) Exit capacity 3 persons x 6.1 mm per person = 9.3 mm *NBCC 3.4.3.2*	Compliant
9) Washroom Fixture Calculation *NBCC 3.7.2.2*	Building is used for storage only. No washroom is required.
10) The building need not be designed to meet the NL Accessibility Act requirements due to its size, age and function.	Compliant
11) Limiting distance:	Non- Compliant. Add 120 minutes of fire rated drywall inside the building along the right end and along the front to the overhead door proximate to the main building. Change the current personnel door to a 90 minute fire rated unit.

2.3.1.6 Conclusions and Recommendations

The following immediate term recommendations are made:

- Replace corroded siding, fascia, gutters windows and window screens.
- Paint cladding and doors.
- Add fire rated interior finish, and doors proximate to the main building due to limiting distance issues.

Mid-term upgrading:

- Replace overhead doors.

2.3.2 Structural Assessment

The Warehouse Building is a pre-engineered steel building with at concrete foundation. The structure is divided into three separate storage units; two of which are provided with an overhead door.

2.3.2.1 Foundation and Floor Systems

The top of the foundation wall is visible on the interior of the building and no visible signs of deterioration is present. The concrete slab on grade appears to be in good condition; only minor shrinkage cracks and slight abrasions are present.

2.3.2.2 Framing Systems

The building is supported by two interior rigid steel frames and two simply supported frames with a center column. The interior frames are concealed in the wall construction and were not visible for inspection. The exterior frames were visible and appeared to be in good condition.

2.3.2.3 Conclusions and Recommendations

The Warehouse Building is in good condition without any structural repairs required.

2.3.3 Mechanical Assessment

2.3.3.1 Plumbing – Drainage, Waste, and Venting

No drainage waste or vent systems are present in the building.

2.3.3.2 Plumbing – Domestic Water Piping and Systems

No domestic water systems are present in the building.

2.3.3.3 Plumbing – Fixtures

No plumbing fixtures are present in the building.

2.3.3.4 HVAC – Air Handling Systems

No air handling systems are present in the building.

2.3.3.5 HVAC – Ventilation Air

No ventilation air systems are present in the building. Natural ventilation can be achieved through use of building openings and through manually operable dampers on either end of the building (see Mechanical photos 1 and 2).

2.3.3.6 HVAC – Controls

No HVAC controls are present in the building.

2.3.3.7 Fire Protection

Each room of the building is provided with a type ABC dry chemical fire extinguisher. The extinguisher ratings are 4A60BC, 6A80BC, and 4A60BC. All extinguishers are 4.5 kg (10 lb) size. These extinguishers are suitable for the application. The extinguishers are regularly inspected and are up to date.

2.3.3.8 Conclusions and Recommendations

Based on the intended use of this building no mechanical systems are required other than the presence of the fire extinguishers.

2.3.4 Electrical Assessment

2.3.4.1 Service and Distribution

2.3.4.1.1 Description

The electrical service enters the warehouse building (old garage building) overhead from a pole mounted single phase distribution transformer.

The main incoming service conductors to the building are connected to a main 200A, 120/240V Square D, QO-40M service entrance rated panelboard c/w 200A main circuit breaker (Refer to Electrical photo 1).

Revenue metering is performed at 120/240V, single phase, 200A service. The meter (Newfoundland Power Meter #540361) is located outside on building wall.

Service entrance grounding is provided at the building main disconnect using grounding rod driven in the ground outside the building

2.3.4.1.2 Observations

The incoming 200A at 120/240V service capacity appears to be adequate.

The panelboard appear to be around twenty (20) years old and is in relatively good physical condition.

Panelboard is surface mounted in the storage area and feeds all building lighting, heating and receptacle loads. There are six (6) circuit breaker spaces available on the panelboard.

2.3.4.1.3 Conclusions

Overall condition of the service entrance and the electrical distribution system appears to be in relatively good condition.

2.3.4.2 Emergency Power System

There is no emergency power distribution system.

2.3.4.3 Lighting

2.3.4.3.1 Description

Two rooms are illuminated by 4 ft. surface mounted florescent strip lighting fixtures with a T12 lamps and wire guard. The third area is illuminated by old incandescent lighting fixtures (Refer to Electrical photos 2 and 3).

The exterior building lighting is provided by three (3) photocell controlled HID wallpacks installed on building walls (Refer to Electrical photo 4).

The building lighting is fed from the 120/240V panelboard.

2.3.4.3.2 Observations

The warehouse were observed to have adequate lighting levels as required by the latest edition of the NBCC.

The fluorescent lights are around fifteen (15) years old and in relatively good. The incandescent lighting fixtures are old and are in poor condition.

The exterior lights is relatively new and in good condition.

2.3.4.3.3 Conclusions

All old incandescent interior lighting fixtures have to be replaced. Install new fluorescent or LED lighting in the room with incandescent lighting. Existing T12 lighting should be replaced in the mid-term with T8 or LED.

2.3.4.4 Exit and Emergency Lighting

2.3.4.4.1 Description

Not available.

2.3.4.4.2 Conclusions

Install emergency lighting units in every storage room.

2.3.4.5 Heating System

2.3.4.5.1 Description

The building is partially heated by electrical unit heaters c/w wall mount thermostat. Only two (2) of the three (3) areas are heated.

2.3.4.5.2 Observations

The electric heaters are in relatively good condition.

2.3.4.5.3 Conclusions

No heater replacement will be required in the next 10 years.

2.3.4.6 Wiring Devices

2.3.4.6.1 Description

U-grounded, duplex receptacles are installed in only one of the three rooms of the building. The receptacles are surface mounted and in poor condition.

The lighting control is provided by individual lighting switches for each circuit.

2.3.4.6.2 Conclusions

The old receptacles including the outlet boxes and faceplates have to be replaced.

2.3.4.7 Wiring Methods

2.3.4.7.1 Description

Wiring system appears to be a combination of building wire in EMT and AC-90 cabling.

2.3.4.7.2 Observations

The observed wiring appears to be in good condition.

2.3.4.8 Fire Alarm System

Not available.

2.3.4.9 Data and Communications

Not available.

2.3.4.10 CCTV / Security System

2.3.4.10.1 Description

The storage building is connected to the main office building proximity card access control system. The card readers are relatively new and in good condition. There is no CCTV system.

2.3.4.11 PA System

Not available.

2.3.4.12 Conclusions and Recommendations

1. Replace the existing incandescent lighting fixtures with T8 fluorescent or LED lighting fixtures.
2. Replace the old receptacles, outlet boxes and faceplates.
3. Install emergency lighting units in all rooms.
4. Replace T12 lighting with T8 or LED in the mid-term.

2.3.5 Environmental Review

2.3.5.1 Air Emissions

No air emissions are present from the facility from fuel burning equipment or processes using chemicals.

2.3.5.2 Asbestos Containing Materials

Based on the age of the facility the presence of asbestos containing materials is unlikely. Based on asbestos surveys provided to the consultant no asbestos was present in this building.

2.3.5.3 Lead Containing Materials

Based on the age of the facility the presence of lead containing materials is unlikely.

2.3.5.4 PCB Containing Materials

Based on the age of the facility the presence of PCB materials is unlikely.

2.3.5.5 Ozone Depleting Substances

No ozone depleting substances were identified in the building.

2.3.5.6 Indoor Air Quality

No indoor air quality issues were noticed while on site.

2.3.5.7 Mould and Mildew

No signs of mould or mildew were present throughout the building.

2.3.5.8 Spills and Contaminated Areas

No signs of spills or were overserved in the building.

2.3.5.9 Flammable and Combustible Liquids Storage

Various flammable and combustible liquids were present in the building.

In the eastern most room the following items were identified outside of safety cabinets (see Environmental photos 26 to 28):

- Three 20 L gasoline containers;
- One 20 L kerosene container;
- Motor oil;
- Aerosol paints;
- BBQ starter fluid;
- Air brake anti-freeze.

The following items were observed in the safety cabinet in the east most room (see Environmental photos 29 to 31):

- BBQ starter fluid;
- Paint thinners;
- Oil based paints;
- Aerosol paints;
- Camp fuel;
- Two 20 L gasoline containers.

In the center room the following items were identified outside of safety cabinets (see Environmental photos 32 to 36):

- One 5 L gasoline container;
- Two stroke motor oil;
- Aerosol spray lubricant;
- Fuel stabilizer;
- BBQ starter fluid.

Quantities present of these liquids are permissible. It is recommended that they be stored in safety cabinets.

2.3.5.10 Compressed Gases Storage

Some compressed gases were observed in the building including one 20 lb cylinder in the eastern room and one 400g single use cylinder in the center room (see Environmental photos 37 to 38).

The National Fire Code of Canada prohibits the indoor storage of Class 2.1 flammable gases of which propane is one unless the storage is in a specially designed room and not within a specified distance of other flammable and combustible liquids.

Two gas cylinders were also located in the center room (see Environmental photo 37).

2.3.5.11 Conclusions and Recommendations

The following recommendations are made regarding environmental issues identified.

- Stored propane cylinders should be moved to an outdoor storage area.

2.3.6 Energy Usage Review

Knowing the energy consumption of a facility from all sources (electricity, petroleum fuels, etc.) a energy use intensity (EUI) can be calculated which can be compared to benchmark EUI's for various types of buildings in Canada. These benchmarks represent median EUIs for various types of facilities. As no energy usage information was provided to the consultant for this building (this building is fed from another metered building) a EUI could not be calculated and compared to benchmark data.

2.4 Storage Shed

2.4.1 Architectural Assessment

The building is a single level on grade pre-engineered loadbearing steel skin structure by Armco. The $22m^2$ building is comprised of a single storage room. Galvanized steel walls and roof cladding are double skinned with an approximately 25 mm thick glass fibre insulation sandwich. The roof is a low slope standing seam gable style with steel panels. The ceiling is metal and there is a vented attic with gable end vents. The door is a single swing type steel in pressed steel frame. An unused side door exists. The building is used primarily for tire and petroleum product storage.

2.4.1.1 Building Exterior Envelope

Walls are structural double wall vertical corrugated galvanized steel with approximately 25 mm of glass fibre thermal insulation between the two layers of cladding. The steel sheeting is unpainted. The roofing consists of low slope gable style standing seam galvanized steel sheets. The steel sheets exhibit significant surface corrosion. The exterior door is hollow metal in a pressed frame with commercial hardware. The attic is vented via two gable end vents.

2.4.1.2 Building Interior

Walls are finished with the interior wythe of exterior wall sandwich galvanized metal sheeting. The flat ceiling is of a similar material. There is an attic but no access to it. Flooring consists of exposed concrete slab.

2.4.1.3 Building Code

The building is classified as F-2 – Medium Hazard Industrial by the NBCC 2010.

The building appears to meet building code.

2.4.1.4 Accessibility

The building is not accessible to persons with mobility challenges and due to its size, age and function is not required to comply with The Accessibility Act.

2.4.1.5 Selected NBCC 2010/LSC 101 Requirements

The following provides an overview of several National Building Code 2010/Life Safety Code NFPA 101 requirements and applicable sections for this facility.

Requirements	**Compliance / Action**
12) Building Occupancy Group F-2 – Medium Hazard Industrial *NBCC A-3.1.3.1*	Compliant
13) Group F, Division 2, Up To Two Storeys 4. A building classified as Group F, Division 2 is permitted to be of combustible construction or non-combustible construction used singly or in combination, provided: e. It has a building are not more than ii. 1000 m^2 if facing 1 street, f. It is not more than one storey in building height. *NBCC 3.2.2.76*	Compliant
14) Occupant Load (Based on LSC) Group F2 - Medium Hazard Industrial: 22 m^2/46 m^2 per person = 1 Total Occupant Load = 1 person	Compliant
15) Exit Capacity The maximum size of rooms or suites with one exit are as follows: Group F-2 – 150 m^2 with a 10 metre travel distance to the egress door. *NBCC 3.4.2.1.A*	Compliant
16) Travel Distance shall be maximum of 30 metres. *NBCC 3.4.2.5*	Compliant
17) Exit capacity 1 person x 6.1 mm per person = 6.1 mm *NBCC 3.4.3.2*	Compliant
18) Washroom Fixture Calculation *NBCC 3.7.2.2*	Building used as materials storage only, washroom not

Requirements	Compliance / Action
	required.
19) The building need not be designed to meet the NL Accessibility Act requirements due to its size and function.	Compliant

2.4.1.6 Conclusions and Recommendations

The building is in good condition generally.

The following mid- term recommendations are made:

- Replace existing galvanized steel roof panels.
- Paint door and frame.

2.4.2 Structural Assessment

The Tire Storage Shed is a small building with galvanized siding and interlocking panels.

2.4.2.1 Foundation and Floor Systems

The foundation of the tire storage shed is a concrete slab cast directly on the ground. There was no noticeable settlement or heaving and in general the slab appeared to be in good condition.

2.4.2.2 Roof Systems

The structural components of the roof system were not visible due to the paneling on the inside. The galvanized coating on the exterior roof panels was worn off and the metal was corroded. The corrosion is only minor and does not appear to penetrate through the panels.

2.4.2.3 Framing Systems

The structural components of the walls were not visible for inspection. The interior is lined with interlocking panels that are in good condition. The exterior is clad in galvanized vertical siding. The coating on the siding is in good condition. The panels around the door have impact damage.

2.4.2.4 Conclusions and Recommendations

Overall the Storage Shed appears to be in fair condition based on a limited visual inspection. There does not appear to be structural repairs required.

2.4.3 Mechanical Assessment

2.4.3.1 Plumbing – Drainage, Waste, and Venting

No drainage waste or vent systems are present in the building.

2.4.3.2 Plumbing – Domestic Water Piping and Systems

No domestic water systems are present in the building.

2.4.3.3 Plumbing – Fixtures

No plumbing fixtures are present in the building.

2.4.3.4 HVAC – Air Handling Systems

The building is provided with a wall propeller type exhaust fan. The fan is not currently wired up, as such its functionality could not be assessed.

2.4.3.5 HVAC – Ventilation Air

There is no source of ventilation air for the building other than what infiltrates through cracks in the building envelope and around openings such as doors. Based on the flammable and combustible liquids present in this building being stored only and not used in a process or being dispensed no ventilation is required.

2.4.3.6 HVAC – Controls

No HVAC controls are present in the building.

2.4.3.7 Fire Protection

The facility is provided with one type ABC dry chemical fire extinguisher. The extinguisher rating is 4A60BC and is a 4.5 kg (10 lb) size. The extinguisher is regularly inspected and is up to date. Based on the National Fire Code the minimum fire extinguisher rating required in tire storage areas is 4A80BC. Based on this the existing extinguisher should be replaced with one of the higher rating.

2.4.3.8 Conclusions and Recommendations

Based on the intended use of this building the existing fire extinguisher should be replaced with one rated 4A80BC.

2.4.4 Electrical Assessment

2.4.4.1 Service and Distribution

2.4.4.1.1 Description

The electrical service enters the storage shed underground from maintenance garage building panelboard.

The main incoming service conductors to the building are connected to a 100A, 120/240V, eighteen (18) circuit load center fed from a 30A, 2P circuit breaker on circuits #16/18 in the maintenance garage building subpanel. The load center is a Cutler-Hammer model number CCPL104.

There is no separate revenue metering for the building.

Service entrance grounding is provided at the building load center through bonding conductor connected to maintenance garage building grounding system.

2.4.4.1.2 Observations

The incoming 30A at 120/240V service capacity appears to be adequate based on observed building loads.

The load center appears to be not more than ten (10) years old and is in good physical condition.

The load center is surface mounted and feeds all building lighting, heating, and receptacle loads. There is one (1) spare circuit breaker and five (5) spaces for circuit breakers available for future loads.

2.4.4.1.3 Conclusions

The load center is new with sufficient spare capacity.

2.4.4.2 Emergency Power System

There is no emergency power distribution system.

2.4.4.3 Lighting

2.4.4.3.1 Description

The building interior is illuminated by three (3) incandescent lighting fixtures. There is no building exterior lighting (Refer to Electrical photo 1).

The building lighting is fed from the 120/240V load center.

2.4.4.3.2 Observations

The building interior was observed to have adequate lighting levels as required by the latest edition of the NBCC.

The lighting fixtures are relatively new and in good condition.

2.4.4.4 Exit and Emergency Lighting

2.4.4.4.1 Description

Not available.

2.4.4.5 Heating System

The storage shed is heated by an electric unit heater. The electric heater is in good physical condition. There were no visible signs of excessive wear or corrosion.

2.4.4.6 Wiring Devices

2.4.4.6.1 Description

Single U-grounded, surface mounted duplex receptacles is installed inside the building. A single GFCI receptacle is installed on building exterior wall.

The interior lighting control is provided by a single lighting switch.

2.4.4.6.2 Observations

The indoor and outdoor receptacles and lighting switches are sufficient quantity. The indoor receptacle is relatively new and in good condition. The outdoor receptacle is without cover and has to be replaced including the weatherproof faceplate.

2.4.4.7 Wiring Methods

2.4.4.7.1 Description
Wiring system appears to be building wires in surface mounted EMT conduit.

2.4.4.7.2 Observations
The observed wiring appears to be in relatively good condition.

2.4.4.8 Fire Alarm
Not available.

2.4.4.9 CCTV / Security System
2.4.4.9.1 Description
There is a proximity card reader and door contacts connected to the office building access control system that controls access to the building. The card access reader and the door switch are in good condition.

There is no CCTV system.

2.4.4.10 PA System
Not available.

2.4.4.11 Conclusions and Recommendations
1. Install emergency lighting unit inside the storage shed.
2. Replace the outdoor GFCI receptacle including the weatherproof faceplate.

2.4.5 Environmental Review
2.4.5.1 Air Emissions
No air emissions are present from the facility from fuel burning equipment or processes using chemicals.

2.4.5.2 Asbestos Containing Materials
Based on the age of the facility the presence of asbestos containing materials is unlikely. Based on asbestos surveys provided to the consultant no asbestos was present in this building.

2.4.5.3 Lead Containing Materials
Based on the age of the facility the presence of lead containing materials is unlikely.

2.4.5.4 PCB Containing Materials
Based on the age of the facility the presence of PCB materials is unlikely.

2.4.5.5 Ozone Depleting Substances
No ozone depleting substances were identified in the building.

2.4.5.6 Indoor Air Quality
No indoor air quality issues were noticed while on site.

2.4.5.7 Mould and Mildew
No signs of mould or mildew were present throughout the building.

2.4.5.8 Spills and Contaminated Areas
There were no visible signs of spills within the building.

2.4.5.9 Flammable and Combustible Liquids Storage
Flammable and combustible liquids were found to be present in the Storage Shed on shelving (see Environmental photos 39 to 42). Liquids found included:

- Two 5 L gasoline containers;
- Hydraulic oil;
- Transmission fluid;
- Motor oil;
- Other lubricants.

Quantities present do not exceed maximum amounts allowable for incidental use.

2.4.5.10 Compressed Gases Storage
No compressed gas storage was present.

2.4.5.11 Conclusions and Recommendations
No environmental issues were noted.

2.4.6 Energy Usage Review
Knowing the energy consumption of a facility from all sources (electricity, petroleum fuels, etc.) a energy use intensity (EUI) can be calculated which can be compared to benchmark EUI's for various types of buildings in Canada. These benchmarks represent median EUIs for various types of facilities. As no energy usage information was provided to the consultant for this building (this building is fed from another metered building) a EUI could not be calculated and compared to benchmark data.

2.5 Equipment Storage Platforms

2.5.1 Structural Assessment
The Stephenville Office site has one large equipment storage platform measuring 30 m x 3 m located in the lower yard at the rear of the property (see Equipment Platform photos 1 to 10). The platform consists of three rows of rough sawn timber girders (125mm x 250mm) supported on timber piles. Rough sawn deck boards (40mm x 100mm) span between the girders to form the platform.

Overall, the condition of the platform is poor. The majority of the deck boards have dried out, rotted or missing. The platform also leans to the rear. It is not clear if the back posts have settled or if it was constructed that way. The platform is currently cordoned off with red tape because hydro personnel do not trust its structural capability. The only positive is that the girders and poles appear to be in good shape.

A small second platform is located behind the Garage (see Equipment Platform photo 11). The platform is approximately 5 m x 1 m in size. The platform consists of two rows of rough sawn timber girders (50mm x 200mm) supported on timber piles. Rough sawn deck boards (40mm x 150mm) span between the girders to form the platform.

Overall, the condition of the platform is poor. A number of the deck boards have dried out, rotted or missing. The piles appear to be in good shape.

2.5.1.1 Conclusions and Recommendations

The equipment platforms are in poor condition and it is recommended they be reconstructed or replaced. The timber piles may be able to be reused and some of the girders may be salvageable.

2.6 Civil/Site Assessment

2.6.1 Asphalt and Concrete Surfaces

The public side of the Office building and between the Office building and the Garage are surfaced with asphalt (see Site/Civil photos 1 to 7). The asphalt is in fair to good condition. The asphalt is failing near edges in the public parking area, near the Garage, as well as along the north side (see Site/Civil photos 2, 4 and 7). Asphalt failure was also observed between two areas within the yard (see Site/Civil photo 5)

Concrete surfaces are present at the public entrance, at the rear of the Office building, at each Garage service bay, at each entrance to the Warehouse building, and at a wash down area adjacent to the Garage (see Site/Civil photos 1, and 8 to 11). These concrete structures are in good condition with no serious cracking and surface abrasions from snow clearing or tracked equipment use.

The remainder of the yard is gravel including the storage yard at the rear of the office building (see Site/Civil photos 12 and 13). The gravel portions of the site are generally in good condition with no significant depressions or washout areas observed. The east and west access roads down to the storage yard are steep and show erosion from surface runoff (see Site/Civil photos 14 and 15). It is recommended that these two access roads be regraded.

2.6.2 Water and Sewer

Water is supplied from the municipal system. As indicated while onsite the water entrance to the Office building could not be located. A curb stop was observed on the east side of the building. It is not known of the Garage water supply is a separate municipal service or is fed from the Office building.

Sanitary sewer is connected to the municipal system.

No issues with the water system or sewage system were reported during the site visit.

2.6.3 Drainage

The site generally slopes from the south to the north with surface drainage going to a stream located to the north of the property. A storm drain was observed on the south side of the Office building in the parking area (see Site/Civil photo 1).

No standing water was observed on site, however there are a couple of locations where water would tend to hold up including near the upper yard gate and adjacent to the Garage (see Site/Civil photos 16 and 4).

There is no indication that any of the buildings are provided with foundation drainage, however it may be present.

2.6.4 Site Fencing

The depot yard is surrounded by a chain link fence. All buildings are located within the fenced in yard with the exception of the front of the Office building.

Inspection of the fencing revealed some issues including (see Site Civil Photos 17 to 24):

- Support brace broken on section in lower west yard.
- Sections of fence leaning in lower east yard.
- Sections of fence leaning in upper west yard.
- Fencing mesh bowed out upper south yard.
- Barb wire off, other wires require tensioning, and brace bar support bracket missing upper south yard.
- Conduit off fencing upper west yard.

2.6.5 Conclusions and Recommendations

The following recommendations are made for site civil:

- Regrade east and west access roads to lower yard.
- Make repairs to site fencing.

CHAPTER 3 REHABILITATION EXPANSION UPGRADE ASSESSMENT

3.1 Office Building

Based on current usage, and beyond repairs and code upgrades identified in Chapter 2 of this report, expansion is recommended for this facility. Personnel on site indicated that they have inadequate space for their workshop areas and that an expansion of the building would be required to accommodate their needs. To accommodate future expansion it is proposed to add a 68m^2 extension to the left of the current Protection and Control Shop to expand the shop area. Work would specifically include a new extension to house one workshop and to reconfigure the existing three workshops into two workshops. A concept plan of the proposed extension and renovations is provided in Appendix C.

The building extension would be slab on grade construction with concrete foundation wall and footings, wood frame construction, pre-engineered roof trusses, batt insulation, wood sheeting, asphalt roofing, and commercial metal siding. Alternatively, a steel framed extension could be provided to match the existing structure complete with pre-engineered roof trusses, asphalt roofing and commercial metal siding. Two single man doors would be provided for this space. Interior finishes would be a combination of drywall and painted plywood in low areas of the workshop and drywall ceilings

Mechanically the extension would be fitted with potable water distribution if required. These would be tied into existing services. The proposed heat recovery ventilation system would be extended to this area or an independent one provided if the extension construction occurred after the existing building was serviced. Fire extinguishers would be provided for fire protection.

Electrically the extension would be serviced through the existing service and spare breakers. Interior lighting would be T8 fluorescent or LED. Exterior lighting would be LED with photocell control. New battery powered emergency lighting units would be provided. Sufficient receptacles would be provided throughout. Heating would be with electric unit heaters. New data and communications outlets would be provided and the fire alarm system expanded to the new area.

3.2 Garage

Based on current usage, and beyond repairs and code upgrades identified in Chapter 2 of this report, no major rehabilitation, expansion, or upgrades are recommended for this facility.

3.3 Warehouse Building

Based on current usage, and beyond repairs identified in Chapter 2 of this report, no major rehabilitation, expansion, or upgrades are recommended for this facility.

3.4 Storage Shed

Based on current usage, and beyond repairs and code upgrades identified in Chapter 2 of this report, no major rehabilitation, expansion, or upgrades are recommended for this facility.

3.5 Pole Ramps and Equipment Platforms

Based on current condition indicated in Chapter 2 of this report, rehabilitation of the equipment platforms is recommended for this site. The existing structures are in poor condition and repair of them is not practical.

The platforms would be constructed to the same size and heights unless any operational requirements would demand changes. Construction could be done with similar wood structure and decking or hybrid construction utilizing galvanized steel piles and beams with wood decking.

CHAPTER 4 COST ESTIMATES

4.1 Recommended Renovations and Improvements to Existing Facilities

4.1.1 Purpose

This section provides an overview of the costs associated to complete the recommended repairs and upgrades outlined above for each building to maintain current operations and functionality and comply with current codes. New construction and extension cost estimates include incorporation of expansion, and upgrading of facilities to service future operational requirements.

Renovation, maintenance and repair costs are grouped into three categories: Immediate; Mid-Term; and Long-Term. The work considered for immediate repairs would include all things which pose a threat to life safety and would also include correcting deficiencies with structural, civil, environmental, mechanical, and electrical. For the regularly occupied buildings, and buildings intended for long-term use, these renovations would be very important to complete for the safety, well-being, and comfort of occupants. For buildings determined to be unsuitable for long-term future use, only repairs which are deemed absolutely necessary would be considered.

Mid-term repairs would be intended for completion in the 3 to 10 year range, assuming the repairs listed as immediate are completed. This could include such items as architectural finishes replacement, end of serviceable life equipment replacement or upgrading of equipment to better service the facility. The long-term repair category would also only apply to buildings intended for extended use as these repairs would fall in the range of 10 to 20 years. These long-term repairs also require the immediate and mid-term repairs to be completed as intended.

4.1.2 Cost Estimating Accuracy

The estimates contained in this report are intended to provide order of magnitude construction costs only and are accurate to Class 3 (-10 to +30%) standards as per generally recognized industry practices. Estimates are based on the site observations (repairs & upgrades) and with the owner's future use and operations considered (new construction/extension). The estimates include appropriate contractor overhead, design contingency and location factors. All estimates are intended to provide an order of magnitude indication of the final project cost and are considered to be sufficient for the purpose of analyzing the redevelopment options under consideration. The figures listed below are an indication of the probable construction cost at the time of this report and are intended to represent fair market value of the scope of work assuming that such work is grouped into reasonably sized contract packages. Unless noted otherwise, architectural and

engineering design fees are not included, nor are value-added taxes. All costs are expressed in Canadian dollars.

4.1.3 Office Building

4.1.3.1 Immediate Maintenance and Repairs

The following renovations, repairs, and/or upgrades are recommended to be completed within the next two years, assuming the facility is intended to continue operations.

Architectural:

- Enclose janitorial supplies in 60 minute fire rated room - $6,500
- Continue main corridor through existing kitchen to create continuous dedicated exit path to eliminate current dead ending - $2,500
- Eliminate existing lean to flammable storage shed at rear of building - $2,000
- Replace male washroom and lunch flooring - $4,000
- Removed loose stored items from electrical and data rooms - $500
- Add upper area attic vents - $2,500
- Add attic access hatch - $1,600

Site/Civil:

- Regrade east and west access roads to lower yard - $2,500
- Make repairs to site fencing - $7,000

Mechanical:

- Revise trap piping on Male Washroom lavatory to be a P trap - $500
- Revise clothes washer standpipe to include a trap - $500
- Replace corroded and uneven sewer cleanout in Women's Washroom - $2,500
- Insulate remainder of accessible copper domestic water piping - $3,500
- Raise Female Washroom hot water tank setpoint temperature to between 50°C and 60°C - $300
- Replace Female Washroom hot water tank and pipe relief discharge piping to code - $3,500
- Provide an electronic hands free flush valve on the urinal - $2,200
- Have an inspection/testing/routine maintenance service call for the split air conditioning system completed - $1,200
- Have an inspection/testing/routine maintenance service call for the humidification system completed - $1,200
- Replace Male Washroom exhaust fan with a higher capacity unit. Not required if a heat recovery system is installed - $2,000
- Update time, day, and schedules on HVAC system master controller - $1,000
- Provide a heat recovery system to service areas of the building not provided with ventilation - $26,000

Electrical:

- Consider installation of new fire alarm system panel with detectors and alarm devices. Reuse existing fire alarm pull stations - $18,000
- Remove the materials stored in the electrical room and install warning sign on electrical room door "Electrical Room – No storage permitted" - $500

- Install the panel cover on the panelboard in the space above the electrical room - $200
- Relocate the communication rack installed in front of the main disconnect to provide a 1 m working space - $3,500
- Replace missing acrylic lenses on wraparound fluorescent lighting fixtures - $800
- Replace both outdoor standard duplex receptacles and faceplates with new GFCI receptacles c/w weatherproof faceplates - $600

Environmental:

- Provide a rated vented safety cabinet in the Warehouse for storage of flammable/combustible liquids - $4,000
- Stained soil in the depot yard should be removed and properly disposed of - $1,000
- Stored propane cylinders should be moved to an outdoor storage area - $500

Estimated total cost for immediate repairs and upgrades:
$102,600 sub-total cost x 10% contingency = $112,900 total cost

4.1.3.2 Mid-Term Maintenance and Repairs

The following list contains recommended renovations and repairs for completion in the next 3 to 10 years, again assuming the building will remain in operation. These repairs would progress after the items listed in the immediate repair category are complete.

Mechanical:

- Replace copper domestic water piping - $14,000
- Replace hot water tank and provide hinged door on tank enclosure - $1,800

Electrical:

- Panels A, B, and the hallway loadcenters should be replaced within the next five (5) years - $9,000
- Replace T12 fluorescent light fixtures with T8 or LED fixtures - $19,500
- Replace batteries in emergency lighting units - $2,500

Estimated total cost for mid-term repairs and upgrades:
$46,800 sub-total cost x 10% contingency = $51,500 total cost

4.1.4 Garage

4.1.4.1 Immediate Maintenance and Repairs

The following renovations, repairs, and/or upgrades are recommended to be completed within the next two years, assuming the facility is intended to continue operations.

Architectural:

- Modify service pit to meet code by adding guard rails and second exit stair, or delete it and infill the pit - $11,000
- Re-paint interiors as well as exterior doors and frames - $4,000
- Replace main entry door threshold - $1,200
- Sand and re-paint corroded cladding - $4,500

- Clean and wax tile floors. Replace washroom and kitchen flooring - $3,000
- Paint steel liner panel in washroom - $800

Mechanical:

- Replace existing service pit sump pump with one rated for hazardous location - $7,000
- Revise the venting on the oil interceptor to be code compliant - $800
- Provide a backflow preventer on the water entrance to the building - $1,800
- Insulate accessible domestic hot and cold water piping - $1,000
- Index the lavatory cold water faucet handle - $200
- Replace hot water tank and provide with drain pan - $1,500
- Increase the hot water temperature setpoint on the hot water tank to between 50°C and 60°C - $200
- Repair or replace the inoperative south end rooftop exhaust fan - $3,500
- Provide a heat recovery unit to meet minimum ventilation requirements - $18,000
- Replace the service pit exhaust fan with one of non-spark construction and suitable for conveyance of combustible gases. Provide visual system operation proving light - $8,000
- Increase general exhaust rates if required and provide tempered make-up air system for general exhaust capacity and pit and welding exhaust systems - $12,000
- Upgrade gas detection system with additional sensors, visual and audible alarm indication, and interlock with exhaust and make-up air systems - $10,000
- Provide nitrogen dioxide gas detection system if diesel vehicles are serviced in the garage - $4,000
- Provide service visit by qualified gas detection system representative to assess system and calibrate existing sensor - $1,200

Electrical:

- Provide filler plates on spare breaker spaces in power panels - $500
- Replace one (1) more than twenty (20) year old emergency lighting unit and one (1) old Exit sign - $1,200
- Provide explosion proof wiring and lighting in the service pit if it will be kept functional - $5,000
- Consider connection the existing pull station to the recommended new fire alarm panel for the office building. Install new fire alarm system detectors and alarm devices as required - $3,500.

Environmental:

- Stored propane and acetylene cylinders should be moved to an outdoor storage area - $2,000

Estimated total cost for immediate repairs and upgrades:
$107,100 sub-total cost x 10% contingency = $117,800 total cost

4.1.4.2 Mid-Term Maintenance and Repairs

The following list contains recommended renovations and repairs for completion in the next 3 to 10 years, again assuming the building will remain in operation. These repairs would progress after the items listed in the immediate repair category are complete.

Architectural:

- Replace overhead doors - $27,000

Electrical:

- Panels should be replaced within the next ten (10) years - $9,000
- Replace T12 fluorescent light fixtures with T8 or LED fixtures - $4,500

Estimated total cost for mid-term repairs and upgrades:
$40,500 sub-total cost x 10% contingency = $44,600 total cost

4.1.5 Warehouse Building

4.1.5.1 Immediate Maintenance and Repairs

The following renovations, repairs, and/or upgrades are recommended to be completed within the next two years, assuming the facility is intended to continue operations.

Architectural:

- Replace corroded siding, fascia, gutters windows and window screens - $14,000
- Paint cladding and doors - $6,000
- Add fire rated interior finish, and doors proximate to the main building due to limiting distance issues - $5,000

Electrical:

- Replace the existing incandescent lighting fixtures with T8 fluorescent or LED lighting fixtures - $4,500
- Replace the old receptacles, outlet boxes and faceplates - $2,000
- Install emergency lighting units in all rooms - $4,500

Environmental:

- Stored propane cylinders should be moved to an outdoor storage area - $500

Estimated total cost for immediate repairs and upgrades:
$36,500 sub-total cost x 10% contingency = $40,200 total cost

The following list contains recommended renovations and repairs for completion in the next 3 to 10 years, again assuming the building will remain in operation. These repairs would progress after the items listed in the immediate repair category are complete.

Architectural:

- Replace overhead doors - $14,000

Electrical:

- Replace T12 lighting with T8 or LED - $9,000

Estimated total cost for mid-term repairs and upgrades:
$23,000 sub-total cost x 10% contingency = $25,300 total cost

4.1.6 Storage Shed

4.1.6.1 IMMEDIATE MAINTENANCE AND REPAIRS

The following renovations, repairs, and/or upgrades are recommended to be completed within the next two years, assuming the facility is intended to continue operations.

Mechanical:

- The existing fire extinguisher should be replaced with one rated 4A80BC - $400

Electrical:

- Install an emergency lighting unit inside the storage shed - $1,500
- Replace the outdoor GFCI receptacle including the weatherproof faceplate - $500

Estimated total cost for immediate repairs and upgrades:
$2,400 sub-total cost x 10% contingency = $2,600 total cost

4.1.6.2 MID-TERM MAINTENANCE AND REPAIRS

The following list contains recommended renovations and repairs for completion in the next 3 to 10 years, again assuming the building will remain in operation. These repairs would progress after the items listed in the immediate repair category are complete.

Architectural:

- Replace existing galvanized steel roof panels - $7,500
- Paint door and frame - $800

Estimated total cost for mid-term repairs and upgrades:
$8,300 sub-total cost x 10% contingency = $9,100 total cost

4.2 Rehabilitation and Expansion Upgrades Costing

4.2.1 Office Building Extension

The opinion of probable cost to construct the proposed building extension is presented in the table below.

Item	Probable Cost ($)
Demolition of exterior siding, roofing, openings, interior partitions, floor cutting, etc	9,000
Site grading, foundation drainage	11,000
Substructure and slab on grade	31,300
Roof structure	14,200
Framing and exterior envelope	36,500
Roof coverings	9,500
Openings - doors, windows	14,500
Plumbing	5,000
HVAC	8,000
Electrical	23,000

Item	Probable Cost ($)
Subtotal	162,000
Contractor bonding, insurance, project management, general contractor mark-ups.	33,000
Design and project management costs	39,000
Total	234,000

4.2.2 Equipment Platforms Rehabilitation

The opinion of probable cost to replace the existing equipment platforms is presented in the table below.

Item	Probable Cost ($)
Demolition of existing platforms (includes removal of existing equipment and materials on platforms)	4,000
Construction of 30mx3m platform	32,000
Construction of 5mx1m platform	5,500
Reinstate existing equipment and materials on platforms	1,500
Subtotal	43,000
Contractor bonding, insurance, project management, general contractor mark-ups.	10,000
Design and project management costs	11,000
Total	64,000

CHAPTER 5 CAPITAL COST SUMMARY AND COMPARISON OF SCENARIOS

5.1 Capital Cost Summary

5.1.1 Table 2: Capital Cost Summary

Building/Action	Construction Costs
Office Building	
Immediate (1-2 years)	$112,900
Mid-Term (3-10 years)	$51,500
Long-Term (10-20 years)	$0
Garage	
Immediate (1-2 years)	$117,800
Mid-Term (3-10 years)	$44,600
Long-Term (10-20 years)	$0
Warehouse Building	
Immediate (1-2 years)	$40,200
Mid-Term (3-10 years)	$25,300
Long-Term (10-20 years)	$0
Storage Shed	
Immediate (1-2 years)	$2,600
Mid-Term (3-10 years)	$9,100
Long-Term (10-20 years)	$0
New extension to existing building	$234,000
Equipment platform rehabilitation	$64,000

Costs provided in these tables do not include HST. Costs provided are in current Canadian dollars and escalation values may have to be applied to renovations in future years to account for such factors as inflation, exchange rate, and competitiveness of construction industry.

This opinion of probable costs is presented on the basis of experience, qualifications, and best judgment. It has been prepared in accordance with acceptable principles and practices. Sudden market trend changes, non-competitive bidding situations, unforeseen labour and material adjustments and the like are beyond the control of CBCL Limited. We cannot warrant or guarantee that actual costs will not vary significantly from the opinion provided.

FINAL REPORT

Issued by:

Paul Sceviour, MASc., P.Eng.
Senior Mechanical Engineer

This document was prepared for the party indicated herein. The material and information in the document reflects CBCL Limited's opinion and best judgment based on the information available at the time of preparation. Any use of this document or reliance on its content by third parties is the responsibility of the third party. CBCL Limited accepts no responsibility for any damages suffered as a result of third party use of this document.

APPENDIX A

Site Photos – Office Building

APPENDIX A

ARCHITECTURAL PHOTOS

Nalcor Assessments - Stephenville

Architectural - Office Building

Main entrance.

Typical roof soffit/fascia. Note double roof.

Typical window. Note deep reveal indicating added insulation and cladding.

Hip roof above original roof.

Representative exterior door.

Soffit/fascia of double roof with unprotected soffit hole.

Proximity of lean-to flammable storage between main and storage buildings.

Interior of lean-to.

Lean-to, to main building interface.

Main building shops access with storage building in background.

Shops access.

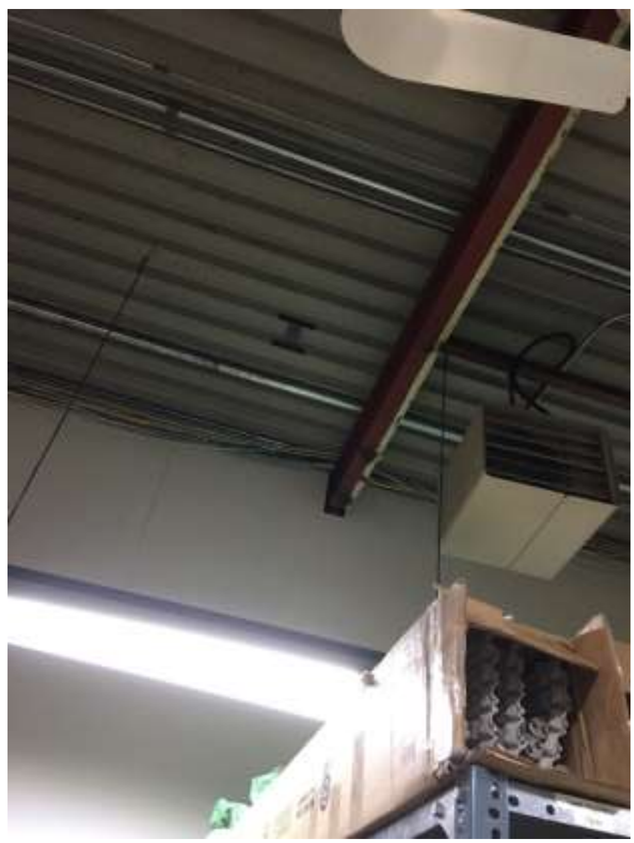
Rear façade with lean-to and storage building in background.

East façade.

Partial rear façade with lean-to and storage building in background.

Storage warehouse.

Storage warehouse.



Storage warehouse.

Janitorial supplies, which require rated room enclosure.

Storage warehouse.

Meeting/Training room.

Main corridor.

Kitchen/lunch/ main circulation route to second exit and shops wing.

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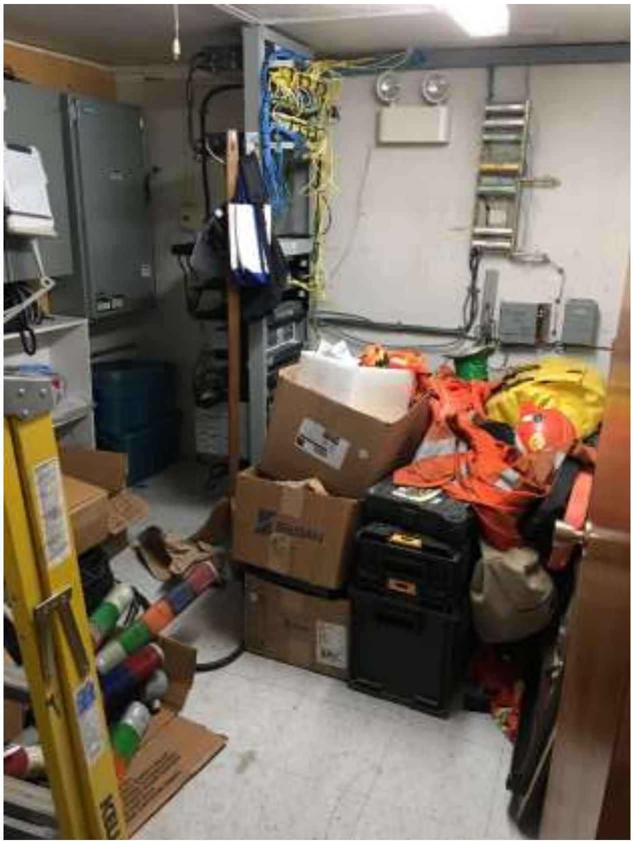
Male washroom. Note flooring condition.

Male washroom.

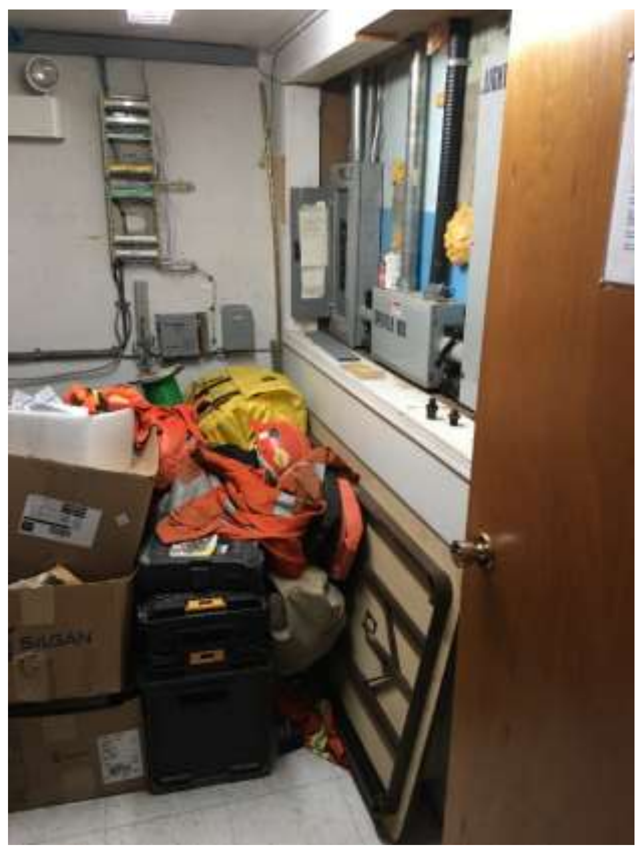
Male washroom. Note flooring condition.

Laundry within male washroom.



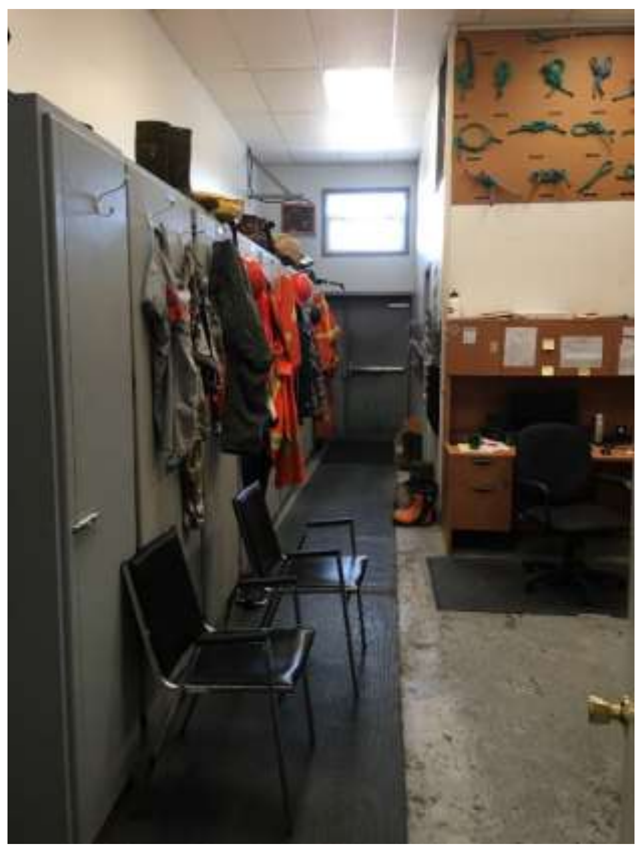
Electrical/ communications room. Note items stored hazard.

Electrical/communications room. Note stored items hazard.



Shop

Shop



Shop

APPENDIX A

STRUCTURAL PHOTOS

Nalcor Assessments – Stephenville
Structural – Office Building

Photo 1

Photo 2

Nalcor Assessments – Stephenville
Structural – Office Building

Photo 3

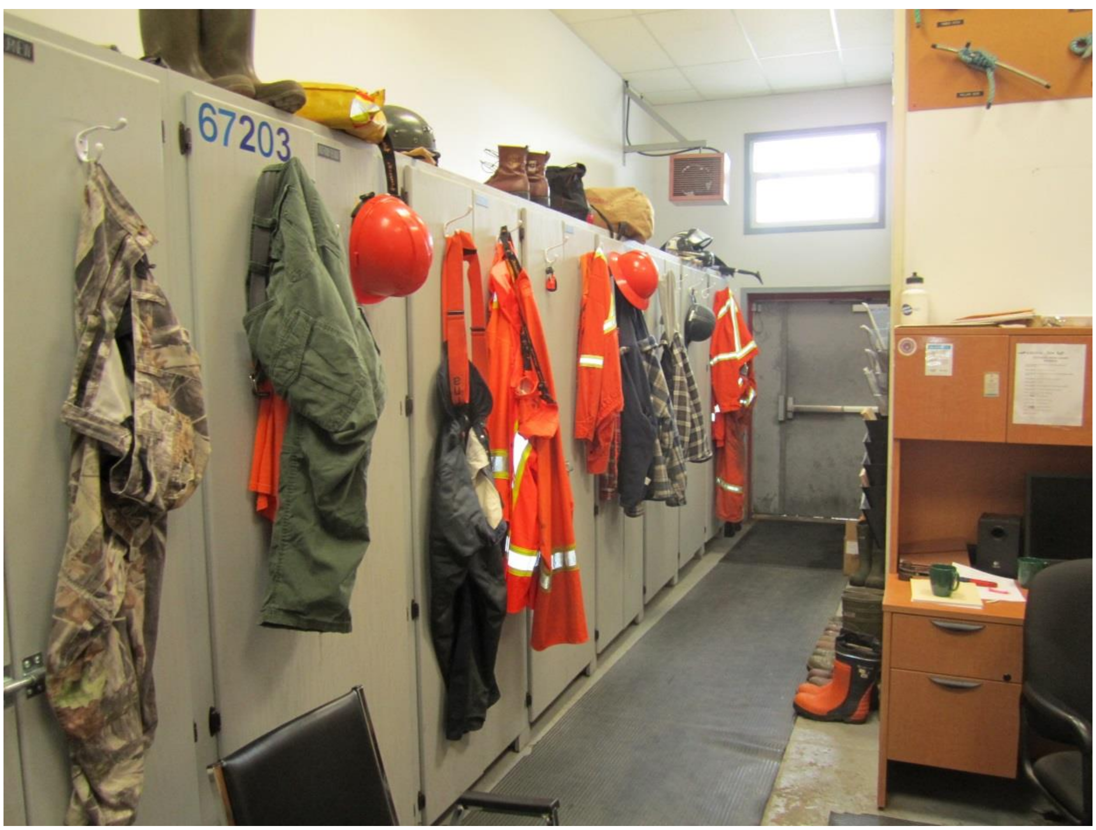


Photo 4

Nalcor Assessments – Stephenville
Structural – Office Building

Photo 5

Photo 6

Nalcor Assessments – Stephenville
Structural – Office Building

Photo 7

Photo 8

Nalcor Assessments – Stephenville
Structural – Office Building

Photo 9

Photo 10

Nalcor Assessments – Stephenville
Structural – Office Building

Photo 11

Photo 12

Nalcor Assessments – Stephenville
Structural – Office Building

Photo 13

APPENDIX A

MECHANICAL PHOTOS

Nalcor Assessments – Stephenville
Mechanical – Office Building

Photo 1

Photo 2

Nalcor Assessments – Stephenville
Mechanical – Office Building

Photo 3

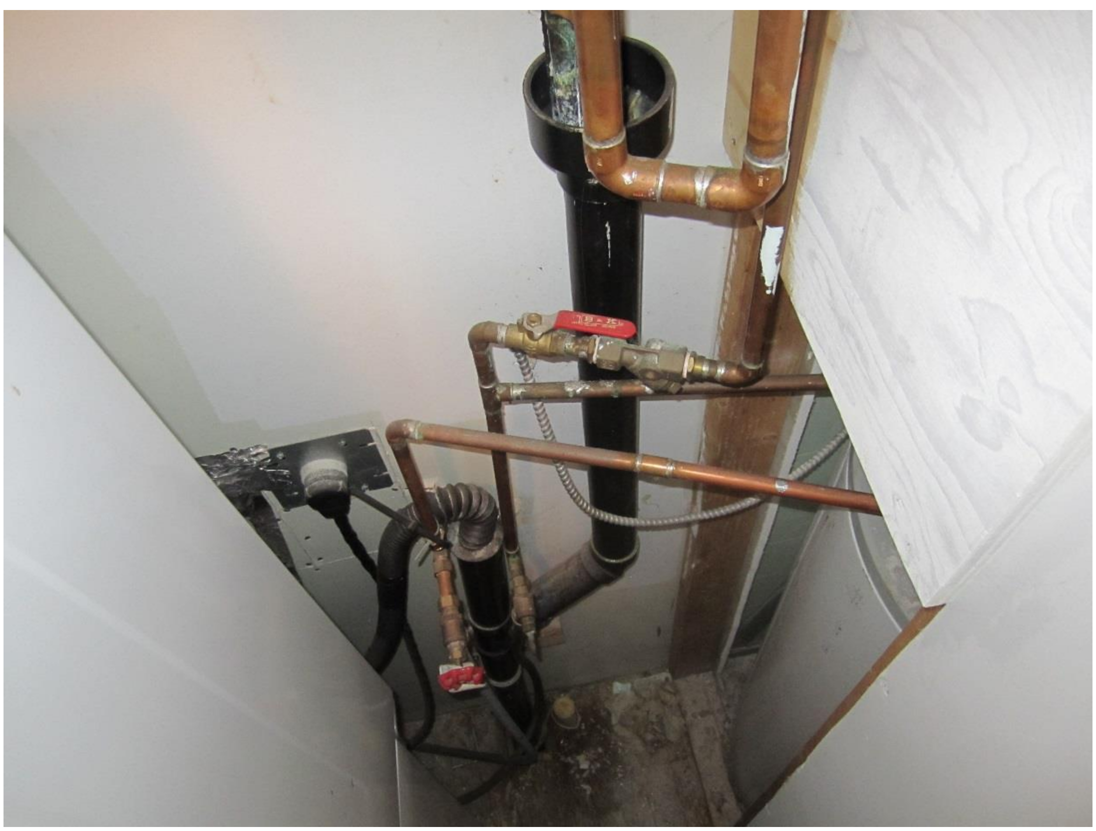


Photo 4

Nalcor Assessments – Stephenville
Mechanical – Office Building

Photo 5

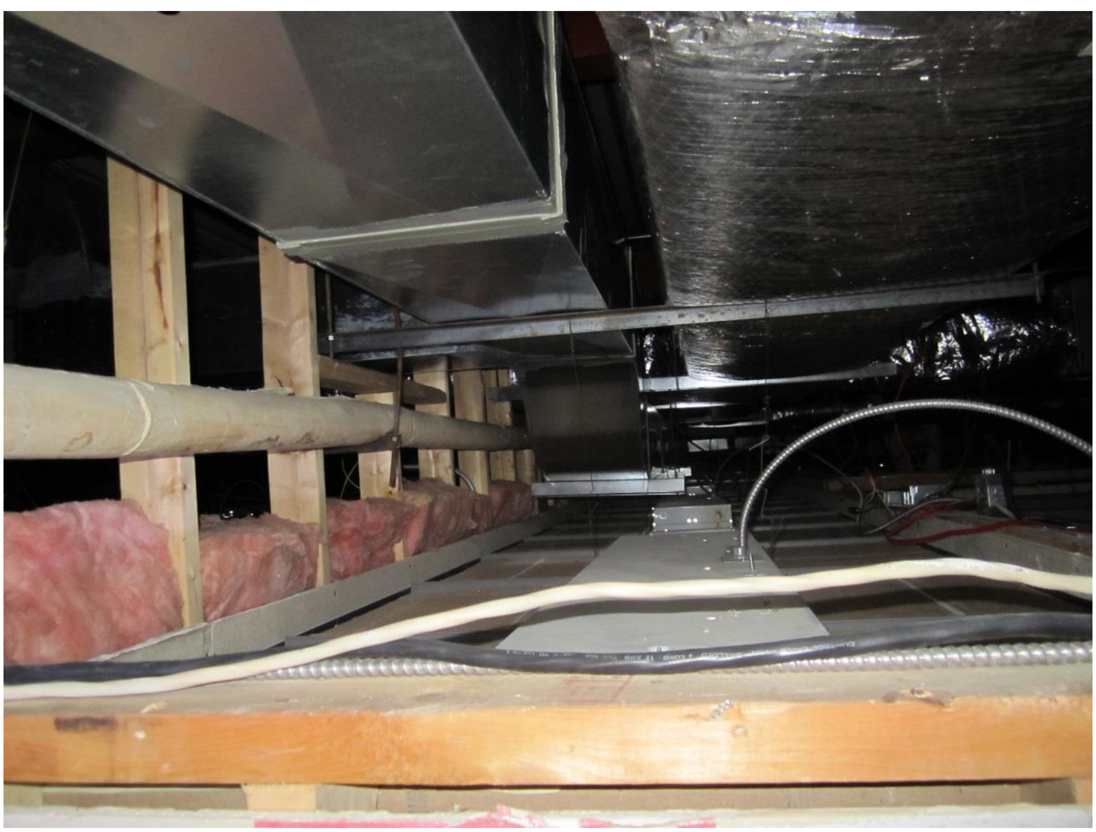


Photo 6

Nalcor Assessments – Stephenville
Mechanical – Office Building

Photo 7

Photo 8

Nalcor Assessments – Stephenville
Mechanical – Office Building

Photo 9

Photo 10

Nalcor Assessments – Stephenville
Mechanical – Office Building

Photo 11

Photo 12

Nalcor Assessments – Stephenville
Mechanical – Office Building

Photo 13

Photo 14

Nalcor Assessments – Stephenville
Mechanical – Office Building

Photo 15

Photo 16

Nalcor Assessments – Stephenville
Mechanical – Office Building

Photo 17

Photo 18

Nalcor Assessments – Stephenville
Mechanical – Office Building

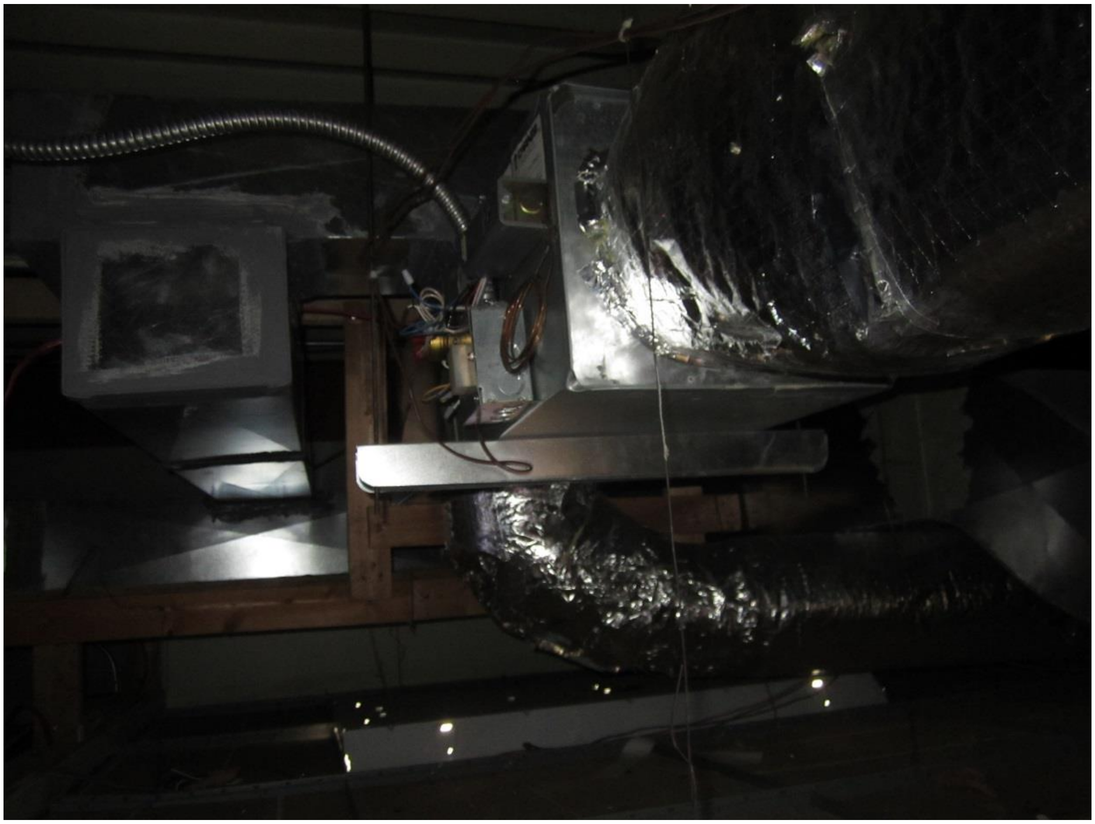


Photo 19

Photo 20

Nalcor Assessments – Stephenville
Mechanical – Office Building

Photo 21

Photo 22

Nalcor Assessments – Stephenville
Mechanical – Office Building

Photo 23

APPENDIX A

ELECTRICAL PHOTOS

Nalcor Assessments – Stephenville
Electrical – Office Building

Photo 1

Photo 2

Nalcor Assessments – Stephenville
Electrical – Office Building

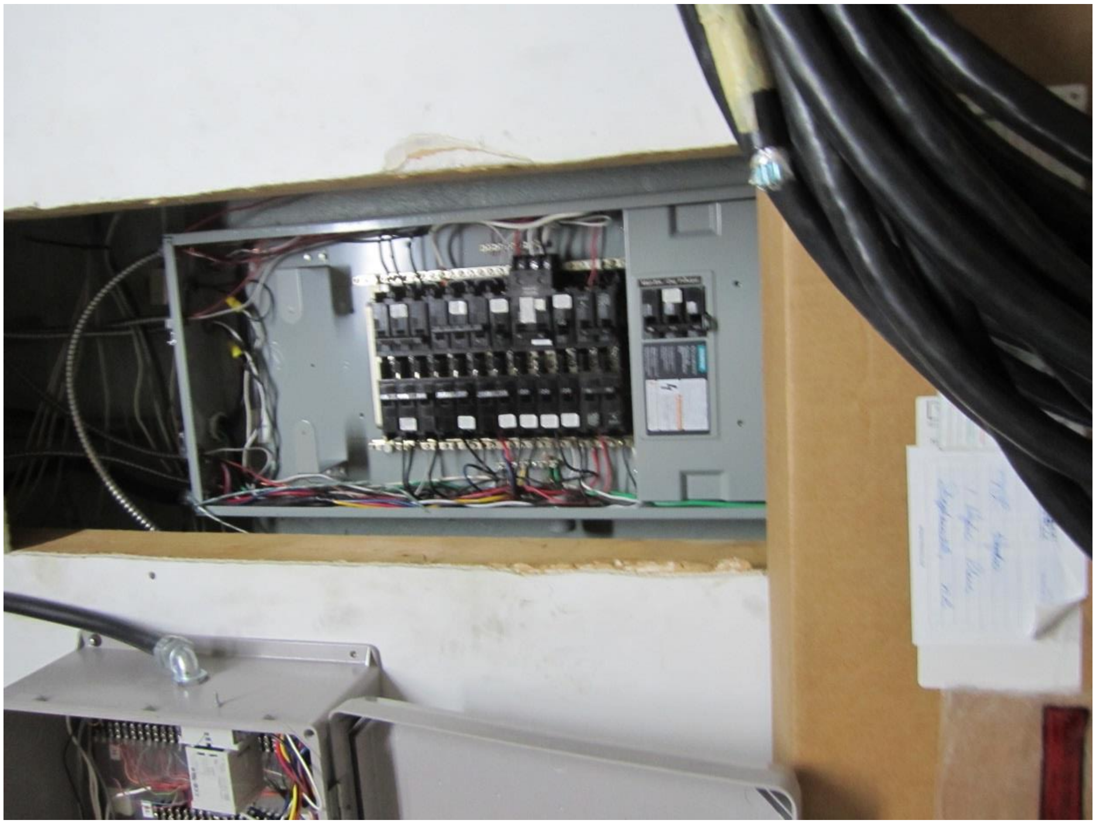


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Photo 3

Nalcor Assessments – Stephenville
Electrical – Office Building

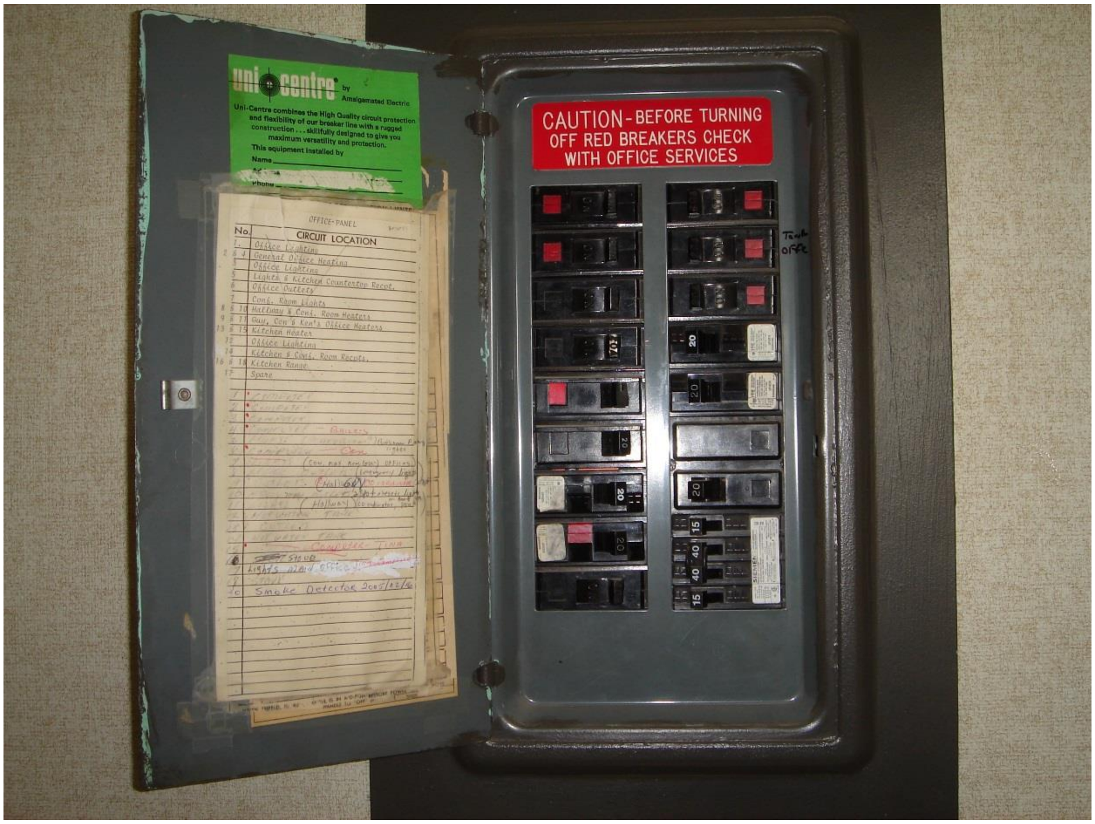


Photo 5

Photo 6

Nalcor Assessments – Stephenville
Electrical – Office Building

Photo 7

Photo 8

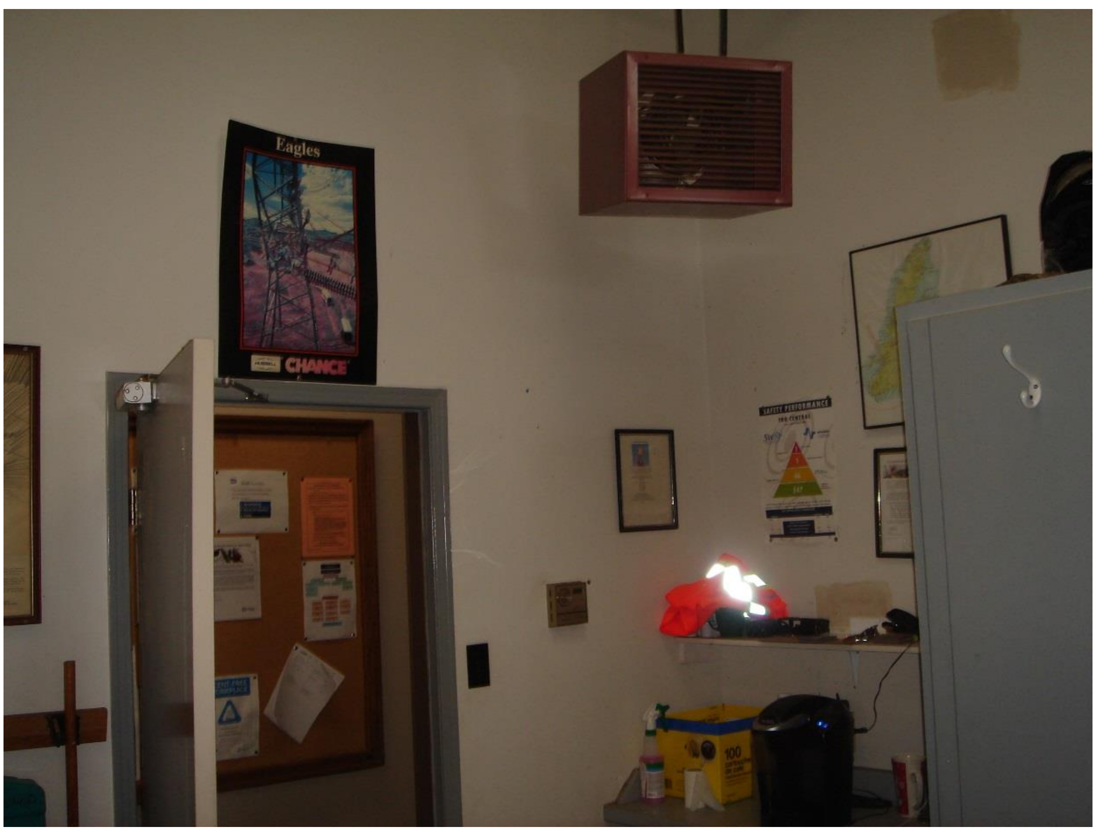
Nalcor Assessments – Stephenville
Electrical – Office Building

Photo 9

Photo 10

Nalcor Assessments – Stephenville
Electrical – Office Building

Photo 11



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Nalcor Assessments – Stephenville
Electrical – Office Building

Photo 13

Photo 14

Nalcor Assessments – Stephenville
Electrical – Office Building

Photo 15

Photo 16

Nalcor Assessments – Stephenville
Electrical – Office Building

Photo 17

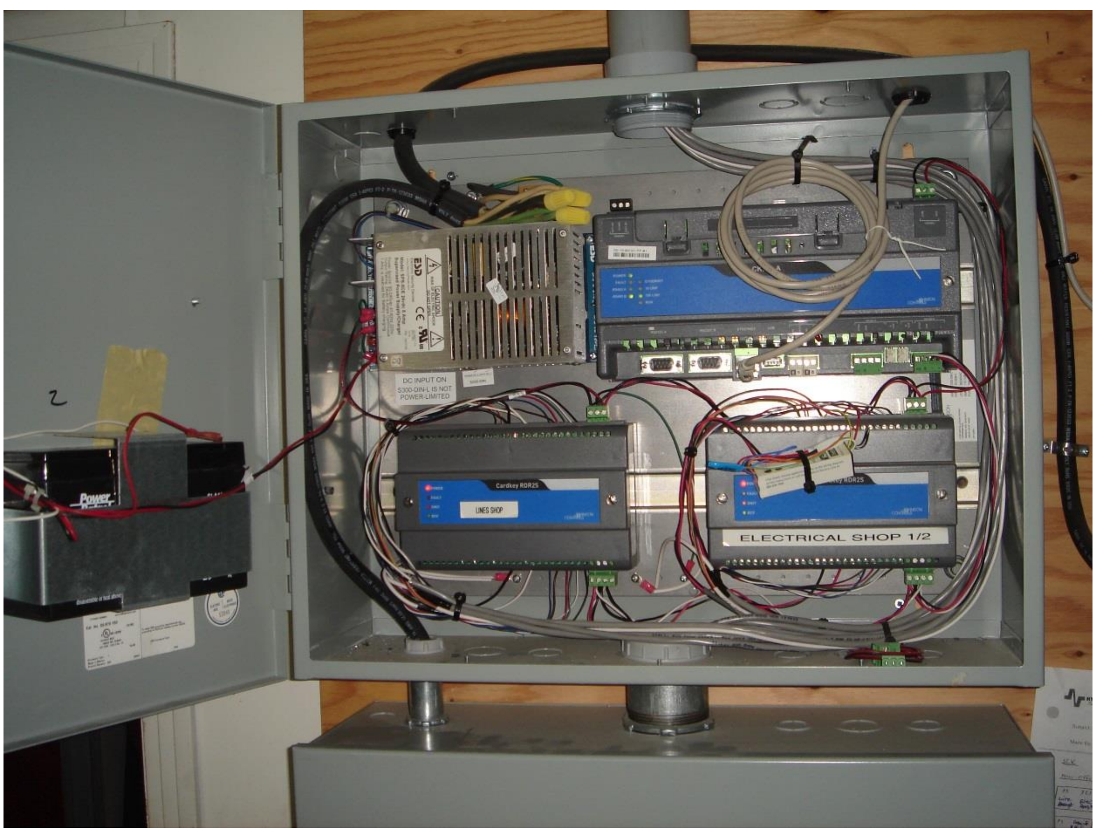


Photo 18

APPENDIX B

Site Photos – Garage

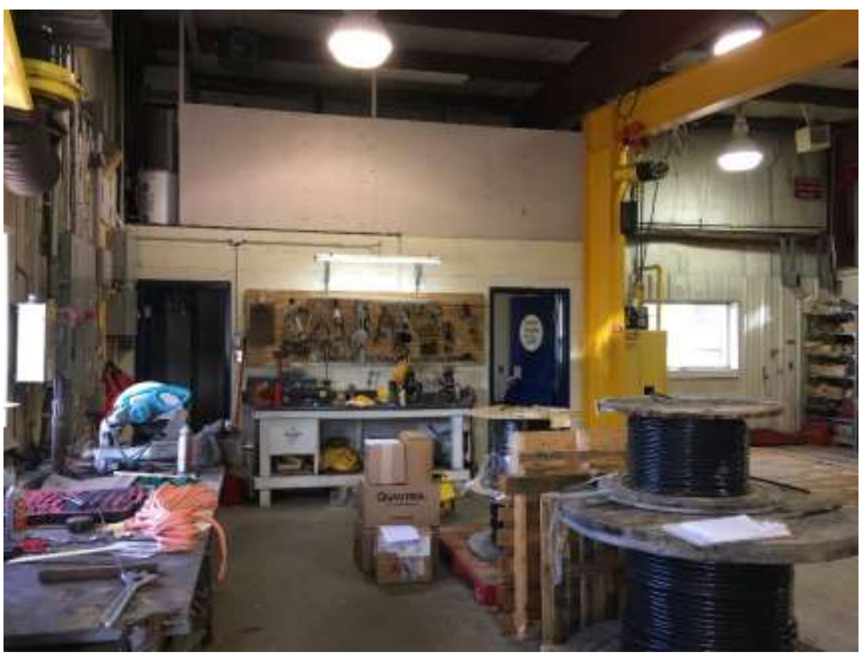
APPENDIX B

ARCHITECTURAL PHOTOS

Interior - note service pit.

Rear façade.

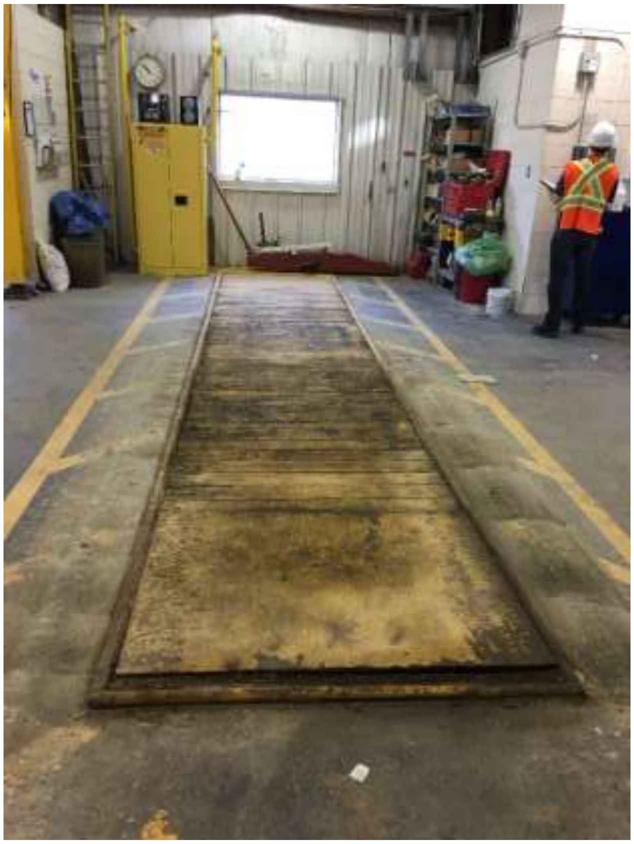
Kitchen / Lunch



Service area.

Overhead doors.

Washroom



Service pit.

Emergency exit.

Storage mezzanine.

Office

APPENDIX B

STRUCTURAL PHOTOS

Nalcor Assessments – Stephenville
Structural - Garage

Photo 1

Photo 2

Nalcor Assessments – Stephenville
Structural - Garage

Photo 3

Photo 4

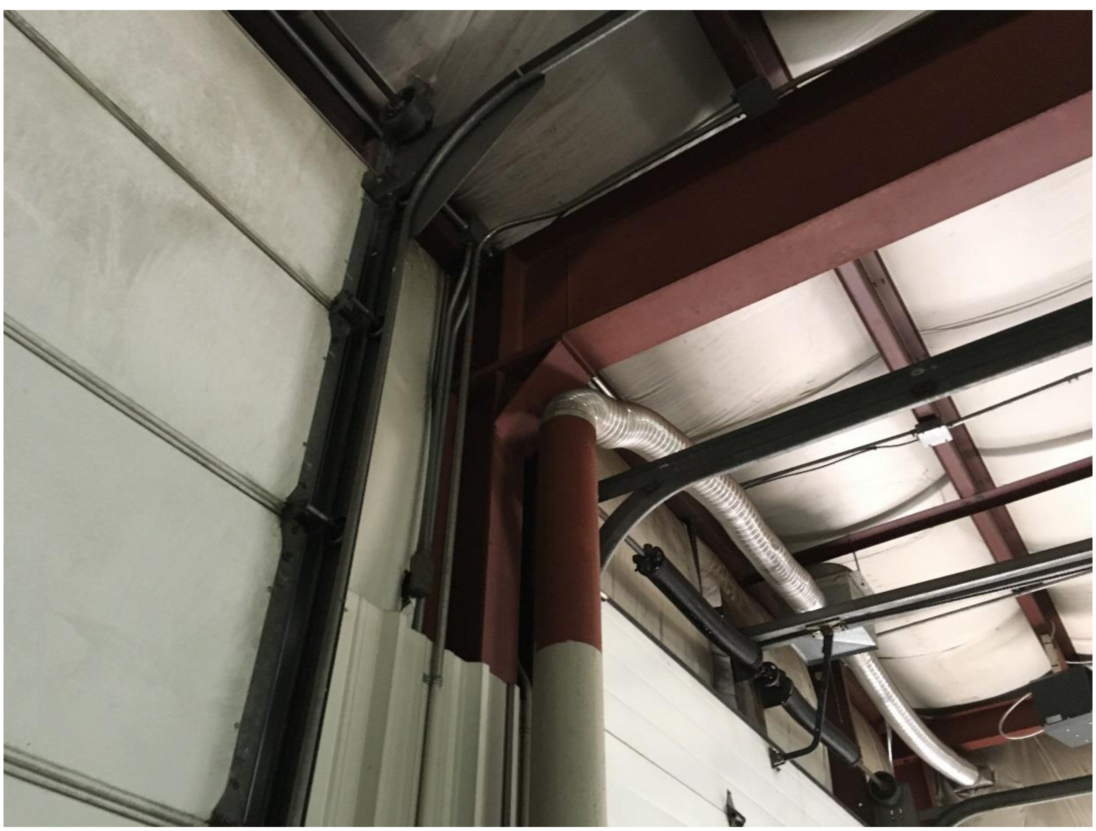
Nalcor Assessments – Stephenville
Structural - Garage

Photo 5

Photo 6

Nalcor Assessments – Stephenville
Structural - Garage

Photo 7



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Nalcor Assessments – Stephenville
Structural - Garage

Photo 9

Photo 10

Nalcor Assessments – Stephenville
Structural - Garage

Photo 11

Photo 12

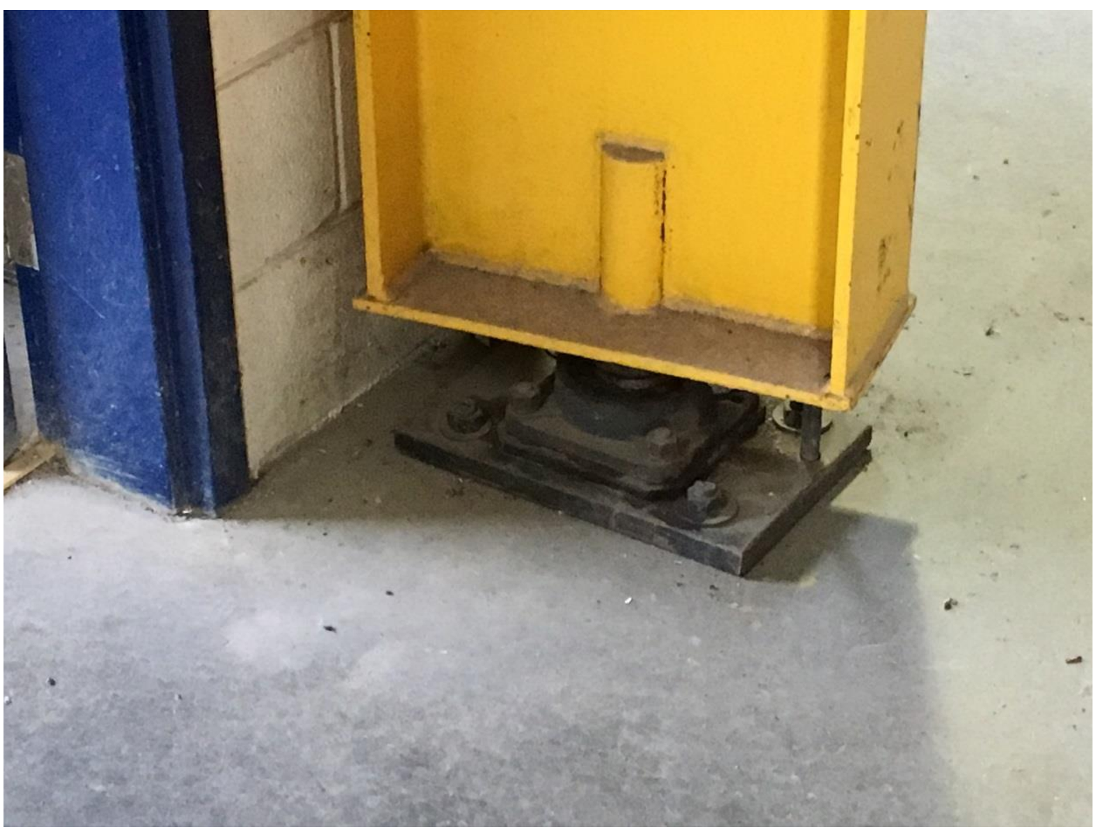
Nalcor Assessments – Stephenville
Structural - Garage

Photo 13

Photo 14

Nalcor Assessments – Stephenville
Structural - Garage

Photo 15



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Nalcor Assessments – Stephenville
Structural - Garage

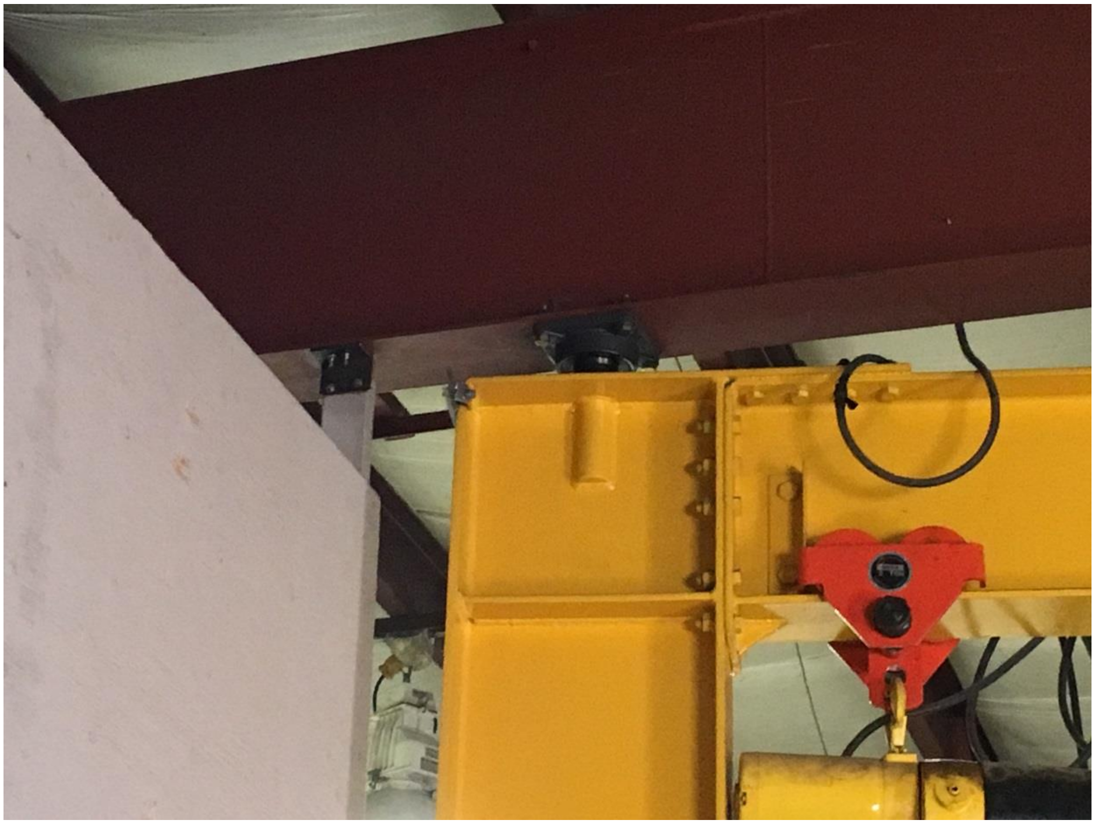


Photo 17

Photo 18

Nalcor Assessments – Stephenville
Structural - Garage

Photo 19

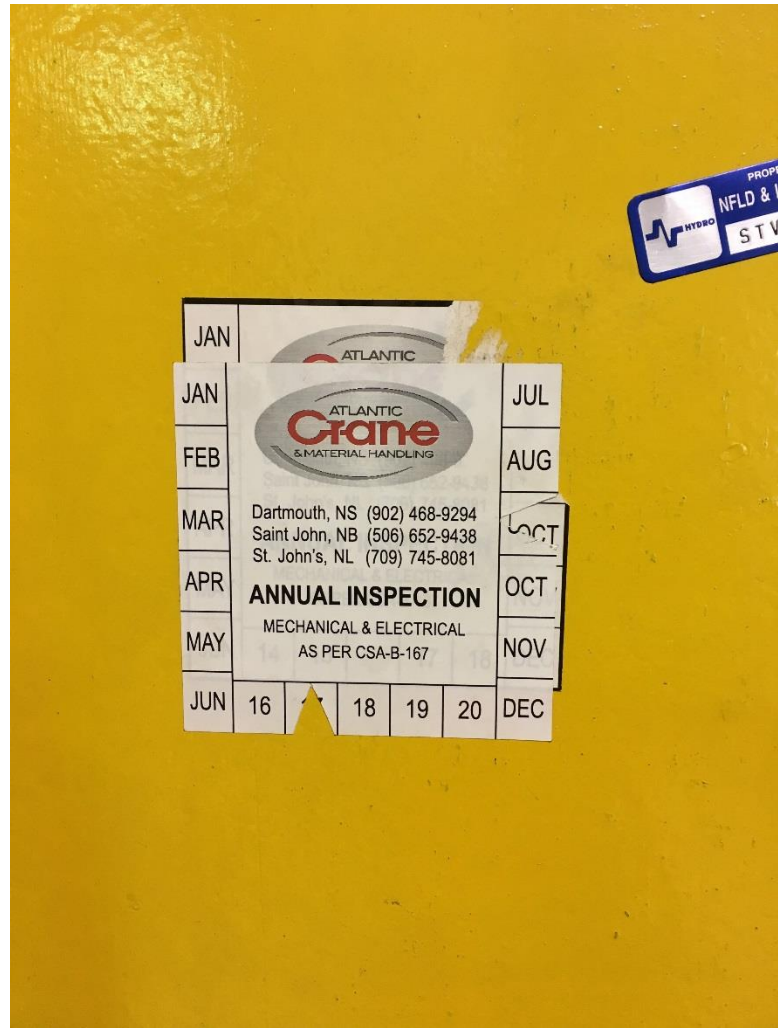


Photo 20

APPENDIX B

MECHANICAL PHOTOS

Nalcor Assessments – Stephenville
Mechanical - Garage

Photo 1

Photo 2

Nalcor Assessments – Stephenville
Mechanical - Garage

Photo 3

Photo 4

Nalcor Assessments – Stephenville
Mechanical - Garage

Photo 5

Photo 6

Nalcor Assessments – Stephenville
Mechanical - Garage

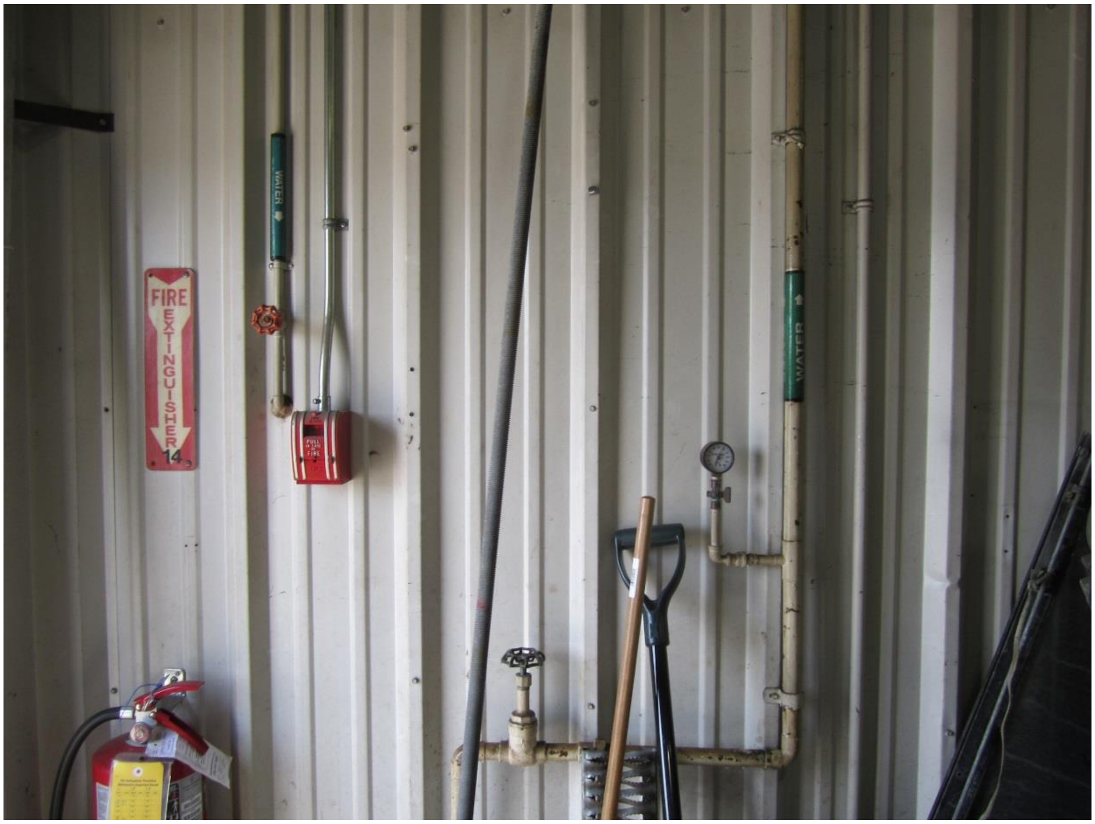


Photo 7

Photo 8

Nalcor Assessments – Stephenville
Mechanical - Garage

Photo 9

Photo 10

Nalcor Assessments – Stephenville
Mechanical - Garage

Photo 11

Photo 12

Nalcor Assessments – Stephenville
Mechanical - Garage

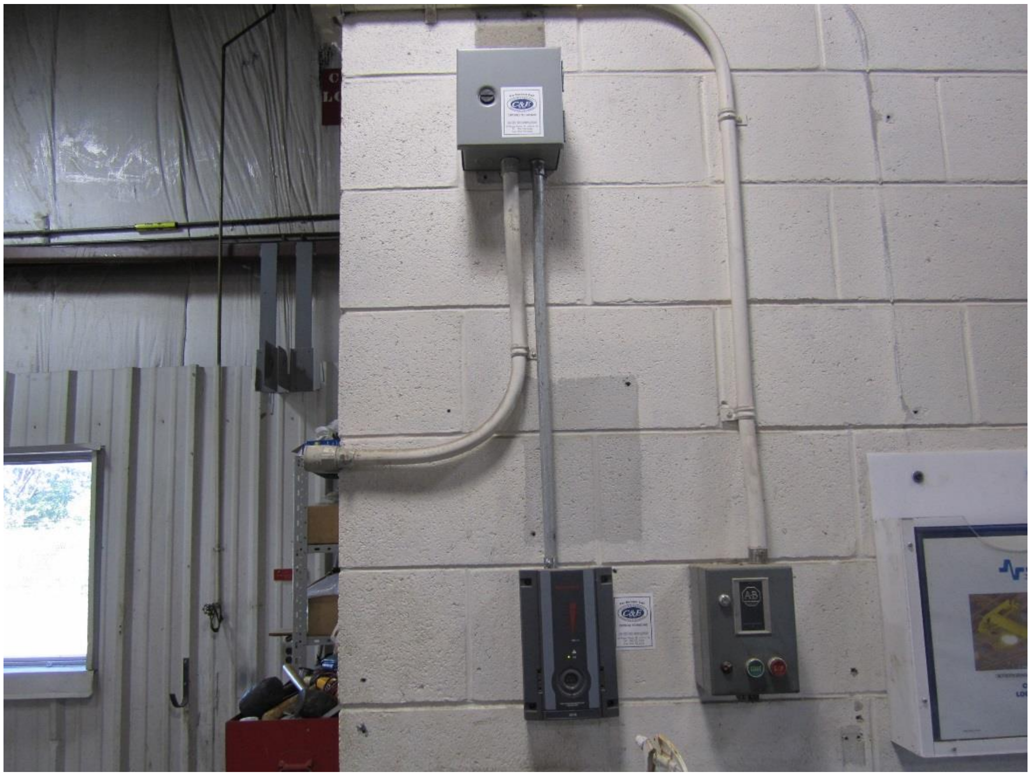


Photo 13

APPENDIX B

ELECTRICAL PHOTOS

Nalcor Assessments – Stephenville
Electrical – Garage

Photo 1

Photo 2

Nalcor Assessments – Stephenville
Electrical – Garage

Photo 3

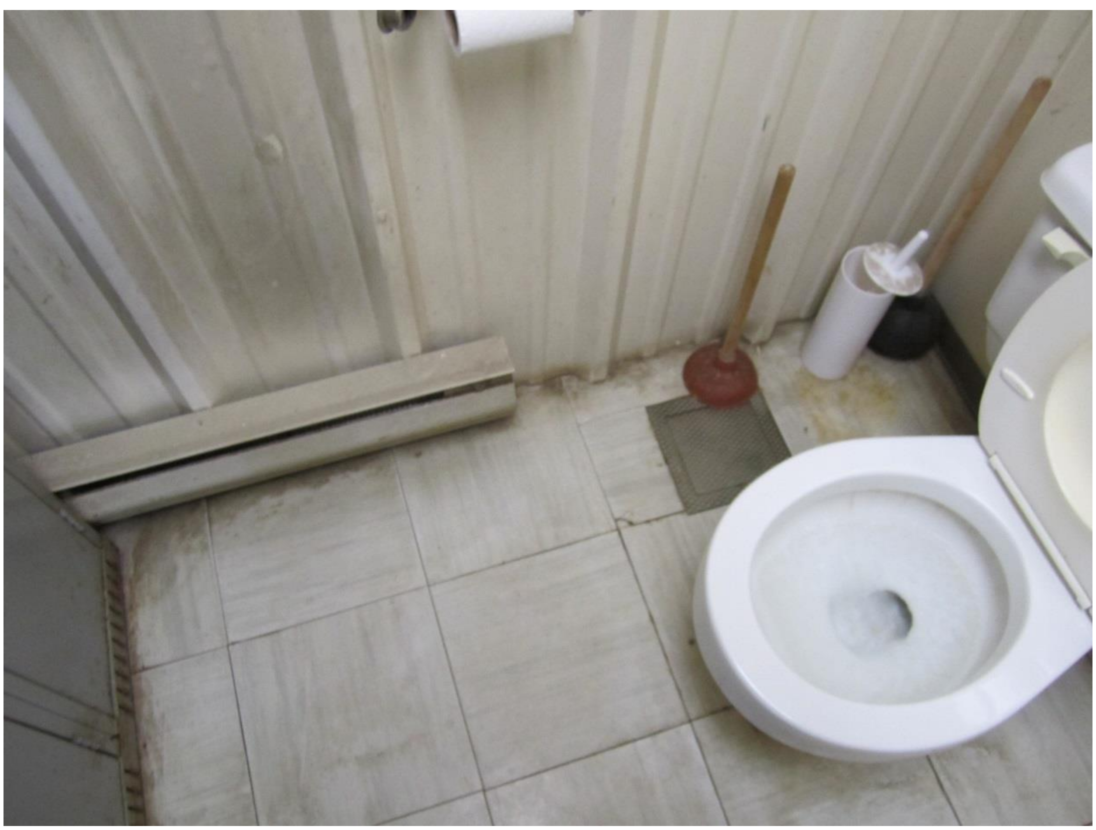


Photo 4

Nalcor Assessments – Stephenville
Electrical – Garage

Photo 5

Photo 6

Nalcor Assessments – Stephenville
Electrical – Garage

Photo 7

APPENDIX C

Site Photos – Warehouse Building

APPENDIX C

ARCHITECTURAL PHOTOS

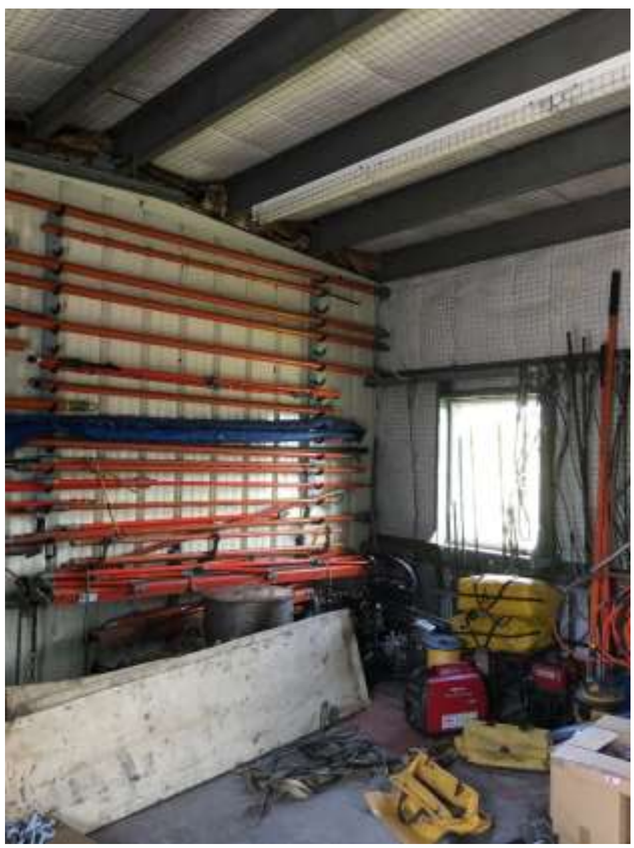
Partial front façade.

Partial front façade.

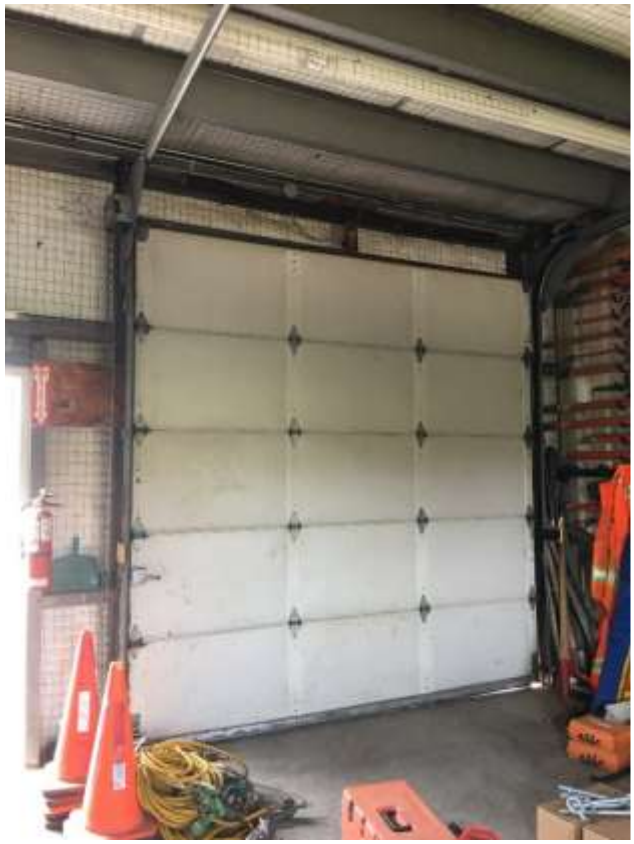
Corroded soffit and paint peeling from cladding.

Rear façade.

Left façade with lean-to in foreground



Interior



Overhead door.

APPENDIX C

STRUCTURAL PHOTOS

Nalcor Assessments – Stephenville
Structural – Warehouse Building

Photo 1

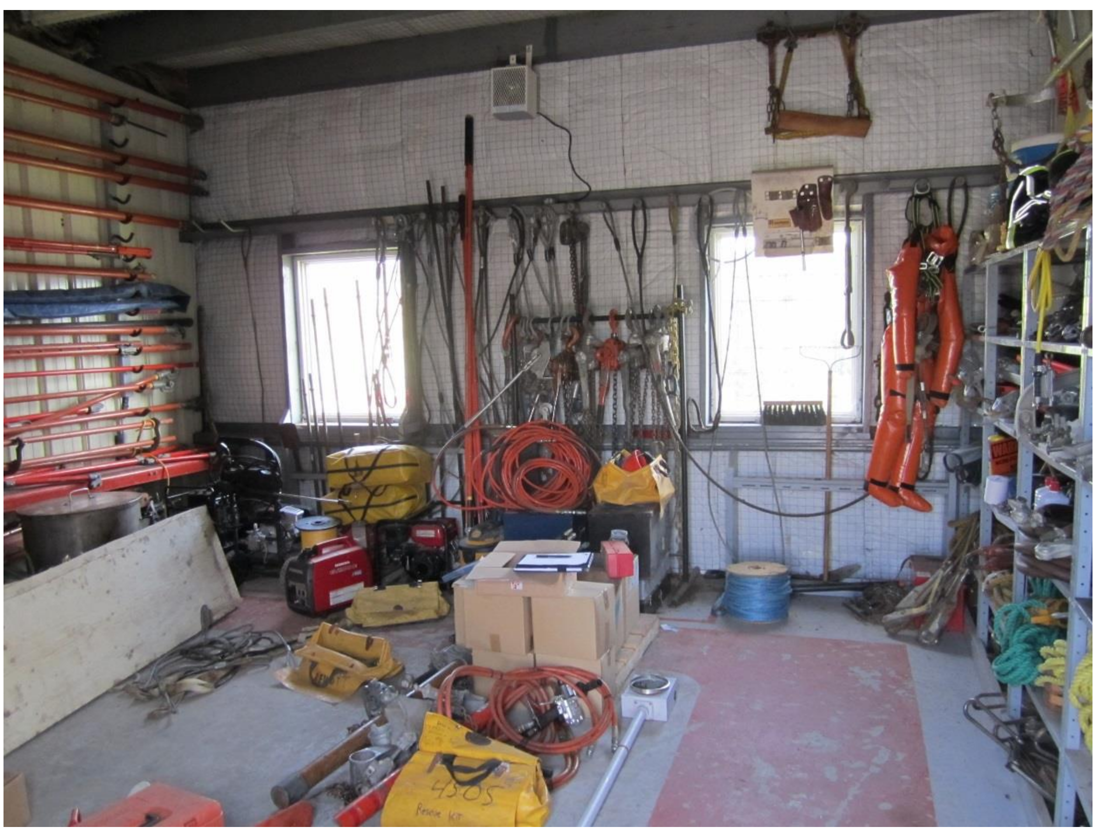


Photo 2

Nalcor Assessments – Stephenville
Structural – Warehouse Building

Photo 3

Photo 4

Nalcor Assessments – Stephenville
Structural – Warehouse Building

Photo 5

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Nalcor Assessments – Stephenville
Structural – Warehouse Building

Photo 7

Photo 8

Nalcor Assessments – Stephenville
Structural – Warehouse Building

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Photo 10

Nalcor Assessments – Stephenville
Structural – Warehouse Building

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Photo 12

Nalcor Assessments – Stephenville
Structural – Warehouse Building

Photo 13

APPENDIX C

MECHANICAL PHOTOS

Nalcor Assessments – Stephenville
Mechanical – Warehouse Building

Photo 1

Photo 2

APPENDIX C

ELECTRICAL PHOTOS

Nalcor Assessments – Stephenville
Electrical – Warehouse Building

3

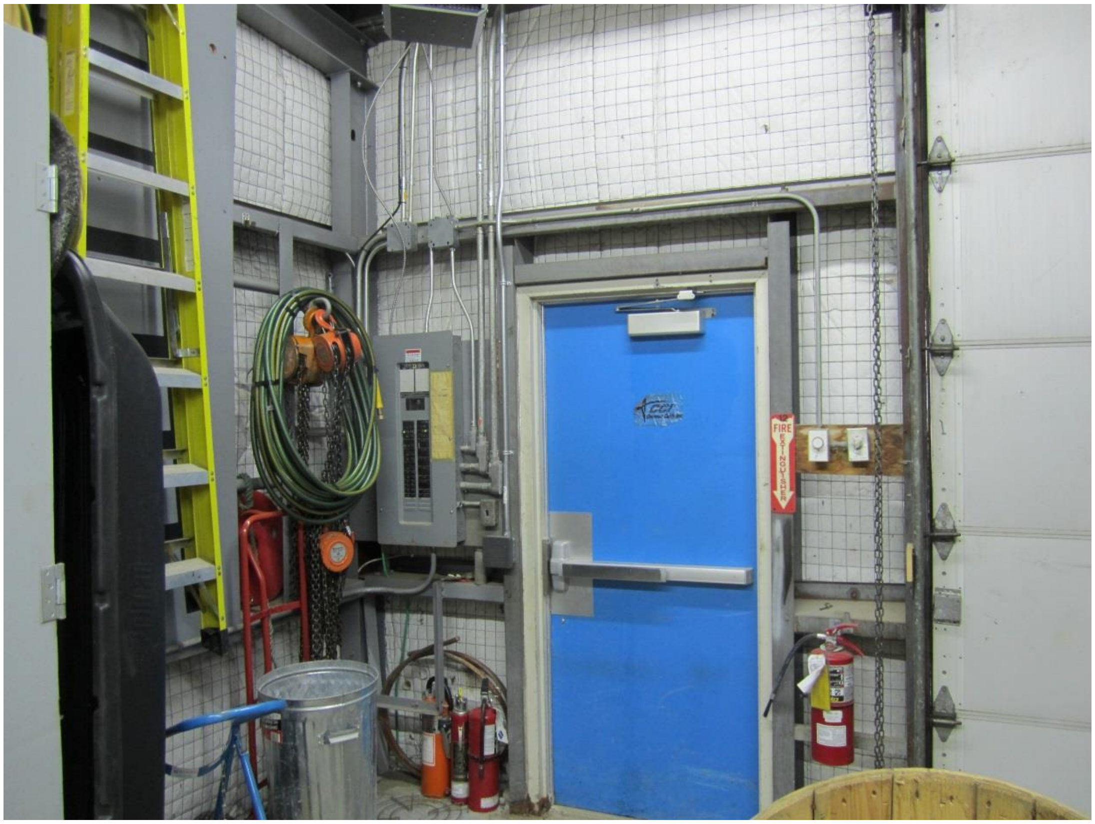

Photo 1

Photo 2

Nalcor Assessments – Stephenville
Electrical – Warehouse Building

Photo 3

Photo 4

APPENDIX D

Site Photos – Storage Shed

APPENDIX D

ARCHITECTURAL PHOTOS

Exterior front and right facades.

Rear façade.

Cladding damage.

Attic ventilation.

Surface corrosion on roofing panels.

Interior

APPENDIX D

STRUCTURAL PHOTOS

Nalcor Assessments – Stephenville
Structural – Storage Shed

Photo 1

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Nalcor Assessments – Stephenville
Structural – Storage Shed

Photo 3

Photo 4

Nalcor Assessments – Stephenville
Structural – Storage Shed

Photo 5

Photo 6

Nalcor Assessments – Stephenville
Structural – Storage Shed

Photo 7

APPENDIX D

MECHANICAL PHOTOS

Nalcor Assessments – Stephenville
Mechanical – Storage Shed

Photo 1

APPENDIX D

ELECTRICAL PHOTOS

Nalcor Assessments – Stephenville
Electrical – Storage Shed

Photo 1

APPENDIX E

Site Photos – Equipment Storage Platforms

Nalcor Assessments – Stephenville
Structural – Pole Ramps and Equipment Platforms

Photo 1

Photo 2

Nalcor Assessments – Stephenville
Structural – Pole Ramps and Equipment Platforms

Photo 3

Photo 4

Nalcor Assessments – Stephenville
Structural – Pole Ramps and Equipment Platforms

Photo 5

Photo 6

Nalcor Assessments – Stephenville
Structural – Pole Ramps and Equipment Platforms

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Photo 8

Nalcor Assessments – Stephenville
Structural – Pole Ramps and Equipment Platforms

Photo 9

Photo 10

Nalcor Assessments – Stephenville
Structural – Pole Ramps and Equipment Platforms

Photo 11

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Site Photos – Site/Civil

Nalcor Assessments – Stephenville
Site Civil Photos

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Nalcor Assessments – Stephenville
Site Civil Photos

Photo 3

Photo 4

Nalcor Assessments – Stephenville
Site Civil Photos

Photo 5

Photo 6

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Site Civil Photos

Photo 7

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Nalcor Assessments – Stephenville
Site Civil Photos

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Site Civil Photos

Photo 11

Photo 12

Nalcor Assessments – Stephenville
Site Civil Photos

Photo 13

Photo 14

Nalcor Assessments – Stephenville
Site Civil Photos

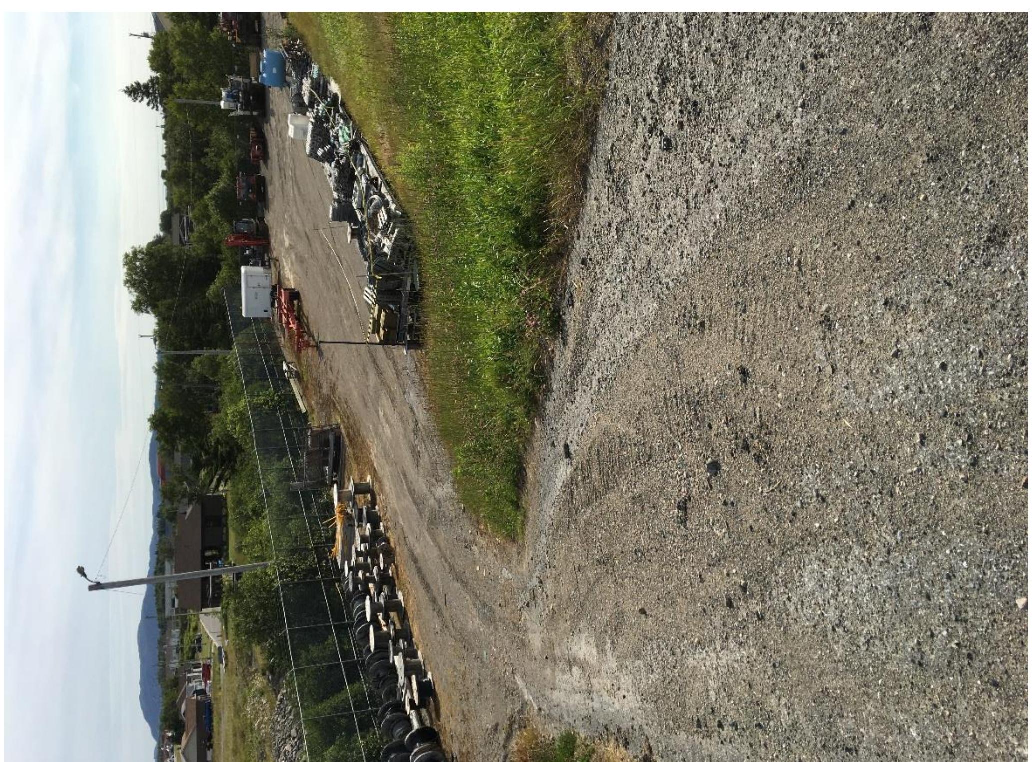

Photo 15

Photo 16

Nalcor Assessments – Stephenville
Site Civil Photos

Photo 17

Photo 18

Nalcor Assessments – Stephenville
Site Civil Photos

Photo 19

Photo 20

Nalcor Assessments – Stephenville
Site Civil Photos

Photo 21

Photo 22

Nalcor Assessments – Stephenville
Site Civil Photos

Photo 23

Photo 24

APPENDIX G

Site Photos – Environmental

Nalcor Assessments – Stephenville
Environmental Photos

Photo 1

Photo 2

Nalcor Assessments – Stephenville
Environmental Photos

Photo 3

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Environmental Photos

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Environmental Photos

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Environmental Photos

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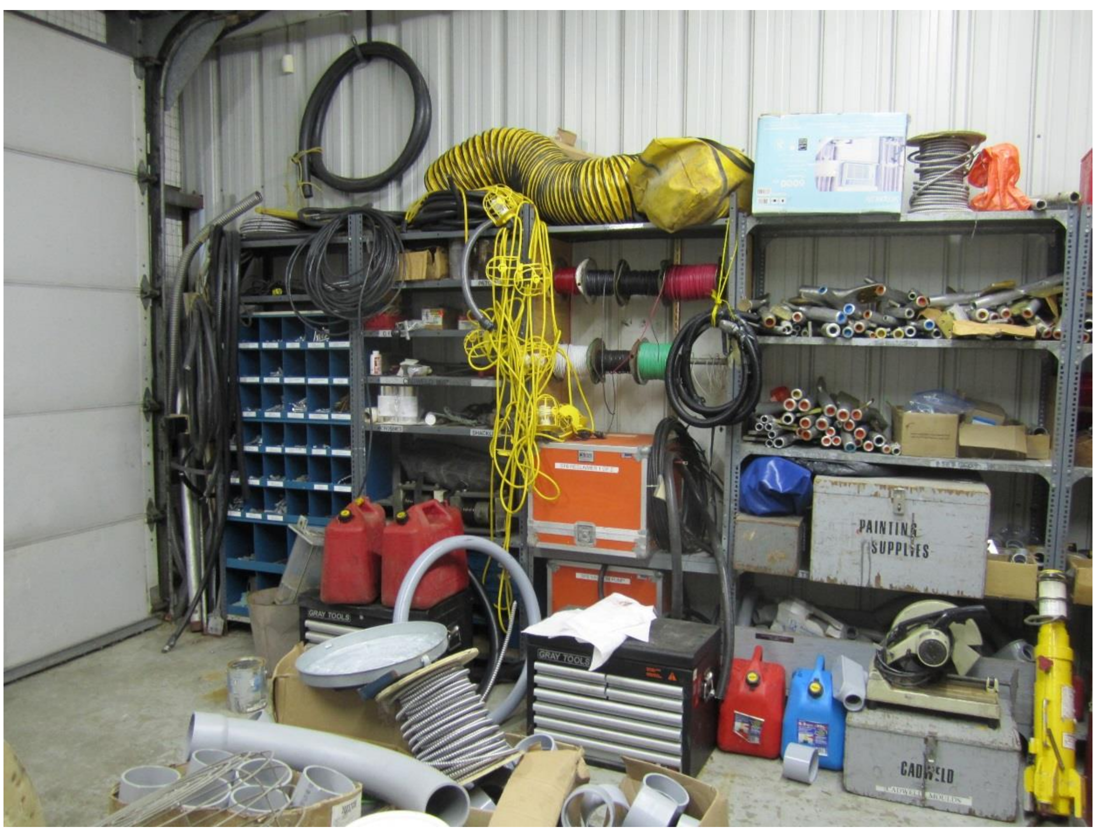

Photo 26

Nalcor Assessments – Stephenville
Environmental Photos

Photo 27

Photo 28

Nalcor Assessments – Stephenville
Environmental Photos

Photo 29

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Environmental Photos

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Nalcor Assessments – Stephenville
Environmental Photos

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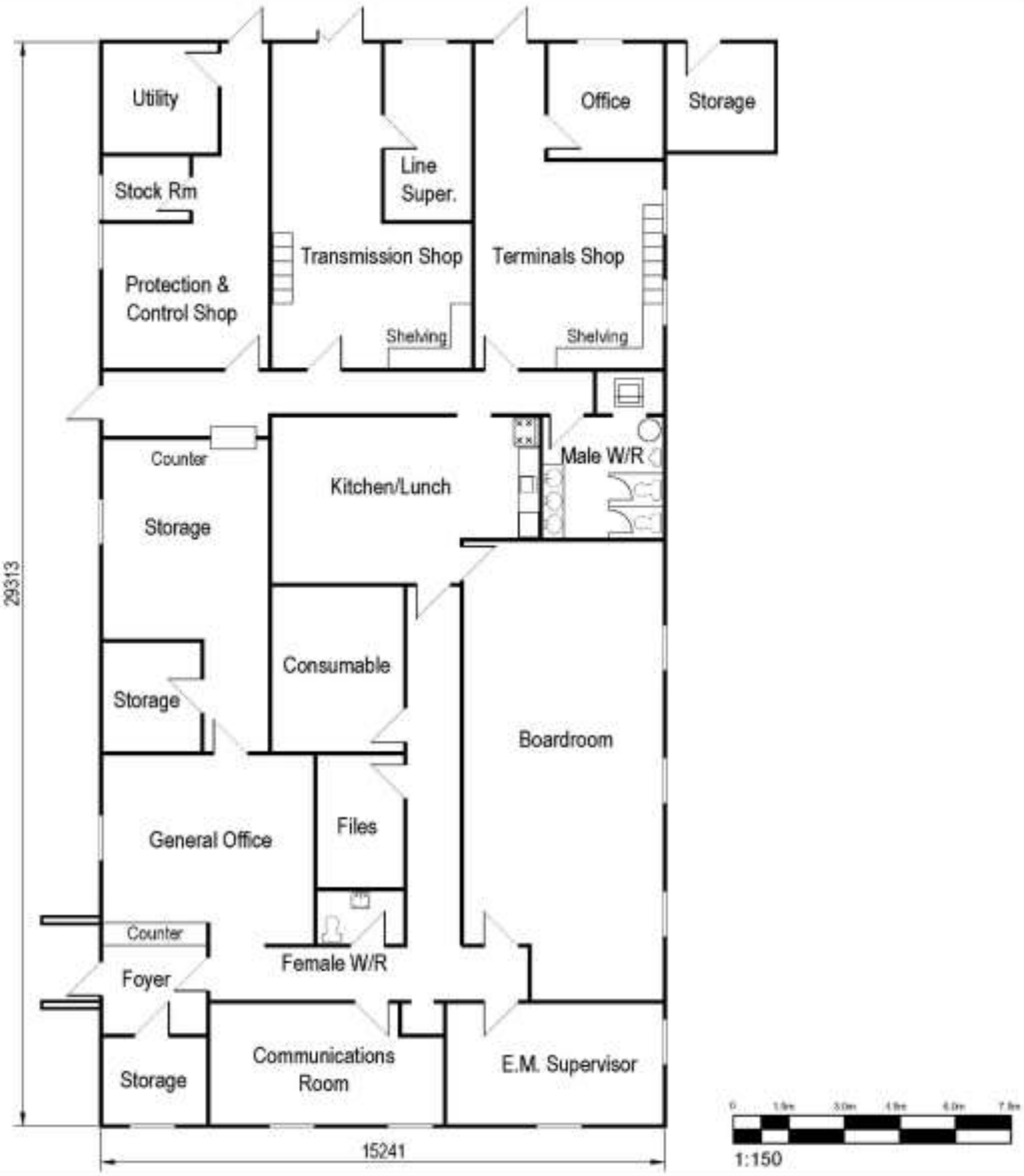
APPENDIX H

Existing Floor Plans



PRIME CONSULTANT:

CBCL LIMITED
Consulting Engineers

ARCHITECTURAL CONSULTANT:

GLENN BARNES
ARCHITECTURE INC.

PROJECT:
BUILDING & INFASTRUCTURE CONDITION ASSESSMENTS FOR LINE DEPOTS, OFFICE FACILITIES AND CONTROL BUILDINGS

DRAWING TITLE: SCHEMATIC AS-BUILT PLAN LINE DEPOT
STEPHENVILLE NL

CLIENT: NL HYDRO

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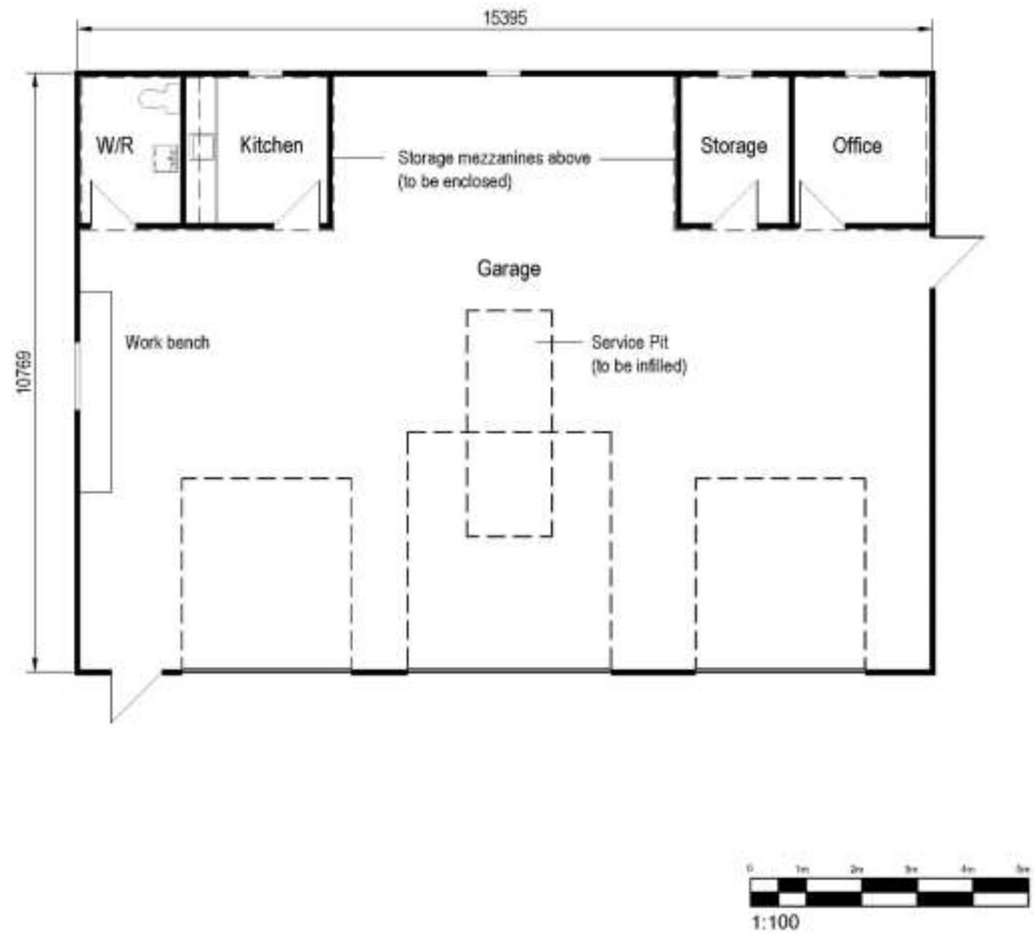

PRIME CONSULTANT:
CBCL LIMITED
Consulting Engineers

ARCHITECTURAL CONSULTANT:
GLENN BARNES
ARCHITECTURE INC.

PROJECT:
BUILDING & INFASTRUCTURE CONDITION ASSESSMENTS FOR LINE DEPOTS, OFFICE FACILITIES AND CONTROL BUILDINGS

DRAWING TITLE:
SCHEMATIC AS-BUILT PLAN
MAINTENANCE GARAGE
STEPHENVILLE NL

CLIENT:
NL HYDRO

SCALE:	DATE:	CLIENT NO.:	PROJECT NO.:	DRAWING NO.:
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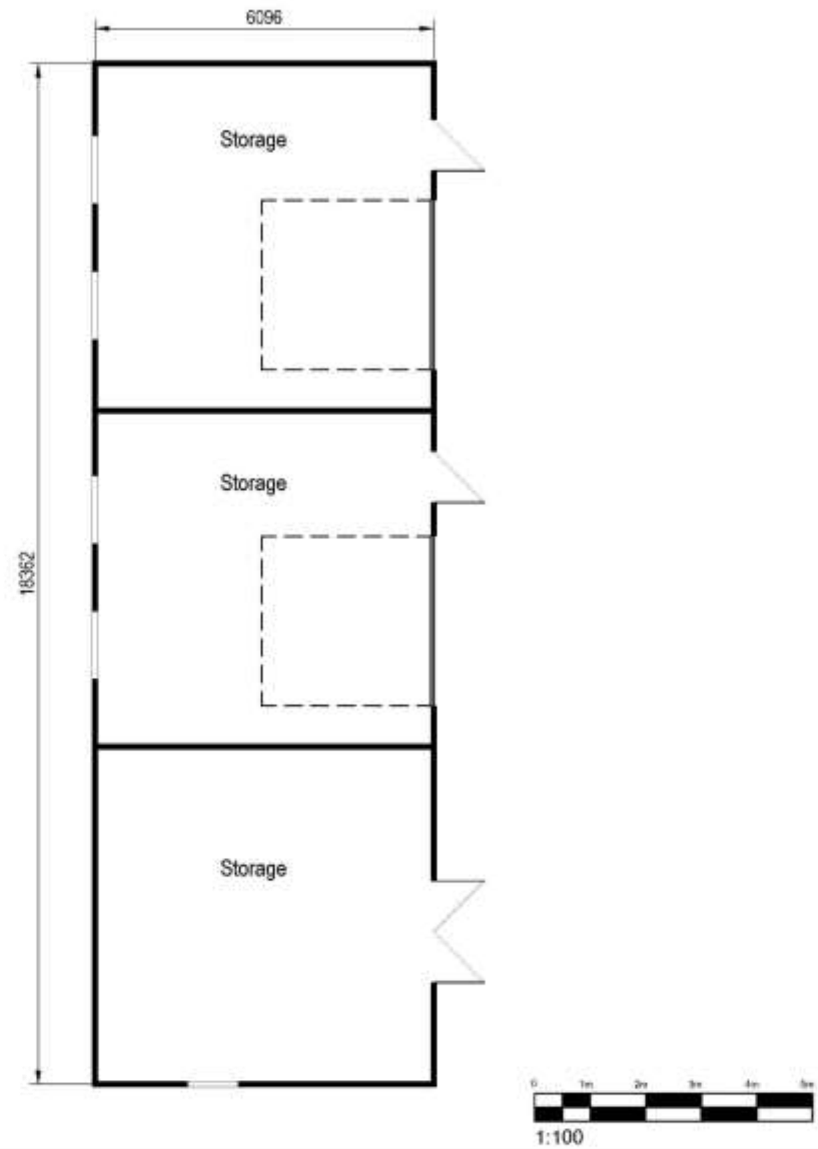

PRIME CONSULTANT: CBCL LIMITED Consulting Engineers	PROJECT: BUILDING & INFASTRUCTURE CONDITION ASSESSMENTS FOR LINE DEPOTS, OFFICE FACILITIES AND CONTROL BUILDINGS			
ARCHITECTURAL CONSULTANT: GLENN BARNES ARCHITECTURE INC.	DRAWING TITLE: SCHEMATIC AS-BUILT PLAN WAREHOUSE BUILDING — STEPHENVILLE NL		CLIENT: NL HYDRO	
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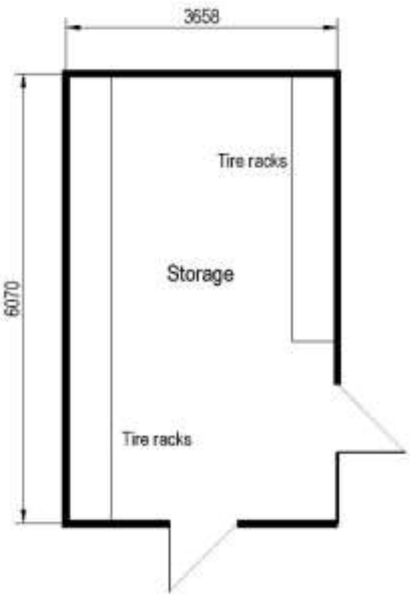

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PRIME CONSULTANT:
CBCL LIMITED
Consulting Engineers

ARCHITECTURAL CONSULTANT:
GLENN BARNES
ARCHITECTURE INC.

PROJECT:
BUILDING & INFASTRUCTURE CONDITION ASSESSMENTS FOR
LINE DEPOTS, OFFICE FACILITIES AND CONTROL BUILDINGS

DRAWING TITLE:
SCHEMATIC AS-BUILT PLAN
STORAGE SHED
STEPHENVILLE NL

CLIENT:
NL HYDRO

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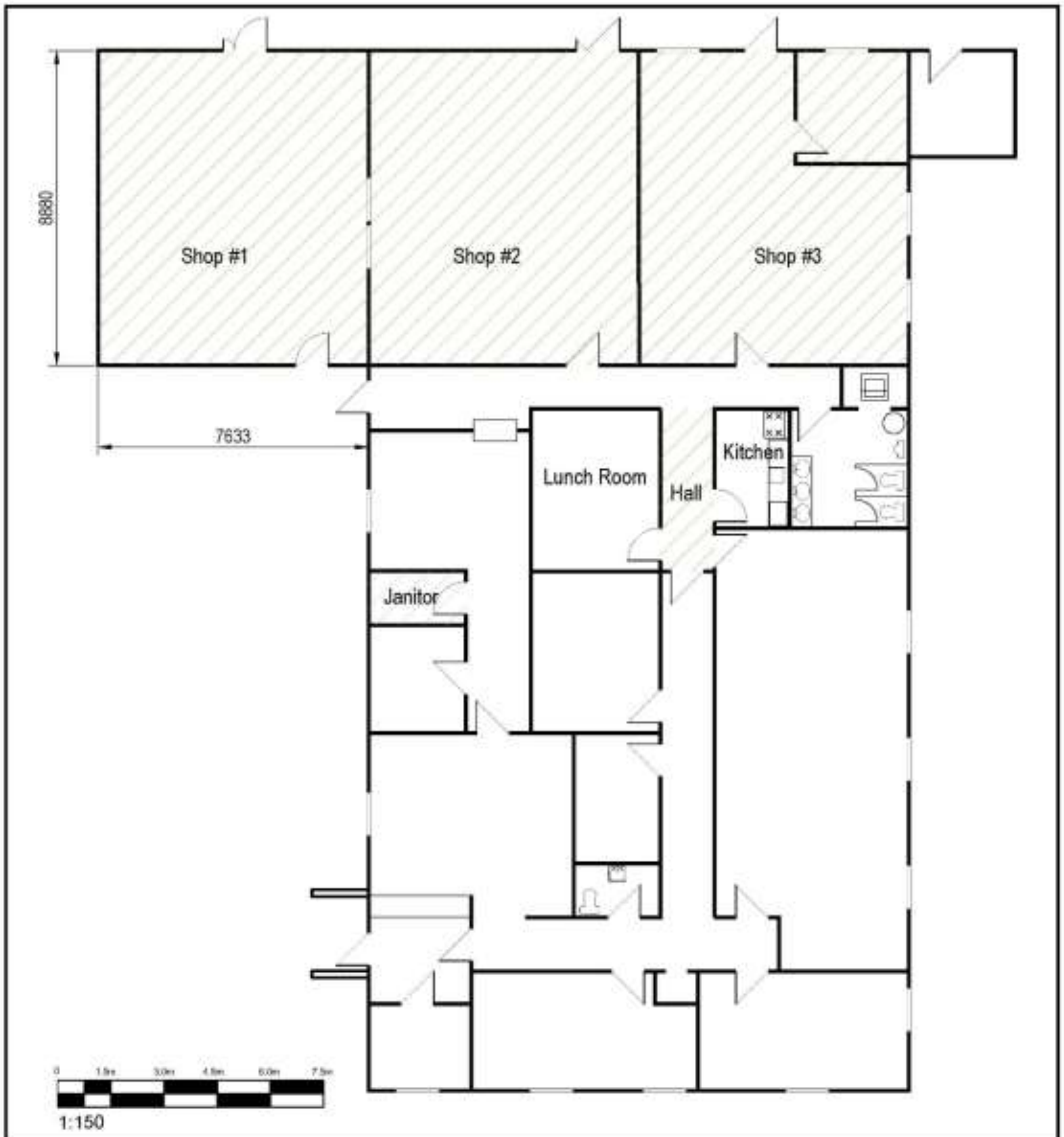
APPENDIX I

Concept Floor Plans



PRIME CONSULTANT:

CBCL LIMITED
Consulting Engineers

ARCHITECTURAL CONSULTANT:

GLENN BARNES
ARCHITECTURE INC.

PROJECT:

BUILDING & INFASTRUCTURE CONDITION ASSESSMENTS FOR LINE DEPOTS, OFFICE FACILITIES AND CONTROL BUILDINGS

DRAWING TITLE:	CLIENT:
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Appendix F

Building and Infrastructure Condition Assessment – Bishops Falls Office/Warehouse (2017)

Building and Infrastructure Condition Assessment Bishops Falls Office/Warehouse

(Bishops Falls, NL)

163046.00 ● Final Report ● March 2017

ISO 9001
Registered Company

Prepared for:

nalcor energy

Prepared by:

CBCL LIMITED
Consulting Engineers

Issued for Final	Paul Sceviour	Mar 31, 2017	Paul Sceviour
Issued for Review	Paul Sceviour	Oct 28, 2016	Paul Sceviour
Issue or Revision	***Reviewed By:***	***Date***	***Issued By:***

CBCL
CBCL LIMITED
Consulting Engineers

ISO 9001
Registered Company

REGISTERED PROFESSIONAL ENGINEER
PAUL SCEVIOUR
SIGNATURE
MAR 31, 2017
DATE
NEWFOUNDLAND & LABRADOR

CBCL Project No 163046.00

Contents

Appendices

CHAPTER 1 REPORT OVERVIEW

1.1 RFP and Consultant Group

In June 2016, the Newfoundland and Labrador Hydro (referred to as the "NLH" hereafter) issued a Request for Proposals to undertake the building and infrastructure condition assessments for various line depots, office facilities, and substation control buildings throughout the province. The sites included:

- Line Depots
  - Ramea
  - Flowers Cove
  - Roddickton
- Office Facilities and Control Buildings
  - Bishop's Falls (Office Building Only)
  - Whitburn Eastern Area Depot
  - Doyles 138 kV Facility
  - Grandy Brook 138 kV Facility
  - Howley 138 kV Facility
  - Springdale 138 kV Facility

CBCL Limited responded to the request on May 27, 2016, and was subsequently awarded the project on June 15, 2016.

The consultant team that performed this assessment consisted of a multi-disciplined engineering team with CBCL Limited performing structural, mechanical, electrical, and environmental tasks, and Glenn Barnes Architecture Inc. performing architectural and functional programming tasks.

This report contains the results of those exercises and provides our professional assessments, recommendations as to the current condition, suitability of use, required code upgrades, recommended upgrades, recommendations to suit future needs, and opinion of probable construction cost for recommendations.

1.2 Scope of Work

The Request for Proposals document contained the terms of reference which outlined the objectives and scope of the project. The assessment has several objectives:

- to review the general condition of the building and site infrastructure including architectural, structural, mechanical, electrical, and environmental;
- provide recommendations of renovations to continue operating existing facilities in view of present and future needs, and
- provide preliminary functional programming based on the client current needs (for storage, operations, etc.) and future needs to determine the most efficient uses of the assessed facilities.

1.3 Site Audits

Site audits were carried out during the weeks of July 25th and August 1st. Prior to the site work, CBCL requested any available plans and prior documents or information on the facilities. Limited information was available so the bulk of the information contained in this report was obtained from onsite review and from information provided by on site personnel. Upon arriving at the various sites the consultant team checked in with site personnel and undertook site specific safety orientation were required.

1.3.1 Bishops Falls Office/Warehouse

The office/warehouse building is located on a large compound housing several buildings, parking areas, and equipment storage yard.

This 3,100 square meter footprint two level office/warehouse building was constructed circa 1980. The building is a combination pre-engineered metal and conventional steel frame structure. The building houses a large office wing with staff lunch areas plus a warehouse which provides supply to Newfoundland and Labrador Hydro's operations throughout most of the Province. The rear of the warehouse is a former transformer shop where they are now stored and de-commissioned. Two mezzanines are located within the warehouse envelope with one housing offices, training and storage and the other a staff lunch room and clothing testing and cleaning. The building is clad in a combination of clay face brick at the office wing and vertical metal siding elsewhere. The office wing roofing is traditional built up pitch and gravel style. Warehouse roofing is standing seam metal. Windows are bronze colour finished aluminum in the original office portion of the building and vinyl in an office extension and warehouse portion of the building. Exterior personnel

doors are both aluminum and hollow metal in aluminum and pressed steel frames. Overhead doors are both original multi leaf vertical stack steel and new insulated pre-painted steel.

The office/warehouse building is connected to municipal water services and sanitary drainage is to two onsite septic systems. The site itself is a combination of asphalt surfaces with curbs, gravel in storage yard area, and grassed areas. Storm drainage from paved areas is through an underground storm system. The remainder of the site drains from sloped surfaces. The compound is fully fenced with a motorized security gate.

1.4 Findings and Recommendations

1.4.1 Findings

The building envelope is showing its age and requires upgrading including replacement of windows and siding, repair of canopies etc. Interiors are in good condition but require code upgrades related to fire separations, ratings and exiting between offices and warehouse and within office and warehouse spaces. Current fire ratings are minimal. The building has another 25 years useful life if properly maintained and upgraded where required.

Structural issues were noted including potential overstressing of a column in the warehouse area which should be addressed.

Many of the building mechanical systems while currently operational are approaching the end of their useful lives and should be planned for replacement. Code issues should also be addressed in the near term.

The facility is generally good condition electrically. There are some code issues to be addressed as well as equipment replacement that should be planned for near, mid and long term.

1.4.2 Recommendations

Near term recommendations that should be planned to be undertaken within the next two years have been put forward for architectural, structural, site, mechanical, electrical, and environmental and are summarized as follows.

Architectural:

- Provide fire rated floors for mezzanines.
- Provide new fire exits and upgrade existing deficient exits.
- Replace aluminum window glazing units which have delaminated film.
- Repair damaged door canopies.
- Paint exterior doors and frames.
- Repair minor brick damage.
- Consider `practical` accessibility provisions.

Structural:

- Repairs need to be carried out on concrete foundation wall at vertical cracks (8 locations)

- A structural analysis of the building frames should be conducted. Given the deformation of a column located in the warehouse area, there is a possibility that the building frames could be overstressed. If an analysis is not desired, the deformed/twisted column should be removed and replaced with a new column.
- Localized column repairs should be carried out. Within the warehouse area of the building there are seven (7) locations where columns are damage due to equipment impact.
- The brick shelf angles on the back wall should be repaired. Although the brick veneer is only small the shelf angles are in poor condition.
- The small equipment pad accessing the storage tanks at the rear of the building should be removed and replaced with a proper platform.

Site/Civil:

- Areas of decomposing asphalt should be cutout and patched or utilize grind and patch repairs.
- Catch basins should have silt, stand, and stone removed from the chambers.
- Catch basins that are below finished grade should be provided with grate risers to bring them up to grade level and new asphalt placed around them.

Mechanical:

- Modify Lunch Room sink vent piping to be code compliant.
- Modify plumbing vent piping that penetrates exterior walls to penetrate roof.
- Have Truck Bay trench drain cleaned and snaked to make functional again.
- Provide backflow prevention on domestic water takeoff.
- Properly insulate domestic water piping.
- Provide proper supports for domestic water piping.
- Replace any hot water tanks older than 10 years of age.
- Provide backflow preventer on water barrel fill pipe.
- Replace the office area rooftop air conditioning unit.
- As an option utilize variable volume in the new rooftop unit and install variable volume air terminal zone units with digital controls.
- Replace the front office extension split air conditioning unit. Consider extending the system to include the unconditioned office.
- Replace the workshop through the wall air conditioner unit or connect room to main office system.
- Replace Oil Test Lab range hood with a slotted bench type hood if work with chemicals and volatile substances are used here.
- Provide proper ventilation and make-up air systems to the majority of the building in accordance with ASHRAE 62.1. Consider using heat recovery technology.
- Replace the existing building automation system and expand the system throughout the building to existing and new HVAC equipment
- Provide backflow prevention on the firewater at the water entrance.
- A review of what is stored, how it is stored, and to what height it is stored in the warehouse area should be undertaken to ensure it complies with NFPA 13 for the overhead sprinkler protection that is present.

Electrical:

- Consider installation of the existing padmount transformer on new concrete pad with fire resisting barrier around transformer and change the transformer orientation if it is not equipped with internal current-limiting fuses and a pressure relief device.
- Some of the electrical equipment inside the main electrical room have exceeded its service life expectancy. Some panels and disconnects are obsolete and should be retrofitted or replaced.
- Power distribution equipment in the paint shop and salvage stores that service mechanical equipment that is no longer in use and should be removed with the obsolete equipment.
- Replace all old exterior lights under canopies and above exterior doors with new LED fixtures.
- Some old emergency lighting units and exit signs have to be replaced.
- All outdoor receptacles need to be replaced including the weather protective covers.
- Provide supports to the ceiling for unsupported cables and covers to open junction boxes.
- Install fire alarm system.
- Provide supports for unsupported data and communications cables in ceiling space.

Environmental:

- Paint existing transformer oil storage tanks.
- New and used transformer oil tank installation and exterior piping do not meet code. Tanks need to be relocated to minimum code distance from the building and each other and provided with non-combustible foundations. Piping should be properly supported and provided with flexible connections for movement.

Mid-term recommendations that should be planned to be done in the next 3-10 years are architectural, mechanical, and electrical and are summarized as follows.

Architectural:

- Replace metal siding.
- Replace approximately 9 exterior doors, frames and hardware.
- Upgrade office block washrooms finishes, vanities, cubicles partitions, accessories.

Mechanical:

- Replace the original building domestic water piping.
- Replace the server room split air conditioning unit.
- Replace the second floor split air conditioning unit.
- Remove and dispose of Paint Room ventilation equipment.

Electrical:

- Consider replacement of the outdoor loudspeakers.

Long-term recommendations that should be planned to be done past the next 10 years are architectural, civil, and electrical and are summarized as follows.

Architectural:

- Replace roof finishes.

Site/Civil:

- Replace concrete curbs.
- Replace storm water catch basins and CMP pipe.

Electrical:

- Replace electric heating equipment.

CHAPTER 2 FACILITY AUDITS

2.1 Main Office building

2.1.1 Architectural Assessment

This 3,100 square meter footprint two level office/warehouse building was constructed circa 1980. The building is a combination pre-engineered metal and conventional steel frame structure. The building houses a large office wing with staff lunch areas plus a warehouse which provides supply to Newfoundland and Labrador Hydro's operations throughout most of the Province. The rear of the warehouse is a former transformer shop where they are now stored and de-commissioned. Two mezzanines are located within the warehouse envelope with one housing offices, training and storage and the other a staff lunch room and clothing testing and cleaning. The building is clad in a combination of clay face brick at the office wing and vertical metal siding elsewhere. The office wing roofing is traditional built up pitch and gravel style. Warehouse roofing is standing seam metal. Windows are bronze colour finish aluminum and vinyl in an office extension off the warehouse and the warehouse itself. Exterior personnel doors are both aluminum and hollow metal in aluminum and pressed steel frames. Overhead doors are both original multi leaf vertical stack steel and new insulated pre-painted steel. The building envelope is showing its age and requires upgrading including replacement of windows and siding, repair of canopies etc. Interiors are in good condition but require code upgrades related to fire separations, ratings and exiting between offices and warehouse and within office and warehouse spaces. Current fire ratings are minimal.

2.1.1.1 BUILDING EXTERIOR ENVELOPE

The office wing is clad with clay face brick with pre-painted metal facias. Brick is in good condition however metal siding has faded and corrosion is noted at several fasteners. The siding is reaching the end of its useful life and replacement should be considered in the next 3-5 years. The warehouse and office addition adjacent to it are clad in a combination of clay face brick and vertical pre-painted metal siding. There is some local corrosion at several siding fasteners and at the sill near warehouse overhead doors, replacement should be considered within the next 3-5 years. Brick is generally in good condition with some minor damage near the warehouse overhead doors and at the office addition. Windows are bronze finish aluminum in fixed and operable combination styles. Seven (7) windows in the office section appear to have a reflective film adhered to one lite of glass between the two hermetically sealed lites. The film has delaminated and is unsightly, such glazing units should be replaced. The frames are in good condition and do not require replacement. Other than some minor caulking windows are otherwise in good condition.

The thermal attributes of the office block exterior wall are unknown but one manager advised that the office and warehouse wings are drafty and cold in winter.

Main entrance doors are glazed aluminum in aluminum frames, glazing is single. These doors and frames are in good condition but thermally inefficient. Other personnel doors are hollow metal in pressed steel frames and are generally in good condition. Painting is suggested for all (approximately 9) as well as a check of hardware and weather stripping. Most overhead doors are multi leaf vertical sliding type, original to the building. Staff advised that a recent study took place and doors were given approval to continue operating. Painting is suggested since existing paint is faded and doors are stained with grease. New overhead doors are pre-painted sandwich insulated metal overhead type and are in good condition. Several personnel doors have had overhead snow and ice sliding canopies added. These require painting and structural enhancement. Several have decayed wood, requiring replacement.

The office block roofing consists of traditional built up tar and gravel. Those roofs appear in fair-good condition. Areas were observed where the gravel has washed away due to drainage from the upper warehouse roof. Other areas were also down to the tarred surface. Lichen was observed growing on parts of this roof. The warehouse and office extension roofs are of standing seam metal and are in good condition with no noticeable corrosion. Roofs do not have interior access ladders and hatches; access is provided via external fixed ladders.

2.1.1.2 Building Interior

Foundations consist of poured in place concrete with concrete slabs on grade. Flooring in office areas is finished with a combination of 300 x 300 mm vinyl tile and carpeting all of which are in good condition. Washrooms in the main office block floors are finished with ceramic tile which is dated but in good condition. Warehouse floors are concrete. The principal staff lunch room floor is finished with residential sheet vinyl. Walls and partitions in the office blocks are of metal stud and in the main block demountable vinyl coated drywall with battens, and in the warehouse office extension and mezzanines, of painted drywall. Ceilings are generally of 610 x 610 mm revel edge unrated suspended acoustical tile which is in good condition. Staining from leakage was observed in the central part of the office area directly below a roof relief vent. The roof insulation also appeared to be stained in this area. Washroom partitions are in poor condition as are vanities and should be replaced. Washroom accessories are in fair to good condition with selected replacements suggested. Doors are generally solid core wood in demountable metal frames and at some locations with fixed partitions in pressed steel frames. Offices in the main office block have frosted glass full height sidelights at each office. In addition to private offices the core of the main office block consists of demountable office cubicles.

Mezzanines are constructed from a combination of steel/concrete and wood floors. Walls and partitions are finished with painted drywall and doors are solid core wood in pressed steel frames. Masonry partitions separate the main office block from the warehouse, they extend to the underside of the roof insulation. Stairs are wood. No fire separations and fire labels were noted in the building. Mezzanine floor assemblies are required to be protected with a 45 minute rating. This may be achieved by either addition of a fire rated suspended acoustic tile ceiling or 16mm type-X drywall to the underside of these assemblies.

2.1.1.3 Building Code

The building is classified by the NBCC 2010 as a multi-classification building of D for office areas, F-2 for warehouses and for the transformer shop area.

2.1.1.4 Accessibility

The building is not accessible to persons with disabilities. Given its age it would not be required to be accessible unless renovations since 1981 and planned exceed 50% of the replacement cost of the building. Consideration might be given to modifying the building as far as practical to provide a degree of accessibility so mobility challenged persons can work there. Examples include the main entrance, and one washroom.

2.1.1.5 Selected NBCC 2010/LSC 101 Requirements

The following provides an overview of several National Building Code/Life Safety Code NFPA 101 requirements and applicable sections for this facility.

Requirements	**Compliance / Action**
1) <u>Building Occupancy</u> Group F-2 – Medium Hazard Industrial Group D – Business and Person Services – Office Areas *NBCC A-3.1.3.1*	Compliant
2) <u>Group F, Division 2, Up To Three Storeys</u> 1. A building classified as Group F, Division 2 is permitted to conform to Sentence (2), provided: a. It is not more than 3 storeys in building height, and b. It has a building area not more than 1500 m^2 when facing 3 streets. 2. The building referred to in Sentence (1) is permitted to be of combustible construction or non-combustible construction used singly or in combination, and a. Floor assemblies shall be fire separations with a fire resistance rating not less than 45 minutes, b. Mezzanines shall have, if of combustible construction, a fire resistance rating not less than 45 minutes, c. Roof assemblies shall have, if of combustible construction, a fire resistance rating not less than 45 minute, except that in a building not more than 1 storey in building height, the fire resistance rating is permitted to be waived provided that the roof assembly is constructed as a fire retardant treated wood roof system conforming to Article 3.1.14.1 d. Loadbearing walls, columns, arches supporting an assembly required to have a fire resistance rating shall i) Have a fire resistance rating not less than 45 minute, or ii) Be of non-combustible construction, and	Multiple occupancy building Group D – Offices Group F-2 – Medium Hazard Industrial Group F-2 – governs as the most restrictive Non-compliant Floor assembly and mezzanines including support structures shall have a 45 minute fire rating.

Requirements	**Compliance / Action**
e. Loadbearing walls, columns, arches supporting a fire separation shall have a fire resistance rating not less than that required for the separation. *NBCC 3.2.2.74*	
3) <u>Occupant Load (Based on LSC)</u> Group F2 -Medium Hazard Industrial: 518 m^2/46 m^2 per person = 113 Group D – Offices: 1,555 m^2/9.3 m^2 per person = 167 Total Occupant Load = 280 persons (Service rooms, storage, circulation and washrooms are excluded)	Compliant
4) Exit Capacity The maximum size of rooms or suites with one exit are as follows: Group D – 200 m^2 with a 25 metre travel distance to the egress door. Group F-2 – 150 m^2 with a 10 metre travel distance to the egress door. *NBCC 3.4.2.1.A*	Non-compliant-aisles in warehouse are dead ended. Mezzanine entrance distances are not met. Add exits from warehouse, and mezzanines.
5) Except if exits are located along the perimeter of the floor area and each main aisle in the floor area leads directly to an exit, the travel distance may be 60 metres maximum. NBCC 3.4.2.5	Non-compliant Add exits from warehouse
6) The minimum width of a public corridor shall be 1100 mm. *NBCC 3.3.1.9*	Compliant
7) Travel Distance shall be maximum of 30 metres. *NBCC 3.4.2.5*	Non-compliant Travel distances exceeded in offices, mezzanine, warehouse and exits not protected to exterior, add protected exits.
8) Exit capacity 280 persons x 6.1 mm per person = 1708 mm = 1.8 doors *NBCC 3.4.3.2*	Compliant
9) Exits shall be separated from the remainder of the building by a fire separation having a fire resistance rating of not less than 45 minutes. *NBCC 3.4.4.1*	Non-compliant Two exits and access to exits not currently fire rated or protected to the exterior.
10) Electrical rooms, if housing transformers, shall have a fire resistance rating of not less than 60 minutes. *NBCC 3.6.2.1*	Compliant
11) Washroom Fixture Calculation Group F2 - 113 persons: 4 male, 4 female Group D - 167 persons, 4 male, 4 female *NBCC 3.7.2.2*	Compliant 16 fixtures provided
12) The building need not be designed to meet the NL Accessibility Act requirements due to its age.	Compliant
13) In a building with more than one major occupancy, the requirement of the most stringent occupancy shall apply	F-2 governs

Requirements	Compliance / Action
to the entire building.	
14) Cooking equipment not within dwelling units used in processes producing grease laden vapours shall be designed and constructed in accordance with Part 6.	Non-compliant, however commercial hood with fire suppression system as required in Part 6 would not be required for this application. A standard residential hood is acceptable.
15) Fuel tanks are located outside the building close to it.	Refer to mechanical assessment.
16) Rooms for storage of janitorial supplies shall be construction with a 45 minute fire resistance rating. *NBCC 3.3.21.2*	Non-compliant Fire rated door and frame and rated walls and ceilings are required.
17) Limiting distance:	Complaint

2.1.1.6 Conclusions and Recommendations

The building while in good condition should be provided with the following life safety as well as envelope and interior improvements including the following:

- Provide fire rated floors for mezzanines.
- Provide new fire exits and upgrade existing deficient exits.
- Replace aluminum window glazing units which have delaminated film.
- Repair damaged door canopies.
- Paint exterior doors and frames.
- Repair minor brick damage.
- Replace metal siding.
- Replace approximately 9 exterior doors, frames and hardware.
- Upgrade office block washrooms finishes, vanities, cubicles partitions, accessories.
- Replace roof finishes.
- Consider `practical` accessibility provisions.

2.1.2 Civil/Site Assessment

2.1.2.1 Asphalt and Concrete Surfaces

Access roads and parking areas around the office/warehouse building are surfaced with asphalt with concrete curbs. The asphalt is in fair to good condition. Crack lines are present in various locations and a couple of areas were observed with deteriorating asphalt (see Site Civil photos 1 to 3). Only minor depressions were observed. Curbs are in poor to fair condition with cracking, snow clearing damage, and sections missing (see Site Civil photo 4).

Concrete walkways are provided around the office portion of the building, to parking lots, and at the rear of the building. The walkways are in fair to good condition with some cracked sections observed (see Site Civil photo 5). Concrete pads are provided at the main warehouse overhead doors and are in fair to good condition with some cracking present (see Site Civil photo 6). Concrete equipment pads and doorway entrance pads are present and are in good condition (see Site Civil photo 7).

2.1.2.2 Water and Sewer

Domestic and fire water for the facility is provided from a pressure boosting pump house. The pump house is located outside the area covered for this study and was therefore not observed as part of this project. Water enters the building at the north corner of the office area of the building through an underground main.

Sanitary sewer exits the building at two locations and is piped to two separate septic systems. One septic system utilizes a 22,000 L septic tank that is approximately five to ten years old. The second system goes to a 5,000 L septic tank however its age is unknown. It was indicated that both systems are serviced annually with no issues or concerns. A septic access pipe was observed for one of the systems near a fenced equipment storage area at the rear of the warehouse section of the building (see Site Civil photo 8).

2.1.2.3 Drainage

Storm runoff is handled by a storm drainage system on paved surfaces. Grassed and gravel surfaces are sloped for surface runoff. The paved surface drainage system is composed of a number of concrete catch basins with cast iron grates and interconnecting galvanized Corrugated Metal Pipe (CMP) (see Site Civil photos 9 and 10). Trench drains with grated covers are also provided in front of the warehouse overhead doors. Drainage is piped to the south of the compound site where it discharges into the nearby Exploits River.

Catch basis and grates were generally found to be in good condition. Many had significant amounts of silt, sand, and stone at their bottoms. One catch basin appeared to have no concrete bottom and is being undermined at its perimeter as observed inside the basin (see Site Civil photos 11 and 12). The CMP piping generally shows noticeable corrosion and is corroded through at some termination locations (see Site Civil photo 13).

Six catch basins appeared to have settled and are no longer level with the finished asphalt grade.

No drainage issues were observed on grassed and gravel areas within the area of the assessment project.

2.1.2.4 Conclusions and Recommendations

The following recommendations are made for the site civil:

- In the short term areas of decomposing asphalt should be cutout and patched or utilize grind and patch repairs.
- In the short term catch basins should have silt, stand, and stone removed from the chambers.
- In the short term catch basins that are below finished grade should be provided with grate risers to bring them up to grade level and new asphalt placed around them.
- In the long term the concrete curbs should be replaced.
- In the long term the storm water catch basins and CMP should be replaced due to the deteriorating condition of the pipe.

2.1.3 Structural Assessment

The main office building and warehouse consist of two pre-engineered metal buildings supported on a concrete foundation wall. Within the warehouse section of the building there are multiple mezzanine levels built. The main mezzanine of the warehouse section appears to be a steel framed structure with a concrete pan deck floor, while the additional mezzanines are timber framed structures. The ground floor of the office building and warehouse is a concrete slab on grade.

2.1.3.1 Foundation and Floor Systems

The building structure is supported on concrete foundation walls which are assumed to extend 1.22m to 1.52m (4' to 5') below grade for frost protection. The inspection of the foundation wall was limited as only the exterior portion of the wall extending above grade could be viewed.

A number of issues were noted during the inspection of the foundation walls. Large vertical cracks in the wall were noted at fairly consistent intervals (see Structural photo 1). It is not directly known what the cause of the cracking is however it is suspected that they are shrinkage cracks that formed during curing. It is most likely that the cracks widened over time due to water infiltration and repeated freeze thaw cycles.

In addition to the vertical cracks there are a number of areas of spalled or scaled concrete along the face of the warehouse foundation (see Structural photos 2 and 3). Scaled concrete is usually caused by water infiltration through cracks and repeated freeze thaw cycles causing pieces of concrete to detach from the main structure. Scaling can also be caused by defects in the concrete such as honey combing and segregation of the coarse aggregate during pouring. At one area of scaled concrete it was noted that ants were travelling through the foundation wall to the interior of the building (see Structural photo 4). Conversations with the employees at site revealed that water infiltration and pests have been an issue at this location of the foundation wall.

Although there are defects in the foundation wall that will require repairs, the remainder of the concrete appears to be sound. Overall the foundation wall appears to be in fair condition.

Concrete slabs on grade make up both the office and warehouse area's ground floor. The office area's floor slab was concealed by finishes and therefore could not be inspected. The warehouse concrete slab appears to be in good condition as there were only minor shrinkage cracks noted (see other report photos). The cracking that has been noted has most likely been present for quite some time and therefore has not affected the load capacity or performance of the slab. The cracking however should be monitored to ensure that the condition does not worsen.

2.1.3.2 Roof Systems

Both the office and warehouse sections roof system consists of exterior cladding and insulation supported by roof purlins which span to and are supported by the main building frames. The warehouse purlins were concealed leaving only the office building structure capable of being inspected.

The roof system of the office building appears to be in good condition. There were no noticeable signs of corrosion or deformations in the structural members. It was noted that reinforcing was carried out on the main building frame, and roof purlins added at the location where the warehouse and office portions meet (see Structural photos 5 & 6). Since the office building roof is at a lower elevation than that of the warehouse the snow loading will be increased due to drifting. If the office building was constructed prior to the warehouse, or was not originally designed for the current loading situation then the reinforcing would be expected. However if the office building was designed to carry the current snow drift loading and still required additional reinforcing it suggests an analysis of the building should be carried out (if not already) to determine any possible overstresses.

A small timber framed structure supported on a concrete foundation wall was added to the side of the warehouse structure. This addition has a sloped roof constructed of pre-engineered timber trusses. The timber trusses were not visible as insulation and vapor barrier prevented the trusses from being visually inspected (see Structural photo 7).

2.1.3.3 Framing Systems

The building structure consists of rigid steel frames constructed of tapered columns and roof beams with additional support provided by intermediate interior columns (see Structural photo 8). The inspection of the rigid frames in the office building area was limited as drop down ceilings, duct work and piping prevented all aspects of the structure from being viewed. The wind girts, bracing and columns of the rigid frame could not be viewed as they were concealed by wall finishes within the office portion of the building.

Although the rigid frame members were visible in the warehouse section, the inspection was conducted from the ground therefore it too can be considered limited.

Overall the framing system of the building appears to be in fair condition. Within the warehouse section it was noted that seven (7) intermediate columns were deformed by what is suspected to be impact from mobile forklift equipment (see Structural photos 9, 10, 11). These deformations affect the overall capacity of the interior as they will be more susceptible to buckling if heavily loaded. A more concerning deformation was noted on the interior column at the 6th bay from the front of the warehouse and on the left hand side if looking at the back wall of the warehouse. The deformation noted is not a localized deformation due to the equipment impact, but more so a twisting of the column (see Structural photo 12 and 13). Although the direct cause of the twist in the column is not known it appears to be a result of overstressing. Damage such as this would merit an analysis to determine if overstresses are present within the structure.

Deformations were also noted in at least one of the wind girts which is adjacent to the new timber framed mezzanine (see Structural photo 14). It is not known whether this deformation is caused by wind loading or by impact from equipment. Other locations appear to have slight deformation however it was difficult to determine from the ground.

2.1.3.4 Mezzanines

There are currently three types of mezzanines located within the warehouse portion of the main building.

The first type of mezzanine consists of a concrete pan deck floor supported on W250 beams which span to and bear on concrete block walls. This framing extends from the upper level washrooms to the stairwell. Past the stairwell the mezzanine floor framing consists of C150 channels which are connected into the concrete block wall supporting the concrete pan deck floor. The inspection of the steel framing was limited as drop down ceiling tiles, electrical conduits/equipment and piping prevented the framing from being viewed. The visual inspection in the storage room on the main floor revealed that the majority of a C150 channel's top and bottom flange were removed to allow conduit to pass to the second floor level (see Structural photo 15). The removal of the flanges will result in a large reduction in capacity and given that the channel supports a concrete pan deck floor, an analysis should be done to determine the adequacy of the channel. The remainder of the steel framing that was visible appeared to be unaltered and in good condition.

The second type of mezzanine structure consists of what appears to be a reinforced concrete suspended slab supported on concrete block walls. It appears as though these mezzanine areas are part of the original building construction. Currently these areas are used as storage. The concrete suspended slab of the mezzanines appears to be in fair condition. For the most part the concrete appears to be sound, however there are locations where horizontal cracking on the face of the slab, and shrinkage cracks on the top of the slab are present (see Structural photos 16 and 17).

Timber framed floor systems have been added between the storage areas and adjacent to the electrical room. The mezzanine floor structure is a combination of TJI joist in one section and 38 x 235 (2"x10") joists in another. The floor system is supported by interior timber framed walls to avoid tying into the existing building frame structure. The inspection of the floor system and timber framed walls was limited as only certain locations could be accessed for viewing. The timber mezzanine appears to be new construction and appears to be built using proper construction practices. Overall the timber mezzanine is in good condition.

2.1.3.5 Concrete block wall.

The concrete block walls within the warehouse areas are load bearing as they support the mezzanine structures. The concrete block wall is supported on the interior concrete slab on grade. Although drawings showing the concrete foundations were not available it is assumed that the concrete slab is thickened at these locations.

There does not appear to be any cracking within the concrete block wall. Typically if any settlement has occurred due to loading the concrete block wall would crack along the grout line in a diagonal pattern. The concrete slab supporting the block wall does not appear to have any cracking present that would be a result of loading on the concrete block wall. Overall the concrete block wall is in good condition.

2.1.3.6 Miscellaneous structural components

Along the exterior of the warehouse structure the building envelope consists of a brick veneer. Brick veneer is either supported vertically by the concrete foundation wall or by a steel shelf angle placed at the bottom of the veneer and connected to the foundation wall. At the back of the warehouse near the large overhead doors the building envelope is combination of a brick veneer and metal cladding (see Structural photo 18). It appears as though the brick veneer in this location is supported by a steel shelf angle. The angle supporting the brick veneer is in poor condition (see Structural photo 19) as it is heavily corroded and deformed.

A brick veneer also makes up the building envelope of the small addition on the side of the warehouse. The brick veneer is supported on the concrete foundation walls along the addition. There are steel angle lintels located above window and door openings of the structure (see Structural photo 20). These angles appeared to be in good condition.

2.1.3.7 Equipment platform

Along the back (north elevation) of the warehouse a small equipment platform was constructed to access the transformer oil storage tanks (see Structural photo 21). The equipment platform is in poor condition as it appears it was poorly constructed. The entire platform sways once loading is put onto it and timber posts near ladder locations are not bearing completely on ground (see Structural photo 22). In addition to the poor construction timbers are beginning to rot (see Structural photo 23).

2.1.3.8 Conclusions and Recommendations

Based on the observations made during the limited visual inspection, the following is recommended.

- Repairs need to be carried out on concrete foundation wall. Numerous vertical cracks should be filled, and areas where concrete has spalled should be repaired. Repair of the foundation may require excavation at the locations where damage is present in order to determine the direct cause of the damage.
- A structural analysis of the building frames should be conducted. Given the deformation of the column mentioned in section 2.1.3.3, there is a possibility that the building frames could be overstressed. If an analysis is not desired, the deformed/twisted column should be removed and replaced with a new column.
- Localized column repairs should be carried out. Within the warehouse area of the building there are 7 interior columns that are damaged due to equipment impact. These areas of damage should be repaired to avoid possible overstresses and buckling. It is expected that the columns can be repaired by adding plating over the damaged areas.
- The brick shelf angles along the northwest warehouse elevation should be repaired. Although the brick veneer is only small the shelf angles appear to be in poor condition.
- The small equipment pad accessing the tank at the rear of the building should be removed and replaced with a proper platform. The current platform is poorly constructed and is poor condition. A new platform with proper supports and framing should be installed.

2.1.4 Mechanical Assessment

2.1.4.1 Plumbing – Drainage, Waste, and Venting

The office/warehouse facility is equipped with a number of washrooms, coffee stations, and lunchrooms throughout the facility. The main floor of the office area is provided with two male washrooms, two female washrooms, and a large lunchroom. The second level office area is provided with a male and female washroom and a coffee station. The office extension on the front of the building is provided with a male and female washroom and a lunchroom. The transformer shop off the warehouse area is provided with a washroom on the ground level and a lunch room on the mezzanine level. In addition to drainage, waste, and venting for these locations interior HVAC equipment is provided with drains and there are some floor drains.

Original waste and vent piping in the building is primarily cast iron and copper (see Mechanical photo 1). Piping used in renovations and extensions is primarily ABS (see Mechanical photo 2). ABS piping is generally permitted in a building such as this due to it being both combustible and non-combustible construction. ABS piping cannot be used in ceiling spaces used as return air plenums and where passing through fire separations must be provided with fire stop collars. No instances of these issues were observed however they potentially exist due to the presence of this type of pipe. In the lunch room off of the main office area the sink is provided with an air admittance valve rather than being vented to the outside. This valve is improperly installed on the upstream side of the sink trap and not on the downstream side of the sink trap (see Mechanical photo 3). This is a plumbing code violation. It was observed that vent piping for the plumbing fixtures at rear of the transformer shop terminates through the exterior wall of the building (see Mechanical photo 4). Venting for the second floor washrooms also terminates through the exterior wall rather than roof. Venting through the wall is a plumbing code violation.

Condensate drains from indoor HVAC units was observed to be copper.

A trench drain is present in the Truck Bay (see Mechanical photo 5). It was indicated that the trench drain does not drain properly and may be blocked.

2.1.4.2 Plumbing – Domestic Water Piping and Systems

Domestic water enters the building through the fire water main located in the building corner near the Truck Bay. Domestic water is tapped off of the main water entrance and flows through a pressure reducing valve then to the building (see Mechanical photo 6). It does not appear that the water is metered and no back flow prevention is provided.

Domestic water piping is copper throughout the facility. Domestic water piping is sporadically insulated in the original office area but typically uninsulated elsewhere (see Mechanical photo 7). Domestic water piping was observed not to be properly supported over the lunch room off of the main office area (see Mechanical photo 8).

Domestic water piping in the original portions of the building are 35 years of age and approaching the end of their expected life. Piping in parts of the building renovated in 1998 are 18 years old and are not at the end of their useful life.

Isolation valves are typically gate valves in older piping and ball valves in newer piping,

Domestic hot water is produced in electric hot water tanks scattered throughout the facility. Three tanks were found during the site visit but it is believed that there are likely one or two additional tanks present (see Mechanical photos 9, 10, and 11). Information on the observed tanks are as follows:

- Under cabinet type tank located in coffee station off of meeting room is a Giant model 112SEO-1R5M, 45 L, 1.5 kW, that was manufactured in 2014. This tank is in excellent condition.
- Tank located in a utility room one the mezzanine level at the rear of the transformer shop is a GSW model G650SDE-30 200, 182 L, 3 kW that was installed in 2015. This tank is in excellent condition.
- Tank located in female washroom of front office area is a Giant model 130E-3R7N, 100 L, 3 kW that was manufactured in 2002. This tank is at the end of its useful life.

Measured hot water temperatures ranged from 52.2°C to 53.2°C which is satisfactory.

A plastic water barrel was observed in the utility room on the mezzanine level of the transformer shop (see Mechanical photo 12). Site personnel indicated it is used to store water that is used in the glove testing machine located on the main level due to the low flow available in this part of the building.

Water quality in the building is not good as can be seen as discoloured water in fixtures. Inline cartridge filters were observed at some sink locations. Signs were also posted indicating not to drink the tap water.

2.1.4.3 Plumbing – Fixtures

As mentioned previously the facility has a number of washrooms, lunch rooms, and other areas with plumbing fixtures. Water closets are generally commercial grade floor mounted tank type utilizing 13 L per flush (see Mechanical photo 13). Water closets were in good conditions with no issues noted.

Urinals are wall hung vitreous china, some provided with electronic flush valves and other with manual flush valves (see Mechanical photo 14). The urinals were in good conditions with no issues noted.

Washroom lavatories were a combination of countertop drop in commercial grade vitreous china units, countertop drop in commercial grade stainless steel, and residential grade vanities (see Mechanical photos 15 to 17). Lavatory faucets were generally residential grade with commercial grade faucets provided with the stainless steel lavatories. Lavatories were in good condition with no issues noted.

Kitchen sinks are a combination of single bowl and double bowl stainless steel (see Mechanical photo 18). Sink faucets are residential grade either two handle or single lever type. Sinks were in good condition with no issues noted.

Two laundry tubs were present in the facility (see Mechanical photo 19). One is located in the second floor female washroom and the second in the Testing Room at the rear of the transformer shop. The tubs are residential grade plastic type with residential grade two handle faucets. Laundry tubs were in good condition with no issues noted.

Self contained wall mounted eyewash units are provided in the south corner of the warehouse and near the rear exit from the transformer shop (see Mechanical photo 20). The units are inspected and maintained on a regular basis.

2.1.4.4 HVAC – Air Handling Systems

The facility is equipped with a number of air handling systems including a rooftop packaged air conditioning unit, three split air conditioning units, a through the wall air conditioning unit, and various exhaust fans.

The main office area including the second floor is conditioned by a packaged constant volume rooftop air conditioning unit (see Mechanical photo 21). This unit is a Carrier model 50TJ020170QA and has a nominal 18 ton cooling capacity. The unit was manufactured in 1999 and was installed as part of the building upgrades made at that time. The unit is provided with a 5 HP indoor fan and a power exhaust option. The unit utilizes R22 refrigerant. At 17 years of age this unit is approaching the end of its useful life. No issues were observed or reported with the system.

This system is provided with ducted supply and return ducting throughout the office area (see Mechanical photos 7 and 22). Supply ducting is insulated with foil faced blanket type insulation. Zones are provided with inline electric duct heaters for reheat (see Mechanical photo 23). Air distribution is through square cone type diffusers and return air grilles. The air distribution system appeared to be in good condition. Return air grilles were observed to be very dirty (see Mechanical photo 24).

Based on the size and composition of the office area and the tabulated performance of this unit it may be undersized for the application.

Consideration could be given to utilizing a variable volume system when replacing the rooftop unit. In addition to the rooftop unit having variable speed fan control, new variable volume terminal units would be provided to reduce airflows and reduce system energy consumption.

The server room located in the main office area is provided with a split air conditioning system (see Mechanical photos 25 and 26). The condenser is located in the warehouse area truck bay and the evaporator is a ceiling cassette style unit located in the server room. The condenser is a United Technologies Carrier model 38HDC018341 and has a nominal cooling capacity of 1.5 tons. The unit was manufactured in 1999 and was installed as part of the building upgrades made at that time. The unit utilizes R22 refrigerant. At 17 years of age this unit is approaching the end of its useful life.

The front office extension is provided with a split air conditioning system (see Mechanical photos 27 and 28). The condenser is located outdoors adjacent to the large office area and the evaporator is an indoor air handler unit located in the ceiling of this large office. The condenser is a Carrier model 38TG030300 and has a nominal cooling capacity of 2.5 tons. The indoor unit is a Carrier model 40AQ030310BU. The units were manufactured in 1990 and utilize R22 refrigerant. This system is provided with supply ducting throughout this office area. Supply ducting is insulated with foil faced blanket type insulation. Air distribution is through slot type diffusers and return air grilles. The air distribution system appeared to be in good condition. At 26 years of age this unit is at the end of its useful life. Personnel indicated that they had an issue with the location of the system thermostat, however they relocated it for better performance.

A portable air conditioning unit was observed in the far left office of the front office area extension (see Mechanical photo 29). This office is not served by the air conditioning system described above. The unit is the portable type with condenser venting through an operable window. The unit appears to be relatively new and operating properly.

The second floor office and lunch room at the rear of the transformer shop is provided with a split air conditioning system (see Mechanical photo 30). The condenser is located outdoors on the roof above the evaporator and the evaporator is an indoor air handler unit located in the ceiling of the second floor corridor area. The evaporator is an Inter-City Products Corp model BMM024BKB. This company is no longer in operation. Based on its model number it has a nominal cooling capacity of 2 tons. The units were manufactured in 1996 and likely utilizes R22 refrigerant. This system is provided with ducted supply and return ducting throughout the office and lunch area. Supply ducting is insulated with foil faced blanket type insulation. Air distribution is through square cone type diffusers and return air grilles. The air distribution system appeared to be in good condition. No operational issues were observed during the site visit. At 20 years of age this unit is at the end of its useful life.

The Workshop located off of the main office area is equipped with a through the wall air conditioning unit manufactured by Electrohome. The unit operated however its cooling circuit does not appear to be operating properly. This unit should be replaced (see Mechanical photo 31).

The main office area washrooms are exhausted through a spun aluminum roof fan (see Mechanical photo 32). The fan is a Penn Domex downblast type that is dated 1999. The fan is in good condition with no observed issues.

Located in the north corner of the facility is a paint room. The paint room is equipped with two wall mounted propeller exhaust fans and a make-up air unit (see Mechanical photos 33 and 34). The make-up air unit is a Trane Torrivent model 25-VF and is belt driven with a 7.5 HP motor. The unit is a large cabinet type centrifugal blower. This unit is located outdoors on a stand adjacent to the Paint Room. The unit is in poor condition with appreciable corrosion on its top panels and its casing deformed out of shape. The wall exhaust fans are direct drive and heavily coated in dust from the painting operations that went on in the space. The exhaust fan motors and their wiring do not appear to be explosion proof as is the other components in the room such as the unit heater and lighting. The age of this equipment is unknown but would be estimated to be 30 plus years of age. Personnel indicated that the space is no longer used for painting operations. As such the ventilation equipment here could be removed.

The transformer repair shop is provided with a fume extraction system which composed of a long reach flexible high pressure exhaust hose with travel arm, swivel joint, fume extraction cone, and high pressure centrifugal exhaust fan (see Mechanical photo 35). The fan discharges air to the outside along the north wall of the facility. The system was manufactured by Nederman. Its age is unknown, however the unit is in good condition and worked properly when operated during the site visit.

Washrooms adjacent to the training room, washrooms above the training room area, the male washroom at the front office extension, and the washroom at the rear of the transformer shop are provided with ceiling exhaust fans. These fans are typically ducted to the nearest exterior wall and terminated with a wall cap. See Mechanical photos 36 and 37.

The lunch room at the front office extension is provided with a ceiling mounted exhaust fan ducted to a roof vent (see Mechanical photo 38). This fan is a propeller type with steel grille. The fan operates but is noisy so its use is likely limited.

The Paint Storage room is provided with an inline exhaust fan. The fan is ducted to an exhaust grille near the floor and exhaust is ducted to a wall cap on the exterior wall (see Mechanical photo 39). The observer was unable to get this fan to function during the site visit.

The Test Room is provided with a washroom type ceiling exhaust fan that is ducted to the outside through a wall cap on the exterior wall. This fan operated properly.

The Oil Test Lab is fitted with a residential style range hood over the workbench (see Mechanical photo 40). The hood is manufactured by Mercury Nutone and appears to be quite old. The hood is ducted to the outside through a wall cap on the exterior wall. This fan operated properly. Flow from this hood would be expected to be low and capture velocity at bench height negligible. Based on American Conference of Governmental Industrial Hygienists (ACGIH) standards hoods should provide a capture velocity at the working level of 0.25-0.5 m/s (50-100 FPM) for this type of work. This can be accomplished by keeping the air intake close to the working surface with a mobile fume extractor, utilize large flowrates for a fixed overhead hood, provide a slotted bench type hood, or utilizing a fume type hood which has an adjustable opening. The most practical from a flow and cost perspective is a slotted bench type hood which draws air across the bench horizontally to the back where a slotted hood is located.

2.1.4.5 HVAC – Ventilation Air

The rooftop air conditioning system that serves the main office area is capable of providing sufficient ventilation air to this part of the building. The remainder of the building has no means of proving ventilation air in accordance with ASHRAE 62.1. The other air conditioning systems described above only recirculate air within their areas. There is no source of makeup air for the other various exhaust systems other than what would come in around doors, windows or other poorly sealed parts of the building.

For efficiency purposes it would be recommended to provide heat recovery on any new systems to bring in ventilation air. Due to the size and distribution of areas in the building providing a number of smaller heat recovery units over one large unit would be more feasible as smaller ductwork could be used and there would be no structural issues associated with a large rooftop unit. Individual units would take exhaust from local washrooms, janitor rooms, lunchrooms, etc that would replace the function of existing exhaust fans. Supply air would be provided to offices, corridors, lunchrooms, warehouse space, and transformer shop area.

2.1.4.6 HVAC – Controls

The building has a combination of stand alone controls and a Building Automation System (BAS). The BAS services the main office area of the building and second floor area and was installed during the renovation project of 1999. The BAS controls operation of the rooftop unit, zone duct heaters, baseboard heaters, and rooftop washroom exhaust fan. The BAS is composed of control panels, zone thermostats, sensors, and other end devices (see Mechanical photos 41 and 42). The main BAS panel is located in the office area server room.

The BAS system is Delta Controls and is not BACNet compatible. The system is now 18 years of age and finding replacement controllers may be difficult should one fail. The observer was not able to access the graphic interface while on site to assess the system.

The split air conditions systems serving the server room, front office extension, and transformer shop second floor offices are all controlled by individual digital thermostats installed in the areas (see Mechanical photo 43). These thermostats are not connected to the BAS.

Washroom and other miscellaneous fans are controlled by simple toggle switches.

An electromechanical timeclock was observed at the Paint Storage room but it was not clear if it controlled the exhaust fan for this room.

2.1.4.7 Fire Protection

The building is fully protected by a combination wet and dry sprinkler system. The main water entrance is located in the building corner near the Truck Bay. Located at the water entrance is a wet system alarm valve (see Mechanical photo 44). No backflow prevention is present at the water entrance though by current practice it should as the system does have a glycol loop present. The fire department connection and bell are located on the adjacent exterior wall. A dry system valve and trim is located on the second floor in a closet space off of the coffee room (see Mechanical photo 46).

Sprinkler piping is primarily black iron with screwed fittings. Newer modifications to the system use grooved fittings. Sprinkler heads are a combination of upright and pendant style. Areas with concealed combustible construction appeared to be properly protected. No unprotected spaces were observed.

There were no rack storage sprinklers present. It was observed that storage was piled very high to the roof which can interfere with sprinkler effectiveness (see Mechanical photo 47). A review of what is stored, how it is stored, and to what height it is stored should be undertaken by a fire protection specialist to ensure it complies with NFPA 13 for the overhead sprinkler protection that is present. Specifically warehouse storage should be assessed from what classes of goods are present, if they are encapsulated or open, use of pallets and other rack obstructions, evaluation of maximum allowable storage height, and evaluation of isle widths. The review should provide conditions for what can be stored, how it should be stored, and how high storage can be utilizing the existing overhead sprinkler protection. If the existing overhead protection does not serve the required storage needs then recommendations should be provided for rack sprinklers including their configuration and estimated cost to install.

The sprinkler system did not appear to have any visible issues such as leaks, improper support, or other installation issues.

The building is provided with portable fire extinguishers throughout. The majority of the extinguishers are dry chemical type suitable for class A, b, and C fires. There appeared to be sufficient fire extinguishers for the hazard classification of the building.

2.1.4.8 Conclusions and Recommendations

The following recommendations are made for mechanical improvements to the depot building.

Plumbing:

- Modify Lunch Room sink vent piping to be code compliant.
- Modify plumbing vent piping that penetrates exterior walls to penetrate roof.
- Have Truck Bay trench drain cleaned and snaked to make functional again.
- Provide backflow prevention on domestic water takeoff.
- Properly insulate domestic water piping.
- Provide proper supports for domestic water piping.
- In the mid-term replace the original building domestic water piping.
- Replace any hot water tanks older than 10 years of age.
- Provide backflow preventer on water barrel fill pipe.

HVAC:

- Replace the office area rooftop air conditioning unit. Verify capacity requirements prior to replacement.
- As an option utilize variable volume in the new rooftop unit and install variable volume air terminal zone units with digital controls.
- In the mid-term replace the server room split air conditioning unit.
- Replace the front office extension split air conditioning unit. Consider extending the system to include the unconditioned office.
- In the mid-term replace the second floor split air conditioning unit.
- Replace the workshop through the wall air conditioner unit or connect room to main office system.
- Remove and dispose of Paint Room ventilation equipment.

- Replace Oil Test Lab range hood with a slotted bench type hood if work with chemicals and volatile substances are used here.
- Provide proper ventilation and make-up air systems to the majority of the building in accordance with ASHRAE 62.1. Consider using heat recovery technology.
- Replace the existing building automation system and expand the system throughout the building to both existing and new HVAC equipment.

Fire Protection:

- Provide backflow prevention on the firewater at the water entrance. Due to limited space a vertical backflow prevention device may be required.
- A review of what is stored, how it is stored, and to what height it is stored in the warehouse area should be undertaken to ensure it complies with NFPA 13 for the overhead sprinkler protection that is present.

2.1.5 Electrical Assessment

2.1.5.1 Service and Distribution

2.1.5.1.1 Description

The electrical service enters the building underground from a padmount transformer located outside the main electrical room (refer to Electrical photo 1).

The main incoming service conductors to the building are connected to a 600A, 600V main disconnect switch.

Revenue metering is performed on the low voltage secondary side of the padmount transformer. The meter (NL Power Meter # 690653) is attached to the padmount transformer enclosure (refer to Electrical photo 2).

The main disconnect feeds through a 600A, 600V, 3P splitter the following:

.1 600V, 400A, 3PH, 3W switchboard providing power to warehouse heat, air conditioning, overhead doors and mechanical equipment.
.2 600-120/208V, 225 kVA, 3PH distribution transformer with 600A, 120/208V, 3PH, 4W switchboard providing power to office area and warehouse lighting, office area heating and various building loads.
.3 600V to splitter located in salvage stores area for local distribution.

Power distribution in the paint shop and salvage stores area is provided through 600V splitter for 600V loads and 600-120/208V, 75 kVA distribution transformer for 120/208V loads (refer to Electrical photo 3).

Power distribution in the rubber glove/hot stick test room is provided through 600V, 3PH switchboard (year 1985) fed from main 600V switchboard and 600-120/2240V, 1PH, 3W, 50 kVA distribution transformer.

120/208V electricity is distributed through the facility is distributed through ten (10) distribution panelboards (refer to Electrical photo 4).

The power distribution system is grounded at the building main disconnect.

2.1.5.1.2 Observations

The incoming 600A service capacity appears to be adequate based on the peak demand history over the past 3 years. The maximum demand is 317.9 kW (340A @ 0.9 PF).

The padmount transformer is in relatively good physical condition with no visible signs of corrosion. The transformer is installed on 8" x 8" wood beams laying on a concrete pad (refer to Electrical photo 1).

Most of the power distribution equipment in main electrical room appears to be more than 30 years old and is in fair physical condition. There were no visible signs of excessive wear or corrosion. There are two (2) new 600V, 60A disconnects servicing AC Unit #1 and Humidifier. Cabling/conduit runs also appeared to be in good condition with no apparent deficiencies.

Panelboards are surface mounted in the warehouse area and recessed mounted in corridor space and feed mostly lighting and receptacle loads. Panels in the office area are installed not more than 10 years ago and are in good condition. There is not sufficient spare capacity on some of the panelboards.

2.1.5.1.3 Conclusions

Consider installing the existing padmount transformer on a new concrete pad. Install fire resisting barrier around transformer and change the transformer orientation if it is not equipped with internal current-limiting fuses and a pressure relief device.

Based on the visual inspection of the facility, some of the electrical equipment inside the main electrical room have exceeded its service life expectancy. Panels #1(120/208V), #6 (600V), and the 600A main disconnect are obsolete and should be retrofitted or replaced.

Overall condition of the electrical distribution systems in the office area and the warehouse area appears to be good condition.

Power distribution equipment in the paint shop and salvage stores that service mechanical equipment that is no longer in use and should be removed with the obsolete equipment.

2.1.5.2 Emergency Power System

There is no emergency power distribution system.

2.1.5.3 Lighting

2.1.5.3.1 Description

The majority of the office areas is illuminated by 4 ft. recessed acrylic lens florescent fixture with a T8 Lamps. (Refer to Electrical photo 5)

Some service and storage rooms are lit with 4 ft. surface mounted 2–lamp, T8 linear wraparound or strip fluorescent fixtures. (Refer to Electrical photo 6)

The meeting room and the training room are lit with fluorescent fixtures with parabolic louvers and incandescent downlights. (Refer to Electrical photo 7)

The warehouse area is primarily illuminated by relatively new 250W Holophane metal halide high bay lighting fixtures. (Refer to Electrical photo 8)

The exterior building lighting is provided by HID lights installed on 6 m lighting poles around the building perimeter, incandescent lighting fixtures under entrance canopies and LED wallpacks. (Refer to Electrical photos 9, 10 and 11)

The building lighting is fed from the 120/208V panelboards.

2.1.5.3.2 Observations

Office areas, corridors, warehouse, paint shop and salvage stores were observed to have adequate lighting levels as required by the latest edition of the NBCC.

The lighting fixture in the office area, salvage stores area and warehouse are less than 10 years old and in good condition.

The lighting fixtures in the paint shop are older and in fair condition.

2.1.5.3.3 Conclusions

Replace all old exterior lights under canopies and above exterior doors with new LED fixtures.

2.1.5.4 Exit and Emergency Lighting

2.1.5.4.1 Description

The building emergency lighting consists of dual head emergency battery units. In some locations the battery unit is combined with exit sign. Most of the battery units are new and in good condition.

The building is equipped with lighted exit signs located throughout. They have battery backup and are lit with incandescent lamps.

(Refer to Electrical photo 14 for emergency and exit lighting)

2.1.5.4.2 Observations
Emergency lighting units and exit signs are adequate and most of them are in good condition.

2.1.5.4.3 Conclusions
Some old emergency lighting units and exit signs have to be replaced. Two old emergency lighting units located in the attached offices corridor and in the paint shop and salvage stores area and one exit sign in the paint shop and salvage stores area have to be replaced.

2.1.5.5 Heating System
2.1.5.5.1 Description
The whole building is heated by electrical heaters. The heaters in the office area are new baseboard heaters and old wall mount convection heaters (refer to Electrical photos 21 and 22). The warehouse, the salvage stores area and the service rooms are heated by electric unit heaters. (Refer to Electrical photo 23)

Most of the heaters are controlled by wall mount thermostats. (Refer to Electrical photo 24) In some areas the heaters are equipped with integral thermostats.

2.1.5.5.2 Observations
The electric office area baseboard heaters are less than 10 years old and in good condition. The rest of the heaters are more than 20 years old but operational and in relatively good condition.

2.1.5.5.3 Conclusions
No heater replacement will be required in the next ten (10) years.

2.1.5.6 Wiring Devices
2.1.5.6.1 Description
U-grounded, duplex receptacles are installed throughout the building. Receptacles are recessed with the exception of the receptacles installed in the warehouse and other mechanical spaces, which are surface mounted. The receptacles in wet areas are GFCI. The outdoor receptacles are weather protected type duplex receptacles.

The lighting control in offices, warehouse and paint shop and salvage stores area is provided by individual lighting switches for each circuit. (Refer to Electrical photos 12 and 13)

2.1.5.6.2 Observations
Receptacles and lighting switches in the office area appear to have been replaced recently and are sufficient quantity and in good condition. All outdoor receptacles are in bed condition (Refer to Electrical photo 15).

2.1.5.6.3 Conclusions
Three outdoor duplex receptacles need to be replaced including the weather protective covers.

2.1.5.7 Wiring Methods

2.1.5.7.1 Description
Wiring system appears to be a combination of AC-90 and TW or RW90 cabling installed in EMT conduit in office area. EMT and conduit is generally used for wiring in unfinished service rooms, warehouse, paint shop and salvage stores area.

2.1.5.7.2 Observations
Most of the wiring appears to have been replaced recently and is in good condition. Some of the cables were not properly supported in ceiling spaces and were lying on the ceiling tiles or on the HVAC ducts. It was noted junction box with missing cover in main electrical room (refer to Electrical photo 16).

2.1.5.7.3 Conclusions
The branch circuit wiring was in overall good condition but we recommend providing supports to the ceiling for unsupported cables and covers to open junction boxes.

2.1.5.8 Fire Alarm

2.1.5.8.1 Description
Not available.

2.1.5.8.2 Observations
There is no fire alarm system in the building.

2.1.5.8.3 Conclusions
As the building is sprinklered a fire alarm system is required.

2.1.5.9 Data and Communications

2.1.5.9.1 Description
The building telecommunication cables enters the building in the telecom room located adjacent to the building entrance. All telecom equipment including but not limited to telephone BIX blocks, telecom racks, patch panels, Ethernet switches, etc. and cabling is not more than 10 years old and is in good condition. Most of the telecommunication cables in cable space are run in basket type cable tray (refer to Electrical photo 17).

2.1.5.9.2 Observations
Some of the telecommunication cables not lying in cable tray were not properly supported in ceiling spaces and were lying on the ceiling tiles or on the HVAC ducts (refer to Electrical photo 18).

2.1.5.9.3 Conclusions
Supports to the ceiling for unsupported cables needs to be provided.

2.1.5.10 CCTV / Security System

2.1.5.10.1 Description

There is a proximity card access control system that controls access to some building areas during after hours. The card access system is relatively new and in good condition (refer to Electrical photo 19). There is no CCTV system.

2.1.5.11 PA System

2.1.5.11.1 Description

There is a public address (PA) system in the building controlled from the front desk. The loudspeakers are recessed in the ceiling tiles inside the office area and surface mounted in the warehouse area and the storage area adjacent to the building.

2.1.5.11.2 Observations

The loudspeakers inside the office area are new and in good condition. The loudspeakers in the warehouse and outdoor are old but still operational. (Refer to Electrical photo 20)

2.1.5.11.3 Conclusions

Consider replacement of the outdoor loudspeakers in the next five (5) years.

2.1.6 Environmental Review

2.1.6.1 Air Emissions

No air emissions are present from the facility from fuel burning equipment or processes using chemicals.

2.1.6.2 Asbestos Containing Materials

An asbestos survey provided to the consultant indicated the presence of asbestos in floor tile and in eave soffit paneling around the main office area. The presence of these asbestos containing materials shall be made aware to any personnel undertaking work in the facility that could disturb these materials.

2.1.6.3 Lead Containing Materials

Lead is likely present in plumbing solder and possibly in oil based paints used in the facility. The potential presence of lead containing materials shall be made aware to any personnel undertaking work in the facility that could disturb these materials.

2.1.6.4 PCB Containing Materials

Fluorescent lighting in the facility is not old enough to be of concern for presence of PCB's that were commonly used in older lighting ballasts.

2.1.6.5 Ozone Depleting Substances

All air conditioning systems (with exception of the portable AC unit) present in the facility utilize of ozone depleting refrigerants such as R22. Older refrigerators may also contain ozone depleting refrigerants. Ozone depleting refrigerants must be recovered and properly documented prior to equipment being disposed of.

There was no Halon fire extinguishing systems identified in the facility.

2.1.6.6 Indoor Air Quality

While no indoor air quality issues were noticed while on site, a substantial portion of the facility is not provided with proper ventilation and make-up air systems. Any odours, VOC's from off gassing, and other airborne pollutants cannot be effectively removed from the building.

2.1.6.7 Mould and Mildew

No signs of mould or mildew were present throughout the building.

2.1.6.8 Spills and Contaminated Areas

No signs of spills or contaminated soils were overserved in the facility or its surrounding property.

2.1.6.9 Flammable and Combustible Liquids Storage

Flammable and combustible liquids were found to be present in the Warehouse, Transformer Shop, Paint Room, and Paint Storage areas of the building (see Environmental Photos 1 to 12).

Liquids found in safety cabinets in the Warehouse included:

- Motor oil;
- Automatic transmission oil;
- Aerosol spray lubricants;
- Barb-B-Que lighter fluid.

Liquids found in the Transformer Shop included:

- 205 L drums of transformer oil;
- 20 L pails of transformer oil;
- Miscellaneous shop items.

Liquids found in the Paint Room included:

- 205 L drums of transformer oil;

Liquids found in safety cabinets and out on room benches and floor in the Paint Storage room included the following. It was observed that many items in the Paint Storage room were not placed in the safety cabinets.

- Alkyd paints;
- Epoxy paints:
- Aerosol spray paints;
- Solvents;
- Paint thinners;
- Used paint thinners;
- Transformer oil;
- Gasoline containers;
- Fuel conditioner;
- Motor oil;
- Automatic transmission fluid.

Quantities present do not exceed maximum amounts allowable for incidental use.

Bulk quantities of new and used transformer oil were observed outdoors in above ground storage tanks at the north end of the building (see Environmental Photos 13 and 14). New transformer oil is held in an above ground self dyked steel tank of 4,540 L capacity and was manufactured in 1996. The tank conforms to ULC S653 for storage of flammable and combustible liquids. The tank is in generally good condition but should be repainted. Used transformer oil is held in an above ground self dyked steel tank of 18,000 L capacity and was manufactured in 1996. The tank conforms to ULC S653 for storage of flammable and combustible liquids. The tank is in generally good condition but should be repainted. Both tanks should be provided with electronic overfill devices with audible and visual alarms as these tanks can be filled remotely without being directly observed. Based on CSA code tanks of this capacity should be located a minimum of 1.5 m from a building. In this case both tanks were observed to be much closer than this minimum distance. Also tanks should be spaced a minimum of 1 m from other tanks which in this case was not met. Tank foundations are to be non-combustible and not contain combustible preservative material. These tanks are mounted on creosote treated wood.

Supply and fill piping from the 4,540 L new oil tank enters the building through the exterior wall. The piping is improperly supported in various locations (see Environmental Photos 15 to 17). Fill piping for the 18,000 L used oil tank enters the building through the exterior wall. The piping is improperly supported in various locations (see Environmental Photos 17 and 18). No flexible joints are provided in piping to allow for frost heave of the tanks with respect to the building.

Inside the building supply and fill pipes from the 4,540 L tank penetrate the exterior wall and terminate over a drip pan where connections can be made to draw off new oil or fill the tank (see Environmental Photo 19). A fill pipe to the 18,000 L tank also penetrates the exterior wall. This pipe is connected to an electrically driven pump and the suction side is set up with quick fittings to allow tanks or transformers to be drained (see Environmental Photo 20). The transfer pump is a positive displacement type 1 HP Viking model GG4195. The pump and associated pipe and fittings appear to be very new condition. The pump assembly and suction piping is mounted above a drip pan.

2.1.6.10 Compressed Gases Storage

No compressed gases were observed in the project limits.

2.1.6.11 Conclusions and Recommendations

The following recommendations are made regarding environmental issues identified.

- Indoor air quality should be addressed as per the recommendation in the mechanical section of this report.
- The presence of asbestos and potentially lead containing materials are to be made aware to anyone undertaking work that may disturb these materials.
- Ozone depleting substances (refrigerants) should be properly recovered prior to disposing of equipment.
- Paint existing transformer oil storage tanks.
- New and used transformer oil tank installation and exterior piping do not meet code. Tanks need to be relocated to minimum code distance from the building and each other and provided with non-combustible foundations. Piping should be properly supported and provided with flexible connections for movement.

2.1.7 Energy Usage Review

Knowing the energy consumption of a facility from all sources (electricity, petroleum fuels, etc.) an energy use intensity (EUI) can be calculated which can be compared to benchmark EUI's for various types of buildings in Canada. These benchmarks represent median EUIs for various types of facilities. Energy usage information was provided for the years 2014 to 2015 for this site. Based on the building area and the energy consumption the EUI was calculated for each of these years to be 0.65 and 0.61 respectively.

Based on the EUI tables for various building uses, the median Site EUI for a mixed use building is 0.90. Based on this the building is more energy efficient than the national median value. However as the building is not provided with a proper ventilation system its calculated EUI is less than would be expected. It would be expected that with the addition of a proper ventilation systems this building EUI would increase to around the national median value.

CHAPTER 3 REHABILITATION EXPANSION UPGRADE ASSESSMENT

3.1 Bishops Falls Office/Warehouse

Based on current usage, and beyond repairs and code upgrades identified in Chapter 2 of this report, no major rehabilitation, expansion, or upgrades are recommended for this facility.

CHAPTER 4 COST ESTIMATES

4.1 Recommended Renovations and Improvements to Existing Facilities

4.1.1 Purpose

This section provides an overview of the costs associated to complete the recommended repairs and upgrades outlined above for each building to maintain current operations and functionality and comply with current codes. New construction and extension cost estimates include incorporation of expansion, and upgrading of facilities to service future operational requirements.

Renovation, maintenance and repair costs are grouped into three categories: Immediate; Mid-Term; and Long-Term. The work considered for immediate repairs would include all things which pose a threat to life safety and would also include correcting deficiencies with structural, civil, environmental, mechanical, and electrical. For the regularly occupied buildings, and buildings intended for long-term use, these renovations would be very important to complete for the safety, well-being, and comfort of occupants. For buildings determined to be unsuitable for long-term future use, only repairs which are deemed absolutely necessary would be considered.

Mid-term repairs would be intended for completion in the 3 to 10 year range, assuming the repairs listed as immediate are completed. This could include such items as architectural finishes replacement, end of serviceable life equipment replacement or upgrading of equipment to better service the facility. The long-term repair category would also only apply to buildings intended for extended use as these repairs would fall in the range of 10 to 20 years. These long-term repairs also require the immediate and mid-term repairs to be completed as intended.

4.1.2 Cost Estimating Accuracy

The estimates contained in this report are intended to provide order of magnitude construction costs only and are accurate to Class 3 (-10 to +30%) standards as per generally recognized industry practices. Estimates are based on the site observations (repairs & upgrades) and with the owner's future use and operations considered (new construction/extension). The estimates include appropriate contractor overhead, design contingency and location factors. All estimates are intended to provide an order of magnitude indication of the final project cost and are considered to be sufficient for the purpose of analyzing the redevelopment options under consideration. The figures listed below are an indication of the probable construction cost at the time of this report and are intended to represent fair market value of the scope of work assuming that such work is grouped into reasonably sized contract packages. Unless noted otherwise, architectural and

engineering design fees are not included, nor are value-added taxes. All costs are expressed in Canadian dollars.

4.1.3 Bishops Falls Office/Warehouse

4.1.3.1 Immediate Maintenance and Repairs

The following renovations, repairs, and/or upgrades are recommended to be completed within the next two years, assuming the facility is intended to continue operations.

Architectural:

- Provide fire rated floors for mezzanines - $16,000
- Provide new fire exits and upgrade existing deficient exits - $60,000
- Replace aluminum window glazing units which have delaminated film - $4,800
- Repair damaged door canopies - $3,500
- Paint exterior doors and frames - $2,700
- Repair minor brick damage - $2,200
- Consider `practical` accessibility provisions - $8,000

Structural:

- Repairs need to be carried out on concrete foundation wall at vertical cracks (8 locations) - $6,500.
- A structural analysis of the building frames should be conducted. Given the deformation of a column located in the warehouse area, there is a possibility that the building frames could be overstressed - $8,500.
- If an analysis is not desired, the deformed/twisted column should be removed and replaced with a new column - $16,000 (column replacement only).
- Localized column repairs should be carried out. Within the warehouse area of the building there are numerous locations where columns are damage due to equipment impact. It is expected that the columns can be repaired by adding plating over the damaged areas. (7 locations) - $7,500
- The brick shelf angles on the back wall should be repaired. Although the brick veneer is only small the shelf angles are in poor condition - $5,000
- The small equipment pad accessing the storage tanks at the rear of the building should be removed and replaced with a proper platform - $3,500

Site/Civil:

- Areas of decomposing asphalt should be cutout and patched or utilize grind and patch repairs - $7,000
- Catch basins should have silt, stand, and stone removed from the chambers - $5,000
- Catch basins that are below finished grade should be provided with grate risers to bring them up to grade level and new asphalt placed around them - $10,500.

Mechanical:

- Modify Lunch Room sink vent piping to be code compliant - $200
- Modify plumbing vent piping that penetrates exterior walls to penetrate roof - $1,500
- Provide backflow prevention on domestic water takeoff - $3,000
- Have Truck Bay trench drain cleaned and snaked to make functional again - $800

- Properly insulate domestic water piping - $2,500
- Provide proper supports for domestic water piping - $1,000
- Replace any hot water tanks older than 10 years of age - $2,400
- Provide backflow preventer on water barrel fill pipe - $2,500
- Replace the office area rooftop air conditioning unit - $35,000
- As an option utilize variable volume in the new rooftop unit and install variable volume air terminal zone units with digital controls - $24,000
- Replace the front office extension split air conditioning unit. Consider extending the system to include the unconditioned office - $7,500
- Replace the workshop through the wall air conditioner unit or connect room to main office system - $1,000
- Replace Oil Test Lab range hood with a slotted bench type hood if work with chemicals and volatile substances are used here - $7,500
- Provide proper ventilation and make-up air systems to the majority of the building in accordance with ASHRAE 62.1. Consider using heat recovery technology - $78,000
- Replace the existing building automation system and expand the system throughout the building to existing and new HVAC equipment - $109,000
- Provide backflow prevention on the firewater at the water entrance - $18,000
- A review of what is stored, how it is stored, and to what height it is stored in the warehouse area should be undertaken to ensure it complies with NFPA 13 for the overhead sprinkler protection that is present - $6,500

Electrical:

- Consider installation of the existing padmount transformer on new concrete pad with fire resisting barrier around transformer and change the transformer orientation if it is not equipped with internal current-limiting fuses and a pressure relief device - $14,000
- Some of the electrical equipment inside the main electrical room has exceeded its service life expectancy and should be replaced – $20,200
- Power distribution equipment in the paint shop and salvage stores that service mechanical equipment that is no longer in use and should be removed with the obsolete equipment - $1,500
- Replace all old exterior lights under canopies and above exterior doors with new LED fixtures - $4,500
- Some old emergency lighting units and exit signs have to be replaced - $4,000
- All outdoor receptacles need to be replaced including the weather protective covers $1,200
- Provide supports to the ceiling for unsupported cables and covers to open junction boxes.
- Install fire alarm system - $29,000
- Provide supports for unsupported data and communications cables in ceiling space - $2,000

Environmental:

- Paint existing transformer oil storage tanks - $2,500
- New and used transformer oil tank installation and exterior piping do not meet code. Tanks need to be relocated to minimum code distance from the building and each other and provided with non-combustible foundations. Piping should be properly supported and provided with flexible connections for movement - $18,500

Estimated total cost for immediate repairs and upgrades:
$564,500 sub-total cost x 10% contingency = $621,000 total cost

4.1.3.2 Mid-Term Maintenance and Repairs

The following list contains recommended renovations and repairs for completion in the next 3 to 10 years, again assuming the building will remain in operation. These repairs would progress after the items listed in the immediate repair category are complete.

Architectural:

- Replace metal siding - $107,500
- Replace exterior doors, frames and hardware - $38,500
- Upgrade office block washrooms finishes, vanities, cubicles partitions, accessories - $16,000

Mechanical:

- Replace the original building domestic water piping - $24,000
- Replace the server room split air conditioning unit - $4,500
- Replace the second floor split air conditioning unit - $6,000
- Remove and dispose of Paint Room ventilation equipment - $2,500

Electrical:

- Consider replacement of the outdoor loudspeakers - $2,000

Estimated total cost for mid-term repairs and upgrades:
$201,000 sub-total cost x 10% contingency = $221,100 total cost

4.1.3.3 Long-Term Maintenance and Repairs

This category includes expected maintenance, repair and replacement items that would be required over the next 10 to 20 years of operation, providing the other two categories of renovations and repairs were completed prior.

Architectural:

- Replace roof finishes - $213,000

Site/Civil:

- Replace concrete curbs - $135,000
- Replace storm water catch basins and CMP pipe - $132,500

Electrical:

- Replace electric heating equipment - $45,000

Estimated total cost for long-term repairs and upgrades:
$525,500 sub-total cost x 10% contingency = $578,100 total cost

CHAPTER 5 CAPITAL COST SUMMARY AND COMPARISON OF SCENARIOS

5.1 Capital Cost Summary

5.1.1 Table 2: Capital Cost Summary

Building/Action	Construction Costs
Bishops Falls Office/Warehouse	
Immediate (1-2 years)	$621,000
Mid-Term (3-10 years)	$221,100
Long-Term (10-20 years)	$578,100

Costs provided in these tables do not include HST. Costs provided are in current Canadian dollars and escalation values may have to be applied to renovations in future years to account for such factors as inflation, exchange rate, and competitiveness of construction industry.

This opinion of probable costs is presented on the basis of experience, qualifications, and best judgment. It has been prepared in accordance with acceptable principles and practices. Sudden market trend changes, non-competitive bidding situations, unforeseen labour and material adjustments and the like are beyond the control of CBCL Limited. We cannot warrant or guarantee that actual costs will not vary significantly from the opinion provided.

FINAL REPORT

Issued by:
Paul Sceviour, MASc., P.Eng.
Senior Mechanical Engineer

This document was prepared for the party indicated herein. The material and information in the document reflects CBCL Limited's opinion and best judgment based on the information available at the time of preparation. Any use of this document or reliance on its content by third parties is the responsibility of the third party. CBCL Limited accepts no responsibility for any damages suffered as a result of third party use of this document.

APPENDIX A

Site Photos – Bishops Falls Office/Warehouse

APPENDIX A

ARCHITECTURAL PHOTOS

Nalcor Assessments – Bishop Falls
Architectural Photos

Photo 1

Photo 2

Nalcor Assessments – Bishop Falls
Architectural Photos

Photo 3

Photo 4

Nalcor Assessments – Bishop Falls
Architectural Photos

Photo 5

Photo 6

Nalcor Assessments – Bishop Falls
Architectural Photos

Photo 7

Photo 8

Nalcor Assessments – Bishop Falls
Architectural Photos

Photo 9

Photo 10

Nalcor Assessments – Bishop Falls
Architectural Photos

Photo 11

Photo 12

Nalcor Assessments – Bishop Falls
Architectural Photos

Photo 13

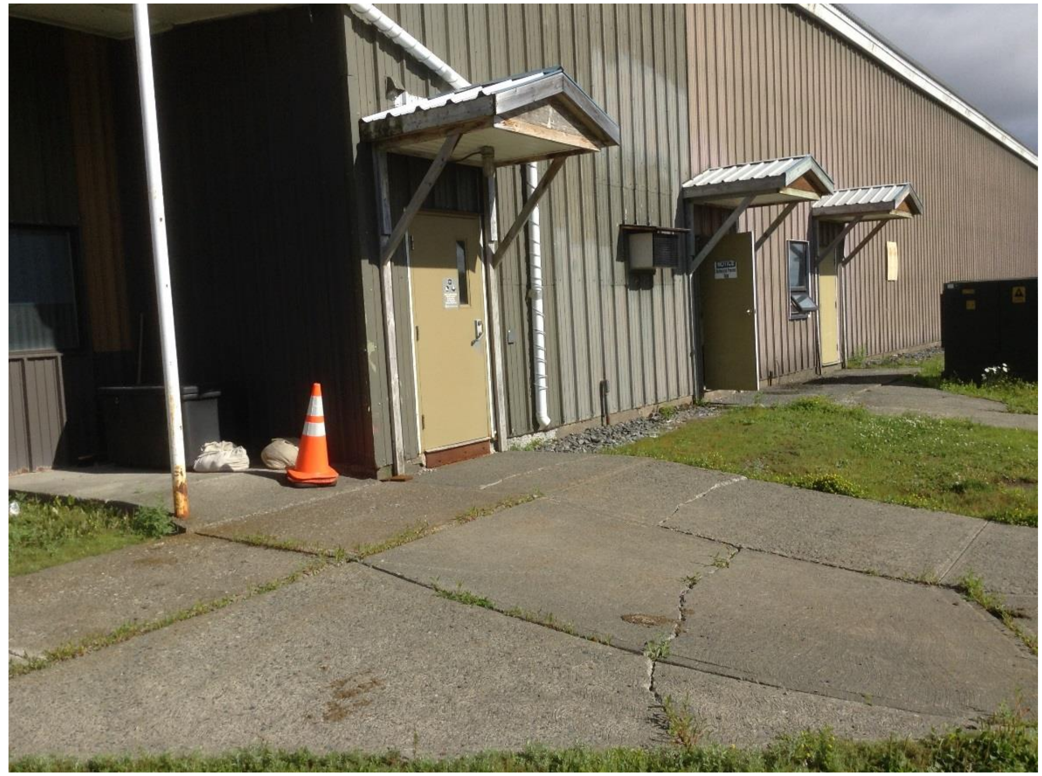


Photo 14

Nalcor Assessments – Bishop Falls
Architectural Photos

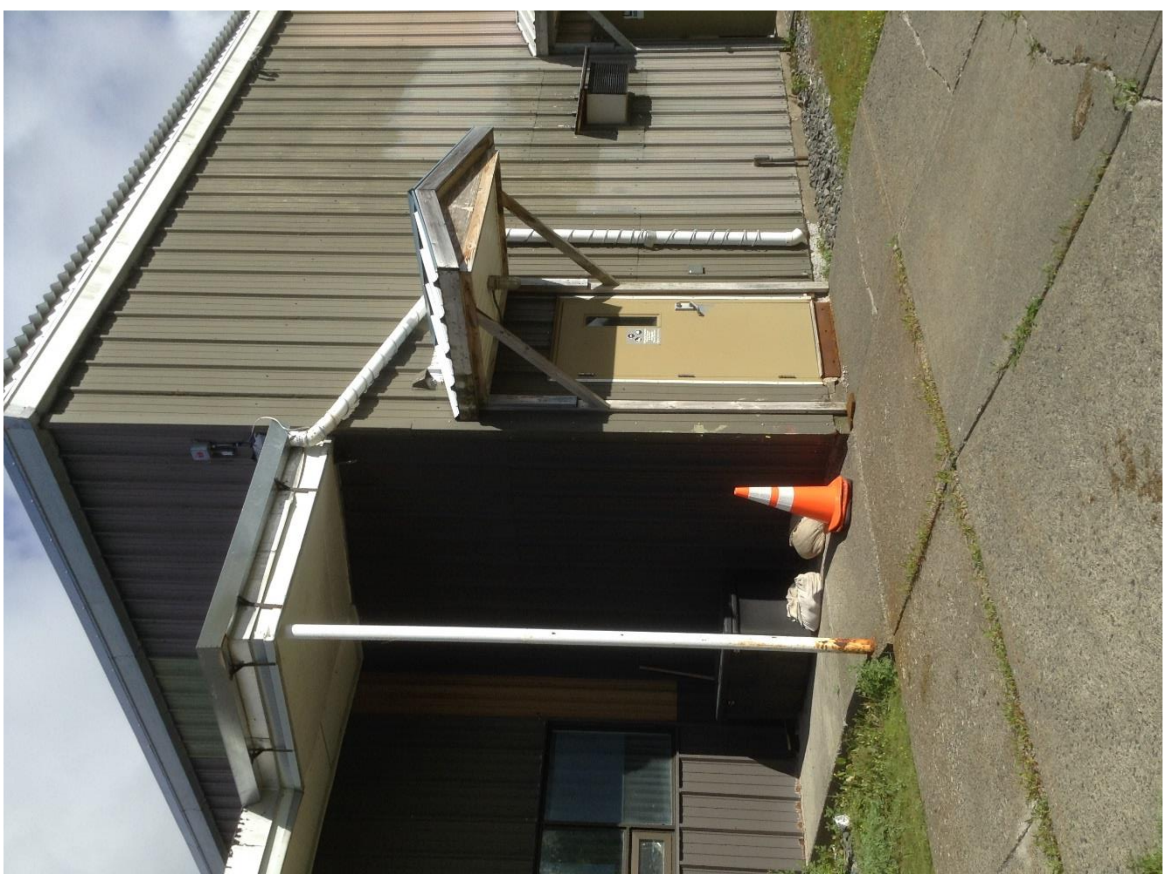


Photo 15

Photo 16

Nalcor Assessments – Bishop Falls
Architectural Photos

Photo 17

Photo 18

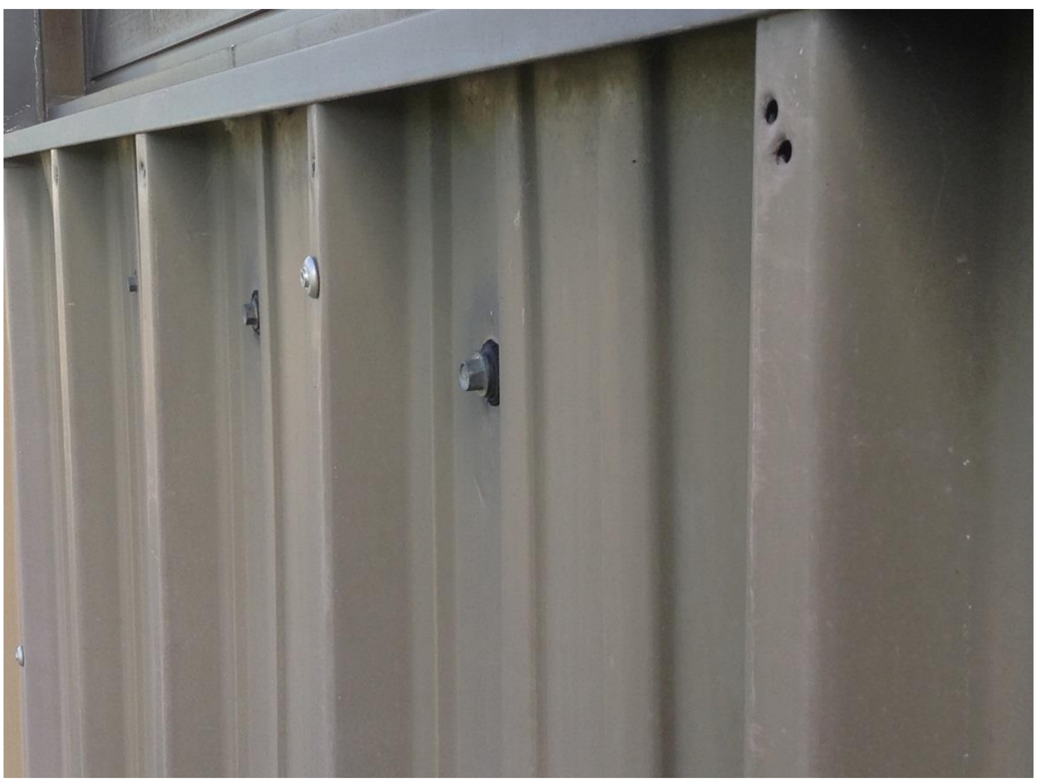
Nalcor Assessments – Bishop Falls
Architectural Photos

Photo 19

Photo 20

Nalcor Assessments – Bishop Falls
Architectural Photos

Photo 21



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Nalcor Assessments – Bishop Falls
Architectural Photos

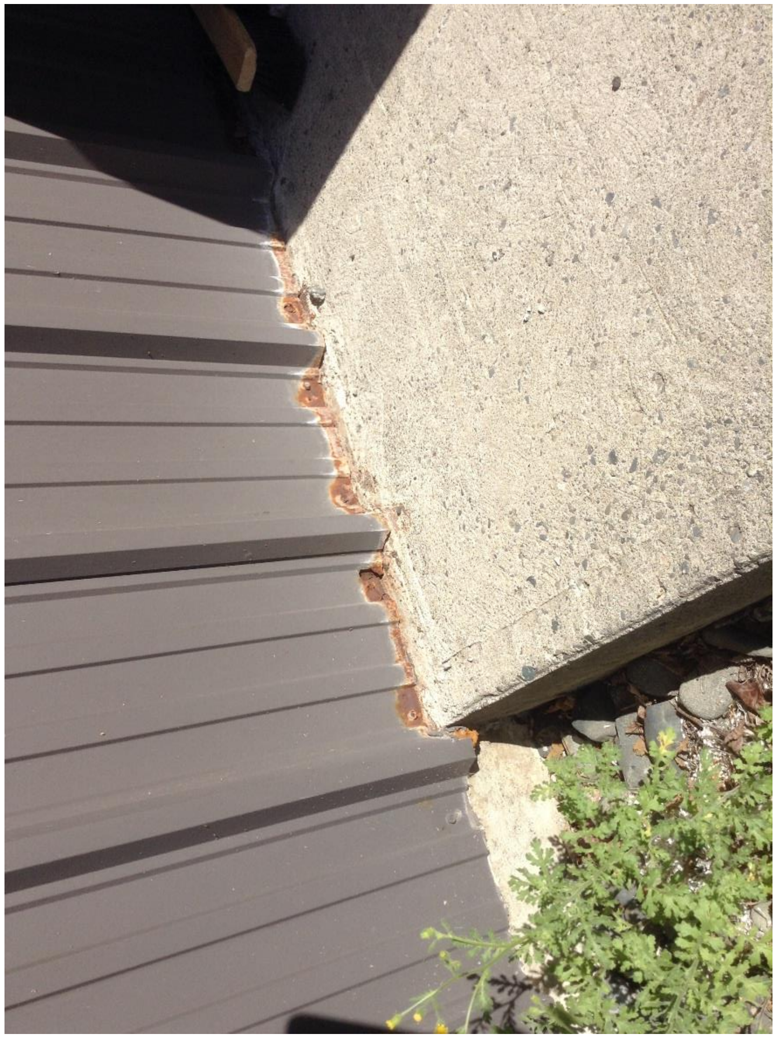

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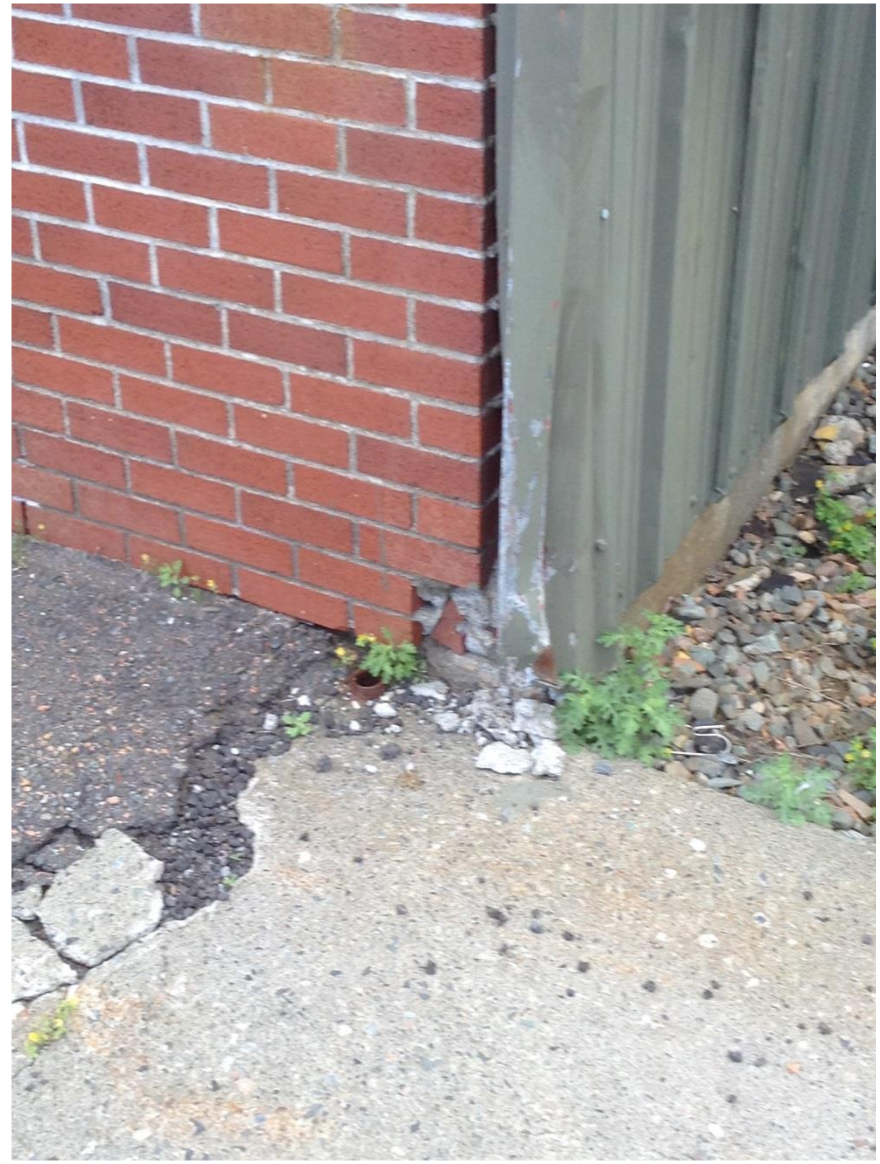
Photo 23

Nalcor Assessments – Bishop Falls
Architectural Photos

Photo 25



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Nalcor Assessments – Bishop Falls
Architectural Photos

Photo 27

Photo 28

Nalcor Assessments – Bishop Falls
Architectural Photos

Photo 29

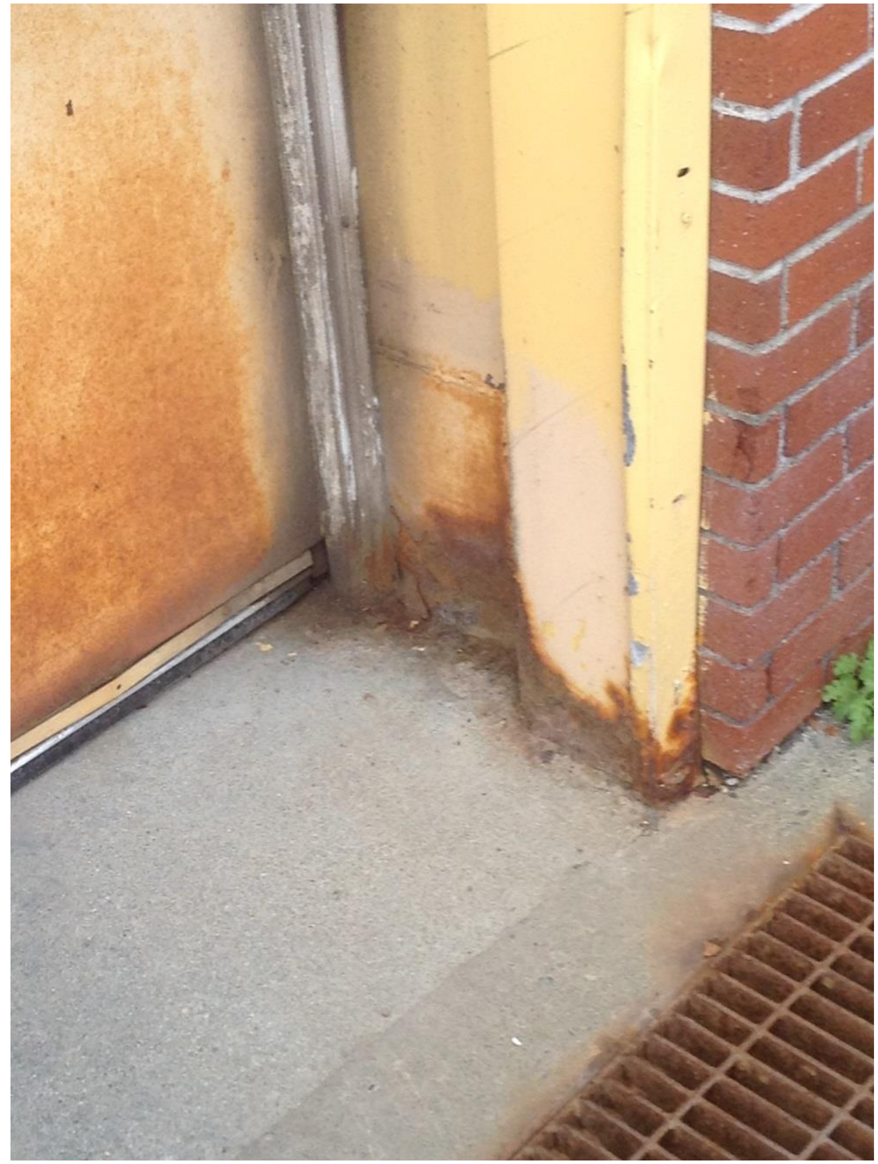

Photo 30

Nalcor Assessments – Bishop Falls
Architectural Photos

Photo 31

Photo 32

Nalcor Assessments – Bishop Falls
Architectural Photos

Photo 33

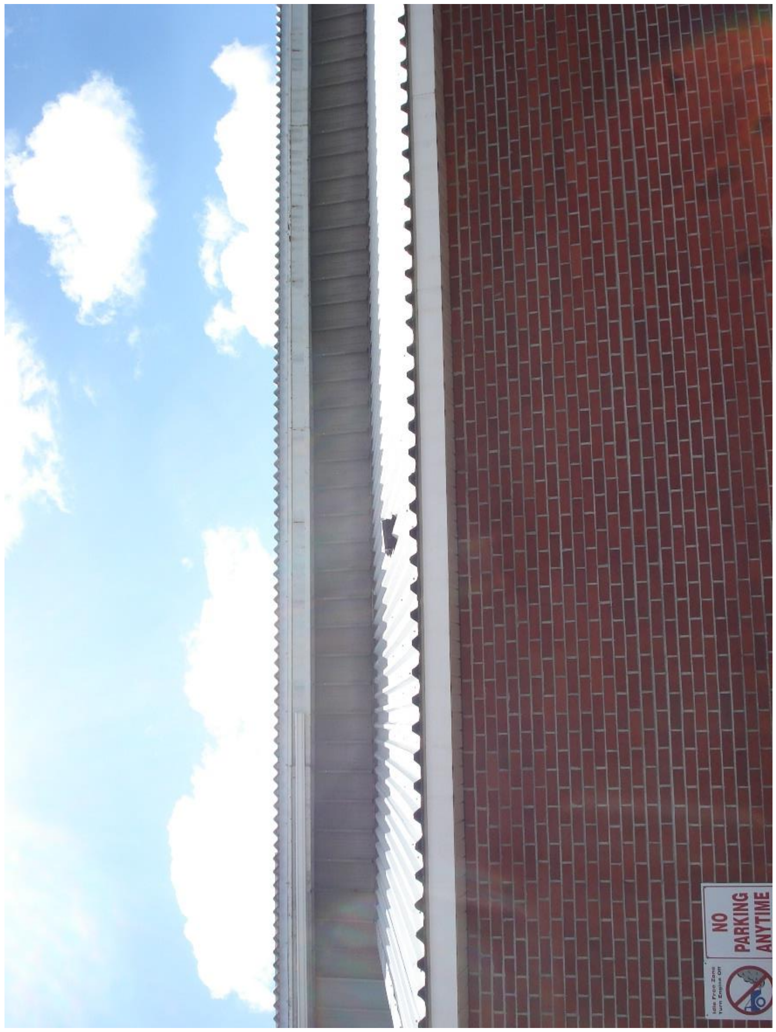

Photo 34

Nalcor Assessments – Bishop Falls
Architectural Photos

Photo 35

Photo 36

Nalcor Assessments – Bishop Falls
Architectural Photos

Photo 37

Photo 38

Nalcor Assessments – Bishop Falls
Architectural Photos

Photo 39

Photo 40

Nalcor Assessments – Bishop Falls
Architectural Photos

Photo 41

Photo 42

Nalcor Assessments – Bishop Falls
Architectural Photos

Photo 43

Photo 44

Nalcor Assessments – Bishop Falls
Architectural Photos

Photo 45

Photo 46

Nalcor Assessments – Bishop Falls
Architectural Photos

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Nalcor Assessments – Bishop Falls
Architectural Photos

Photo 49

Photo 50

Nalcor Assessments – Bishop Falls
Architectural Photos

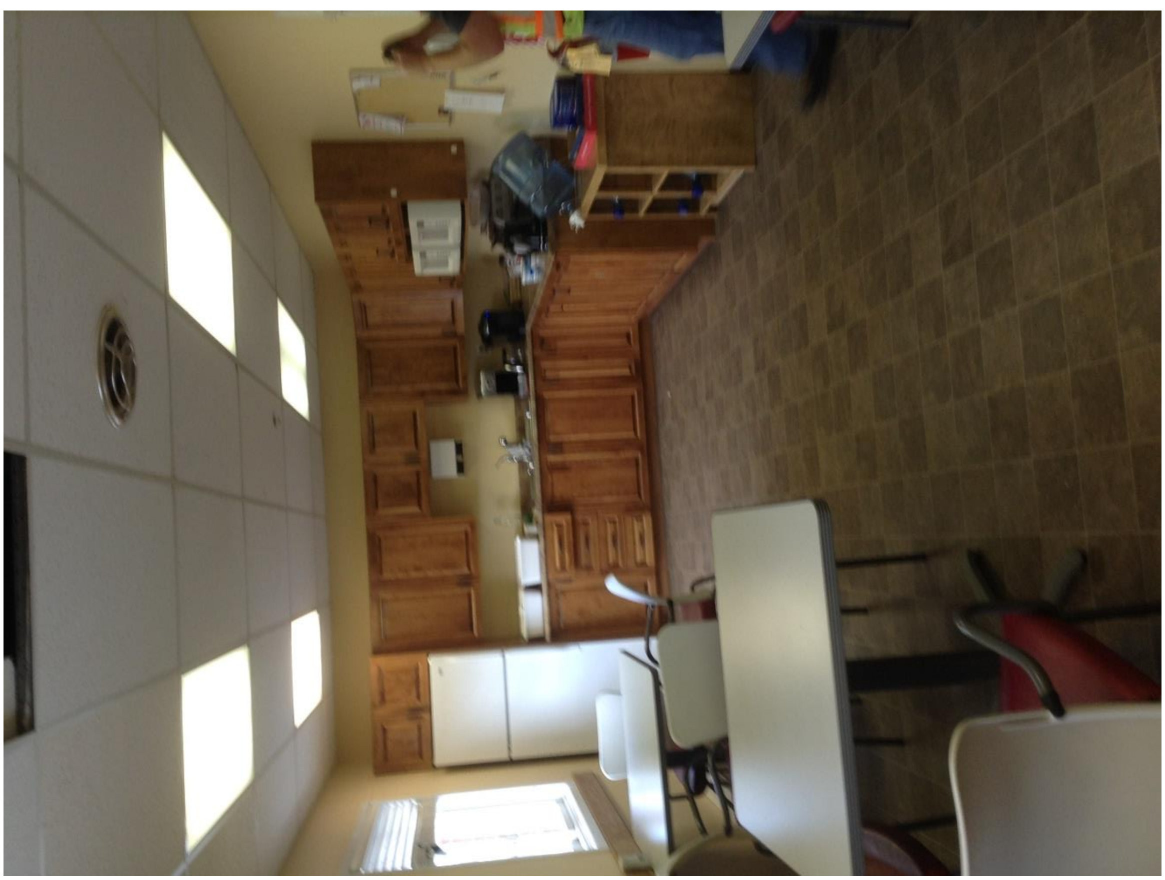


Photo 51

Photo 52

Nalcor Assessments – Bishop Falls
Architectural Photos

Photo 53

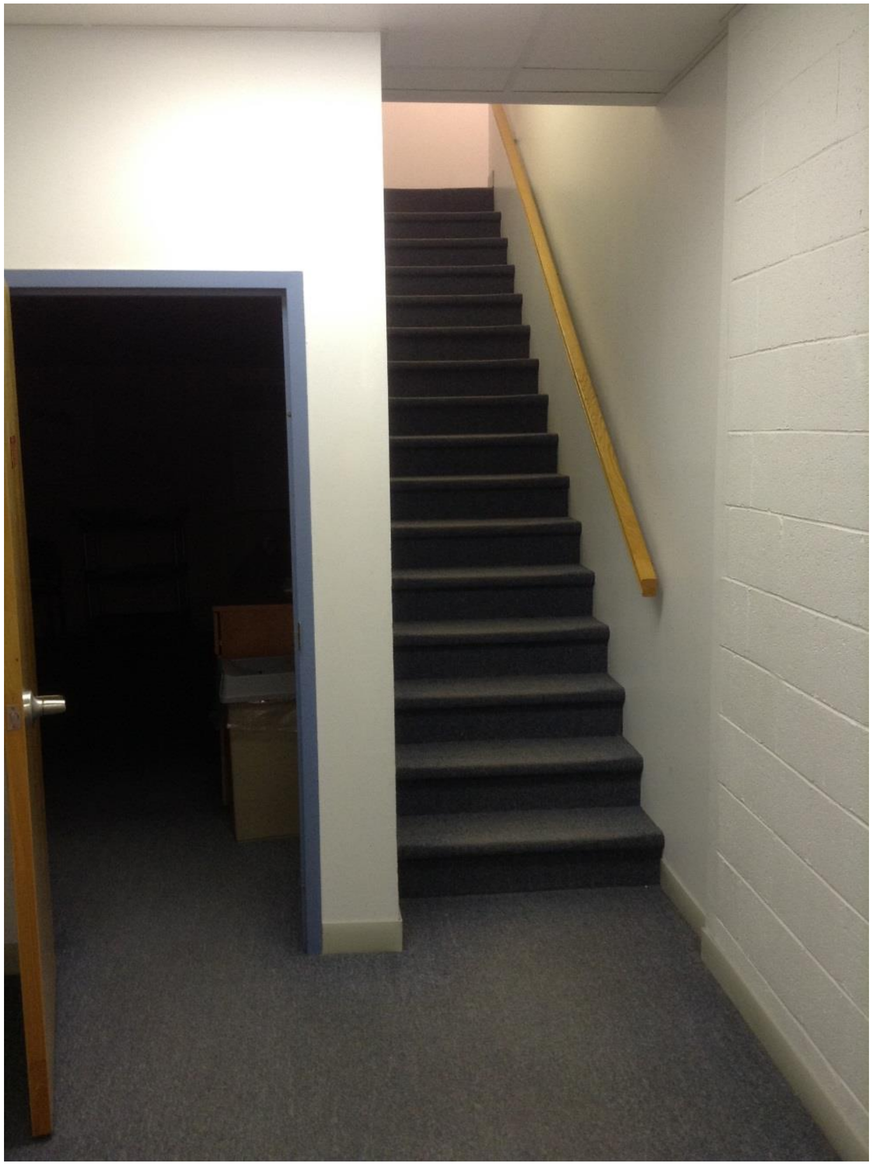
Photo 54

Nalcor Assessments – Bishop Falls
Architectural Photos

Photo 56

Photo 55

Nalcor Assessments – Bishop Falls
Architectural Photos



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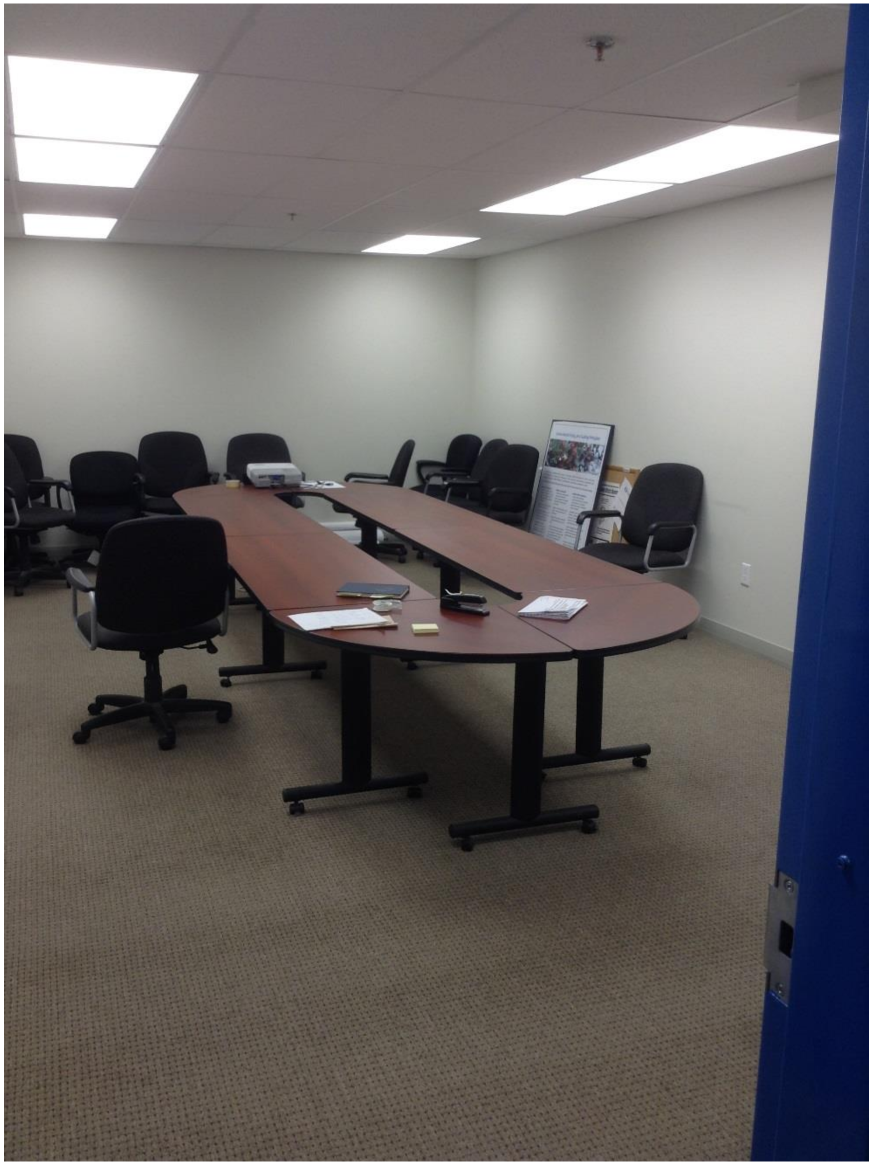
Nalcor Assessments – Bishop Falls
Architectural Photos



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Nalcor Assessments – Bishop Falls
Architectural Photos

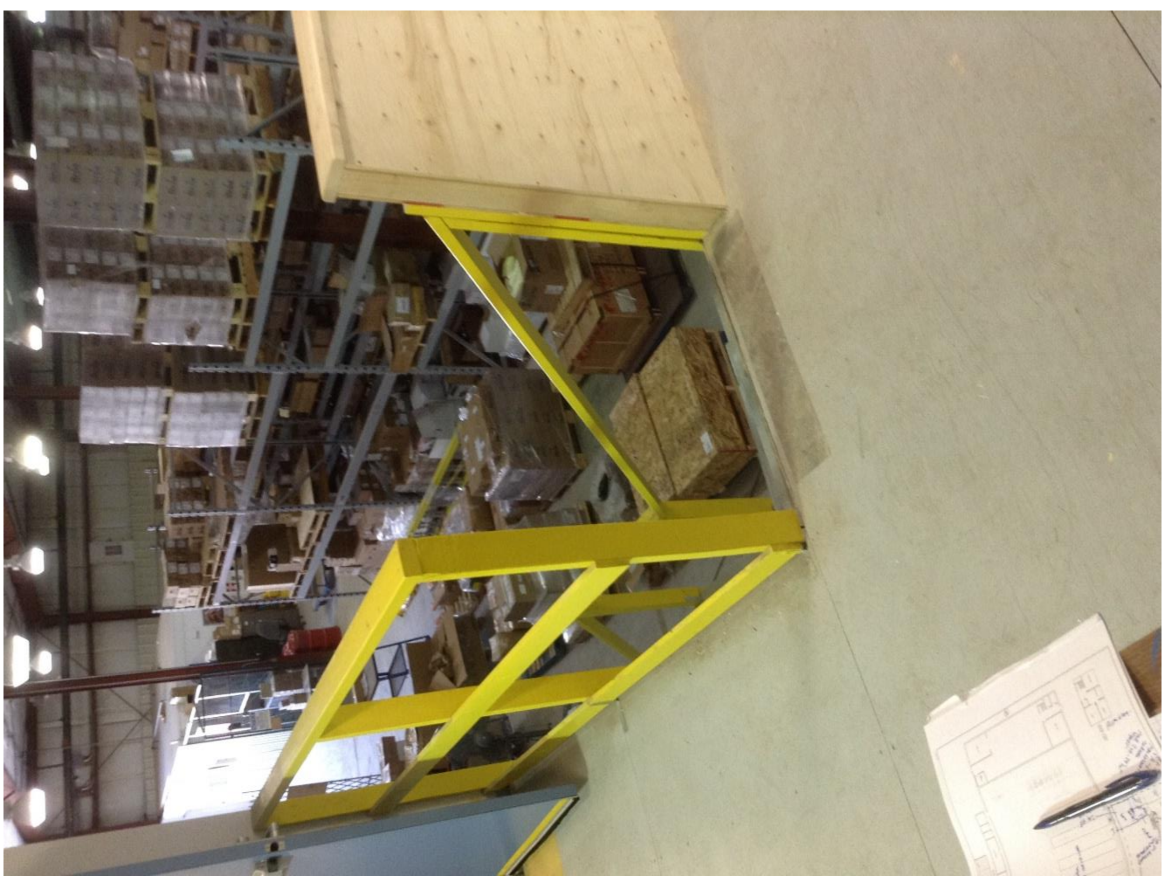
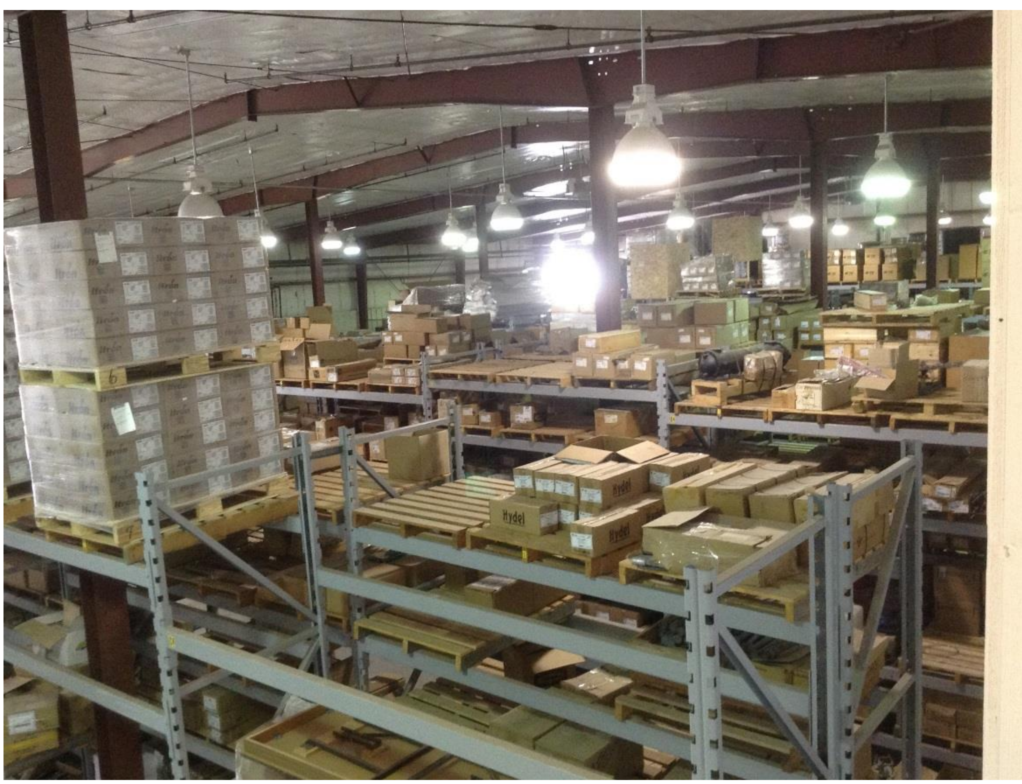


Photo 61

Photo 62

Nalcor Assessments – Bishop Falls
Architectural Photos

Photo 63



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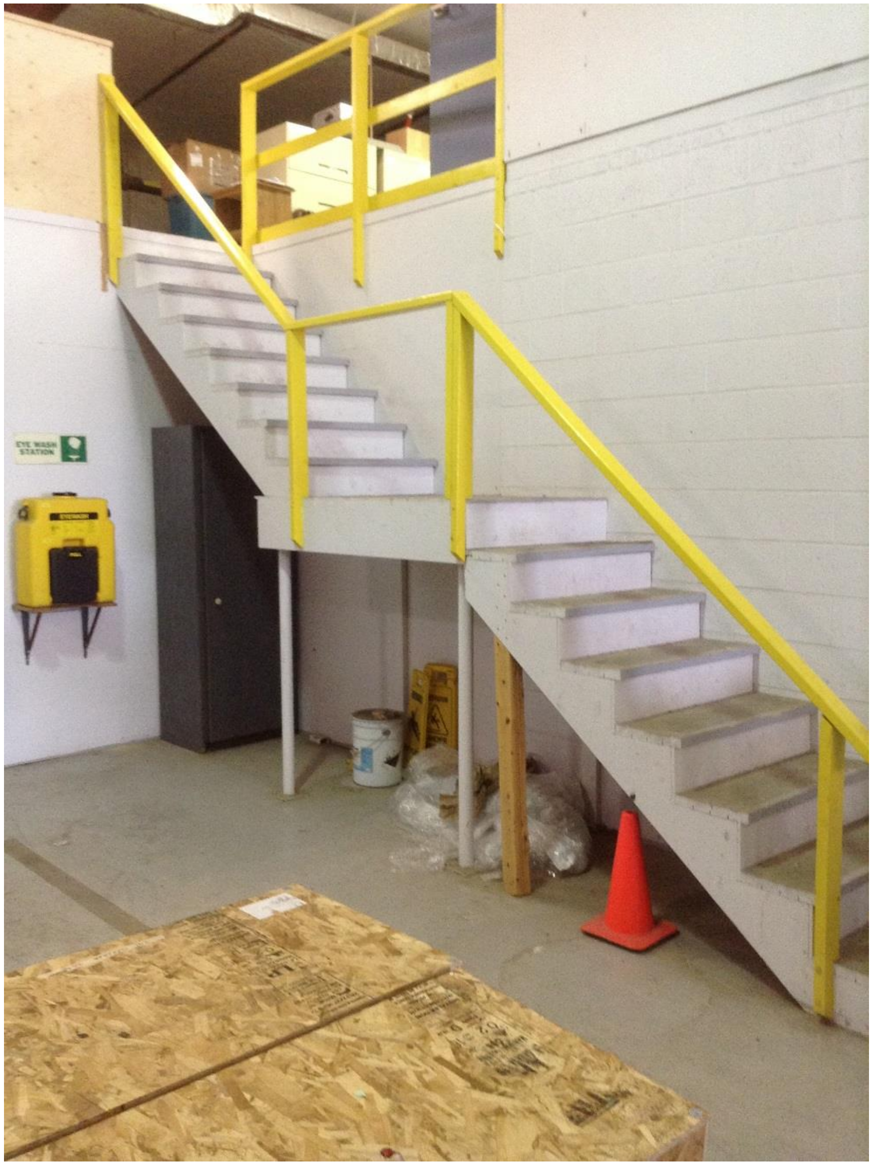
Nalcor Assessments – Bishop Falls
Architectural Photos



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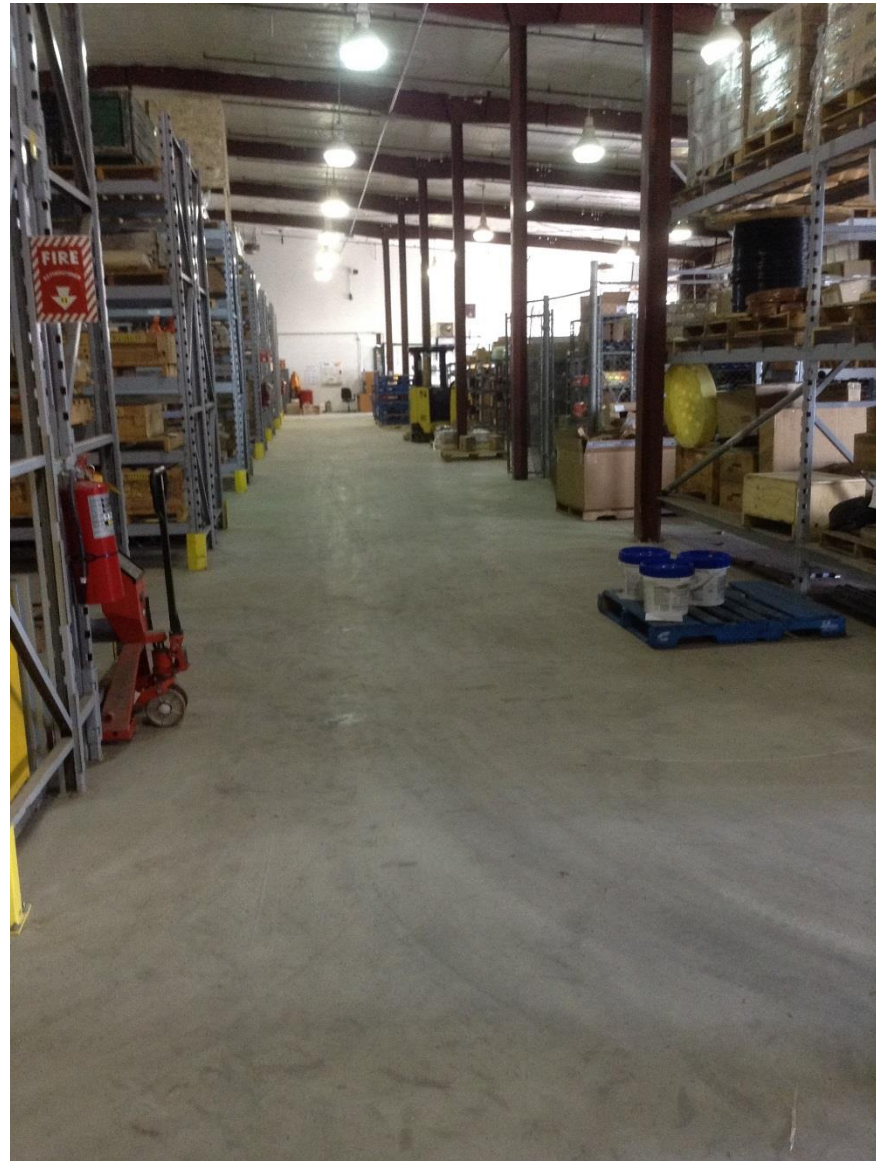


Photo 66

Nalcor Assessments – Bishop Falls
Architectural Photos

Photo 67

Photo 68

Nalcor Assessments – Bishop Falls
Architectural Photos

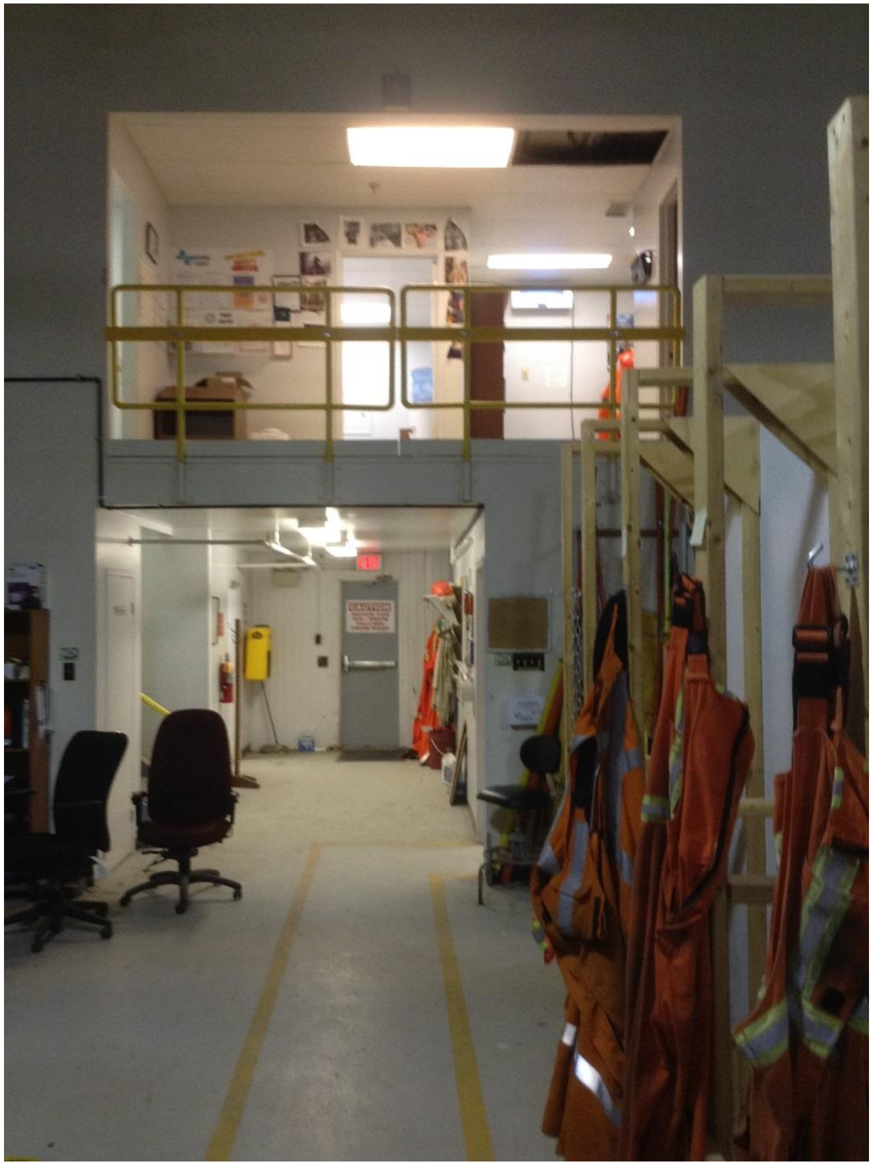


Photo 69

Photo 70

Nalcor Assessments – Bishop Falls
Architectural Photos

Photo 71

Photo 72

Nalcor Assessments – Bishop Falls
Architectural Photos

Photo 73

Photo 74

Nalcor Assessments – Bishop Falls
Architectural Photos

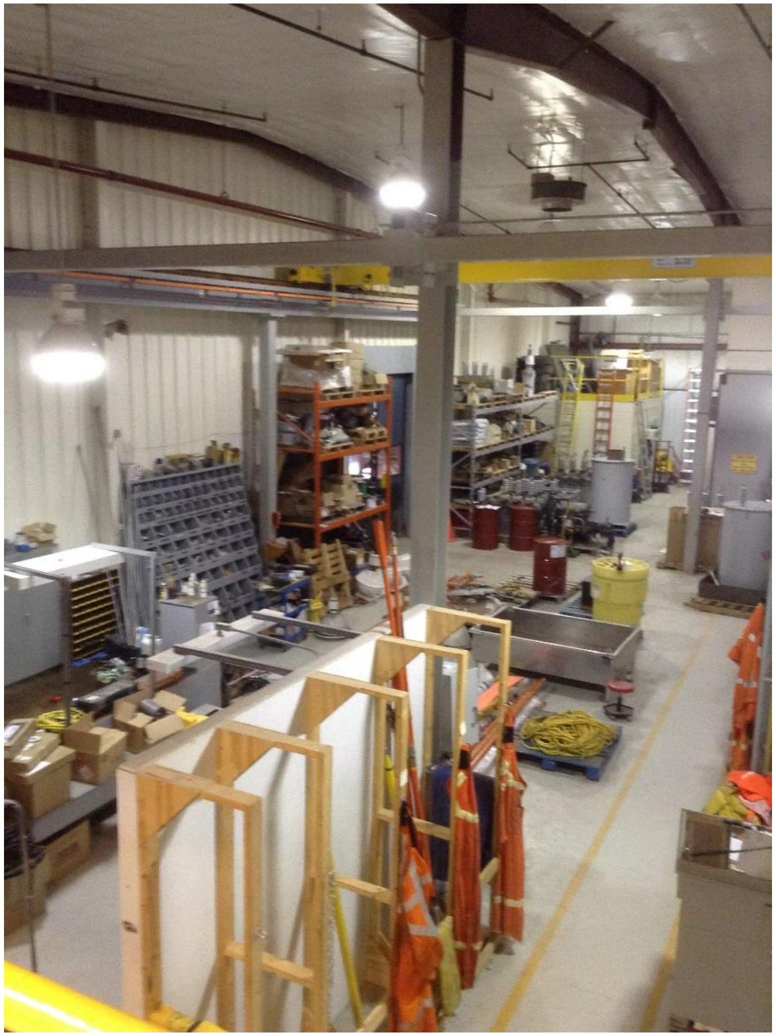


Photo 75

Photo 76

Nalcor Assessments – Bishop Falls
Architectural Photos

Photo 78

Photo 77

APPENDIX A

SITE CIVIL PHOTOS

Nalcor Assessments – Bishop Falls
Site Civil Photos

Photo 1 - Asphalt Cracking

Photo 2 - Asphalt Degrading

Nalcor Assessments – Bishop Falls
Site Civil Photos

Photo 3 - Asphalt Degrading

Photo 4 - Curb Damage

Nalcor Assessments – Bishop Falls
Site Civil Photos

Photo 5 - Concrete Walkway

Photo 6 - Concrete Pad at Loading Door

Nalcor Assessments – Bishop Falls
Site Civil Photos

Photo 7 - Doorway and Equpment

Photo 8 - Septic Tank Access

Nalcor Assessments – Bishop Falls
Site Civil Photos

Photo 9 - Stormwater Catch Basin

Photo 10 - Catch Basin

Nalcor Assessments – Bishop Falls
Site Civil Photos

Photo 11 - Catch Basin Not Up To Grade

Photo 12 - Catch Basin Chamber Undermined

Nalcor Assessments – Bishop Falls
Site Civil Photos

Photo 13 - CMP Corroded

APPENDIX A

STRUCTURAL PHOTOS

Nalcor Assessments – Bishop Falls
Structural Photos

Photo 1 - Vertical Crack in Foudation Wall

Photo 2 - Damage to Concrete Foundation Wall

Nalcor Assessments – Bishop Falls
Structural Photos

Photo 3 - Scaled Concrete on Foundation Wall

Photo 4 - Ants Entering Building Through Foundation Wall

Nalcor Assessments – Bishop Falls
Structural Photos

Photo 5 - Reinforced Building Frame

Photo 6 - Reinforced Building Frame and Additional Purlins

Nalcor Assessments – Bishop Falls
Structural Photos

Photo 7 - Timber Trusses Concealed by Vapor Barrier and Insulation

Photo 8 - Typical Building Frame

Nalcor Assessments – Bishop Falls
Structural Photos

Photo 9 - Deformation on Column Due to Impact (1)

Photo 10 - Deformation in Column due to Impact (2)

Nalcor Assessments – Bishop Falls
Structural Photos

Photo 11 - Deformation in Column due to Impact (3)

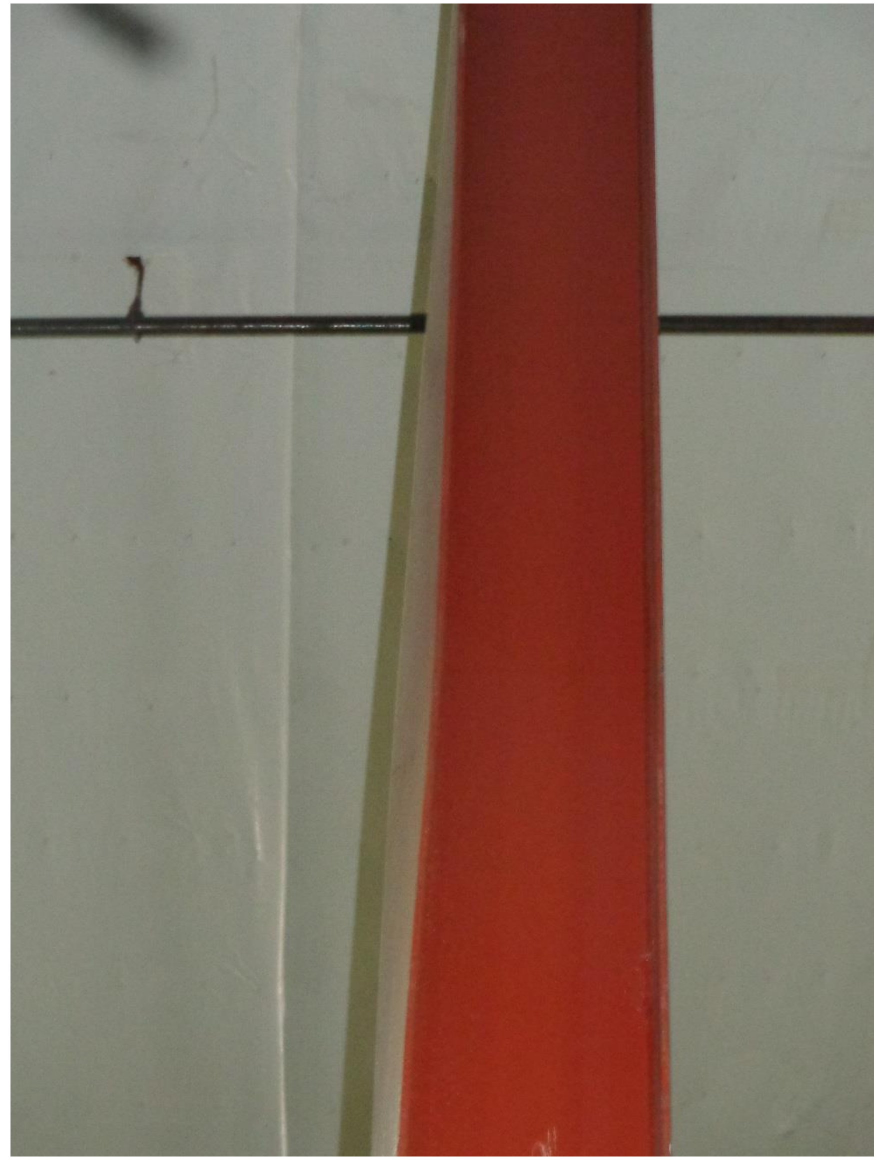


Photo 12 - Twist in Column Possibly Due to Overstress (1)

Nalcor Assessments – Bishop Falls
Structural Photos

Photo 13 - Twist in Column Possibly Due to Overstress (2)

Photo 14 - Deformation in Girt

Nalcor Assessments – Bishop Falls
Structural Photos

Photo 15 - Channel's Flanges Removed

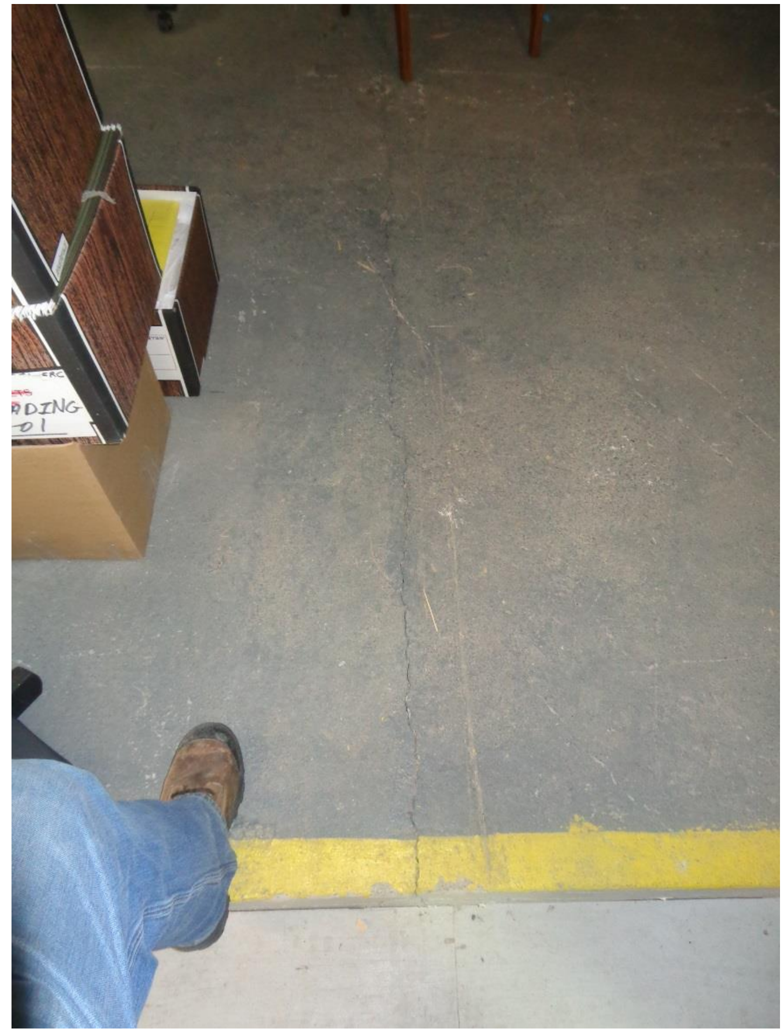


Photo 16 - Small Shrinkage Crack in Slab

Nalcor Assessments – Bishop Falls
Structural Photos

Photo 17 - Horizontal Crack in Slab

Photo 18 - Brick Veneer and Metal Cladding

Nalcor Assessments – Bishop Falls
Structural Photos

Photo 19 - Shelf Angle in Poor Condition

Photo 20 - Steel Lintel Over Window Openings

Nalcor Assessments – Bishop Falls
Structural Photos

Photo 21 - Timber Equipment

Photo 22 - Post Not Bearing on Ground

Nalcor Assessments – Bishop Falls
Structural Photos

Photo 23 - Rotting Post of Equipment Platform

APPENDIX A

MECHANICAL PHOTOS

Nalcor Assessments – Bishop Falls
Mechanical Photos

Photo 1 - Copper Vent Piping

Photo 2 – ABS Waste Piping

Nalcor Assessments – Bishop Falls
Mechanical Photos

Photo 3 - Air Admittance Valve Mounted Incorrectly

Photo 4 - Vent Piping Terminating Through Exterior Wall

Nalcor Assessments – Bishop Falls
Mechanical Photos

Photo 5 - Truck Bay Trench Drain

Photo 6 - Domestic Water Entrance

Nalcor Assessments – Bishop Falls
Mechanical Photos

Photo 7 - Partially Insulated Domestic Water Piping

Photo 8 - Water Piping Not Properly Supported

Nalcor Assessments – Bishop Falls
Mechanical Photos

Photo 9 - Coffee Station HWT

Photo 10 - Mezzanine Level HWT

Nalcor Assessments – Bishop Falls
Mechanical Photos

Photo 11 - Office Extension HWT

Photo 12 - Water Barrel on Mezzanine Level

Nalcor Assessments – Bishop Falls
Mechanical Photos

Photo 13 - Water closet

Photo 14 - Urinal with Electronic Flush Valve

Nalcor Assessments – Bishop Falls
Mechanical Photos

Photo 15 - Vitreous China Lavatory

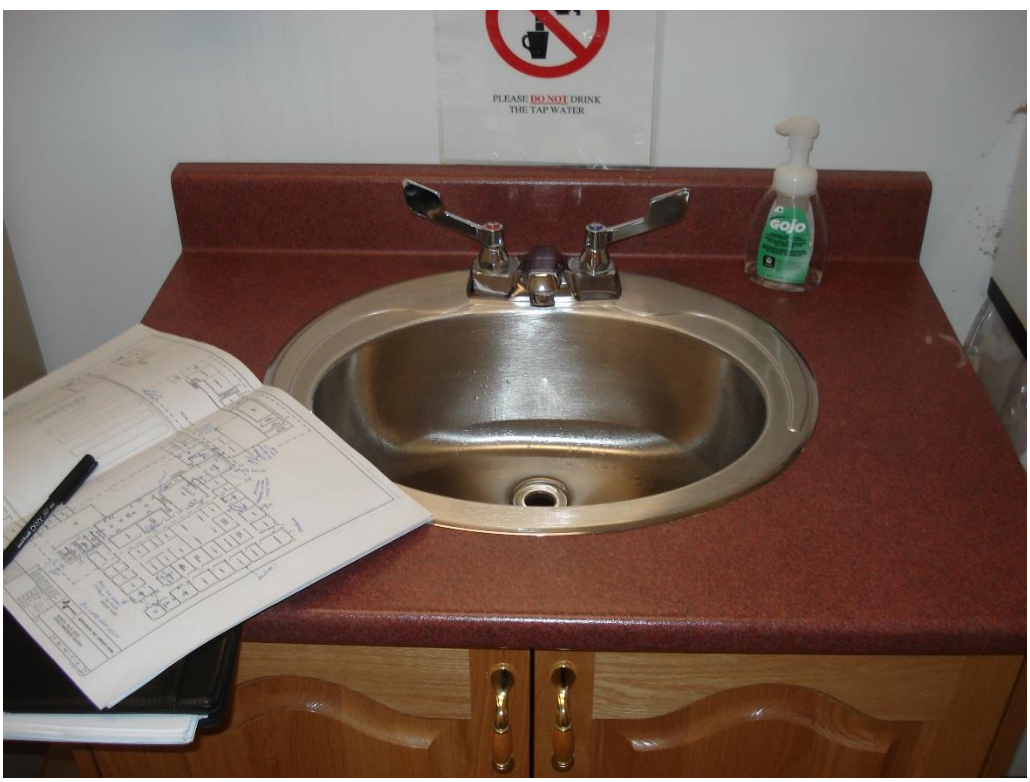


Photo 16 - Stainless Steel Lavatory

Nalcor Assessments – Bishop Falls
Mechanical Photos

Photo 17 - Residential Grade Vanity

Photo 18 - Lunch Room Sink

Nalcor Assessments – Bishop Falls
Mechanical Photos

Photo 19 - Laundry Tub

Photo 20 - Emergency Eyewash Station

Nalcor Assessments – Bishop Falls
Mechanical Photos

Photo 21 - Office Area Rooftop AC Unit

Photo 22 - Insulated Supply Ductwork

Nalcor Assessments – Bishop Falls
Mechanical Photos

Photo 23 - Zone Duct Heater

Photo 24 - Return Grilles Very Dirty

Nalcor Assessments – Bishop Falls
Mechanical Photos

Photo 25 - Server Room Condenser Unit

Photo 26 - Server Room Evaporator Unit

Nalcor Assessments – Bishop Falls
Mechanical Photos

Photo 27 - Front Office Area Condenser Unit

Photo 28 - Front Office Area Evaporator Unit

Nalcor Assessments – Bishop Falls
Mechanical Photos

Photo 29 - Portable Air Conditioning Unit

Photo 30 - Transformer Shop Offices Evaporator Unit

Nalcor Assessments – Bishop Falls
Mechanical Photos

Photo 31 - Workshop Wall AC Unit

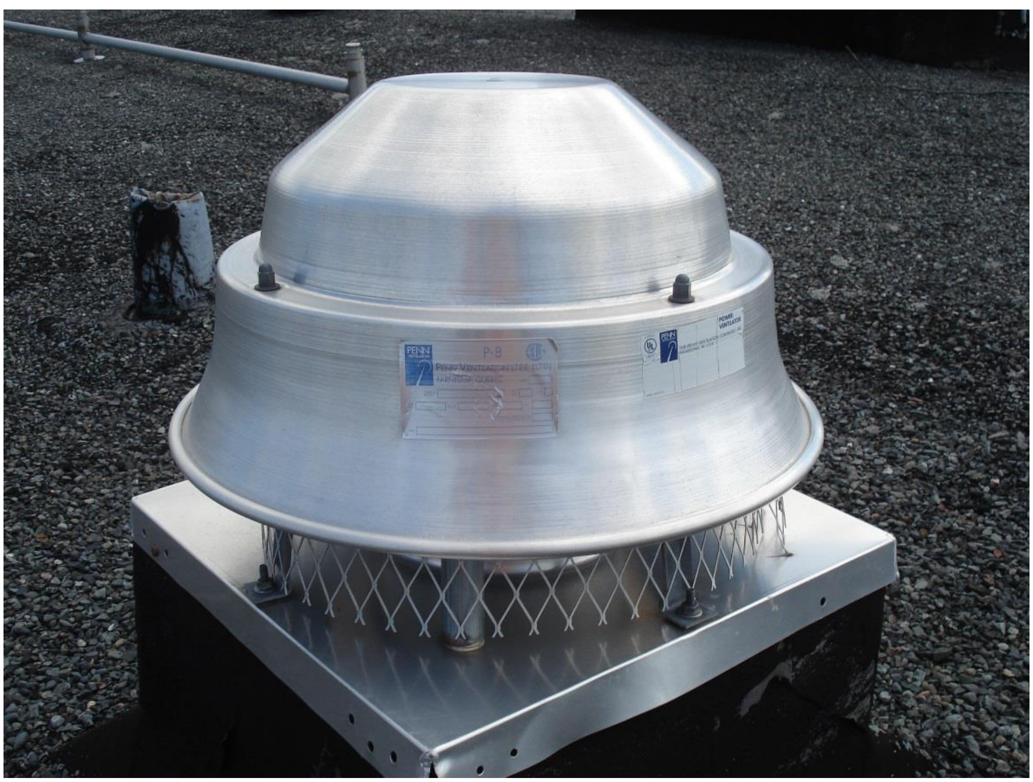


Photo 32 - Washroom Roof Exhaust Fan

Nalcor Assessments – Bishop Falls
Mechanical Photos

Photo 33 – Paint Room Propeller Exhaust Fans

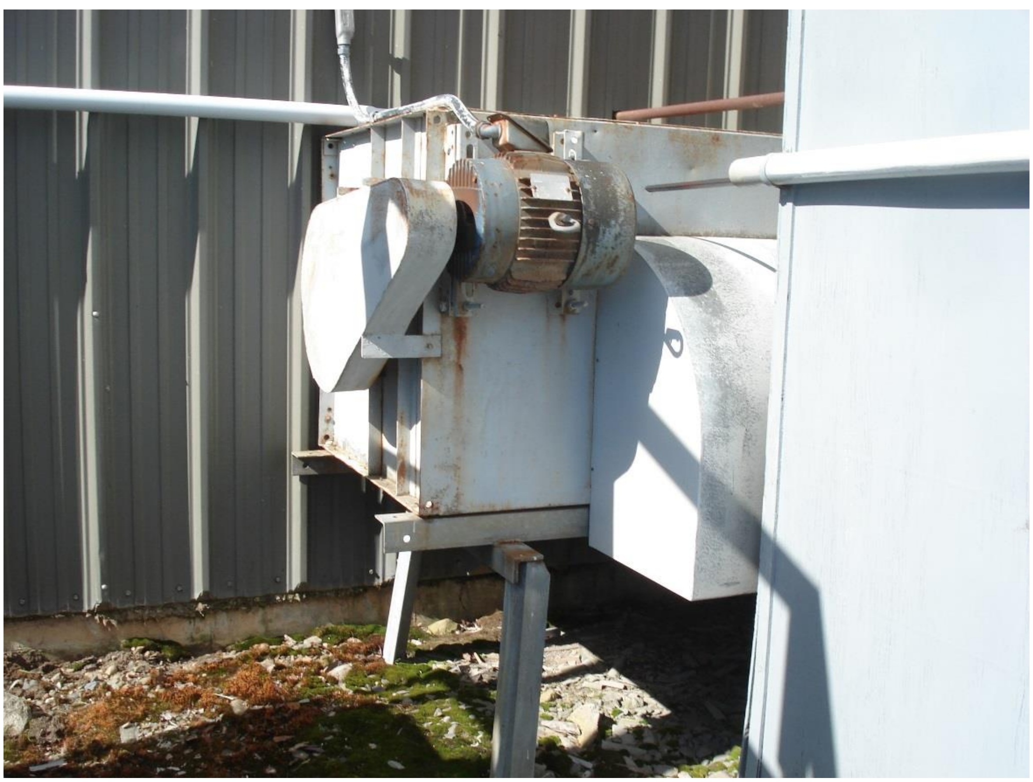


Photo 34 - Paint Room Make-up Air Unit

Nalcor Assessments – Bishop Falls
Mechanical Photos

Photo 35 - Fume Extraction System

Photo 36 - Typical Washroom Exhaust Fan

Nalcor Assessments – Bishop Falls
Mechanical Photos

Photo 37 - Exhaust Fan Wall Caps

Photo 38 - Lunch Room Ceiling Exhaust Fan

Nalcor Assessments – Bishop Falls
Mechanical Photos

Photo 39 - Paint Storage Exhaust Air Grille and Ducting

Photo 40 - Oil Test Lab Exhaust Hood

Nalcor Assessments – Bishop Falls
Mechanical Photos

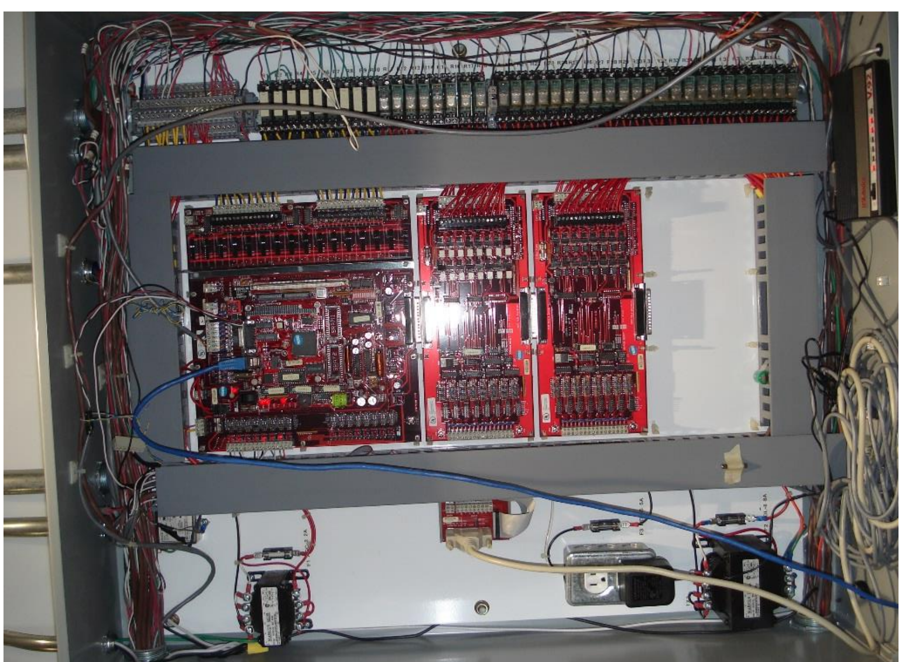


Photo 41 - BAS Control Panel

Photo 42 - BAS Zone Thermostat

Nalcor Assessments – Bishop Falls
Mechanical Photos

Photo 43 - Typical Split AC System Thermostat

Photo 44 - Wet Sprinkler System Alarm Valve

Nalcor Assessments – Bishop Falls
Mechanical Photos

Photo 45 - Fire Department Connection and Alarm Bell

Photo 46 - Dry Sprinkler System Valve

Nalcor Assessments – Bishop Falls
Mechanical Photos

Photo 47 - Rack Storage Very Close to Roof

APPENDIX A

ELECTRICAL PHOTOS

Nalcor Assessments – Bishop Falls
Electrical Photos

Photo 1

Photo 2

Nalcor Assessments – Bishop Falls
Electrical Photos

Photo 3

Photo 4

Nalcor Assessments – Bishop Falls
Electrical Photos

Photo 5

Photo 6

Nalcor Assessments – Bishop Falls
Electrical Photos

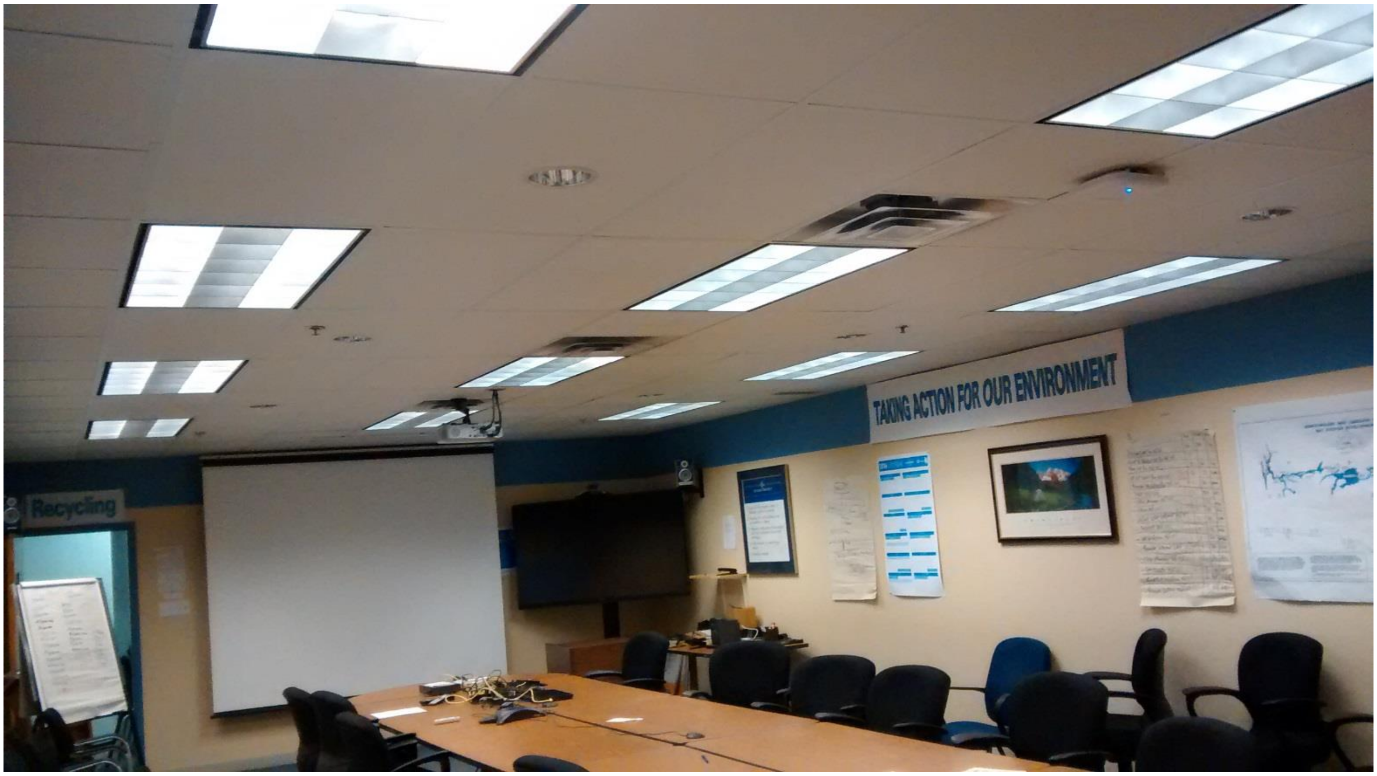


Photo 7

Photo 8

Nalcor Assessments – Bishop Falls
Electrical Photos

Photo 9

Photo 10

Nalcor Assessments – Bishop Falls
Electrical Photos

Photo 11

Photo 12

Nalcor Assessments – Bishop Falls
Electrical Photos

Photo 13

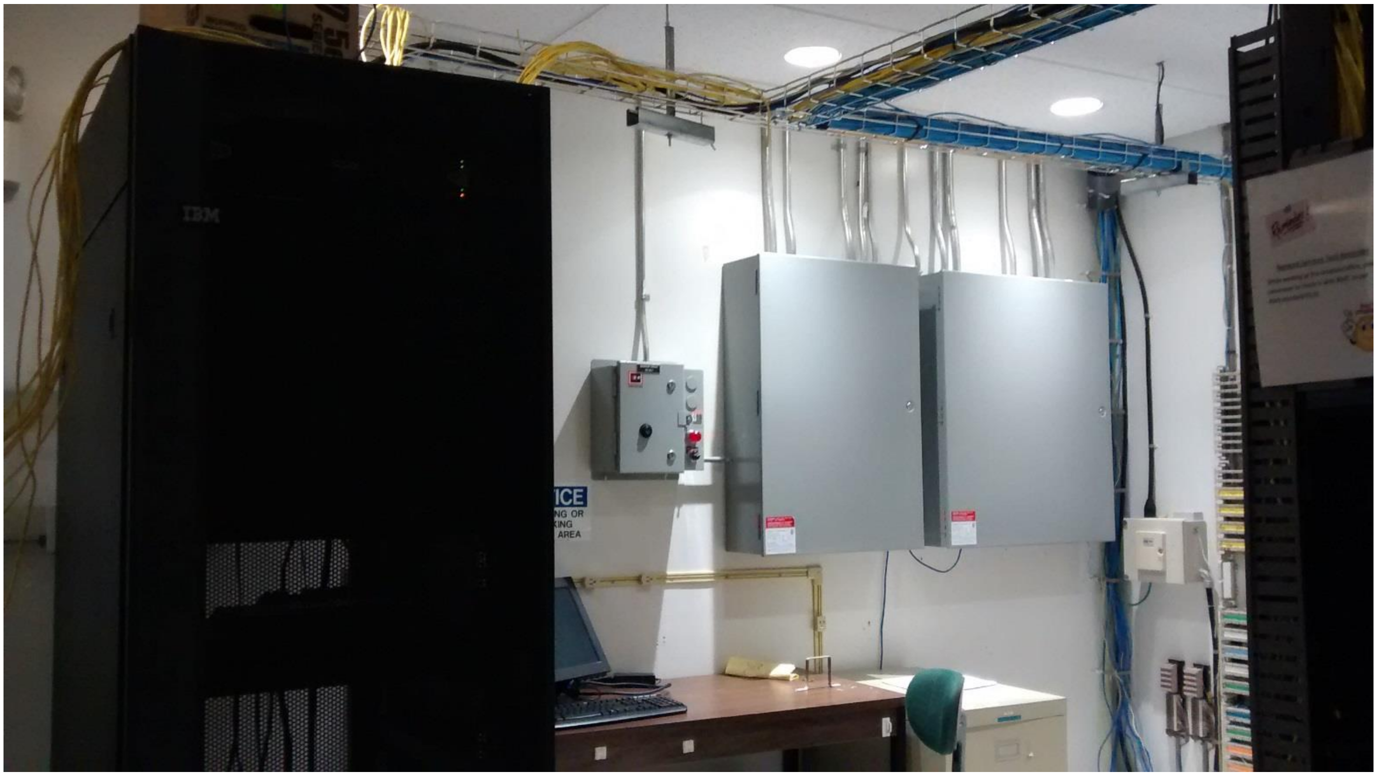
Photo 14

Nalcor Assessments – Bishop Falls
Electrical Photos

Photo 15

Photo 16

Nalcor Assessments – Bishop Falls
Electrical Photos



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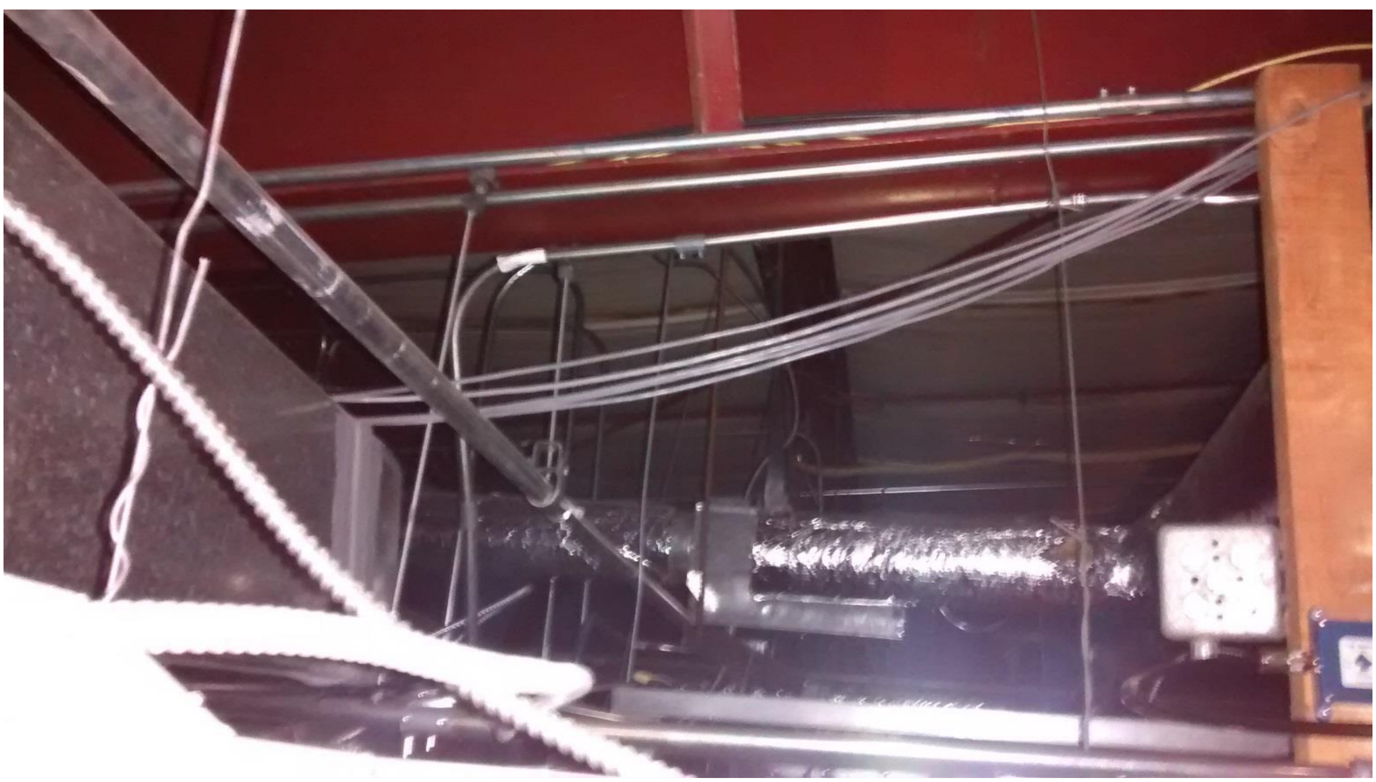


Photo 18

Nalcor Assessments – Bishop Falls
Electrical Photos

Photo 19

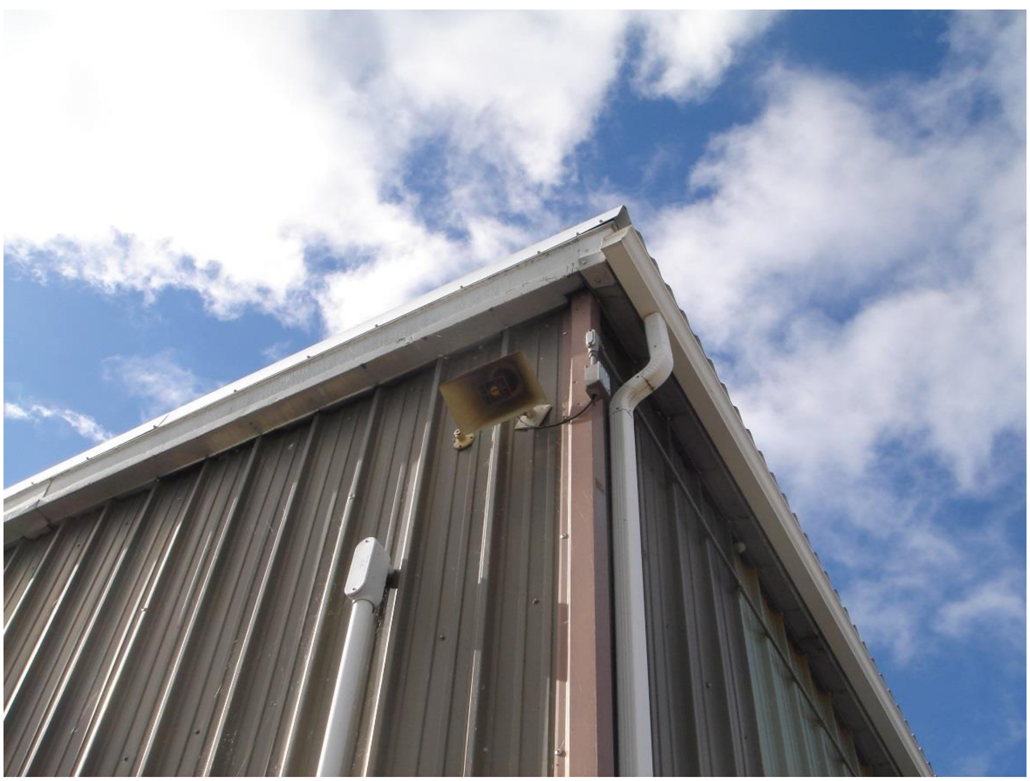


Photo 20

Nalcor Assessments – Bishop Falls
Electrical Photos

Photo 21

Photo 22

Nalcor Assessments – Bishop Falls
Electrical Photos

Photo 23

Photo 24

APPENDIX A

ENVIRONMENTAL PHOTOS

Nalcor Assessments – Bishop Falls
Environmental Photos

Photo 1 – Warehouse Safety Cabinet

Photo 2 – Warehouse Safety Cabinet

Nalcor Assessments – Bishop Falls
Environmental Photos

Photo 3 – Warehouse Safety Cabinet

Photo 4 – Transformer Shop Oil Drums

Nalcor Assessments – Bishop Falls
Environmental Photos

Photo 5 – Transformer Shop Oil Pails

Photo 6 – Paint Room Oil Drums

Nalcor Assessments – Bishop Falls
Environmental Photos

Photo 7 – Paint Storage Safety Cabinet

Photo 8 – Paint Storage Safety Cabinet

Nalcor Assessments – Bishop Falls
Environmental Photos

Photo 9 – Paint Storage Flammable Combustible Liquids

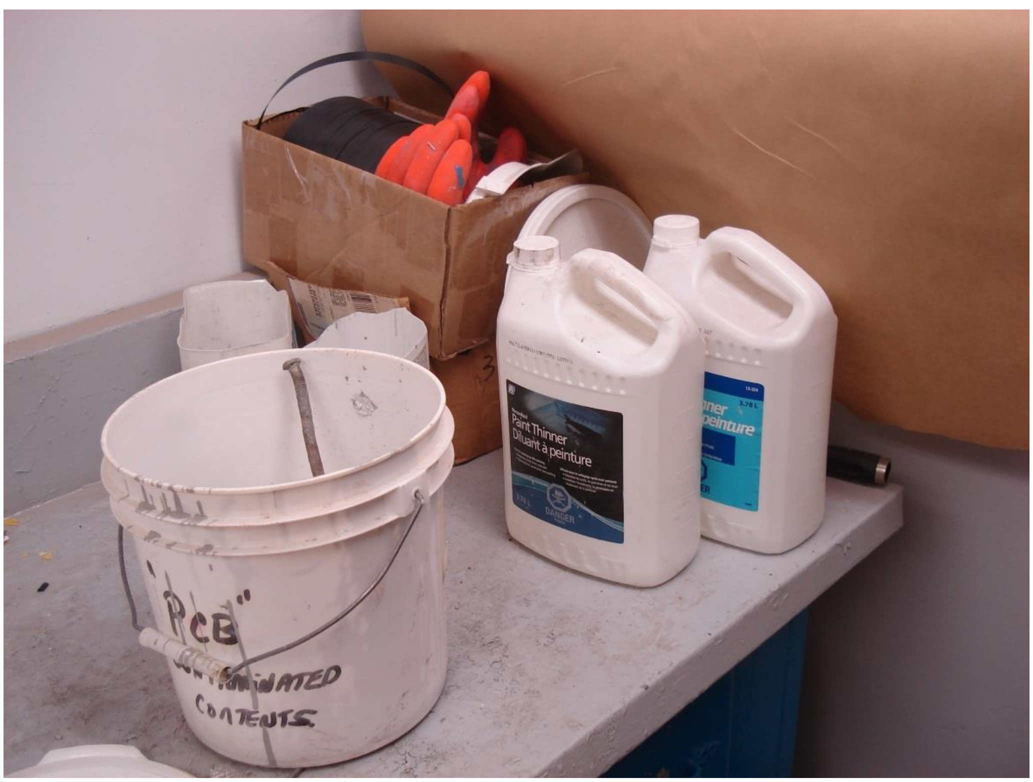


Photo 10 – Paint Storage Flammable Combustible Liquids

Nalcor Assessments – Bishop Falls
Environmental Photos

Photo 11 - Paint Storage Flammable Combustible Liquids

Photo 12 - Paint Storage Flammable Combustible Liquids

Nalcor Assessments – Bishop Falls
Environmental Photos

Photo 13 – 4,540 L Transformer Oil Tank

Photo 14 – 18,000 L Transformer Oil Tank (Used Oil)

Nalcor Assessments – Bishop Falls
Environmental Photos

Photo 15 – Tank Piping Not Properly Supported

Photo 16 - Tank Piping Not Properly Supported

Nalcor Assessments – Bishop Falls
Environmental Photos

Photo 17 - Tank Piping Not Properly Supported

Photo 18 - Tank Piping Not Properly Supported

Nalcor Assessments – Bishop Falls
Environmental Photos

Photo 19 – Transformer Oil Supply and Fill Pipes

Photo 20 – Waste Oil Transfer Pump

APPENDIX B

Existing Floor Plans


NEWFOUNDLAND AND LABRADOR HYDRO
HYDRO
BISHOPS FALLS DEPOT
OFFICE/WAREHOUSE BUILDING
DWG. NO. B1- 405 - C - 01
REV. 3.
PLOT SCALE 1:100 C.A.D.
NOTICE:
This Drawing contains intellectual property of Newfoundland and Labrador Hydro (HYDRO) and shall not be copied or distributed in whole or in part without prior written consent from HYDRO. Use of the drawing shall be restricted to purposes of HYDRO or a contract with HYDRO.
ELECT. SCALE: 1:100
CIVIL DESIGNED:
TRANS. DRAWN: J.T./C.R.H.
MECH. DATE: 1998-10-30
P&C CHECKED:
TELC. APPROVED:
W.O. NO.
3 99-11-23 MINOR REVISIONS C.R.
2. 99-09-14 1998 OFFICE/WAREHOUSE RENOVATIONS "AS BUILT" C.R.
1. 99-02-23 WIDTH OF WAREHOUSE DECREASED BY 1044mm IN FRONT AREA (FIELD VERIFIED BY J.T.) C.R.H.
NO. DATE DESCRIPTION DWN. DESIGN. CHK. APP'D
REVISIONS
DWG.NO. TITLE
REFERENCE DRAWINGS
GROUND FLOOR
SECOND FLOOR
WAREHOUSE OFFICES
SALVAGE STORES SECOND FLOOR
BOARDROOM
G. BRINSTON
R. RALPH
LIBRARY
S. BROWN
L. FUDGE
L. LeDREW (SWITCHBOARD)
V. PEDDLE
DONNA HANCOCK
FILE STORAGE
K. CURTIS
MENS WASHROOM
LADIES WASHROOM
TELEPHONE
H. OLDFORD
VACANT
DARLENE HANCOCK
D. ROSE
J. THOMPSON
B. WAYE
B. COURTNEY
F. DEIR
G. O'BRIEN
M. HOLLET
C. FUDGE
C. DAVIS
J. SCEVIOUR
K. SAUNDERS
FILE SERVER
G. QUINLAN
KITCHEN
HALL
C. PENNY (MAILROOM)
SUPPLIES
MAXIMO DATA ENTRY
WORKSHOP
TRAINING ROOM
COFFEE ROOM
FEMALE WASHROOM
MALE WASHROOM
WATER MAIN ROOM
STORAGE ROOM
ELECT. ROOM
TRUCK BAY
O.H. DOOR
OFFICE
WINDOW
TO ROOF OPEN AREA
MALE WASHROOM
FEMALE WASHROOM
ROOF DECK
ROOM MEETING
ROOM COFFEE
WATER MAIN ACCESS
STORAGE AREA
TEST RM
PAINT STORAGE
PAINT RM
SUPV
LUNCH RM
99-11-23
2:45 PM

Appendix G

Building and Infrastructure Condition Assessment – Whitbourne Eastern Area Depot (2017)

Building and Infrastructure Condition Assessment Whitbourne Eastern Area Depot

(Whitbourne, NL)

163046.00 ● Final Report ● June 2017

ISO 9001
Registered Company

Prepared for:

nalcor energy

Prepared by:

CBCL LIMITED
Consulting Engineers

Issued for Final	Paul Sceviour	Jun 16, 2017	Paul Sceviour
Issued for Review	Paul Sceviour	Mar 23, 2017	Paul Sceviour
Issue or Revision	***Reviewed By:***	***Date***	***Issued By:***

CBCL LIMITED
Consulting Engineers

ISO 9001
Registered Company

REGISTERED PROFESSIONAL ENGINEER
PAUL SCEVIOUR
SIGNATURE
JUNE 16, 2017
DATE
NEWFOUNDLAND & LABRADOR

CBCL Project No 163046.00

Contents

Appendices

CHAPTER 1 REPORT OVERVIEW

1.1 RFP and Consultant Group

In June 2016, the Newfoundland and Labrador Hydro (referred to as the "NLH" hereafter) issued a Request for Proposals to undertake the building and infrastructure condition assessments for various line depots, office facilities, and substation control buildings throughout the province. The sites included:

- Line Depots
  - Ramea
  - Flowers Cove
  - Roddickton
- Office Facilities and Control Buildings
  - Bishop's Falls (Office Building Only)
  - Whitburn Eastern Area Depot
  - Doyles 138 kV Facility
  - Grandy Brook 138 kV Facility
  - Howley 138 kV Facility
  - Springdale 138 kV Facility

CBCL Limited responded to the request on May 27, 2016, and was subsequently awarded the project on June 15, 2016.

The consultant team that performed this assessment consisted of a multi-disciplined engineering team with CBCL Limited performing structural, mechanical, electrical, and environmental tasks, and Glenn Barnes Architecture Inc. performing architectural and functional programming tasks.

This report contains the results of those exercises and provides our professional assessments, recommendations as to the current condition, suitability of use, required code upgrades, recommended upgrades, recommendations to suit future needs, and opinion of probable construction cost for recommendations.

1.2 Scope of Work

The Request for Proposals document contained the terms of reference which outlined the objectives and scope of the project. The assessment has several objectives:

- to review the general condition of the building and site infrastructure including architectural, structural, mechanical, electrical, and environmental;
- provide recommendations of renovations to continue operating existing facilities in view of present and future needs, and
- provide preliminary functional programming based on the client current needs (for storage, operations, etc.) and future needs to determine the most efficient uses of the assessed facilities.

1.3 Site Audits

Site audits were carried out during the weeks of July 25th and August 1st. Prior to the site work, CBCL requested any available plans and prior documents or information on the facilities. Limited information was available so the bulk of the information contained in this report was obtained from onsite review and from information provided by on site personnel. Upon arriving at the various sites the consultant team checked in with site personnel and undertook site specific safety orientation were required.

1.3.1 Main Depot Building

This 800 square meter pre-engineered metal building was originally constructed circa 1974 with a 12 meter extension having been added to the warehouse many years later. The building consists of two on grade levels on concrete foundations and slabs on grade. The building houses offices, training room, staff lunch rooms, washrooms, warehouse, and various individual workshop units. The building has pre-formed metal siding and steel roof.

Site utilities include a well water supply and a septic system for sanitary drainage. The site itself is gravel and slopes to lower elevations to the south side of the site. The depot yard is fully fenced with the front of the depot building forming part of the perimeter.

1.3.2 Maintenance Garage

This maintenance garage building has a 133 square metre footprint/first floor area plus a small 18.4 square meter second floor. The age of the building is unknown but it is not contemporary. The building houses a repair garage with an in floor repair pit and equipment workspace. A single washroom/laundry and storage room complete the first floor. The second floor, accessed via open wood stairs houses an office plus a compressor and parts storage room. The building is of wood frame with sloped roof clad in asphalt shingles. Siding consists of vertical pre-painted metal which is in several colours and is significantly faded. Exterior doors

include one hollow metal personnel door in a pressed steel frame which requires re-painting. One large pre-painted insulated steel overhead door provides vehicle access. The building is in fair condition with significant upgrading required. Interior finishes of the walls and ceilings consist of painted hardboard. Foundations are of poured concrete with the first floor being poured in placed concrete slabs.

Site utilities include a well water supply and a septic system for sanitary drainage.

1.3.3 Storage Building

This contemporary building is a Quonset hut style fabricated with arced shape of self-supporting galvanized steel panels. The 41 square meter single level on grade structure is founded on a concrete foundation and slab on grade floor. The building is uninsulated. The building acts as storage space for ATVs, snowmobiles and other line equipment. The building has a single uninsulated pre-painted steel overhead door and a single hollow metal person door in a pressed steel frame. One turbine type roof exhaust ventilator sits atop the centre of the roof.

The Storage Building does not have any site services.

1.3.4 Carpenter Building

This 37 square meter wood frame building consists of a single open interior space which was formerly a workshop but now acts as storage for grounds maintenance equipment, tires, line tools, and other equipment. The building has a sloped roof with asphalt shingles, vinyl siding, one residential type metal access door, vinyl sliding windows and is founded on what appears to be wood blocks with skirted space between floor and grade. The building is in fair to good condition.

The Carpenter Building does not have any site services.

1.4 Findings and Recommendations

1.4.1 Main Depot Building Findings

The building is in good condition but the envelope is showing its age and upgrades should be considered in the next 3-5 years. Some codes upgrading work is also required.

1.4.2 Main Depot Building Recommendations

Near term recommendations that should be planned to be undertaken within the next two years have been put forward for architectural, structural, site, mechanical, electrical, and environmental and are summarized as follows.

Architectural:

- Replace stained ceiling tiles.
- Repoint brick.
- Provide non-skid treads c/w tactile to corridor stairs.
- Correct code exiting and fire ratings deficiencies.
- Add gutter and downspout systems.
- Paint doors and frames.
- Provide correct code to code guards and stair rails in shops and warehouse.

Structural:

- Foundation wall should be exposed in locations where larger horizontal cracks and spalling is noted. It is recommended to remove cladding and carry out required excavation in the location of the damage to uncover full extent of the damage. Once the full damage of the crack is determined an appropriate repair detail can be recommended.
- All tools must be removed from horizontal cross bracing.
- Cracks in concrete block partition walls possibly caused by settlement should be monitored to ensure condition does not worsen.

Site/Civil:

- Make repairs to site fencing.

Mechanical:

- Replace any ABS piping present in the office area return air plenum with copper or plenum rated plastic DWV.
- Replace domestic hot water tank.
- Provide insulation on uninsulated domestic water piping.
- Verify office area control operation and set up for continuous operation during occupied periods.
- Inspect and service office area steam humidifier.
- Provide a dedicated cooling system for the Electrical/Server Room.
- Replace the warehouse/workshop area Lunch Room range hood.
- Rebalance outside air rates to office area.
- Provide heat recovery ventilation system to provide minimum outside air to warehouse/shop area of building.

Electrical:

- The old exterior lights and associated controls should be replaced.
- Investigate and repair baseboard heater in space off of warehouse area.
- All outdoor receptacles, including the outlet boxes and the weather protective covers need replacement.
- Replace any outdated emergency lighting batteries.

- Installation of visual alarms in fire alarm system for aiding any potential hearing impaired occupants.
- Relocate fire alarm annunciator/control panel next to the main entrance as required by NBCC.

Environmental:

- Indoor air quality should be addressed as per the recommendation in the mechanical section of this report.
- Stained soil in the depot yard should be removed and properly disposed of. Stains on interior floors should be cleaned.
- Stored propane cylinders should be moved to an outdoor storage area.

Mid-term recommendations that should be planned to be done in the next 3-10 years are architectural, mechanical, and electrical and are summarized as follows.

Architectural:

- Replace metal siding.
- Replace remaining fibreglass overhead doors.
- Paint interior of building.
- Replace metal roofing.

Mechanical:

- Replace copper domestic water piping throughout facility.

Electrical:

- Install new panelboards with sufficient spare capacity.

1.4.3 Maintenance Garage Findings

The building is in fair condition with interior and exterior finishes upgrading recommended within the next few years. Codes upgrading related to the second floor fire rating and exiting is recommended in the short term. Covering exposed hardboard is recommended in the short term due to its flame spread rating.

1.4.4 Maintenance Garage Recommendations

Near term recommendations that should be planned to be undertaken within the next two years have been put forward for architectural, structural, mechanical, electrical, and environmental and are summarized as follows.

Architectural:

- Fire rate laundry room.
- Clean building interior.
- Reconstruct stairs to meet code.
- Provide emergency egress from opposite end of repair pit plus electrical and ventilation to code.
- Provide attic access hatch and study attic condition and attic ventilation. Add ventilation and insulation to code if required.

- Firerate the second floor and the exit from it to the exterior.
- Paint exterior door.
- Paint building interior.

Structural:
- The damaged concrete adjacent to the man door should be repaired.

Mechanical:
- Modify plumbing vent piping to be code compliant.
- Replace existing service pit sump pump with one rated for hazardous location including associated wiring.
- Presence of an oil interceptor and regular maintenance should be confirmed. If an interceptor is not present one should be installed and connected to the building floor drainage system.
- Replace hot water tank.
- Extend hot water tank relief piping to within 300mm of floor or less providing an air break.
- Insulate accessible domestic hot and cold water piping.
- Provide a domestic water hose reel in the service bay area.
- Provide a heat recovery unit to meet minimum ventilation requirements.
- Investigate and repair any issues with the service pit exhaust system. Replace exhaust fan with one of non-spark construction and suitable for conveyance of combustible gases. Provide visual system operation proving light.
- Provide welding fume extraction exhaust system.
- Increase general exhaust rates if required and provide tempered make-up air system for general exhaust capacity and pit and welding exhaust systems.
- Upgrade gas detection system with additional sensors, visual and audible alarm indication, and interlock with exhaust and make-up air systems.
- Provide nitrogen dioxide gas detection system if diesel vehicles are serviced in the garage.

Electrical:
- All old interior and exterior lighting fixtures to be replaced. Install new photocell control for the exterior lighting.
- Service pit lighting and wiring to be replaced with suitable material for hazardous locations.
- Service pit receptacles and wiring should be removed or replaced with suitable material for hazardous locations.

Environmental:
- Stored propane and acetylene cylinders should be moved to an outdoor storage area.

Mid-term recommendations that should be planned to be done in the next 3-10 years are architectural and electrical and are summarized as follows.

Architectural:
- Replace metal siding.
- Replace roof shingles.

Electrical:
- New main disconnect and panelboard with sufficient spare capacity to be installed.

- All old receptacles and lighting switches, including the outlet boxes and faceplates to be replaced.

1.4.5 Storage Building Findings

The building is in good condition, requiring only minor regular maintenance.

1.4.6 Storage Building Recommendations

Near term recommendations that should be planned to be undertaken within the next two years have been put forward for architectural and are summarized as follows.

Architectural:
- Seal hole in door frame, replace corroded hinges, and upgrade caulking.

Electrical:
- Install exterior lighting with photocell control.

1.4.7 Carpenter Building Findings

No work is contemplated other than addition of an attic hatch and door and frame and hardware upgrades.

1.4.8 Carpenter Building Recommendations

Near term recommendations that should be planned to be undertaken within the next two years have been put forward for architectural, mechanical, and electrical and are summarized as follows.

Architectural:
- Repair and paint door and frame, replace sill.
- Provide attic hatch.

Mechanical:
- Based on the intended use of this building it should be provided with a ventilation system.

Electrical:
- Install photocell controlled building exterior lighting.
- Install one dual head emergency battery unit in the building.

Mid-term recommendations that should be planned to be done in the next 3-10 years are architectural and electrical and are summarized as follows.

Architectural:
- Replace door.
- Replace roof shingles.

Electrical:
- Install new main disconnect and main load center with sufficient spare capacity.
- Replace baseboard heaters.
- Replace all old receptacles and lighting switches, including the outlet boxes and faceplates.

CHAPTER 2 FACILITY AUDITS

2.1 Main Depot Building

2.1.1 Architectural Assessment

This 800 square meter pre-engineered metal building was originally constructed circa 1974 with a 12 meter extension having been added to the warehouse many years later. The building consists of two on grade levels on concrete foundations and slabs on grade. The building houses offices, training room, staff lunch rooms, washrooms, warehouse and various individual workshop units. The building is in good condition but the envelope is showing its age and upgrades should be considered in the next 3-5 years. Some codes upgrading is also required.

2.1.1.1 BUILDING EXTERIOR ENVELOPE

The building envelope is of pre-engineered steel frame, with vertical painted metal cladding, aluminum operable and fixed windows, hollow metal and aluminum doors, fibreglass and insulated metal overhead doors and low slope metal roofing. Siding is exhibiting corrosion at the sills due to proximity of grade and splash back from roof drainage. Paint is faded and peeled. Replacement of the siding is recommended within the next 2-3 years, addition of full roof gutter and downspout system is also recommended to be carried out within one year. Personnel doors are in good condition with painting recommended. Windows are aluminum. Insulated metal overhead doors are contemporary and in good condition, remaining are single lite fibreglass panel overhead doors while in fair to good condition are thermally poor performers, replacement should be considered in the next 1-3 years. The metal roofing has had a coating applied in the general area where the 'L' shaped building wings intersect. The roofing appears to be at or close to the end of its useful life with replacement to be considered in the next 3-5 years. The exterior walls are clad with clay face brick along part of the front façade. While the brick is in good condition some pointing is required. No brick vents were noted at the top but weep holes were noted along the sill.

2.1.1.2 BUILDING INTERIOR

Offices block (original construction):

Floors are concrete slabs on grade with 300 x 300 mm vinyl tile and rubber base finish which is in good condition but would benefit from washing and waxing. The training room has a carpet floor finish. The main entrance vestibule floor is of non-glazed ceramic tile. Interior finish of exterior walls as well as partitions is of painted drywall. Studs are metal with the exception of the training room which has a sound insulated wood stud partition. Ceilings are 610 mm x 1220 mm un-rated suspended acoustical tile. Aged water stains are present along several locations close to the front exterior wall. Staff advised that recent roof leaks were repaired, stained tiles should be replaced. Doors are generally solid core wood in pressed steel frames with commercial hardware, these are in good condition.

Shops/offices block (original construction):

Both the original construction and extension shops/offices and warehouse are located one half level below the offices block to follow the site's natural grade. Poured concrete stairs access between the two levels. This block houses three offices, one washroom, a staff lunch room, small storage room and three individual trade shops. Floors are concrete slabs on grade with painted finish in the shops and 300 x 300 mm vinyl tile elsewhere. Shops partitions are of painted concrete masonry block with metal stud and painted drywall elsewhere. Personnel doors are hollow metal in pressed steel frames to the shops and solid core wood in pressed steel frames elsewhere. All are painted. No fire rating labels were noted. Ceilings in the offices, washroom and lunch room are 610 x 1220 mm non rated suspended acoustical tile. Aged water stains are evident, such tile should be replaced. The closest shop to the office block has had a plywood and wood stud framed storage room constructed within it with an open storage mezzanine above it accessed by a fixed ladder.

Warehouse (addition):

A pre-engineered steel warehouse was added to the original shops wing. The 12.2 metre long extension matches the original building in depth and height. Exterior walls are pre painted vertical metal siding, roll glass fibre vinyl coated insulation and interior of exterior walls are finished part height with pre painted steel liner panel. The roof consists of a low slope standing seam steel roof with roll type glass fibre vinyl coated insulation exposed to the building interior. The overhead door is contemporary insulated pre painted steel which is in good condition. The extension is overall in good condition.

The extension includes wood stud/joist/plywood constructed storage mezzanines which have low ceiling and are a combination of open space and plywood shelving. Similar rooms exist on the first floor. The mezzanines are accessed via open wood stairs.

2.1.1.3 Building Code

The building is classified as F-3 – Low Hazard Industrial and "D" Offices by the NBCC 2010.

2.1.1.4 Accessibility

The building is not currently accessible to persons with disabilities. Given its age it would not be required to be accessible unless renovations from 1981 to now, plus additional renovations were to take place which exceeded 50% of the replacement cost of the building. The estimated replacement value of the building is $2,016,000. If it was desired the building could be made 'reasonably accessible' by adding a power door operator, accessible washroom and lift on the stair between the office block and warehouse/shop block. To change doors and door clearances would be a major project. Such modifications could allow mobility challenged visitors and office staff to use the building.

2.1.1.5 Selected NBCC 2010/ LSC 101 Requirements

The following provides an overview of several National Building Code/Life Safety Code NFPA 101 requirements and applicable sections for this facility.

Requirements	**Compliance / Action**
1) <u>Building Occupancy</u> Group F-3 – Low Hazard Industrial Group D – Business and Person Services – Office Areas *NBCC A-3.1.3.1*	Compliant
2) <u>Group D, Up To Two Storeys</u> 1. A building classified as Group D, is permitted to conform to Sentence (2) provided a. It is not more than 2 storeys in building height, and b. It has a building area not more than 1500 m^2 when facing 3 streets. 2. The building referred to in Sentence (1) is permitted to be of combustible construction or non-combustible construction used singly or in combination, and a. Floor assemblies shall be fire separations and, if of combustible construction, shall have a fire resistance rating not less than 45 minutes, and i) Have a fire resistance rating not less than 45 minutes, and ii) be of combustible construction. *NBCC 3.2.2.50*	Multiple Occupancy Group D – Offices Group F-3 – Low Hazard Industrial Group D is the most restrictive, therefore governs. Compliant
3) <u>Occupant Load (Based on LSC)</u> Group F3 - Low Hazard Industrial: 450 m^2/46 m^2 per person = 9.8 Group D – Offices: 247 m^2/9.3 m^2 per person = 26.5 Total Occupant Load = 36 persons (Service rooms, storage, circulation and washrooms are excluded)	Compliant
4) Exit Capacity The maximum size of rooms or suites with one exit are as follows: Group D – 200 m^2 with a 25 metre travel distance to the egress door. Group F-3 – 200 m^2 with a 15 metre travel distance to the egress door. *NBCC 3.4.2.1.A*	Suites are compliant
5) Except if exits are located along the perimeter of the floor area and each main aisle in the floor area leads directly to an exit, the travel distance may be 60 metres maximum. NBCC 3.4.2.5	Compliant
6) The minimum width of a public corridor shall be 1100 mm. *NBCC 3.3.1.9*	Compliant
7) Travel Distance shall be maximum of 30 metres. *NBCC 3.4.2.5*	Non-compliant Certain corridor (access to

Requirements	**Compliance / Action**
	exit) travel distances exceed 30 m and are dead ended. Exits to be added.
8) Exit capacity 36 persons x 6.1 mm per person = 220 mm *NBCC 3.4.3.2*	Compliant (with the exception of dead ending and travel distances).
9) Exits shall be separated from the remainder of the building by a fire separation having a fire resistance rating of not less than 45 minutes. *NBCC 3.4.4.1*	N/A
10) Electrical rooms, if housing transformers, shall have a fire resistance rating of not less than 60 minutes. *NBCC 3.6.2.1*	Compliant
11) Washroom Fixture Calculation Group F-3 - 9.8 persons: 1 washroom Group D - 26 persons: 1 male, 1 female *NBCC 3.7.2.2*	Compliant
12) The building need not be designed to meet the NL Accessibility Act requirements due to its age.	
13) In a building with more than one major occupancy, the requirement of the most stringent occupancy shall apply to the entire building.	Group D governs
14) Cooking equipment not within dwelling units used in processes producing grease laden vapours shall be designed and constructed in accordance with Part 6.	Non-compliant, however commercial hood with fire suppression system as required in Part 6 would not be required for this application. A standard residential hood is acceptable.
15) Rooms for storage of janitorial supplies shall be constructed with a 45 minute fire rated fire separation. *NBCC 3.3.21.2*	Non-compliant Labelled door and frame and walls and ceilings with required rating to be constructed.
16) Limiting distance	Compliant

2.1.1.6 Conclusions and Recommendations

The building is in generally good condition with minor maintenance and codes upgrading required.

The following short term recommendations are made:

- Replace stained ceiling tiles.
- Repoint brick.
- Provide non-skid treads c/w tactile to corridor stairs.

- Correct code exiting by addition of an exit from “plan” west of Corridor 17 (refer to floorplan in Appendix G) to eliminate dead ending and travel distance overage as well as fire ratings deficiencies.
- Add gutter and downspout systems.
- Paint doors and frames.
- Provide correct code to code guards and stair rails in shops and warehouse.

The following mid- term recommendations are made:

- Replace metal siding.
- Replace remaining fibreglass overhead doors.
- Paint interior of building.
- Replace metal roofing.

2.1.2 Structural Assessment

The main depot building at the Whitbourne Eastern Area Depot is a pre-engineered steel building supported on a concrete foundation wall. The building can be split up into the office area, the work shop/ warehouse area and the newer extension. The extension a pre-engineered steel structure which ties into the warehouse area.

2.1.2.1 Foundation and Floor Systems

The main building structures are supported on a concrete foundation wall. Since the office building portion is located on higher grade the foundation wall that is shared between the warehouse and office also acts as a retaining wall.

The foundations of the main building range from poor to good condition. Typically with foundation walls it is recommended to have a minimum of 150mm (6”) to 200 mm (8”) of the foundation wall above grade. It appears as though most of the building’s foundation wall does not protrude above grade the minimum 150 mm (6”) meaning that the top edges of the concrete wall will be in more frequent contact with rain or snow. The constant water contact and repeated freeze thaw cycles can result in damage to the concrete as well as to the metal cladding.

The warehouse foundation appears to be in good condition as there were no large defects noted other than vertical shrinkage cracks on the concrete retaining wall. Although there is no significant damage noted on the warehouse foundation, there are concerns of possible future damage to the backside foundation wall due to the grading of site sloping towards the foundation wall (see Structural photo 1). Water from rainfall or snow fall will then migrate towards the foundation wall due to this slope. Given that the top of the foundation wall is assumed to be close to the grade (cladding conceals top of wall) contact with water and repeated freeze thaw cycles could result in damage.

The foundation wall supporting the office building area is in poor condition. The portion of the foundation along the front face of the building and to the right of the main entrance is cracked horizontally resulting in large areas of spalled concrete (see Structural photos 2 and 3). The same damage is evident on the face of the foundation wall facing the Maintenance Garage (see Structural photo 4). It is suspected that this damage has been caused by water infiltration and repeated freeze thaw cycles. Given the proximity of the top of wall to grade level, the top edge of the foundation wall would be in contact with water or snow more frequently possibly accelerating the damage. It appears that the metal cladding below the windows have been replaced in the area in which the damage was noted. It is not known whether this cladding has been replaced due to water issues or due to another issue.

The inspection of the foundation walls was limited as only a small portion of the wall could be viewed from the exterior.

The interior ground floor of both the warehouse and office building consists of concrete slab on grade. The office portions slab was concealed by floor tile, and therefore could not be inspected. The concrete slabs that were visible appear to be in fair condition. Cracking was noted at various areas however this cracking appears to be caused by shrinkage during curing as there are no patterns to the cracking that would suggest otherwise (see Structural photos 5 and 6). Although it is suspected that these cracks are caused by shrinkage, the definite cause of cracking is not known. Regardless of the cause, the noted cracks will not affect the performance or strength of the slab.

2.1.2.2 Roof Systems

The roofing system of the main building consists of metal cladding and insulation supported on cold formed steel purlins which in turn are supported by the main building frames. The inspection of the roof system of the main building was limited as not every component was visible for inspection. The warehouse areas allowed easy access to view the purlins and building frames, however the locations where drop down ceilings are installed proved more challenging as mechanical and electrical components concealed portions of the roof system.

Overall the roof system from a structural stand point appears to be in good condition. Throughout the inspection of the front office portion of the building, water damage was noted on some of the drop down ceiling tiles. Although water damage was viewed on the ceiling tiles the water did not affect the main structural members supporting the roof. Within the warehouse portion of the building there were a couple of locations in which purlins were noted as being deformed (see Structural photo 7). The deformations in the purlins do not appear to have been caused by overstressing. Typically when a purlin or beam is overstressed due to bending the top compression flange will show signs of buckling. The deformations noted occur on the bottom tension flange which suggest that the damage was caused by abrasion during construction or everyday operations.

2.1.2.3 Framing Systems

Pre-engineered buildings consist of a series of rigid building frames in the transverse direction tied together by way of purlins, wind girts and horizontal and vertical steel bracing. The entire framing system could not be viewed as interior liner panel and wall finishes in both new addition and office building concealed the exterior column flange and wind girts.

The steel framing appears to be in good condition as there were no signs of deformations or damage to any of the visible building frames or bracing member. Minor surface corrosion was noted on the bolts and base plates of the columns however the corrosion is not of concern. During the inspection the location of the wind girt within the warehouse section seemed rather large resulting in the interior and exterior panels spanning a long distance. On closer inspection the interior panel is cut where it meets the wind girt (see Structural photo 8). Therefore it is assumed that additional members such as steel or timber studs must be framed from the ground floor to underside of girt in order to take the wind loading of the panel given as there does not appear to be damage to the panels. The existing drawings that were provided did not include a detail for the wall construction.

It was also noted during the inspection of the building frame within the new extension that tools are being hung from the horizontal steel tie rod (see photo 9). Although hanging the tools does not affect the condition of the tie rod, it may affect the loading. Any additional weight put onto the tie rod will result in increased tension loads being transferred into the member. The increased loading is not desirable as the tie rod system is typically designed to be near maximum capacity.

2.1.2.4 Mezzanines and second floor framing

Within the back two bays of the building (new addition) a timber framed second level was constructed. The timber floor is constructed of 38 x 235 (2x10) timber joist spaced at 400 mm (16"), supported by a 3 ply 38mm x 235 mm (2x10) built-up timber beam which spans a maximum of 3.0 m (10'0"). Steel jack posts which bear on ground level concrete slab on grade provide support to the main supporting beam (see Structural photo 10). The floor system is finished with painted plywood sheathing.

The timber floor systems of the addition appear to be in good condition. The floor appears to be built using proper construction methods and no signs of excessive deflections are visible. While walking on the upper floor levels there is no excessive vibration or "bouncing" of the floor joists indicating sufficient strength. Also, the main supporting beam appears to be adequately connected to the steel jack post.

The telecontrol and protection shop of the warehouse portion is also equipped with a small mezzanine supported constructed on top of a storage room (see Structural photo 11). The framing of the mezzanine was not visible at the time of inspection however it is assumed to be in good condition as there were no signs of cracking in the ceiling finishes below. Cracking in the ceiling finishes would suggest excessive deflections, which could mean overstressing.

2.1.2.5 Concrete block partition walls

Concrete block partition walls are in fair condition. The block walls extend from concrete slab on grade to the underside of roof framing elevation. Cracking diagonally along the grout line was noted, which is an indication of settlement (see Structural photos 12 and 13). The settlement could have occurred shortly after construction of the wall such as initial settlement of placed gravels, or could have happened over time. Although the cracking indicates settlement of the wall, there is no need for immediate concern, rather the walls with this cracking evident should be monitored to ensure the condition does not worsen.

2.1.2.6 Conclusions and Recommendations

Overall the main building is in good condition with the exception of the damage to the foundation wall. Based on the observations made during the inspection the following is recommended.

- Foundation wall should be exposed in locations where larger horizontal cracks and spalling is noted. The visual inspection was limited as only a small portion of the wall was visible. This makes it difficult to determine the cause of the damage noted on the foundation wall. It is recommended to remove cladding and carry out required excavation in the location of the damage to uncover full extent of the damage. Once the full damage of the crack is determined an appropriate repair detail can be recommended.
- All tools must be removed from horizontal cross bracing. As discussed in section 2.1.3.3, any additional weight imposed onto the steel tie rod will result in an increased tension load significantly. Relatively small transverse loads applied to tension members such as tie rods can impart a significantly tension force to the member. Pre-engineered building components are typically designed to their maximum theoretical capacity, therefore additional weight could theoretically overstress the member.
- Cracks in concrete block partition walls possibly caused by settlement should be monitored to ensure condition does not worsen.

2.1.3 Mechanical Assessment

2.1.3.1 Plumbing – Drainage, Waste, and Venting

The office/warehouse facility is equipped with a number of washrooms and lunchrooms throughout the facility. The office area is provided with one male washroom, one female washroom, and a small lunchroom. The warehouse level is provided with one washroom, laundry area, and lunchroom.

Waste and vent piping in the building is primarily ABS (see Mechanical photos 1 to 3). ABS piping cannot be used in ceiling spaces used as return air plenums and where passing through fire separations must be provided with fire stop collars. No instances of these issues were directly observed however they potentially exist due to the presence of this type of pipe and that the office space utilizes the ceiling space as a return air plenum.

Condensate drains from indoor HVAC equipment was observed to be copper.

Based on the original building drawings, the three workshops were provided with floor drains connected to an oil interceptor system. The oil Interceptor system was indicated to be composed of a stabilizing chamber, oil interceptor, and underground oil storage tank. Discharge from the system was indicated to be piped to a drainage ditch. On site it was observed that all three shop floor drains have been capped rendering the system nonfunctional (See Mechanical photo 4). Access to the stabilizing chamber (located in the Transmission Shop) and the oil interceptor (located in the Warehouse) were not possible due to racking and storage cabinets placed on top of the floor access covers (see Mechanical Photos 5 and 6). There was no observable evidence of the presence of the underground oil storage tank.

The original building drawings indicate that sanitary sewage from the facility flows to a septic system located on the eastern end of the facility. There were no observable or accessible components of this system.

2.1.3.2 Plumbing – Domestic Water Piping and Systems

Domestic water for the facility is provided from an onsite well. Based on original building drawings the buried well is located in the yard area south of the workshops. No observable signs of the well were present during the site visit. Well water enters the building in the Communications Shop to a 72 L diaphragm type pressure tank fitted with a pressure switch. The well pump control is fitted with a pump protection module. Water from this tank is piped to a polyethylene storage tank that is provided with level controls which operates a motorized ball valve to open when water level in the tank falls below a set level. Water from the storage tank enters a Berkeley Model 7HN ¾ HP centrifugal pump mounted on the floor that is controlled with a pressure switch and water is stored under pressure in a second 132 L diaphragm type pressure tank. See Mechanical photos 7 to 9. An inline cartridge type filter provides filtration. There was no presence of a water disinfection system. The water supply system is fully functional with no issues being reported.

With the exception of the water entrance pumping and storage system the domestic water piping is copper throughout the facility. Domestic water piping is generally insulated with preformed pipe insulation and canvas jacketing. Some areas of the piping are not insulated (see Mechanical photo 10).

Domestic water piping throughout the building is generally 42 years of age and is at the end of its expected life.

Isolation valves are typically gate valves in older piping and ball valves in newer piping,

Domestic hot water is produced in an electric hot water tank located in a storage room in the Office area Lunch Room. The tank is a Giant model 152ETE-3F5M, 175 L, 3kW, that was manufactured in 2004 (see Mechanical photo 11). This tank is at the end of its useful life.

Measured hot water temperature was 55.6°C which is satisfactory.

Water quality in the building appeared to be relatively good, however it would not be suitable for consumption without a means of disinfection. The Office Area Lunch Room sink is provided with a Purelux UV filtration system with dispensing faucet. The unit was not plugged in so the UV system is not functional. If the system is to be re-instated it should be provided with signage to indicating that water from the system is not potable and must be boiled prior to consumption.

2.1.3.3 Plumbing – Fixtures

As mentioned previously the facility has a number of washrooms, lunch rooms, and other areas with plumbing fixtures. Water closets are a combination of commercial grade and residential grade floor mounted tank type utilizing 13 L or 6 L per flush (see Mechanical photo 13). Water closets were generally in good condition. The water closet in the shop/warehouse area washroom was observed to have its seat cover off (see Mechanical photo 13).

Urinals are wall hung commercial grade vitreous china with manual flush valves (see Mechanical photo 14). The urinals were in good conditions with no issues noted.

Washroom lavatories were a combination of countertop residential grade and commercial grade wall hung (see Mechanical photos 15 and 16). Lavatory faucets were residential grade. Lavatories were in good condition with no issues noted.

Lunch Room sinks were single bowl stainless steel (see Mechanical photo 17). Sink faucets are residential grade two handle type. Sinks were in good condition with no issues noted.

A self-contained wall mounted eyewash unit is provided in the warehouse extension (see Mechanical photo 18). The unit is inspected and maintained on a regular basis.

2.1.3.4 HVAC – Air Handling Systems

The facility is provided with minimal air handling systems. The office area is provided with a built up system with cooling and humidification as described below. Exhaust fans are present in washrooms and lunch rooms.

The main office area is provided with a split air conditioning system. The condenser is located outdoors on the north end of the office area and the evaporator is an indoor air handler unit located in the ceiling of the office area main corridor. The condenser is a Carrier model 38TRA060 and has a nominal cooling capacity of 5 tons (see Mechanical photo 19). The indoor air handler unit is a Carrier model 42BHC20 (see Mechanical photo 20). The units were manufactured in 2005 and utilize R22 refrigerant. This system is provided with supply ducting throughout this office area. A return air fan located above the Lunch Room ceiling takes air from the ceiling plenum and returns a portion to the indoor unit and expels a portion to the outside through an exhaust hood. The return air fan is a Carnes model VIBK15R1C1NL20S. Supply ducting, return air ducting, outside air ducting, and exhaust air ducting is insulated with foil faced blanket type insulation. At 11 years of age this system should have 5 to 10 years life remaining.

Downstream of the indoor air handler is an electric duct heater which tempers the air in non-cooling mode when required. The duct heater is a Thermolec model SC-CTPBX with 26 kW capacity. The discharge temperature of the duct heater is controlled by a duct temperature sensor and thermostat located in the janitor room.

Air distribution is through bypass type terminal units and square cone diffusers and return air grilles into the ceiling cavity (see Mechanical photo 21). The air distribution system appeared to be in good condition. The terminal units are controlled by zone thermostats which control the airflow to the space to maintain space temperature and also control the space baseboard heat.

A master controller is located in the janitor room which turns the systems fans on and off, controls the outdoor condenser cooling stage, and enables/disables the duct heater operation (see Mechanical photo 22). It was observed on site that the system did not operate continuously but cut in and cut out possibly to the fan control in the controller not being set to occupied continuous operation. As this system also provides ventilation air to this part of the building this system should operate continuously during occupied periods.

The system is provided with an electric steam humidification system to maintain proper humidity levels in winter conditions. The humidifier was manufactured by DriSteam (see Mechanical photo 23). Its model and capacity were not able to be verified. Based on the age of this unit it should have a remaining expected lifespan of 10 to 15 years. Steam from the unit is injected into the supply air ductwork downstream of the indoor air handling unit. Humidifier output is controlled by a humidity sensor located in the return air ductwork. Regular inspection and maintenance should be performed on this unit.

It was observed that the Electrical Room which houses the network equipment is not serviced by this system and there is no other means of cooling this space which appeared to be a higher temperature than would normally be desired. A dedicated cooling system for this space should be considered.

Lunch Rooms are provided with domestic style range hoods ducted to the outside (see Mechanical photo 24). It was observed that the warehouse/workshop area Lunch Room range hood was not working.

Washrooms are provided with ceiling mounted exhaust fans ducted to the outside (see Mechanical photo 25).

2.1.3.5 HVAC – Ventilation Air

The office area built up air handling system is configured to provide ventilation air. When the system is running a quantity of outside air taken in through a hood mixes with return air and is distributed throughout the office area. Excess return air is exhausted to the outside from a hood (see Mechanical photo 19 for intake and exhaust air hoods). Based on the ventilation upgrading drawings provided, the amount of outside ventilation air being bought into this space (427 L/s) is excessive based on ASHRAE standards. This excess outside air results in greater cooling and heating costs to the facility. Proper ventilation air should be calculated and this part of the system rebalanced.

The remainder of the building has no means of proving ventilation air in accordance with ASHRAE 62.1. There is no source of makeup air for the other various exhaust systems other than what would come in around doors, windows or other poorly sealed parts of the building. It is recommended that a heat recovery system be installed to provide ventilation air to spaces in accordance with ASHRAE.

Use of heat recovery ventilator is recommended for energy savings. The existing washroom and lunchroom exhaust fans could be removed and washroom and lunch room exhaust ducted to the new heat recovery unit. The heat recovery unit would service the warehouse, shops, and associated offices. The new system would be provided with an outside air intake, exhaust air discharge, supply air electric tempering coil, associated controls, and distribution ductwork and grilles. The unit could be installed on an existing mezzanine level in the warehouse extension or communications shop. Ductwork would be run above the existing shop office area and high in the existing warehouse and shop areas.

2.1.3.6 HVAC – Controls

The office area air handling system is provided with a master control unit (Viconics T7652A1000) located in the janitor room as per part 2.1.3.4 (see Mechanical photo 22). System zone bypass terminal units and perimeter heat as described in part 2.1.3.4 are controlled by non-networked thermostats (see Mechanical photo 26). Refer to section 2.1.3.4 for a more detailed description of these controls.

Washroom and other miscellaneous fans are controlled by simple toggle switches.

2.1.3.7 Fire Protection

No sprinkler system is present in the building.

The building is provided with portable fire extinguishers throughout. The majority of the extinguishers are dry chemical type suitable for class A, B, and C fires. All extinguishers had up to date inspections. There appeared to be sufficient fire extinguishers for the hazard classification of the building.

2.1.3.8 Conclusions and Recommendations

The following recommendations are made for mechanical improvements to the depot building.

Plumbing:

- Replace any ABS piping present in the office area return air plenum with copper or plenum rated plastic DWV.
- Replace domestic hot water tank.
- Provide insulation on uninsulated domestic water piping.
- In the mid-term replace copper domestic water piping throughout facility.

HVAC:

- Verify office area control operation and set up for continuous operation during occupied periods.
- Inspect and service office area steam humidifier.
- Provide a dedicated cooling system for the Electrical/Server Room.
- Replace the warehouse/workshop area Lunch Room range hood.
- Rebalance outside air rates to office area.
- Provide heat recovery ventilation system to provide minimum outside air to warehouse/shop area of building.

2.1.4 Electrical Assessment

2.1.4.1 Service and Distribution

2.1.4.1.1 Description

The electrical service enters the main building overhead from three (3) pole mounted single phase distribution transformers (refer to Electrical photo 1).

The main incoming service conductors to the building are connected to a 600A, 120/208V disconnect switch. The main disconnect feeds main splitter which feeds two (2) other splitters, one (1) 225A for lighting and general loads and one (1) 400A for heating loads.

Revenue metering is performed at both secondary splitters with separate revenue meters, one (1) meter for lighting and general loads and one (1) meter for heating loads. The main disconnect, the splitters with associated disconnects and revenue meters are located inside the main building electrical/telecommunication room (refer to Electrical photo 2).

120/208V electricity is distributed through the facility is distributed through four (4) distribution panelboards (Refer to Electrical photos 3 and 4) as follows:

- Heating Panel HPA – Main Office
- Heating Panel HPB – Lower Corridor
- Lighting Panel LPA – Main Office
- Lighting Panel LPB – Lower Corridor

2.1.4.1.2 Observations

The incoming 600A at 120/208V service capacity appears to be adequate based on the peak demand history over the past 3 years.

Most of the power distribution equipment in main electrical room appears to be more than thirty (30) years old and is in fair physical condition. There were no visible signs of excessive wear or corrosion. Cabling/conduit runs also appeared to be in good condition with no apparent deficiencies.

Panelboards are recessed mounted in the office area and in the corridor space and feed all building lighting, heating and receptacle loads. Panels seem to be original installed more than thirty (30) years ago and are in poor condition. There is no spare capacity on most of the panelboards. There are five (5) circuit breaker spaces available only at one of the heating panelboards.

2.1.4.1.3 Conclusions

Based on the visual inspection of the facility, all four distribution panelboards have exceeded their service life expectancy. New panelboards with sufficient spare capacity have to be installed in the next five (5) years.

2.1.4.2 Emergency Power System

There is no emergency power distribution system.

2.1.4.3 Lighting

2.1.4.3.1 Description

The majority of the office areas are illuminated by 4 ft. recessed acrylic lens florescent fixtures with T8 Lamps (Refer to Electrical photo 5).

Some service and storage rooms are lit with 4 ft. surface mounted 2–lamp, T8 linear wraparound or strip fluorescent fixtures.

The warehouse area is primarily illuminated by stem-mounted lensed fluorescent fixtures (Refer to Electrical photo 6).

The exterior building lighting is provided by HID wallpacks installed above the overhead doors and man doors (Refer to Electrical photo 7) and wall by mounted HID fixtures.

The building lighting is fed from the 120/208V panelboards. The exterior lighting is partially operated through a lighting contactor located in the main electrical/telecommunication room. The lighting fixtures above man doors have individual control and some were observed to be switched on during day time.

2.1.4.3.2 Observations

Office areas, corridors and warehouses were observed to have adequate lighting levels as required by the latest edition of the NBCC.

The lighting fixture in the office area, corridors and warehouses are in good condition.

The exterior fixtures with exception of the fixtures above man door are in poor condition.

2.1.4.3.3 Conclusions

The old exterior lights and associated controls should be replaced.

2.1.4.4 Exit and Emergency Lighting

2.1.4.4.1 Description

The building emergency lighting consists of dual head emergency battery units. In some locations the battery unit is combined with exit sign. Most of the battery units are new and in good condition.

The building is equipped with lighted exit signs located throughout. They have battery backup and are lit with incandescent lamps. Refer to Electrical photo 8 for emergency and exit lighting.

2.1.4.4.2 Observations

Emergency lighting units and exit signs are adequate and most of them are in good condition.

2.1.4.4.3 Conclusions

Provide 30-second monthly functional test. Consider battery replacement for 10 year old lead acid units or for 15 year old nickel cadmium units.

2.1.4.5 Heating System

2.1.4.5.1 Description

The whole building is heated by electrical heaters. The office area is heated by electric baseboard, wall mount convection and wall mount forced air heaters (Refer to Electrical photo 9). The warehouses are heated by vertical discharge electric unit heaters (Refer to Electrical photo 6).

2.1.4.5.2 Observations

The electric heater in office area and warehouses area are in relatively good condition. It was observed that a baseboard heater in the space off of the warehouse was not operational and that one of the warehouse unit heaters was noisy.

2.1.4.5.3 Conclusions

Investigate and repair baseboard heater in space off of warehouse area. No heater replacement will be required in the next 10 years.

2.1.4.6 Wiring Devices

2.1.4.6.1 Description

U-grounded, duplex receptacles are installed throughout the building. Receptacles are recessed with the exception of the receptacles installed in the warehouse and other shop spaces, which are surface mounted. The receptacles in wet areas are GFCI. The outdoor receptacles are weather protected type duplex receptacles.

The lighting control in offices, service rooms and warehouses is provided by individual lighting switches for each circuit.

2.1.4.6.2 Observations

The indoor receptacles and lighting switches are sufficient quantity and in good condition. All outdoor receptacles are in poor condition (refer to Electrical photo 10).

2.1.4.6.3 Conclusions

All outdoor receptacles, including the outlet boxes and the weather protective covers need replacement.

2.1.4.7 Wiring Methods

2.1.4.7.1 Description

Wiring system appears to be a combination of AC-90 and NMD90 cabling installed concealed in walls and above ceiling in the office area and TW or RW90 cabling installed in EMT conduit in warehouses.

2.1.4.7.2 Observations

The observed wiring appears to be in good condition.

2.1.4.8 Fire Alarm

2.1.4.8.1 Description

The Fire Alarm panel is a GE EST FireShield System with 3-zone conventional fire alarm control (Refer to Electrical photo 11).

2.1.4.8.2 Observations

The fire alarm panel appears to have been replaced and is not more than 10 years old. Wiring is concealed and not visible.

Smoke detectors, pull stations and fire alarm bells are installed throughout the building. Smoke detectors are relatively new. Pull stations and alarm bells are original. All fire alarm devices are in good condition.

No visual signal alarms were apparent throughout the building.

The fire alarm system annunciator/control panel is located in the office area and is not visible from the main entrance.

2.1.4.8.3 Conclusions

We recommend the installation of visual alarms for aiding any potential hearing impaired occupants.

Consider relocation of the fire alarm annunciator/control panel next to the main entrance as required by NBCC, Clause 3.2.4.9.

2.1.4.9 Data and Communications

The building telecommunication cables enters the building in the main electrical/telecommunication room. All telecom equipment including but not limited to telephone BIX blocks, telecom racks, patch panels, Ethernet switches, etc. and cabling is not more than 10 years old and is in good condition (Refer to Electrical photo 12).

2.1.4.10 CCTV / Security System

2.1.4.10.1 Description

There is a proximity card access control system that controls access to some building areas during after hours. The card access system is relatively new and in good condition (refer to Electrical Photo 13). There is no CCTV system.

2.1.4.11 PA System

There is public address (PA) system in the building controlled from the front desk. The loudspeakers are recessed in the ceiling tiles inside the office area and surface mounted in the warehouse area and the storage area adjacent to the building. The loudspeakers are new good condition.

2.1.5 Environmental Review

2.1.5.1 Air Emissions

No air emissions are present from the facility from fuel burning equipment or processes using chemicals.

2.1.5.2 Asbestos Containing Materials

An asbestos survey provided to the consultant indicated the presence of asbestos in floor tile and in drywall joint filler. The presence of these asbestos containing materials shall be made aware to any personnel undertaking work in the facility that could disturb these materials.

2.1.5.3 Lead Containing Materials

Lead is likely present in plumbing solder and possibly in oil based paints used in the facility. The potential presence of lead containing materials shall be made aware to any personnel undertaking work in the facility that could disturb these materials.

2.1.5.4 PCB Containing Materials

Fluorescent lighting in the facility is not old enough to be of concern for presence of PCB's that were commonly used in older lighting ballasts.

2.1.5.5 Ozone Depleting Substances

The office air conditioning system utilizes the recognized ozone depleting refrigerants R22. Older refrigerators may also contain ozone depleting refrigerants. Ozone depleting refrigerants must be recovered and properly documented prior to equipment being disposed of.

There was no Halon fire extinguishing systems identified in the facility.

2.1.5.6 Indoor Air Quality

While no indoor air quality issues were noticed while on site, a substantial portion of the facility is not provided with proper ventilation and make-up air systems. Any odours, VOC's from off gassing, and other airborne pollutants cannot be effectively removed from the building.

2.1.5.7 Mould and Mildew

No signs of mould or mildew were present throughout the building.

2.1.5.8 Spills and Contaminated Areas

Signs of spills were observed both inside the main depot building and around the site based on stains (see Environmental Photos 1 to 3). The spill inside the building was observed in the extension off of the warehouse area underneath a mobile transfer pump. Stains in the depot yard were found to the south of the main building.

2.1.5.9 Flammable and Combustible Liquids Storage

Flammable and combustible liquids were found to be present in the Warehouse and Warehouse extension (see Environmental Photos 4 to 17).

Liquids found in safety cabinets in the Warehouse included:

- Aerosol spray paints;
- Aerosol spray primers;
- Aerosol spray cleaners;
- Aerosol spray lubricants;
- Penetrating lubricants;
- Paint thinner;
- Acetone;
- Insulator cleaner and protector.

Liquids found in safety cabinets in the Warehouse Extension included:

- Penetrating oil;
- Gasoline;
- Hydraulic fluid;
- Transmission oil.

Miscellaneous liquids found in the Warehouse Extension but not in safety cabinets included:

- Compressor oil;
- Degreaser;
- Gasoline and oils in various combustion engine powered equipment such as chainsaws, brush cutters, pumps, snow blower, etc.

Liquids found outdoors at the south corner of the site included numerous 205 L drums of transformer oil. A ramp located on the east end of the building contained 205 L drums of jet fuel.

Quantities present do not exceed maximum amounts allowable for incidental use.

2.1.5.10 Compressed Gases Storage

Quantities of compressed gases were observed within the building and in the depot yard (see Environmental Photos 18 to 23). Items found inside the building included:

- Propane cylinders stored in safety cabinet;
- Propane cylinder in BBQ located in warehouse extension (two such);
- Nitrogen cylinder;
- Sulfur hexafluoride cylinder.

The National Fire Code of Canada prohibits the indoor storage of Class 2.1 flammable gases of which propane is one unless the storage is in a specially designed room and not within a specified distance of other flammable and combustible liquids.

Gases stored outside in the yard include:

- Sulfur hexafluoride;
- Propane cylinder (used on forklift).

2.1.5.11 Conclusions and Recommendations

The following recommendations are made regarding environmental issues identified.

- Indoor air quality should be addressed as per the recommendation in the mechanical section of this report.
- The presence of asbestos and potentially lead containing materials are to be made aware to anyone undertaking work that may disturb these materials.
- Ozone depleting substances (refrigerants) should be properly recovered prior to disposing of equipment.
- Stained soil in the depot yard should be removed and properly disposed of. Stains on interior floors should be cleaned.
- Stored propane cylinders should be moved to an outdoor storage area.

2.1.6 Energy Usage Review

Knowing the energy consumption of a facility from all sources (electricity, petroleum fuels, etc.) an energy use intensity (EUI) can be calculated which can be compared to benchmark EUI's for various types of buildings in Canada. These benchmarks represent median EUIs for various types of facilities. Energy usage information was provided for the years 2014 to 2015 for this site. Based on the building area and the energy consumption the EUI was calculated for each of these years to be 0.64 and 0.59 respectively.

Based on the EUI tables for various building uses, the median Site EUI for a mixed use building is 0.90. Based on this the building is more energy efficient than the national median value. However as the building is not provided with a proper ventilation system its calculated EUI is less than would be expected. It would be expected that with the addition of a proper ventilation systems this building EUI would increase to around the national median value.

2.2 Maintenance Garage

2.2.1 Architectural Assessment

This vehicle repair building has a 133 square metre footprint/first floor area plus a small 18.4 square meter second floor. The age of the building is unknown but it is not contemporary. The building houses a repair garage with an in floor repair pit and equipment workspace. A single washroom/laundry and a storage room complete the first floor. The second floor, accessed via open wood stairs houses an office plus a compressor/storage room. The building is of wood frame with sloped roof clad in asphalt shingles. Siding consists of vertical pre-painted metal which is in several colours and is significantly faded. Exterior doors include one hollow metal personnel door in a pressed steel frame, which requires re-painting. One large pre-painted insulated steel overhead door provides vehicle access. The building is in fair condition with significant upgrading required. Interior finishes of the walls and ceilings consist of painted hardboard. Foundations are of poured concrete with the first floor being poured in placed concrete slabs.

2.2.1.1 Building Exterior Envelope

The wood frame building exterior walls are clad in pre-painted vertical metal siding. Several colours are noted, all with significant paint fade. Replacement is recommended. The roof is sloped with asphalt shingle finish. Attics were not accessible. Eaves are clad in pre-painted aluminum and vented vinyl soffits. Shingles appear to be in good condition. Windows are located high in the repair bay as well as in the washroom. Windows appear to be in good condition. The single exterior personnel door is hollow metal in pressed steel frame. It shall be painted. The large overhead door is contemporary, and is fabricated of pre-painted steel and rigid insulation sandwich panels and is operated by an electric operator.

2.2.1.2 Building Interior

Floors on the first level are poured in place concrete slabs on grade that require re-painting. Interior finishes of exterior walls is painted hardboard as are ceilings. Interior rooms are of wood stud and joists with similar finishes. Re-painting would be recommended. Hardboard has a high flame spread. Encapsulation with a non-combustible material, such as drywall is recommended. The washroom/laundry is in fair condition with space being limited and requiring re-painting. The other interior rooms are in fair condition with accumulated dust and dirt requiring cleaning and painting. No fire or sound ratings were noted. Stairs are open wood design opening into the repair garage and do not meet current codes. The garage includes an in floor repair pit which has an access ships ladder at one end only. Removable steel guard rails are all around. The garage houses an overhead crane, welding and other mechanical repair equipment. There was no attic access available to inspect roof sheeting condition, trusses, or insulation levels and condition.

2.2.1.3 Building Code

The building is classified as F-2 Medium Hazard Industrial by the NBCC 2010.

2.2.1.4 Accessibility

The building is not accessible to persons with disabilities and due to its age and function would not be required to be such.

2.2.1.5 Selected NBCC 2010/LSC 101 Requirements

The following provides an overview of several National Building Code/Life Safety Code NFPA 101 requirements and applicable sections for this facility.

Requirements	**Compliance / Action**
17) <u>Building Occupancy</u> Group F-2 – Medium Hazard Industrial *NBCC A-3.1.3.1*	Compliant
18) <u>Group F, Division 2, Up To Two Storeys</u> 3. A building classified as Group F, Division 2 is permitted to be of combustible construction or non-combustible construction used singly or in combination, provided: c. It has a building are not more than i. 900 m^2 if facing 3 streets, d. It is not more than two storeys in building height; e. Floor assemblies are fire separations and if of combustible construction, rated 45 minutes, and f. Loadbearing walls, columns, and arches supporting a rated assembly shall also be rated for 45 minutes or be of non-combustible construction. *NBCC 3.2.2.76*	Non-compliant 2nd floor shall have a 45 minute fire ratings added
19) <u>Occupant Load (Based on LSC)</u> Group F2 - Medium Hazard Industrial: 143 m^2/46 m^2 per person = 3 Total Occupant Load = 3 persons (Service rooms, storage, circulation and washrooms are excluded)	Compliant
20) Exit Capacity The maximum size of rooms or suites with one exit are as follows: Group F-2 – 150 m^2 with a 10 metre travel distance to the egress door.	Compliant

Requirements	**Compliance / Action**
NBCC 3.4.2.1.A	
21) Except if exits are located along the perimeter of the floor area and each main aisle in the floor area leads directly to an exit, the travel distance may be 60 metres maximum. NBCC 3.4.2.5	Compliant
22) The minimum width of a public corridor shall be 1100 mm. *NBCC 3.3.1.9*	N/A
23) Travel Distance shall be maximum of 30 metres. *NBCC 3.4.2.5*	Compliant
24) Exit capacity 3 persons x 6.1 mm per person = 18.3 mm *NBCC 3.4.3.2*	Compliant
25) Common laundry rooms can be separated from the remainder of the building by a rated fire separation of 45 minutes. *NBCC 3.3.1.22*	Non-compliant fire rate the washroom/laundry.
26) Exits shall be separated from the remainder of the building by a fire separation having a fire resistance rating of not less than 45 minutes. *NBCC 3.4.4.1*	Non-compliant 2nd floor exit is not enclosed, rated or protected to the exterior. Provide such enclosure.
27) Washroom Fixture Calculation Group F2 - 3 persons: 1 washroom *NBCC 3.7.2.2*	Compliant
28) The building need not be designed to meet the NL Accessibility Act due to its function and age.	Compliant
29) Limiting distance:	Compliant

2.2.1.6 Conclusions and Recommendations

The building is in fair condition. Carryout code and finishes upgrades.

The following short term recommendations are made:

- Fire rate laundry room.
- Clean building interior.
- Reconstruct stairs to meet code.
- Provide emergency egress from opposite end of repair pit plus electrical and ventilation to code.
- Provide attic access hatch and study attic condition and attic ventilation. Add ventilation and insulation to code if required.
- Firerate the second floor and the exit from it to the exterior.
- Paint exterior door.
- Paint building interior.

The following mid- term recommendations are made:

- Replace metal siding.
- Replace roof shingles.

2.2.2 Structural Assessment

The Maintenance Garage at the Whitbourne Eastern Area Depot is assumed to be a timber framed structure with pre-engineered timber trusses forming a gable roof. The timber framed building is supported on a concrete foundation wall, with the interior floor being a concrete slab on grade. The roof is weatherproofed with asphalt shingles while the walls are weatherproofed with metal cladding.

2.2.2.1 Foundation and Floor Systems

The foundation wall appears to be in fair condition as there was only small vertical cracks noted (see Structural photo 1). It appears as though the cracking is caused by shrinkage cracks that developed during curing. There is also concrete damage around the man door at the side of the building. It appears as though the foundation concrete may have been chipped to make an opening for the door installation (see Structural photo 2). Large voids in the concrete adjacent to the door are now present due to this chipping.

The ground floor of the maintenance garage consists of a concrete slab on grade with a large service pit off to one side (see Structural photo 3). Both the pit and slab on grade appear to be in good condition. The only defects noted on the concrete was minor shrinkage cracks and typical marks due to equipment abrasion (see Structural photo 4).

2.2.2.2 Roof Systems

It is assumed the roof system is constructed using pre-engineered timber trusses sheathed with plywood and weatherproofed with asphalt shingles. The roof elements could not be visually inspected as they are concealed by ceiling finishes. The roof is assumed to be in good condition as there does not appear to be any signs of overstress such as excessive deflection or cracking of the ceiling finishes. It should be noted that the inspection was conducted during the summer and therefore the loading on the roof would be minimal. In order to get an accurate assessment of the adequacy of the roof, the roof should be inspected in the winter when the largest load would be present.

2.2.2.3 Framing Systems

As mentioned in section 2.2.2 although the wall framing was not visible it is assumed to be a timber framed structure. Although the framing could not be viewed there did not appear to be cracking in the finishes which would indicate excessive deflections. All walls appeared to be plumb.

2.2.2.4 Mezzanines

A mezzanine which houses an office and storage area is located at the back of the garage. Two rooms are located below the mezzanine floor; a bathroom and another room which was locked. The floor system of the mezzanine could not be viewed as it was concealed by ceiling finishes on the underside of the floor framing. While walking over the floor there did not appear to be any large deflections or sags in the system. It should be noted however that a fair amount of moisture or staining was present at the location where the air compressor is stored (see Structural photo 5). Since the floor system could not be visually inspected, it will be classified as being in fair condition.

2.2.2.5 Hoist

The garage area is equipped with a hoist with a maximum lifting capacity of 17.8kN (4000lbs). The hoist is connected to the roof structure by way of a large steel plate which appears to bolt to the roof trusses at approximately 600mm (24”). The hoist is bolted and bears on the concrete slab. The hoist appears to be in good condition with only minor corrosion noted on the edges of the flanges.

2.2.2.6 Conclusions and Recommendations

Overall the maintenance garage is considered to be in fair condition. Based on the observations made during the inspection the following is recommended.

- The damaged concrete adjacent to the man door should be repaired. Currently there is a large piece of concrete that has spalled from the vertical corner. The concrete if not fixed the condition is expected to worsen due to freeze thaw cycles.

2.2.3 Mechanical Assessment

2.2.3.1 Plumbing – Drainage, Waste, and Venting

The facility is provided with one washroom containing a water closet, lavatory, and service sink. A domestic clothes washer is also located in this room (see Mechanical Photos 1 and 2).

Visible sanitary drainage and vent piping is ABS.

The fixtures are vented through the rear wall of the Maintenance Garage which is a plumbing code violation (see Mechanical Photo 3).

The sloped roof of the building is not provided with any roof drains.

The service pit in the garage is equipped with a sump pump (see Mechanical Photo 4). The sump appears to have had petroleum products in it. The pump should be replaced with one suitable for hazardous areas. It was not observed on site if discharge from this pump is separated in an oil interceptor prior to discharging. Presence of an oil interceptor and regular maintenance should be confirmed. If an interceptor is not present one should be installed and connected to all floor drains in the facility.

2.2.3.2 Plumbing – Domestic Water Piping and Systems

The source of domestic water is unknown though it may be from the same well that feeds the main office/warehouse building. The water entrance appears to be located under the stairs to the mezzanine. There is no apparent strainer, pressure reducing valve, or water meter present.

Hot water is generated by a 36 Litre (8 Imp Gal) electric hot water tank (see Mechanical Photo 5). The tank is a 1.5 kW Rheem model number RE10. The hot water heater appeared to work properly.

Hot water temperature was measured to be 52.8°C which is acceptable. The tank was manufactured in 2004 based on its serial number. Based on its date of manufacture this tank has served its useful life. The hot water tank relief piping is run into a plastic bottle. As a result the tanks installation is not plumbing code compliant.

Hot and cold water piping within the building is copper and is not insulated. The piping appears to be in good condition though its age is unknown. A non-freeze hose bib is provided at the side of the building near the single access door.

2.2.3.3 Plumbing – Fixtures

The facility is provided with a water closet, lavatory, and service sink in the washroom. The water closet is a floor mounted type with flush box. The water closet worked properly.

The lavatory is a wall hung type china unit with two handle faucet. Washing machine is connected to the lavatory faucet.

The service sink is a enameled cast iron unit with back mounted faucet. The sink and two handle faucet are in good condition and operated properly.

A self contained wall mounted eyewash unit is provided in the Maintenance Garage. The unit is inspected and maintained on a regular basis.

2.2.3.4 HVAC – Air Handling Systems

The facility is provided with two exhaust fans. The service bay area is provided with a propeller type wall exhaust fan with outside hood (see Mechanical Photo 6). The fan operated properly during the site visit. It was not confirmed if this fan has the capacity to meet general ventilation requirements for this space. There is no source of make-up air present when this fan is operating other than what would come in through open doors or windows or around cracks in the building envelope. Without a source of make-up air there is no way to determine if exhaust rates are in accordance with NBCC and ASHARE codes and standards. New general exhaust capability should be provided in the facility.

The service pit is equipped with an exhaust air duct which runs to a side wall exhaust fan located on the outside of the building (see Mechanical photos 7 and 8). This fan could not be operated during the site visit. This fan is required to operate continuously when the building is occupied. The fan should be replaced with a unit of non-sparking construction and suitable for conveyance of combustible gases and provided with a visible indication of system operating. There is no source of make-up air present when this fan is operating other than what would come in through open doors or windows or around cracks in the building envelope. Without a source of make-up air there is no way to determine if exhaust rates are in accordance with NBCC and ASHARE codes and standards.

There was no washroom exhaust air which is a NBCC/ASHRAE code requirement.

Due to the presence of welding in the facility a fume removal system composed of a articulating arm and flexible fume collection hose along with an exhaust fan should be installed. This system would allow the flexibility to do welding work in various parts of the facility.

2.2.3.5 HVAC – Ventilation Air

There is no source of ventilation air for the building other than what infiltrates through cracks in the building envelope and around openings such as doors and windows. This building is not compliant with the National Building Code of Canada which required all buildings to be ventilated in accordance with ASHRAE 62.1.

It is recommended that a ventilation system be installed in the building to bring in minimum required outside air. Use of heat recovery ventilator is recommended for energy savings. The existing washroom would be ducted to the new heat recovery unit in lieu of a washroom exhaust fan. The new system would be provided with an outside air intake, exhaust air discharge, supply air electric tempering coil, associated controls, distribution ductwork and grilles, zone isolation dampers, and fire dampers. The heat recovery unit should be provided with face and bypass capability or preheat to enable continuous operation (no recirculation or supply fan shutdown type defrost). The unit could be located in the mezzanine level compressor room. Ductwork would be run under the existing service bay ceilings and down to the lower floor spaces.

A tempered make-up air system should be provided to allow additional air as required to enter the building when general, welding, and pit exhaust systems are operational.

2.2.3.6 HVAC – Controls

There are no HVAC controls present. The existing exhaust fans are controlled by manual starters.

A carbon monoxide (CO) gas detector unit is located on the west side of the garage (see Mechanical Photo 5). It is a Critical Environmental Technologies model MAC-AMCO-IJN provided with a readout and audible alarm. The CO detector is not wired in to control building exhaust fans. A nitrogen dioxide (NO2) sensor should also be provided as diesel powered vehicles may also be serviced in the garage. No gas sensing was present in the service pit. A CO sensor should be located here. Additional gas detection signaling in the form of audible and visual (strobe) should be provided. The upgraded gas detection system should be interlocked with general exhaust and make-up air system to automatically operate these in the event of low gas levels being detected. Upon high gas levels detected the audible and visual alarms would be triggered.

2.2.3.7 Fire Protection

The facility is provided with six dry chemical fire extinguishers with one in the service pit, four in the garage bay, and one on the mezzanine level. The extinguishers are regularly inspected and are up to date.

2.2.3.8 Conclusions and Recommendations

The following recommendations are made for mechanical improvements to the depot building.

Plumbing:

- Modify vent piping to be code compliant.
- Replace existing service pit sump pump with one rated for hazardous location including associated wiring.
- Presence of an oil interceptor and regular maintenance should be confirmed. If an interceptor is not present one should be installed and connected to the building floor drainage system.
- Insulate accessible domestic hot and cold water piping.
- Replace hot water tank.
- Extend hot water tank relief piping to within 300mm of floor or less providing an air break.
- Provide a domestic water hose reel in the service bay area.

HVAC:

- Provide a heat recovery unit to meet minimum ventilation requirements.
- Investigate and repair any issues with the service pit exhaust system. Replace exhaust fan with one of non-spark construction and suitable for conveyance of combustible gases. Provide visual system operation proving light.
- Provide welding fume extraction exhaust system.
- Increase general exhaust rates if required and provide tempered make-up air system for general exhaust capacity and pit and welding exhaust systems.
- Upgrade gas detection system with additional sensors, visual and audible alarm indication, and interlock with exhaust and make-up air systems.
- Provide nitrogen dioxide gas detection system if diesel vehicles are serviced in the garage.

2.2.4 Electrical Assessment

2.2.4.1 Service and Distribution

2.2.4.1.1 Description

The electrical service enters the garage building overhead from a 25 kVA pole mounted single phase distribution transformer (Refer to Electrical photo 1).

The main incoming service conductors to the building are connected to a 200A disconnect switch. The main disconnect feeds main 200A, 120/240V panelboard located nearby (Refer to Electrical photo 2).

Revenue metering is performed at 120/240V, single phase, 200A service. The meter is located outside on building wall.

Service entrance grounding is provided at the building main disconnect using grounding rod driven in the ground outside the building

2.2.4.1.2 Observations

The incoming 200A at 120/240V service capacity appears to be adequate based on the peak demand history over the past 3 years.

The main disconnect and the distribution panelboard appear to be more than thirty (30) years old and are in poor physical condition (Refer to Electrical photo 3).

Panelboard is surface mounted in the workshop area and feeds all building lighting, heating and receptacle loads. There are five (5) circuit breaker spaces available only on the panelboard.

2.2.4.1.3 Conclusions

Based on the visual inspection of the facility, all power distribution equipment has exceeded its service life expectancy. New main disconnect and panelboard with sufficient spare capacity have to be installed in the next five (5) years.

2.2.4.2 Emergency Power System

There is no emergency power distribution system.

2.2.4.3 Lighting

2.2.4.3.1 Description

The office area is illuminated by 4 ft. surface mounted florescent fixture with a T8 Lamps. (Refer to Electrical photo 4).

The workshop area lit with 4 ft. surface mounted 2–lamp, T8 linear open fluorescent fixtures and four (4) high bay metal halide lighting fixtures (Refer to Electrical photo 5).

The service pit is provided with 4 ft. surface mounted 2–lamp, T8 linear vapour proof fluorescent fixtures.

The exterior building lighting is provided by three (3) photocell controlled HID wallpacks installed on building walls.

The building lighting is fed from the 120/240V panelboard.

2.2.4.3.2 Observations

Office areas, corridors and warehouses were observed to have adequate lighting levels as required by the latest edition of the NBCC.

Most of the lighting fixture in the office and workshop areas are old and are in poor condition.

One of the exterior lights is relatively new and in good condition. The other two (2) exterior fixtures are old and in poor condition.

The service pit lighting fixtures are not rated for hazardous locations.

2.2.4.3.3 Conclusions

All old interior and exterior lighting fixtures have to be replaced. Install new photocell control for the exterior lighting.

Service pit lighting and wiring to be replaced with suitable material for hazardous locations.

2.2.4.4 Exit and Emergency Lighting

2.2.4.4.1 Description

The building emergency lighting consists of one (1) dual head emergency battery unit. Most of the battery units are new and in good condition.

The building is equipped with two (2) lighted exit signs located above each exit doors. They have battery backup and are lit with incandescent lamps.

(Refer to Electrical photos 5 and 6 for emergency and exit lighting)

2.2.4.4.2 Observations

Emergency lighting units and exit signs are adequate and are in fair condition.

2.2.4.4.3 Conclusions

Provide 30-second monthly functional test. Consider battery replacement for 10 years old lead acid battery or for 15 years old nickel cadmium battery.

2.2.4.5 Heating System

2.2.4.5.1 Description

The whole building is heated by electrical heaters. The workshop area is heated by electric unit heater c/w wall mount thermostat. There is a convection heater c/w wall integral thermostat in the washroom.

2.2.4.5.2 Observations

The electric heaters are in relatively good condition.

2.2.4.5.3 Conclusions

No heater replacement will be required in the next 10 years.

2.2.4.6 Wiring Devices

2.2.4.6.1 Description

U-grounded, duplex receptacles are installed throughout the building. Receptacles are recessed with the exception of the receptacles installed in the workshop area, which are surface mounted (Refer to Electrical photo 7). The outdoor receptacles are weather protected type duplex receptacles.

The lighting control in offices, service rooms and warehouses is provided by individual lighting switches for each circuit.

2.2.4.6.2 Observations

The indoor and outdoor receptacles and lighting switches are sufficient quantity. Some of the receptacles and lighting switches are original and are in fair condition.

The service pit receptacles are not rated for hazardous locations.

2.2.4.6.3 Conclusions

Service pit receptacles and wiring should be removed or replaced with suitable material for hazardous locations.

All old receptacles and lighting switches, including the outlet boxes and faceplates have to be replaced in the next five (5) years.

2.2.4.7 Wiring Methods

2.2.4.7.1 Description

Wiring system appears to be a combination of AC-90 and NMD90 cabling installed concealed in walls and above ceiling in the office area and TW or RW90 cabling installed in EMT conduit in workshop area.

2.2.4.7.2 Observations

The observed wiring appears to be in relatively good condition.

2.2.4.8 Fire Alarm

Not available.

2.2.4.9 CCTV / Security System

2.2.4.9.1 Description

The garage building is connected to the main office building proximity card access control system. The card access system is relatively new and in good condition. There is no CCTV system.

2.2.4.10 PA System

There is one (1) loudspeaker in good condition connected to the main office building public address (PA) system.

2.2.5 Environmental Review

2.2.5.1 Air Emissions

No air emissions are present from the facility from fuel burning equipment or processes using chemicals.

2.2.5.2 Asbestos Containing Materials

An asbestos survey provided to the consultant indicated the presence of asbestos in floor tile. The presence of these asbestos containing materials shall be made aware to any personnel undertaking work in the facility that could disturb these materials.

2.2.5.3 Lead Containing Materials

Lead is likely present in plumbing solder and possibly in oil based paints used in the facility. The potential presence of lead containing materials shall be made aware to any personnel undertaking work in the facility that could disturb these materials.

2.2.5.4 PCB Containing Materials

Fluorescent lighting in the facility is not old enough to be of concern for presence of PCB's that were commonly used in older lighting ballasts.

2.2.5.5 Ozone Depleting Substances

No potential ozone depleting substances were observed.

There was no Halon fire extinguishing systems identified in the facility.

2.2.5.6 Indoor Air Quality

While no indoor air quality issues were noticed while on site, the facility is not provided with proper ventilation and make-up air systems. Any odours, fumes, VOC's from off gassing, and other airborne pollutants cannot be effectively removed from the building.

2.2.5.7 Mould and Mildew

No signs of mould or mildew were present throughout the building.

2.2.5.8 Spills and Contaminated Areas

Signs of spills were observed inside the Maintenance Garage in the service pit based on petroleum stains (see Environmental Photo 22).

2.2.5.9 Flammable and Combustible Liquids Storage

Flammable and combustible liquids were found to be present in the Maintenance Garage (see Environmental Photos 24 to 27).

Liquids found in a safety cabinet in the facility included:

- Aerosol lubricants;
- Motor oil;
- Gasoline;
- Paint thinner;
- Gear oil;
- Aerosol paints.

Miscellaneous liquids found in the facility but not in safety cabinets included:

- Hydraulic oil;
- Lubricating oil;
- Waste oil.

Quantities present do not exceed maximum amounts allowable for incidental use.

2.2.5.10 Compressed Gases Storage
Quantities of compressed gases were observed within the building (see Environmental photo 28). Items found inside the building included:

- Propane cylinders stored in safety cabinet;
- Oxygen / acetylene cylinders;
- Argon/CO2 cylinder;

The National Fire Code of Canada prohibits the indoor storage of Class 2.1 flammable gases of which acetylene and propane are examples unless the storage is in a specially designed room and not within a specified distance of other Class 1 and Class II flammable and combustible liquids.

2.2.5.11 Conclusions and Recommendations
The following recommendations are made regarding environmental issues identified.

- Indoor air quality should be addressed as per the recommendation in the mechanical section of this report.
- The presence of asbestos and potentially lead containing materials are to be made aware to anyone undertaking work that may disturb these materials.
- Stored propane and acetylene cylinders should be moved to an outdoor storage area.

2.2.6 Energy Usage Review
Knowing the energy consumption of a facility from all sources (electricity, petroleum fuels, etc.) an energy use intensity (EUI) can be calculated which can be compared to benchmark EUI's for various types of buildings in Canada. These benchmarks represent median EUIs for various types of facilities. Energy usage information was provided for the years 2014 to 2015 for this building however the Carpentry Shop and Storage Building are both fed from the Maintenance Garage. As such determining a EUI for the Maintenance Garage alone is not possible.

2.3 Storage Building
2.3.1 Architectural Assessment
This contemporary building is a Quonset hut style fabricated in an arced shape of self-supporting galvanized steel panels. The 41 square meter single level on grade structure is founded on a concrete foundation and slab on grade floor. It is uninsulated, and serves as a single storage space for ATVs, snowmobiles, and other line equipment. The building has a single uninsulated pre-painted steel overhead door and a single hollow metal person door in a pressed steel frame. One turbine type roof exhaust ventilator sits atop the centre of the roof. The building is in good condition, requiring only minor regular maintenance.

2.3.1.1 Building Exterior Envelope
Uninsulated galvanized steel corrugated curved self supporting panels form the walls and roof in a continuous half circle arc curve. The structure is in excellent condition.

2.3.1.2 Building Interior
Concrete slabs on grade floor and walls and roof are the interior face of the exterior wall/roof curved panels exposed. No insulation is present. Interior systems are in excellent condition.

2.3.1.3 Building Code

The building is classified as F-2 – Medium Hazard industrial by the NBCC 2010.

2.3.1.4 Accessibility

The building is not accessible to persons with disabilities. Due to its size and function accessibility would not be required.

2.3.1.5 Selected NBCC 2010/LSC 101 Requirements

The following provides an overview of several National Building Code/Life Safety Code NFPA 101 requirements and applicable sections for this facility.

Requirements	Compliance / Action
30) <u>Building Occupancy</u> Group F-2 – Medium Hazard Industrial *NBCC A-3.1.3.1*	Compliant
31) <u>Group F, Division 2, Up To Two Storeys</u> 4. A building classified as Group F, Division 2 is permitted to be of combustible construction or non-combustible construction used singly or in combination, provided: g. It has a building are not more than 1000 m^2 when facing one street h. It is not more than one storey in building height. *NBCC 3.2.2.76*	Compliant
32) <u>Occupant Load (Based on LSC)</u> Group F2 - Medium Hazard Industrial: 41 m^2/46 m^2 per person = 1 Total Occupant Load = 1 person (Service rooms, storage, circulation and washrooms are excluded)	Compliant
33) Exit Capacity The maximum size of rooms or suites with one exit are as follows: Group F-2 – 150 m^2 with a 10 metre travel distance to the egress door. *NBCC 3.4.2.1.A*	Compliant
34) Except if exits are located along the perimeter of the floor area and each main aisle in the floor area leads directly to an exit, the travel distance may be 60 metres maximum. NBCC 3.4.2.5	Compliant
35) The minimum width of a public corridor shall be 1100 mm. *NBCC 3.3.1.9*	N/A
36) Travel Distance shall be maximum of 30 metres. *NBCC 3.4.2.5*	Compliant
37) Exit capacity	Compliant

Requirements	**Compliance / Action**
1 persons x 6.1 mm per person = 6.1 mm *NBCC 3.4.3.2*	
38) Washroom Fixture Calculation *NBCC 3.7.2.2*	Building is uninsulated and used for storage only. No washroom is required.
39) The building need not be designed to meet the NL Accessibility Act requirements due to its size and function.	Compliant
40) Limiting distance:	Compliant

2.3.1.6 Conclusions and Recommendations

The building is contemporary and other than routine maintenance, does not require upgrading.

The following short term recommendations are made:

- Seal hole in door frame, replace corroded hinges, and upgrade caulking.

2.3.2 Structural Assessment

The Whitbourne Area depot Storage Building is a pre-fabricated Quonset hut structure supported on a concrete slab on grade (see Structural photo 1). The structure is equipped with a man door and overhead door and is used to store all-terrain vehicles, skidoos, and equipment.

2.3.2.1 Foundation and Floor Systems

The concrete slab on grade appears to be in good condition based on a limited visual inspection. The interior area of the slab was almost completely concealed by the large amount of equipment being stored in the area. Based on what could be viewed, only minor shrinkage cracks are present therefore the slab is in good condition (see Structural photo 2).

An exterior concrete pad at the front of the building was found to be in good condition with no cracking, shifting or settling present.

2.3.2.2 Framing Systems

The prefabricated steel of the structure appears to be in excellent condition. Structure appears to be a newly constructed building and therefore the steel sections and bolts are free of corrosion (see Structural photo 3).

2.3.2.3 Conclusions and Recommendations

The Storage Building is in excellent condition without any structural repairs required.

2.3.3 Mechanical Assessment

2.3.3.1 Plumbing – Drainage, Waste, and Venting

No drainage waste or vent systems are present in the building.

2.3.3.2 Plumbing – Domestic Water Piping and Systems
No domestic water systems are present in the building.

2.3.3.3 Plumbing – Fixtures
No plumbing fixtures are present in the building.

2.3.3.4 HVAC – Air Handling Systems
No air handling systems are present in the building.

2.3.3.5 HVAC – Ventilation Air
No ventilation air systems are present in the building. Natural ventilation can be achieved through use of building openings.

2.3.3.6 HVAC – Controls
No HVAC controls are present in the building.

2.3.3.7 Fire Protection
The facility is provided with one type ABC dry chemical fire extinguisher. The extinguisher rating is 10A80BC and is a 13.6 kg (30 lb) size. This extinguisher is suitable for the application. The extinguisher is regularly inspected and is up to date.

2.3.3.8 Conclusions and Recommendations
Based on the intended use of this building no mechanical systems are required other than the presence of a fire extinguisher.

2.3.4 Electrical Assessment

2.3.4.1 Service and Distribution

2.3.4.1.1 Description
The electrical service enters the storage shed overhead from the Maintenance Garage building panelboard.

The main incoming service conductors to the building are connected to a 100A, 120/240V, eighteen (18) circuit panelboard (see Electrical photo 1).

There is no separate revenue metering for the building.

Service entrance grounding is provided at the building main disconnect using grounding rod driven in the ground outside the building

2.3.4.1.2 Observations
The incoming 100A at 120/240V service capacity appears to be adequate based on observed building loads.

The panelboard appears to be not more than ten (10) years old and is in good physical condition.

Panelboard is surface mounted and feeds all building lighting and receptacle loads. There are nine (9) spaces for circuit breakers available for future loads.

2.3.4.1.3 Conclusions

Panelboard is new with sufficient spare capacity.

2.3.4.2 Emergency Power System

There is no emergency power distribution system.

2.3.4.3 Lighting

2.3.4.3.1 Description

The building interior is illuminated by four (4) 4 ft. suspended from the ceiling florescent fixtures with a two (2) T8 Lamps (see Electrical photo 2).

The building exterior lighting is provided by a HID wallpack (see Electrical photo 3).

The building lighting is fed from the 120/240V panelboard.

2.3.4.3.2 Observations

The building interior was observed to have adequate lighting levels as required by the latest edition of the NBCC.

The lighting fixtures are relatively new and in good condition.

The exterior light was switched on during day time.

2.3.4.3.3 Conclusions

Consider installation of photocell control for building exterior lighting.

2.3.4.4 Exit and Emergency Lighting

2.3.4.4.1 Description

Not available.

2.3.4.5 Heating System

Not available.

2.3.4.6 Wiring Devices

2.3.4.6.1 Description

U-grounded, recessed duplex receptacles are installed throughout the building (see Electrical photo 4). The outdoor receptacles are weather protected type duplex receptacles.

The interior lighting control is provided by single lighting switch.

2.3.4.6.2 Observations
The indoor and outdoor receptacles and lighting switches are sufficient quantity. The indoor and outdoor receptacles are relatively new and in good condition.

2.3.4.7 Wiring Methods

2.3.4.7.1 Description
Wiring system appears to be building wires in surface mounted EMT conduit (see Electrical photo 4).

2.3.4.7.2 Observations
The observed wiring appears to be in relatively good condition.

2.3.4.8 Fire Alarm
Not available.

2.3.4.9 CCTV / Security System
2.3.4.9.1 Description
Not available.

2.3.4.10 PA System
Not available.

2.3.5 Environmental Review
2.3.5.1 Air Emissions
No air emissions are present from the facility from fuel burning equipment or processes using chemicals.

2.3.5.2 Asbestos Containing Materials
Based on the age of the facility the presence of asbestos containing materials is unlikely. Based on asbestos surveys provided to the consultant no asbestos was present in this building.

2.3.5.3 Lead Containing Materials
Based on the age of the facility the presence of lead containing materials is unlikely.

2.3.5.4 PCB Containing Materials
Based on the age of the facility the presence of PCB materials is unlikely.

2.3.5.5 Ozone Depleting Substances
No ozone depleting substances were identified in the building.

2.3.5.6 Indoor Air Quality
No indoor air quality issues were noticed while on site.

2.3.5.7 Mould and Mildew
No signs of mould or mildew were present throughout the building.

2.3.5.8 Spills and Contaminated Areas

No signs of spills or were overserved in the building.

2.3.5.9 Flammable and Combustible Liquids Storage

One small gasoline container was present in the building (see Environmental photo 29).

No other storage is present however stored motorized vehicles, and other engine powered equipment likely have fuels and oils contained in them.

2.3.5.10 Compressed Gases Storage

No compressed gas storage was present.

2.3.5.11 Conclusions and Recommendations

There are no environmental concerns to report.

2.3.6 Energy Usage Review

Knowing the energy consumption of a facility from all sources (electricity, petroleum fuels, etc.) a energy use intensity (EUI) can be calculated which can be compared to benchmark EUI's for various types of buildings in Canada. These benchmarks represent median EUIs for various types of facilities. As no energy usage information was provided to the consultant for this building (this building is fed from another metered building) a EUI could not be calculated and compared to benchmark data.

2.4 Carpentry Shop

2.4.1 Architectural Assessment

This 37 square meter wood frame building consists of a single open interior space which was formerly a workshop but now acts as storage for grounds maintenance equipment, tires, line tools, and other equipment. The building has a sloped roof with asphalt shingles, vinyl siding, one residential metal access door, vinyl sliding windows and is founded on what appears to be wood blocks with skirted space between floor and grade. The building is in fair to good condition.

2.4.1.1 Building Exterior Envelope

Exterior walls are of wood stud, vinyl siding, vented vinyl soffit, pre painted aluminum fascia, and sloped roof with asphalt shingle finish. Shingles exhibit two colours and are nearing the end of their useful life with replacement to be considered within the next 3-5 years. Vinyl slider windows are in good condition. The single residential type metal access door in wood frame requires painting and hardware replacement with more robust commercial type. The door sill requires replacement.

2.4.1.2 Building Interior

The plywood floor is finished with paint as are the plywood finished walls. The ceiling is finished with 300 x 300 mm residential pre-painted stapled or glued fibre ceiling tile. The attic was not accessible but gable end vents and soffit vents do exist.

2.4.1.3 Building Code

The building is classified as F-2 – Medium Hazard Industrial by the NBCC 2010.

2.4.1.4 Accessibility

The building is not accessible to persons with disabilities and due to its size and function would not be required to be accessible.

2.4.1.5 Selected NBCC 2010/LSC 101 Requirements

The following provides an overview of several National Building Code/Life Safety Code NFPA 101 requirements and applicable sections for this facility.

Requirements	**Compliance / Action**
41) Building Occupancy Group F-2 – Medium Hazard Industrial *NBCC A-3.1.3.1*	Compliant
42) Group F, Division 2, Up To Two Storeys 5. A building classified as Group F, Division 2 is permitted to be of combustible construction or non-combustible construction used singly or in combination, provided: i. It has a building are not more than ii. 1000 m^2 if facing 1 street, j. It is not more than one storey in building height. *NBCC 3.2.2.76*	Compliant
43) Occupant Load (Based on LSC) Group F2 - Medium Hazard Industrial: 37 m^2/46 m^2 per person = 1 Total Occupant Load = 1 person (Service rooms, storage, circulation and washrooms are excluded)	Compliant
44) Exit Capacity The maximum size of rooms or suites with one exit are as follows: Group F-2 – 150 m^2 with a 10 metre travel distance to the egress door. *NBCC 3.4.2.1.A*	Compliant
45) Travel Distance shall be maximum of 30 metres. *NBCC 3.4.2.5*	Compliant
46) Exit capacity 1 person x 6.1 mm per person = 6.1 mm *NBCC 3.4.3.2*	Compliant
47) Washroom Fixture Calculation *NBCC 3.7.2.2*	Building used as equipment storage only, washroom not required.
48) The building need not be designed to meet the NL Accessibility Act requirements due to its size and function.	Compliant

2.4.1.6 Conclusions and Recommendations

The building is in good condition generally.

The following short term recommendations are made:

- Repair and paint door and frame, replace sill.
- Provide attic hatch.

The following mid- term recommendations are made:

- Replace door.
- Replace roof shingles.

2.4.2 Structural Assessment

The Carpentry Building at the Whitbourne Area Depot is a small timber framed structure with a sloped roof. A skirting wrapping around the perimeter of the building prevented the inspectors of determining what supports the structure (see Structural photo 1).

2.4.2.1 Foundation and Floor Systems

The foundation of the storage building was not visible as skirting was installed around the perimeter of the building. The fact that skirting is installed around the perimeter suggests that the structure is supported on either concrete piers or timber piles. It is difficult to comment on the condition of the supports as they can't be inspected visually. The floor system appears to be solid with no sags excessive deflections or dips which would suggest that the foundation would have failed. As the foundations could not be visually inspected, they will be assessed as being in fair condition.

2.4.2.2 Roof Systems

The structural components of the roof system were not visible however it is assumed that the roof structure consists of either timber rafters or timber trusses. Small ceiling tiles finish conceal the trusses from the underside. There doesn't appear to be any excessive deflections in the ceiling that would suggest overstressing. It appeared as though there was water damage on the ceiling tiles above the tire storage area however a closer visual determined that it was in fact scrapes caused by abrasion of tires (see Structural photo 2). Although there doesn't appear to be any excessive deflections, the inspection was conducted in the summer where loads on the roof are minimal. To accurately determine the adequacy of roof system inspections must be conducted in the winter where loads on the roof system will be at their maximum. Based on the limited visual inspection, the roof system appears to be in fair condition.

2.4.2.3 Framing Systems

The timber framed walls are finished on the interior with wood paneling. The walls appears to be in fair condition as they appear to be plumb and free of any excessive deflections which may indicate overstressing.

2.4.2.4 Conclusions and Recommendations

Overall the Carpentry Building appears to be in fair condition based on a limited visual inspection. There does not appear to be structural repairs required.

2.4.3 Mechanical Assessment

2.4.3.1 Plumbing – Drainage, Waste, and Venting

No drainage waste or vent systems are present in the building.

2.4.3.2 Plumbing – Domestic Water Piping and Systems

No domestic water systems are present in the building.

2.4.3.3 Plumbing – Fixtures

No plumbing fixtures are present in the building.

2.4.3.4 HVAC – Air Handling Systems

No air handling systems are present in the building. The building was formally used as a carpentry shop however now it is used primarily for storage of tires, paints, and equipment. Due to the potential fumes the building should be provided with a ventilation system.

2.4.3.5 HVAC – Ventilation Air

There is no source of ventilation air for the building other than what infiltrates through cracks in the building envelope and around openings such as doors and windows. This building is not compliant with the National Building Code of Canada which required all buildings to be ventilated in accordance with ASHRAE 62.1.

It is recommended that a ventilation system be installed in the building to bring in outside air. Use of heat recovery ventilator is recommended for energy savings. The new system would be provided with an outside air intake, exhaust air discharge, supply air electric tempering coil, associated controls, and distribution ductwork and grilles. The unit can be mounted inside the building and ductwork either run through the attic (insulated) or tight to the ceiling (uninsulated).

2.4.3.6 HVAC – Controls

No HVAC controls are present in the building.

2.4.3.7 Fire Protection

The facility is provided with one type ABC dry chemical fire extinguisher. The extinguisher rating is 10A120BC and is a 9.1 kg (20 lb) size. This extinguisher is suitable for the application. The extinguisher is regularly inspected and is up to date.

2.4.3.8 Conclusions and Recommendations

Based on the intended use of this building it should be provided with a ventilation system.

2.4.4 Electrical Assessment

2.4.4.1 Service and Distribution

2.4.4.1.1 Description

The electrical service enters the carpenter shop building overhead from the Maintenance Garage building panelboard.

The main incoming service conductors to the building are connected to a 100A disconnect switch. The main disconnect feeds main 100A, 120/240V fused load center located nearby (see Electrical photo 1). A load center c/w eight (8) 15A circuit breakers located at work bench is fed from the main load center (see Electrical photo 2).

There is no separate revenue metering for the building.

Service entrance grounding is provided at the building main disconnect using grounding rod driven in the ground outside the building

2.4.4.1.2 OBSERVATIONS

The incoming 100A at 120/240V service capacity appears to be adequate based on observed building loads.

The main disconnect and the main load center appear to be more than thirty (30) years old and are in poor physical condition. The workbench load center is in relatively good condition.

Load centers is surface mounted in the workshop area and feeds all building lighting, heating, power tools and receptacle loads. There are four (4) spaces for fuses available at main load center for future loads.

2.4.4.1.3 CONCLUSIONS

Based on the visual inspection of the facility, the main disconnect and main load center have exceeded their service life expectancy. New main disconnect and main load center with sufficient spare capacity have to be installed in the next five (5) years.

2.4.4.2 EMERGENCY POWER SYSTEM

There is no emergency power distribution system.

2.4.4.3 LIGHTING

2.4.4.3.1 DESCRIPTION

The building interior is illuminated by four (4) 4 ft. surface mounted florescent fixtures with a two (2) T8 Lamps (see Electrical photo 3).

There is no building exterior lighting.

The building lighting is fed from the 120/240V load center.

2.4.4.3.2 OBSERVATIONS

The building interior was observed to have adequate lighting levels as required by the latest edition of the NBCC.

The lighting fixtures are relatively new and in good condition.

2.4.4.3.3 Conclusions
Consider installation of photocell controlled building exterior lighting.

2.4.4.4 Exit and Emergency Lighting
2.4.4.4.1 Description
Not available.

2.4.4.4.2 Observations
Not applicable.

2.4.4.4.3 Conclusions
Install one (1) dual head emergency battery unit in carpenter shop.

2.4.4.5 Heating System
2.4.4.5.1 Description
The building is heated by electrical baseboard heaters.

2.4.4.5.2 Observations
The electric baseboard heaters are old and in poor condition.

2.4.4.5.3 Conclusions
Consider baseboard heater replacement in the next five (5) years.

2.4.4.6 Wiring Devices
2.4.4.6.1 Description
U-grounded, recessed duplex receptacles are installed throughout the building (see Electrical photo 4). The outdoor receptacles are weather protected type duplex receptacles.

The interior lighting control is provided by single lighting switch.

2.4.4.6.2 Observations
The indoor and outdoor receptacles and lighting switches are sufficient quantity. The indoor receptacles and lighting switch are original and are in fair condition. The outdoor receptacles are relatively new and in good condition.

2.4.4.6.3 Conclusions
All old receptacles and lighting switches, including the outlet boxes and faceplates have to be replaced in the next five (5) years.

2.4.4.7 Wiring Methods

2.4.4.7.1 Description
Wiring system appears to be a combination of AC-90 and NMD90 cabling installed concealed in walls and above ceiling.

2.4.4.7.2 Observations
The observed wiring appears to be in relatively good condition.

2.4.4.8 Fire Alarm
Not available.

2.4.4.9 CCTV / Security System
2.4.4.9.1 Description
Not available.

2.4.4.10 PA System
Not available.

2.4.5 Environmental Review
2.4.5.1 Air Emissions
No air emissions are present from the facility from fuel burning equipment or processes using chemicals.

2.4.5.2 Asbestos Containing Materials
Based on the age of the facility the presence of asbestos containing materials is unlikely. Based on asbestos surveys provided to the consultant no asbestos was present in this building.

2.4.5.3 Lead Containing Materials
Based on the age of the facility the presence of lead containing materials is unlikely.

2.4.5.4 PCB Containing Materials
Based on the age of the facility the presence of PCB materials is unlikely.

2.4.5.5 Ozone Depleting Substances
No ozone depleting substances were identified in the building.

2.4.5.6 Indoor Air Quality
No indoor air quality issues were noticed while on site.

2.4.5.7 Mould and Mildew
No signs of mould or mildew were present throughout the building.

2.4.5.8 Spills and Contaminated Areas
The building has wood floors and some stains likely from petrochemicals were observed (see Environmental photos 30 and 31). The stains appear to be surface stains only and likely did not penetrate the flooring system to contaminate the ground below, however this could not be confirmed.

2.4.5.9 Flammable and Combustible Liquids Storage

Flammable and combustible liquids were found to be present in the Carpentry Shop in the safety cabinet and around the building (see Environmental photos 32 to 34). Liquids found included:

- Gasoline;
- Diesel fuel;
- Insulator coating.

Quantities present do not exceed maximum amounts allowable for incidental use.

2.4.5.10 Compressed Gases Storage

No compressed gas storage was present.

2.4.5.11 Conclusions and Recommendations

Numerous spillage stains were observed in this building. It is suggested that greater care be taken when dispensing petroleum products.

2.4.6 Energy Usage Review

Knowing the energy consumption of a facility from all sources (electricity, petroleum fuels, etc.) a energy use intensity (EUI) can be calculated which can be compared to benchmark EUI's for various types of buildings in Canada. These benchmarks represent median EUIs for various types of facilities. As no energy usage information was provided to the consultant for this building (this building is fed from another metered building) a EUI could not be calculated and compared to benchmark data.

2.5 Civil/Site Assessment

2.5.1 Asphalt and Concrete Surfaces

The Office Area entrance of the main building is provided with concrete walkways and steps (see Site/Civil photo 1). These concrete structures are in good condition.

The parking lot on the public side of the main building is paved and in good condition (see Site/Civil photo 2).

The yard directly to the south of the main building is paved and in good condition (see Site/Civil photo 3).

2.5.2 Water and Sewer

Water supply for the main building is from an onsite drilled well. Based on drawings provided, this well is located south of the shops/warehouse area of the building. The location of this well could not be confirmed during the site visit. Water enters the main building in the Communications Shop.

Based on drawings provided, the main building is provided with a septic tank and distribution field at the east side of the building. Based on drawings provided, the Maintenance Garage is provided with a septic tank and distribution field at the east side of the building. The septic tanks or other infrastructure was not visible during the site visit.

No issues with the water system or sewage system were reported during the site visit.

2.5.3 Drainage

The site generally slopes from the north to the south with surface drainage going to a stream located to the south of the property (see Site/Civil photos 4 to 7). No standing water was observed on site. It appears that relatively recent site work was done for underground drainage piping or a washout based on the different soil type apparent heading towards the stream (see Site/Civil photo 8).

Based on drawings provided the main depot building is provided with foundation drainage. There is no indication that either the maintenance garage or storage building are provided with foundation drainage, however it may be present.

2.5.4 Site Fencing

The depot yard is surrounded by a chain link fence. All buildings are located within the fenced in yard with the exception of the front of the main depot building which houses the offices.

Inspection of the fencing revealed some issues including (see Site Civil Photos 9 to 19):

- Sections of fence leaning on north, east, south, and west sides.
- Fencing off of bottom on north, east, and west sides.
- Fencing bowed out, bracing bent, and off of brace fittings possibly from snow clearing at south west corner.
- One fence post split at bottom at south west corner.
- Barbed wire supports off on south and west sides.

2.5.5 Conclusions and Recommendations

The following recommendations are made for site civil:

- Make repairs to site fencing.

CHAPTER 3 REHABILITATION EXPANSION UPGRADE ASSESSMENT

3.1 Main Depot Building

Based on current usage, and beyond repairs and code upgrades identified in Chapter 2 of this report, no major rehabilitation, expansion, or upgrades are recommended for this facility.

3.2 Maintenance Garage

Based on current usage, and beyond repairs and code upgrades identified in Chapter 2 of this report, no major rehabilitation, expansion, or upgrades are recommended for this facility.

3.3 Storage Building

Based on current usage, and beyond repairs identified in Chapter 2 of this report, no major rehabilitation, expansion, or upgrades are recommended for this facility.

3.4 Carpentry Building

Based on current usage, and beyond repairs and code upgrades identified in Chapter 2 of this report, no major rehabilitation, expansion, or upgrades are recommended for this facility.

CHAPTER 4 COST ESTIMATES

4.1 Recommended Renovations and Improvements to Existing Facilities

4.1.1 Purpose

This section provides an overview of the costs associated to complete the recommended repairs and upgrades outlined above for each building to maintain current operations and functionality and comply with current codes. New construction and extension cost estimates include incorporation of expansion, and upgrading of facilities to service future operational requirements.

Renovation, maintenance and repair costs are grouped into three categories: Immediate; Mid-Term; and Long-Term. The work considered for immediate repairs would include all things which pose a threat to life safety and would also include correcting deficiencies with structural, civil, environmental, mechanical, and electrical. For the regularly occupied buildings, and buildings intended for long-term use, these renovations would be very important to complete for the safety, well-being, and comfort of occupants. For buildings determined to be unsuitable for long-term future use, only repairs which are deemed absolutely necessary would be considered.

Mid-term repairs would be intended for completion in the 3 to 10 year range, assuming the repairs listed as immediate are completed. This could include such items as architectural finishes replacement, end of serviceable life equipment replacement or upgrading of equipment to better service the facility. The long-term repair category would also only apply to buildings intended for extended use as these repairs would fall in the range of 10 to 20 years. These long-term repairs also require the immediate and mid-term repairs to be completed as intended.

4.1.2 Cost Estimating Accuracy

The estimates contained in this report are intended to provide order of magnitude construction costs only and are accurate to Class 3 (-10 to +30%) standards as per generally recognized industry practices. Estimates are based on the site observations (repairs & upgrades) and with the owner's future use and operations considered (new construction/extension). The estimates include appropriate contractor overhead, design contingency and location factors. All estimates are intended to provide an order of magnitude indication of the final project cost and are considered to be sufficient for the purpose of analyzing the redevelopment options under consideration. The figures listed below are an indication of the probable construction cost at the time of this report and are intended to represent fair market value of the scope of work assuming that such work is grouped into reasonably sized contract packages. Unless noted otherwise, architectural and

engineering design fees are not included, nor are value-added taxes. All costs are expressed in Canadian dollars.

4.1.3 Main Depot Building

4.1.3.1 Immediate Maintenance and Repairs

The following renovations, repairs, and/or upgrades are recommended to be completed within the next two years, assuming the facility is intended to continue operations.

Architectural:

- Replace stained ceiling tiles - $1,500
- Repoint brick - $3,500
- Provide non-skid treads c/w tactile to corridor stairs - $1,200
- Correct code exiting and fire ratings deficiencies - $18,000
- Add gutter and downspout systems - $5,000
- Paint doors and frames - $2,500
- Provide correct code to code guards and stair rails in shops and warehouse - $7,500

Structural:

- Foundation wall should be exposed in locations where larger horizontal cracks and spalling is noted. It is recommended to remove cladding and carry out required excavation in the location of the damage to uncover full extent of the damage. Once the full damage of the crack is determined an appropriate repair detail can be recommended - $5,500
- All tools must be removed from horizontal cross bracing - $500
- Cracks in concrete block partition walls possibly caused by settlement should be monitored to ensure condition does not worsen - $2,500 (annually)

Site/Civil:

- Make repairs to site fencing - $16,000

Mechanical:

- Replace any ABS piping present in the office area return air plenum with copper or plenum rated plastic DWV - $4,000
- Replace domestic hot water tank - $1,200
- Provide insulation on uninsulated domestic water piping - $2,500
- Verify office area control operation and set up for continuous operation during occupied periods - $800
- Inspect and service office area steam humidifier - $1000
- Provide a dedicated cooling system for the Electrical/Server Room - $6,500
- Replace the warehouse/workshop area Lunch Room range hood - $900
- Rebalance outside air rates to office area - $2,000
- Provide heat recovery ventilation system to provide minimum outside air to warehouse/shop area of building - $48,000

Electrical:

- The old exterior lights and associated controls should be replaced - $13,500
- Investigate and repair baseboard heater in space off of warehouse area - $800

- All outdoor receptacles, including the outlet boxes and the weather protective covers need replacement - $3,200
- Replace any outdated emergency lighting batteries - $1,200
-
- Installation of visual alarms in fire alarm system for aiding any potential hearing impaired occupants - $8,500
- Relocate fire alarm annunciator/control panel next to the main entrance as required by NBCC - $4,500

Environmental:

- Indoor air quality should be addressed as per the recommendation in the mechanical section of this report – Refer to Mechanical section.
- Stained soil in the depot yard should be removed and properly disposed of. Stains on interior floors should be cleaned - $1,200
- Stored propane cylinders should be moved to an outdoor storage area - $2,200

Estimated total cost for immediate repairs and upgrades:
$165,700 sub-total cost x 10% contingency = $182,300 total cost

4.1.3.2 Mid-Term Maintenance and Repairs

The following list contains recommended renovations and repairs for completion in the next 3 to 10 years, again assuming the building will remain in operation. These repairs would progress after the items listed in the immediate repair category are complete.

Architectural:

- Replace metal siding - $53,900
- Replace remaining three fibreglass overhead doors - $24,000
- Paint interior of building - $14,000
- Replace metal roofing - $53,400

Mechanical:

- Replace copper domestic water piping throughout facility - $13,000

Electrical:

- Install new panelboards with sufficient spare capacity - $24,000

Estimated total cost for mid-term repairs and upgrades:
$182,300 sub-total cost x 10% contingency = $200,500 total cost

4.1.4 Maintenance Garage

4.1.4.1 Immediate Maintenance and Repairs

The following renovations, repairs, and/or upgrades are recommended to be completed within the next two years, assuming the facility is intended to continue operations.

Architectural:

- Fire rate laundry room - $2,500
- Clean building interior - $1,500

- Reconstruct stairs to meet code - $2,800
- Provide emergency egress from opposite end of repair pit plus electrical and ventilation to code - $6,500
- Provide attic access hatch and study attic condition and attic ventilation. Add ventilation and insulation to code if required - $3,500
- Fire rate the second floor and the exit from it to the exterior - $8,000
- Paint exterior door - $800
- Paint building interior - $4,000

Structural:

- The damaged concrete adjacent to the man door should be repaired - $2,500

Mechanical:

- Modify plumbing vent piping to be code compliant - $1,500
- Replace existing service pit sump pump with one rated for hazardous location including associated wiring - $5.500
- Presence of an oil interceptor and regular maintenance should be confirmed by Nalcor. If an interceptor is not present one should be installed and connected to the building floor drainage system - $18,000
- Insulate accessible domestic hot and cold water piping - $2,000
- Replace hot water tank - $1,200
- Extend hot water tank relief piping to within 300mm of floor or less providing an air break - $200
- Provide a domestic water hose reel in the service bay area - $800
- Provide a heat recovery unit to meet minimum ventilation requirements - $ 27,000
- Replace exhaust fan with one of non-spark construction and suitable for conveyance of combustible gases. Provide visual system operation proving light - $4,500
- Provide welding fume extraction exhaust system - $9,500
- Increase general exhaust rates if required and provide tempered make-up air system for general exhaust capacity and pit and welding exhaust systems - $12,000
- Upgrade gas detection system with additional sensors, visual and audible alarm indication, and interlock with exhaust and make-up air systems - $12,000
- Provide nitrogen dioxide gas detection system if diesel vehicles are serviced in the garage - $2,800

Electrical:

- All old interior and exterior lighting fixtures to be replaced. Install new photocell control for the exterior lighting - $4,300
- Service pit lighting and wiring to be replaced with suitable material for hazardous locations - $13,000
- Service pit receptacles and wiring should be removed or replaced with suitable material for hazardous locations - $5,000

Environmental:

- Stored propane and acetylene cylinders should be moved to an outdoor storage area - $100

Estimated total cost for immediate repairs and upgrades:
$149,000 sub-total cost x 10% contingency = $163,900 total cost

4.1.4.2 Mid-Term Maintenance and Repairs

The following list contains recommended renovations and repairs for completion in the next 3 to 10 years, again assuming the building will remain in operation. These repairs would progress after the items listed in the immediate repair category are complete.

Architectural:
- Replace metal siding - $20,300
- Replace roof shingles - $7,500

Electrical:
- New main disconnect and panelboard with sufficient spare capacity to be installed - $7,500
- All old receptacles and lighting switches, including the outlet boxes and faceplates to be replaced - $3,400

Estimated total cost for mid-term repairs and upgrades:
$38,700 sub-total cost x 10% contingency = $42,600 total cost

4.1.5 Storage Building

4.1.5.1 Immediate Maintenance and Repairs

The following renovations, repairs, and/or upgrades are recommended to be completed within the next two years, assuming the facility is intended to continue operations.

Architectural:
- Seal hole in door frame, replace corroded hinges, and upgrade caulking - $1,800

Electrical:
- Install exterior lighting with photocell control - $2,200

Estimated total cost for immediate repairs and upgrades:
$4,000 sub-total cost x 10% contingency = $4,400 total cost

4.1.6 Carpentry Building

4.1.6.1 Immediate Maintenance and Repairs

The following renovations, repairs, and/or upgrades are recommended to be completed within the next two years, assuming the facility is intended to continue operations.

Architectural:
- Repair and paint door and frame, replace sill - $1,000
- Provide attic hatch - $1,500

Mechanical:
- Based on the intended use of this building it should be provided with a ventilation system - $6,000

Electrical:

- Install photocell controlled building exterior lighting - $2,200
- Install one dual head emergency battery unit in the building - $900

Estimated total cost for immediate repairs and upgrades:
$11,600 sub-total cost x 10% contingency = $12,800 total cost

4.1.6.2 Mid-Term Maintenance and Repairs

The following list contains recommended renovations and repairs for completion in the next 3 to 10 years, again assuming the building will remain in operation. These repairs would progress after the items listed in the immediate repair category are complete.

Architectural:

- Replace door - $3,800
- Replace roof shingles - $4,500

Electrical:

- Install new main disconnect and main load center with sufficient spare capacity - $4,500
- Replace baseboard heaters - $2,400
- Replace all old receptacles and lighting switches, including the outlet boxes and faceplates - $2,200

Estimated total cost for mid-term repairs and upgrades:
$17,400 sub-total cost x 10% contingency = $19,100 total cost

CHAPTER 5 CAPITAL COST SUMMARY AND COMPARISON OF SCENARIOS

5.1 Capital Cost Summary

5.1.1 Table 2: Capital Cost Summary

Building/Action	Construction Costs
Main Depot Building	
Immediate (1-2 years)	$182,300
Mid-Term (3-10 years)	$200,500
Maintenance Garage	
Immediate (1-2 years)	$163,900
Mid-Term (3-10 years)	$42,600
Storage Building	
Immediate (1-2 years)	$4,400
Carpentry Building	
Immediate (1-2 years)	$12,800
Mid-Term (3-10 years)	$19,100

Costs provided in these tables do not include HST. Costs provided are in current Canadian dollars and escalation values may have to be applied to renovations in future years to account for such factors as inflation, exchange rate, and competitiveness of construction industry.

This opinion of probable costs is presented on the basis of experience, qualifications, and best judgment. It has been prepared in accordance with acceptable principles and practices. Sudden market trend changes, non-competitive bidding situations, unforeseen labour and material adjustments and the like are beyond the control of CBCL Limited. We cannot warrant or guarantee that actual costs will not vary significantly from the opinion provided.

FINAL REPORT

Issued by:

Paul Sceviour, MASc., P.Eng.
Senior Mechanical Engineer

APPENDIX A

Site Photos – Main Depot Building

APPENDIX A

ARCHITECTURAL PHOTOS

Nalcor Assessments – Whitbourne
Architectural – Main Depot Building

Photo 1

Photo 2

Nalcor Assessments – Whitbourne
Architectural – Main Depot Building

Photo 3

Photo 4

Nalcor Assessments – Whitbourne
Architectural – Main Depot Building

Photo 5

Photo 6

Nalcor Assessments – Whitbourne
Architectural – Main Depot Building

Photo 7

Photo 8

Nalcor Assessments – Whitbourne
Architectural – Main Depot Building

Photo 9

Photo 10

Nalcor Assessments – Whitbourne
Architectural – Main Depot Building

Photo 11

Photo 12

Photo 13

Photo 14

Nalcor Assessments – Whitbourne
Architectural – Main Depot Building

Photo 15

Photo 16

Nalcor Assessments – Whitbourne
Architectural – Main Depot Building

Photo 17

Photo 18

Nalcor Assessments – Whitbourne
Architectural – Main Depot Building

Photo 19

Photo 20

Nalcor Assessments – Whitbourne
Architectural – Main Depot Building

Photo 21

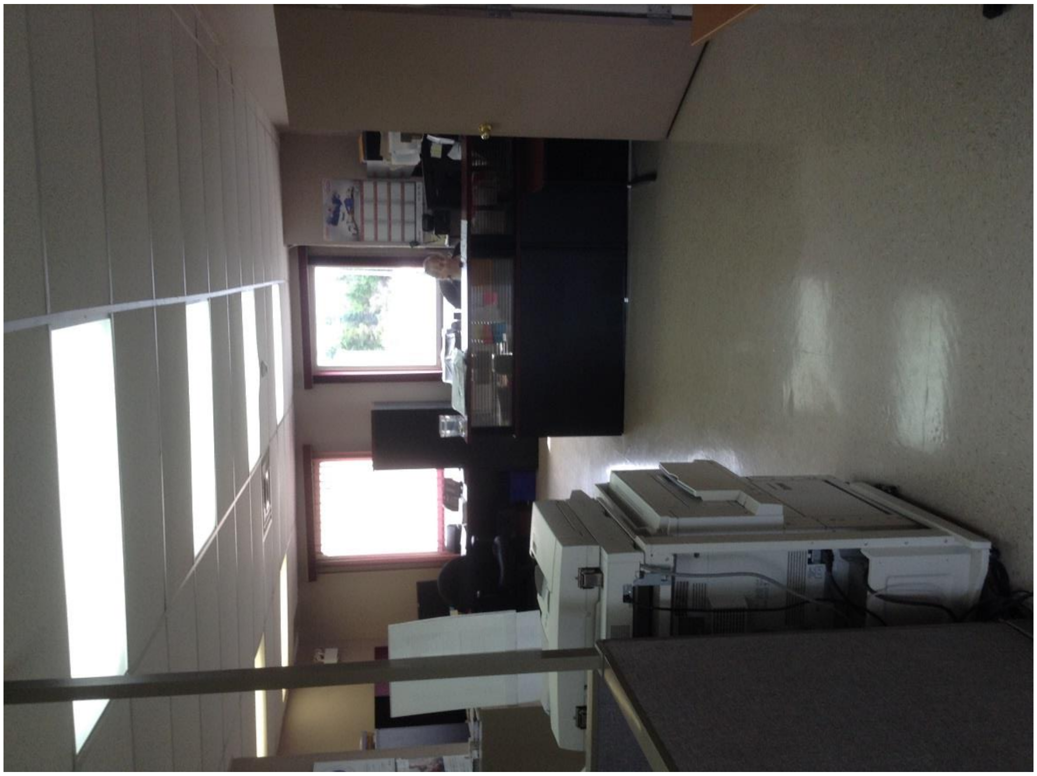


Photo 22

Nalcor Assessments – Whitbourne
Architectural – Main Depot Building

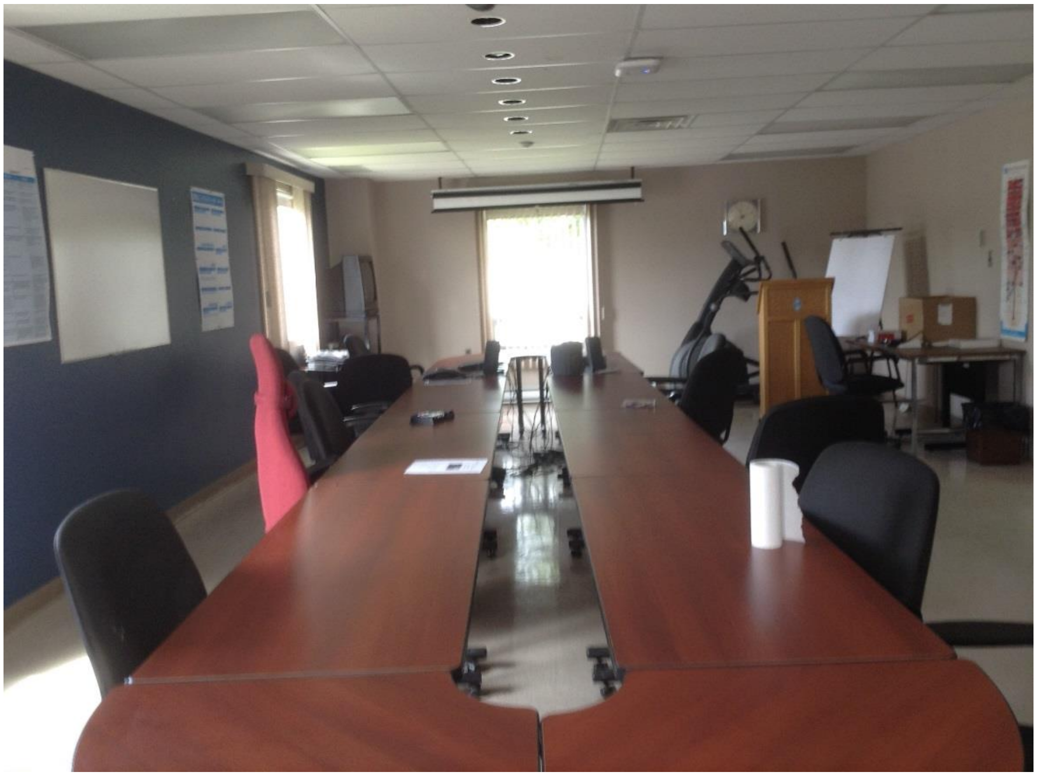


Photo 23

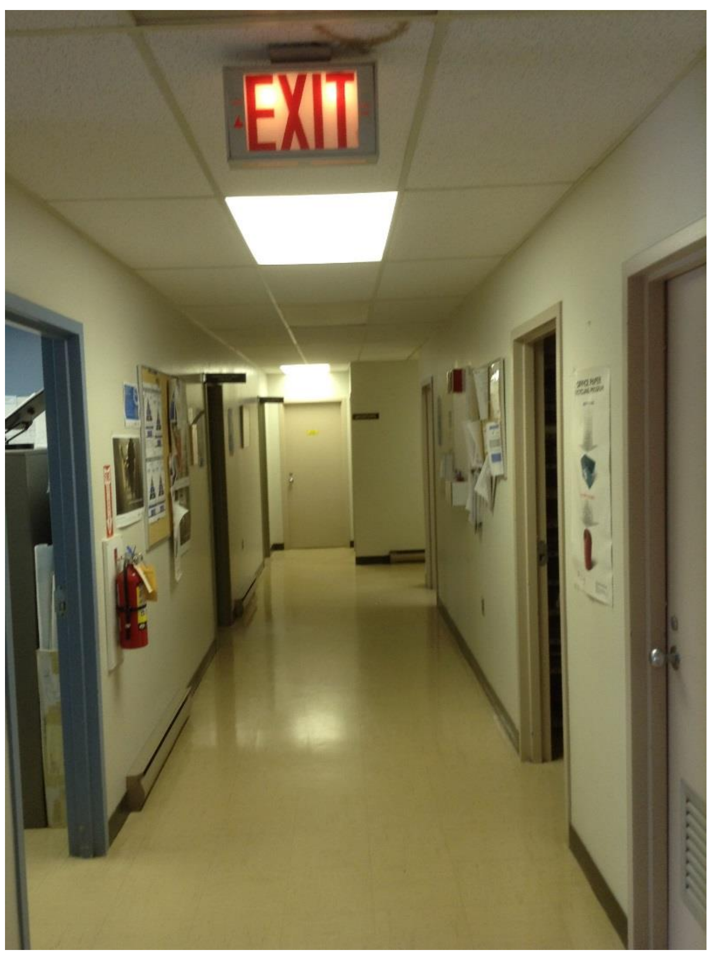


Photo 24

Nalcor Assessments – Whitbourne
Architectural – Main Depot Building

Photo 25

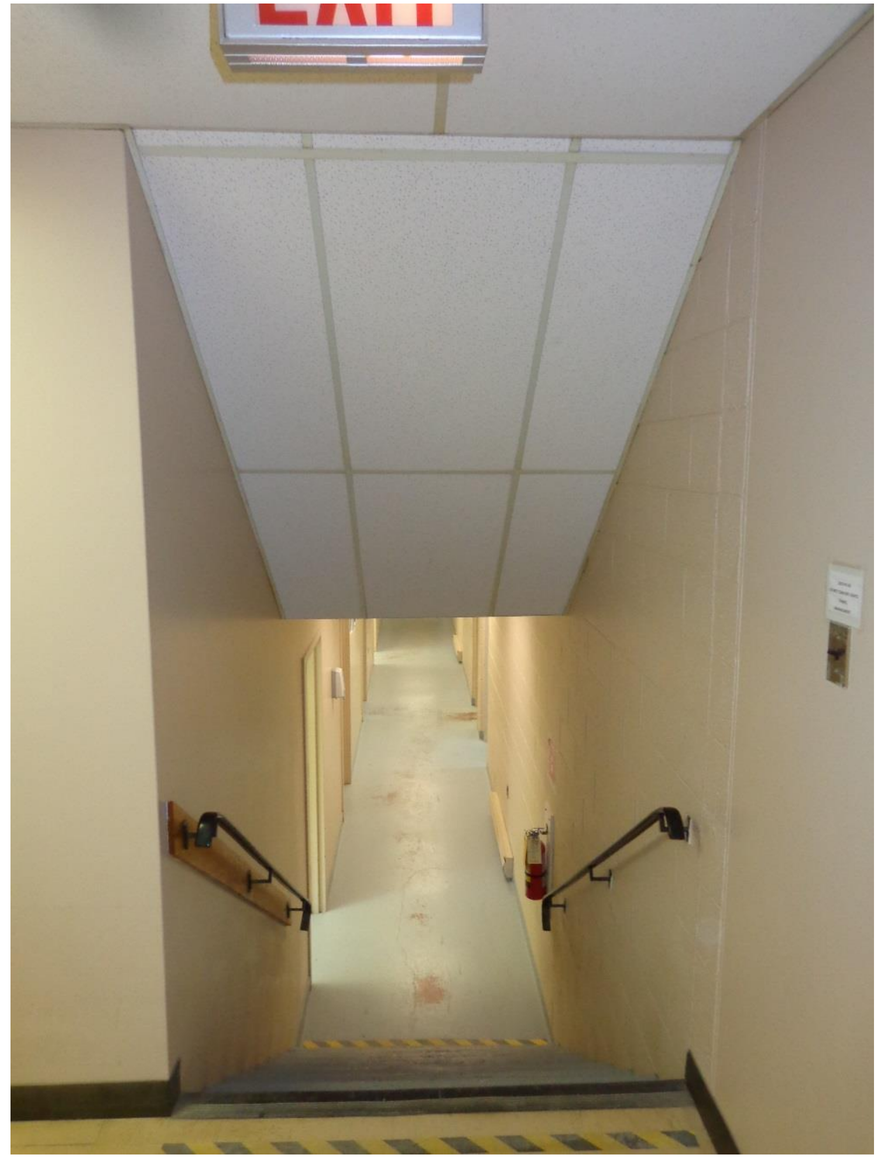


Photo 26

Nalcor Assessments – Whitbourne
Architectural – Main Depot Building

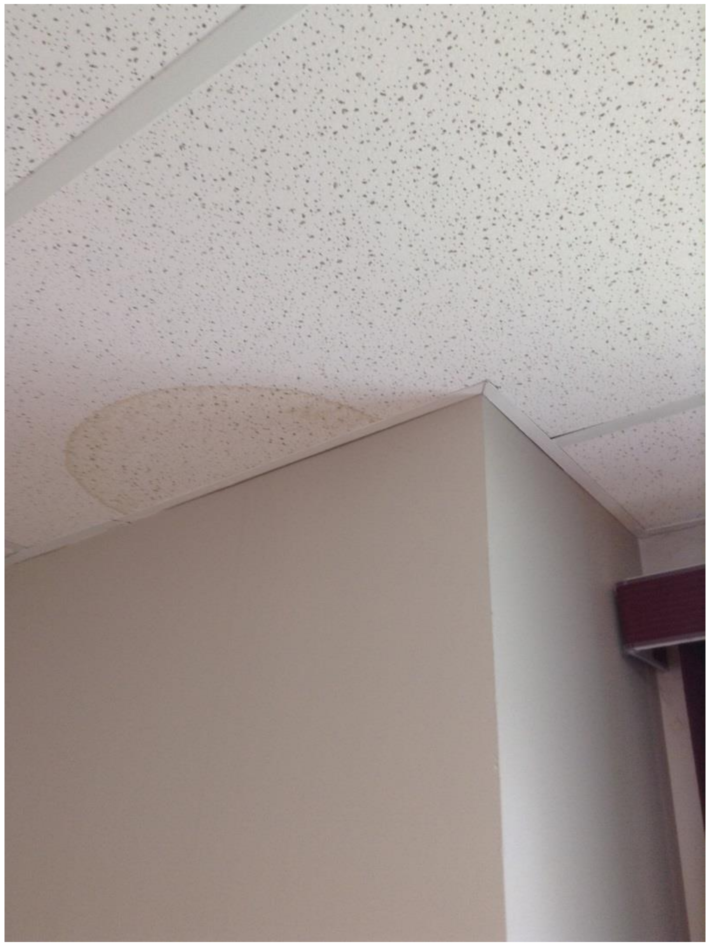


Photo 27

Photo 28

Nalcor Assessments – Whitbourne
Architectural – Main Depot Building

Photo 29

Photo 30

Nalcor Assessments – Whitbourne
Architectural – Main Depot Building

Photo 31

Photo 32

Nalcor Assessments – Whitbourne
Architectural – Main Depot Building

Photo 33

Photo 34

Photo 36

Photo 35

Nalcor Assessments – Whitbourne
Architectural – Main Depot Building

Photo 38

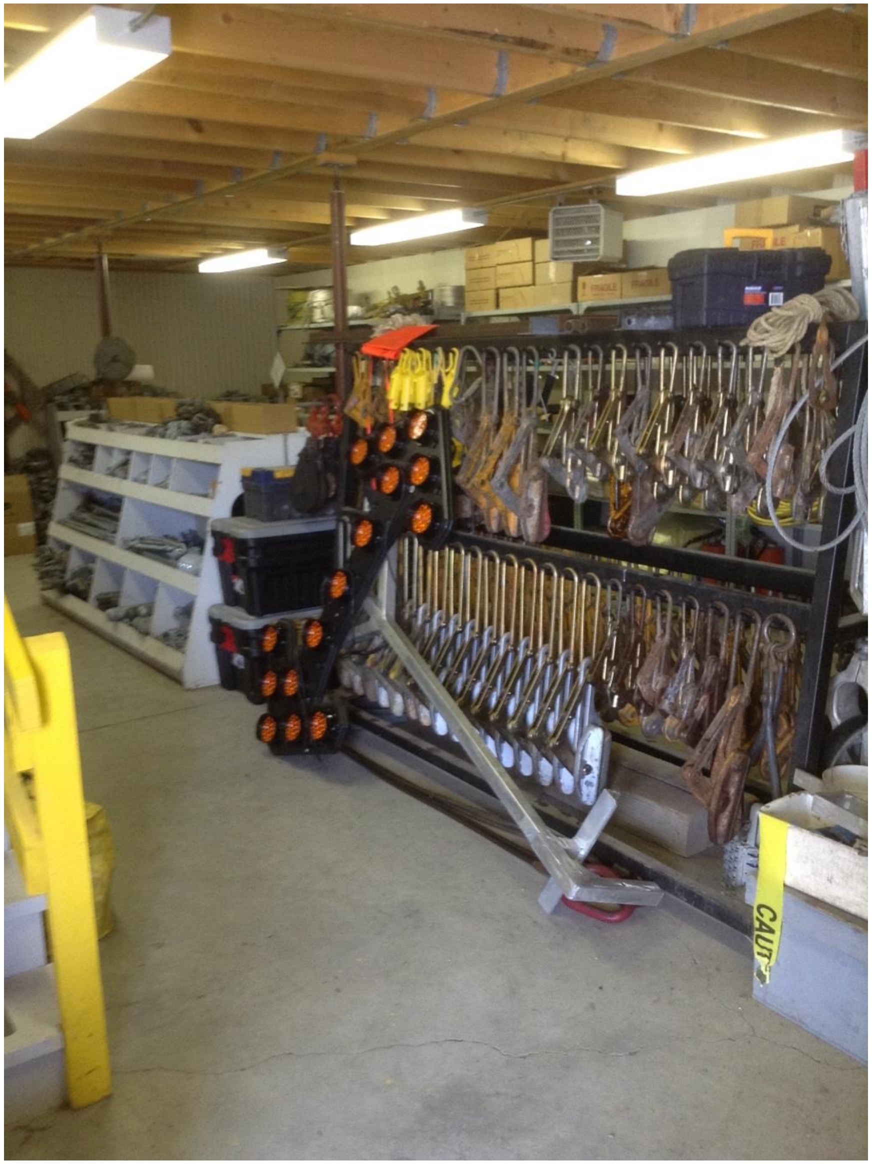
Photo 37

Nalcor Assessments – Whitbourne
Architectural – Main Depot Building

Photo 39

Photo 40

Nalcor Assessments – Whitbourne
Architectural – Main Depot Building



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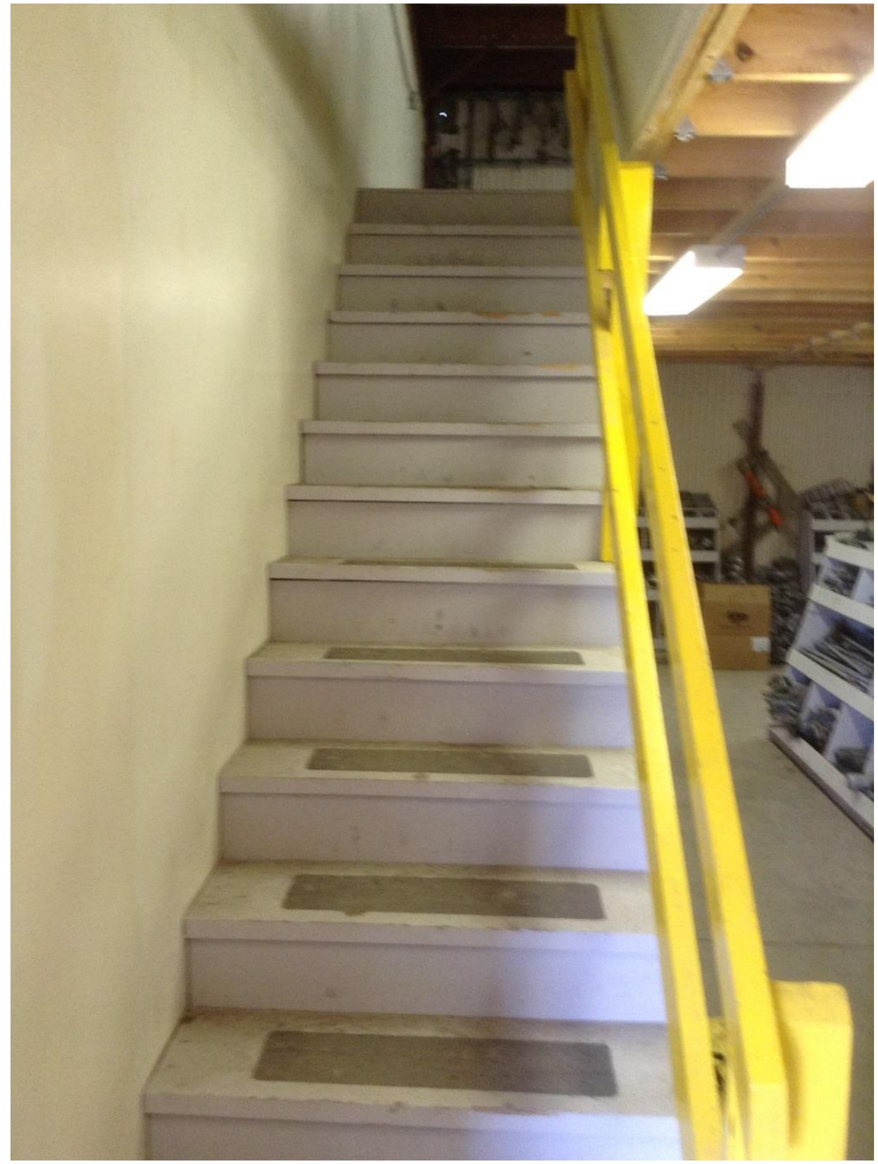


Photo 42

Nalcor Assessments – Whitbourne
Architectural – Main Depot Building

Photo 43

APPENDIX A

STRUCTURAL PHOTOS

Nalcor Assessments – Whitbourne
Structural – Main Depot Building

Photo 1 - Site Grading Towards Foundation Wall

Photo 2 - Large Horizontal Cracks in Foundation

Nalcor Assessments – Whitbourne
Structural – Main Depot Building

Photo 3 - Large Spall in Foundation

Photo 4 - Large Horizontal Crack in Foundation Wall

Nalcor Assessments – Whitbourne
Structural – Main Depot Building

Photo 5 - Shrinkage Cracks in Interior Slab (2)

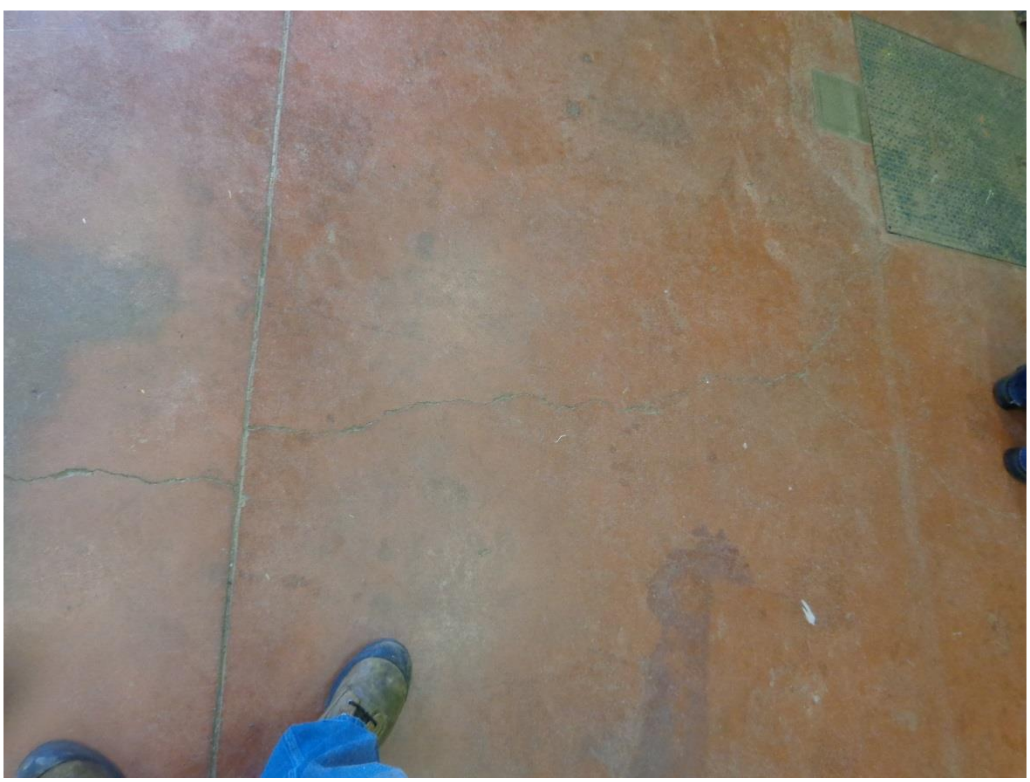


Photo 6 - Shrinkage Cracks in Interior Slab

Nalcor Assessments – Whitbourne
Structural – Main Depot Building

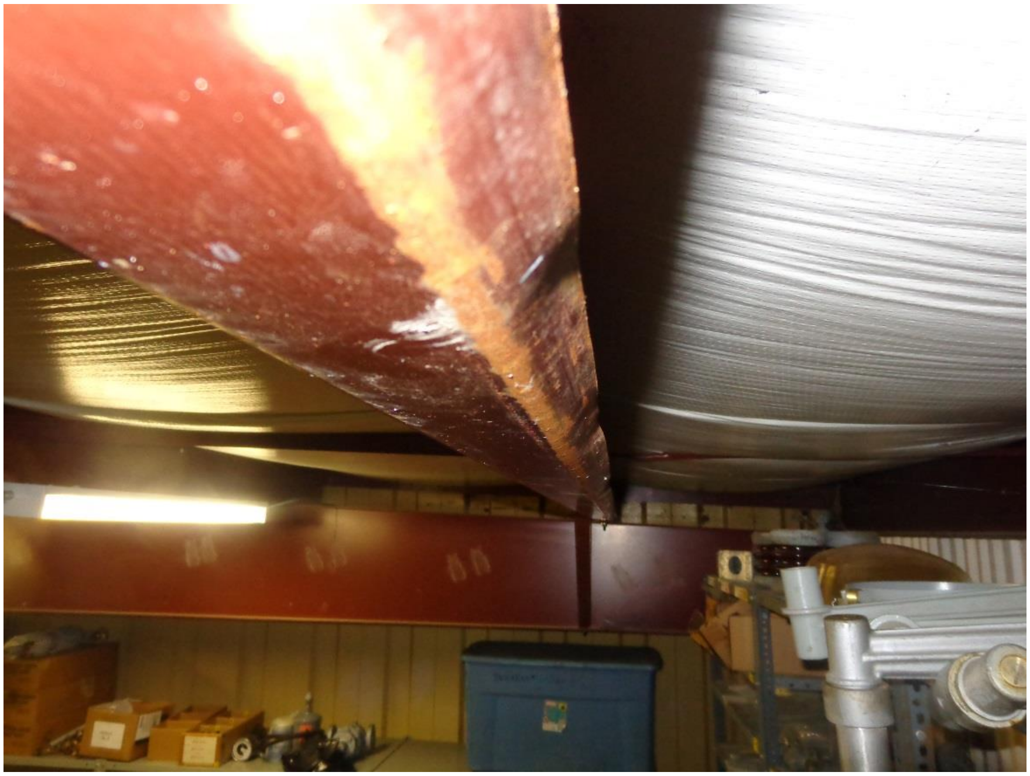


Photo 7 - Deformation of Purlin

Photo 8 - Wind Girt Spacing and Paneling

Nalcor Assessments – Whitbourne
Structural – Main Depot Building

Photo 9 - Equipment Hung from Steel Tie Rod

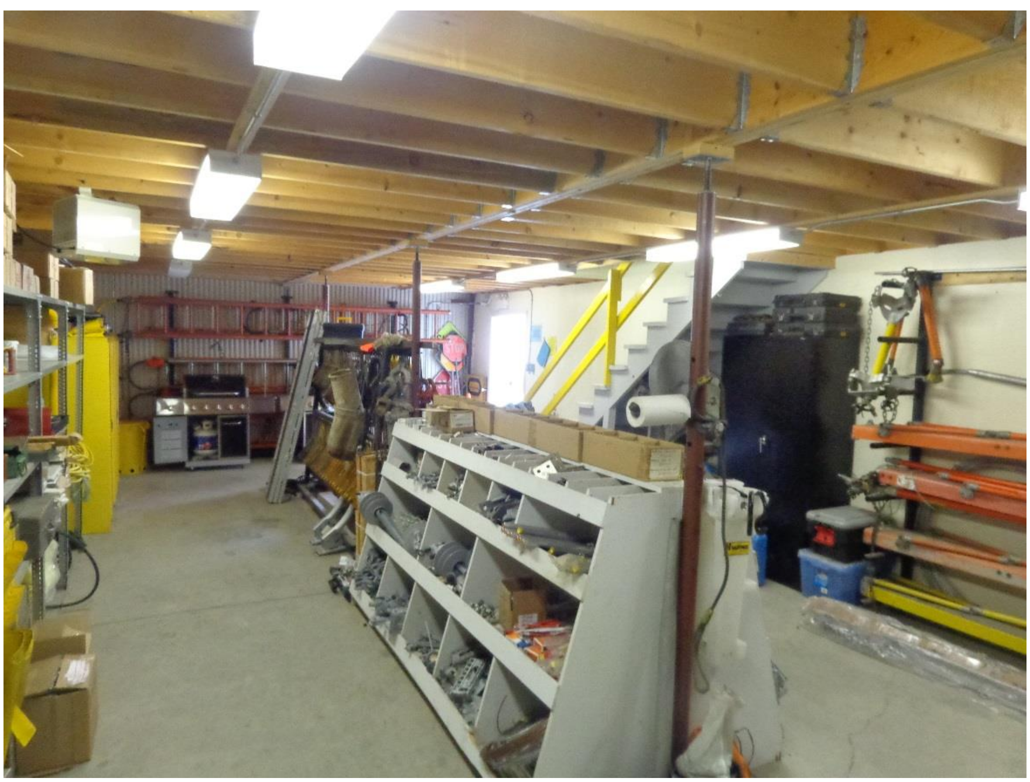


Photo 10 - Second Level Floor Framing

Nalcor Assessments – Whitbourne
Structural – Main Depot Building

Photo 11 - Mezzanine in Telecontrol Room

Photo 12 - Settlement Cracks in Block Wall

Nalcor Assessments – Whitbourne
Structural – Main Depot Building

Photo 13 - Settlement Cracks in Block Wall (2)

APPENDIX A

MECHANICAL PHOTOS

Nalcor Assessments – Whitbourne
Mechanical – Main Depot Building

Photo 1 - ABS Drainage and Vent Piping

Photo 2 - ABS Drainage Piping

Nalcor Assessments – Whitbourne
Mechanical – Main Depot Building

Photo 3 - ABS Vent Piping

Photo 4 - Capped Floor Drain

Nalcor Assessments – Whitbourne
Mechanical – Main Depot Building

Photo 5 – Oil Interceptor Access Cover

Photo 6 – Stabilizing Chamber Access Cover

Nalcor Assessments – Whitbourne
Mechanical – Main Depot Building

Photo 7 - Domestic Water Pressure Tanks and Piping

Photo 8 - Domestic Water Storage

Nalcor Assessments – Whitbourne
Mechanical – Main Depot Building

Photo 9 - Well Pump Controls

Photo 10 - Uninsulated Domestic Water Piping

Nalcor Assessments – Whitbourne
Mechanical – Main Depot Building

Photo 11 - Hot Water Tank

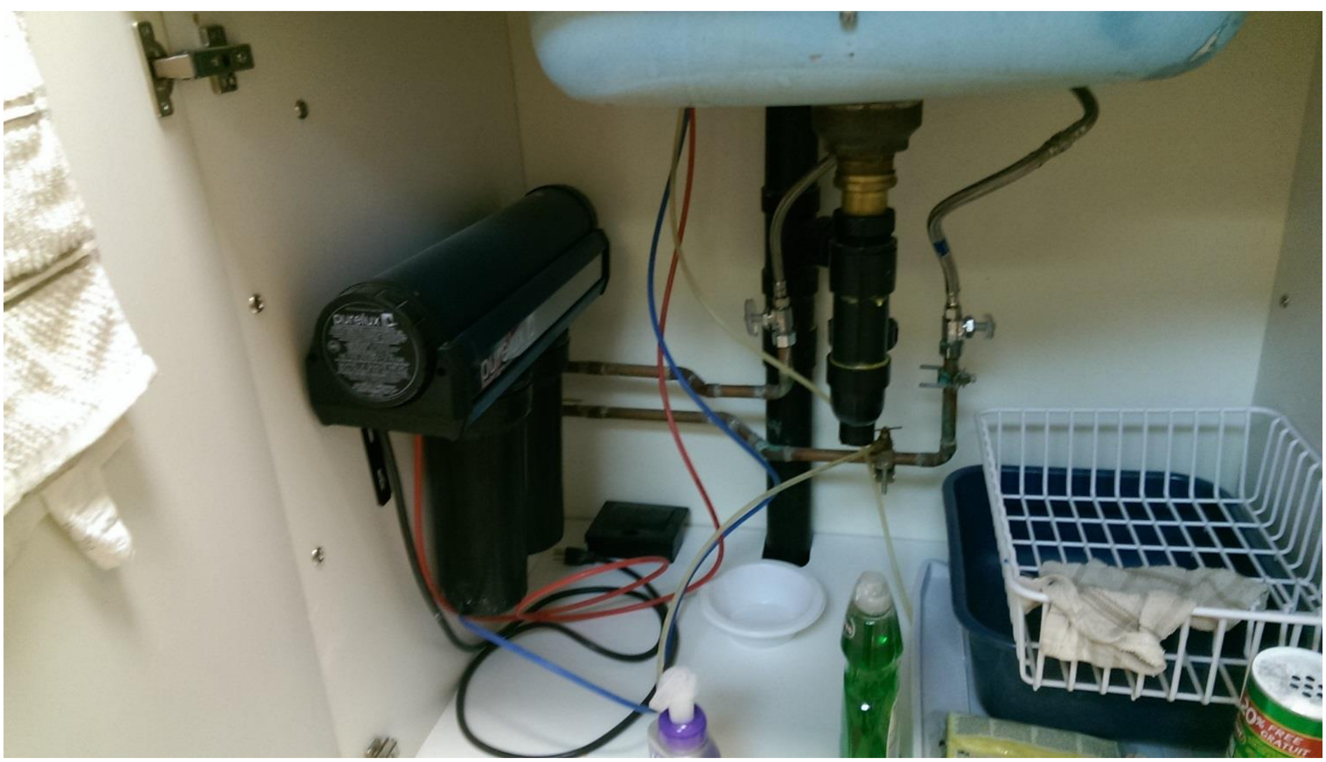


Photo 12 - Lunch Room Sink Water Filtration System

Nalcor Assessments – Whitbourne
Mechanical – Main Depot Building

Photo 13 - Water Closet

Photo 14 - Urinal

Nalcor Assessments – Whitbourne
Mechanical – Main Depot Building

Photo 15 - Lavatory

Photo 16 - Wall Mounted Lavatory

Nalcor Assessments – Whitbourne
Mechanical – Main Depot Building

Photo 17 - Lunch Room Sink

Photo 18 - Eyewash Unit

Nalcor Assessments – Whitbourne
Mechanical – Main Depot Building

Photo 19 - AC Condenser and Air Intake and Exhaust Hood

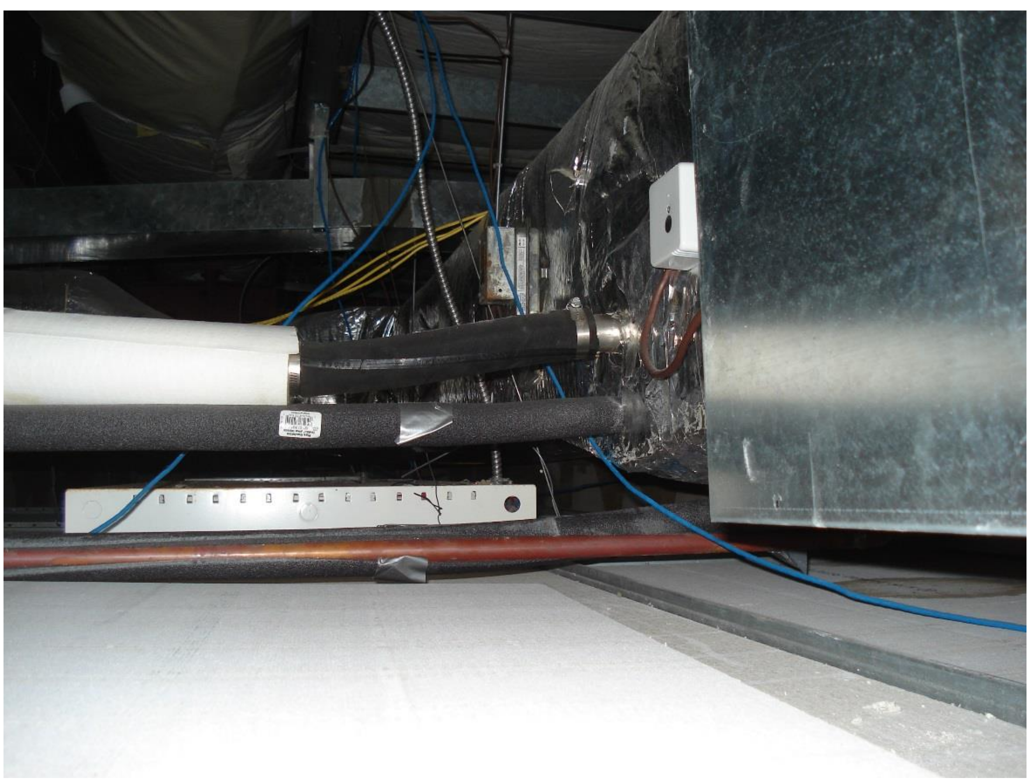


Photo 20 - Indoor Unit

Nalcor Assessments – Whitbourne
Mechanical – Main Depot Building

Photo 21 - Typical Bypass Terminal Unit

Photo 22 - Main System Controller

Nalcor Assessments – Whitbourne
Mechanical – Main Depot Building

Photo 23 - Humidifier

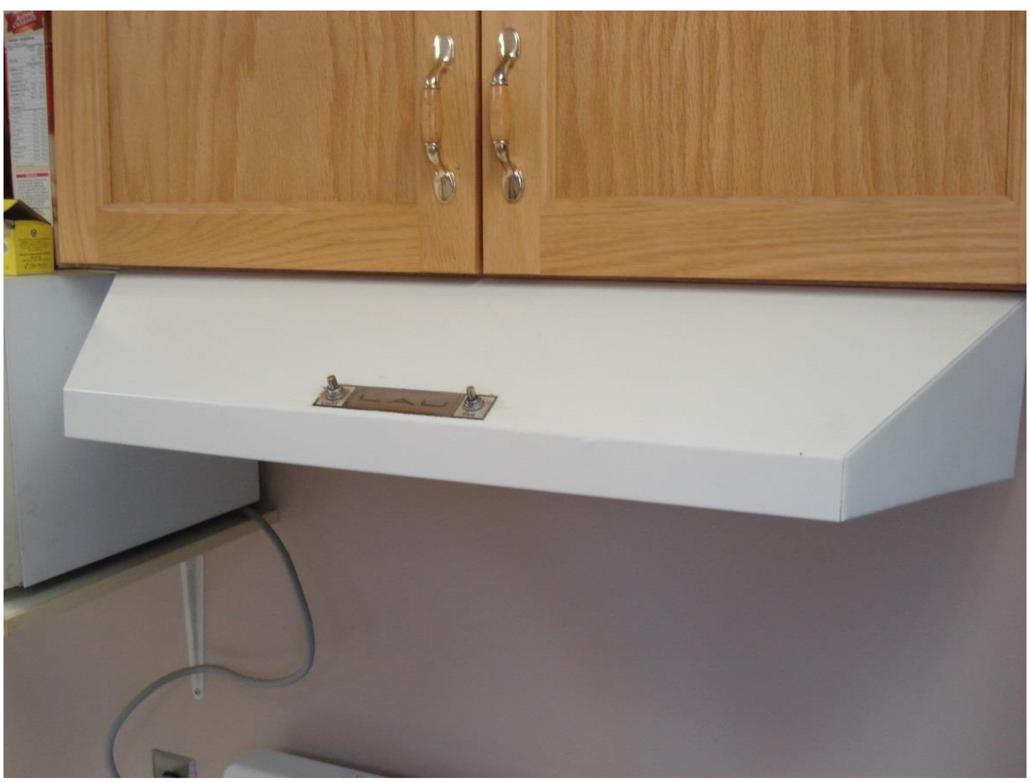


Photo 24 - Range Hood

Nalcor Assessments – Whitbourne
Mechanical – Main Depot Building

Photo 25 - Washroom Exhaust Fan

Photo 26 – Office Area Zone Thermostat

APPENDIX A

ELECTRICAL PHOTOS

Nalcor Assessments – Whitbourne
Electrical – Main Depot Building

Photo 1

Photo 2

Nalcor Assessments – Whitbourne
Electrical – Main Depot Building

Photo 3

Photo 4

Nalcor Assessments – Whitbourne
Electrical – Main Depot Building

Photo 5

Photo 6

Nalcor Assessments – Whitbourne
Electrical – Main Depot Building

Photo 7

Photo 8

Nalcor Assessments – Whitbourne
Electrical – Main Depot Building

Photo 9

Photo 10

Nalcor Assessments – Whitbourne
Electrical – Main Depot Building

Photo 11

Photo 12

Nalcor Assessments – Whitbourne
Electrical – Main Depot Building

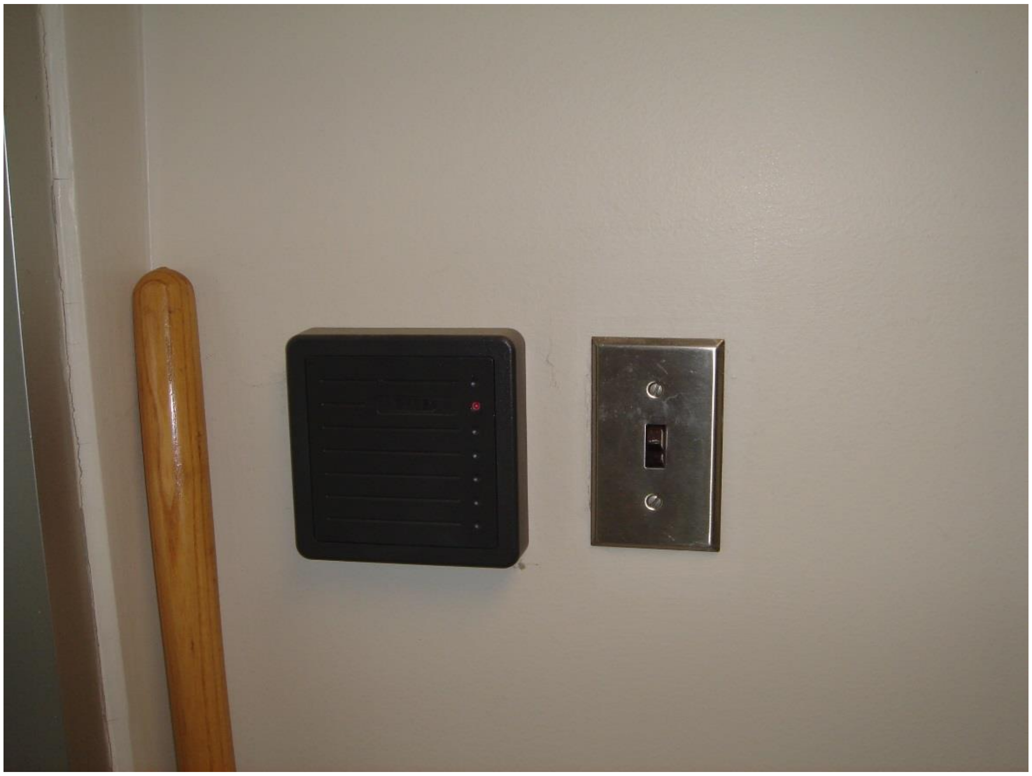


Photo 13

APPENDIX B

Site Photos – Maintenance Garage

APPENDIX B

ARCHITECTURAL PHOTOS

Nalcor Assessments – Whitbourne
Architectural – Maintenance Garage

Photo 1

Photo 2

Nalcor Assessments – Whitbourne
Architectural – Maintenance Garage

Photo 3

Photo 4

Nalcor Assessments – Whitbourne
Architectural – Maintenance Garage

Photo 5

Photo 6

Nalcor Assessments – Whitbourne
Architectural – Maintenance Garage

Nalcor Assessments – Whitbourne
Architectural – Maintenance Garage

Photo 8

Photo 9

Photo 7

Photo 10

Nalcor Assessments – Whitbourne
Architectural – Maintenance Garage

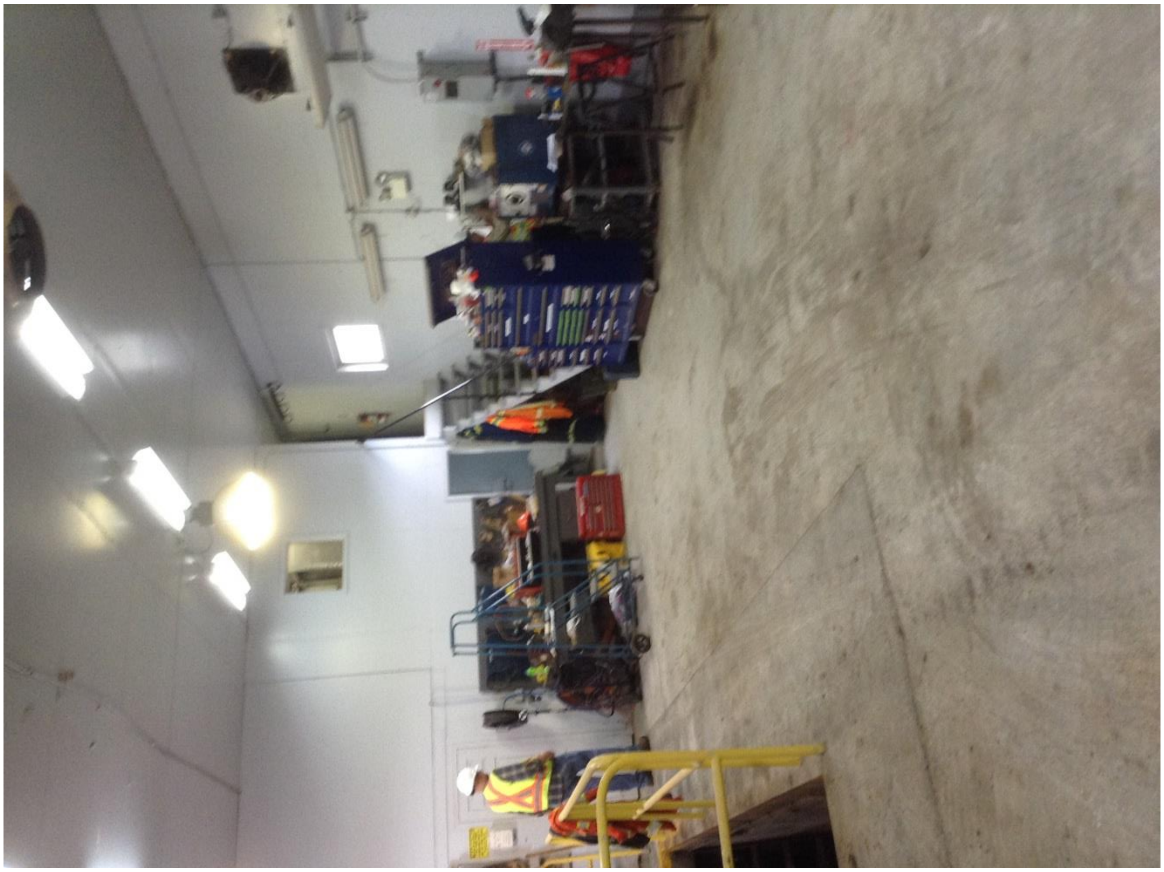


Photo 12

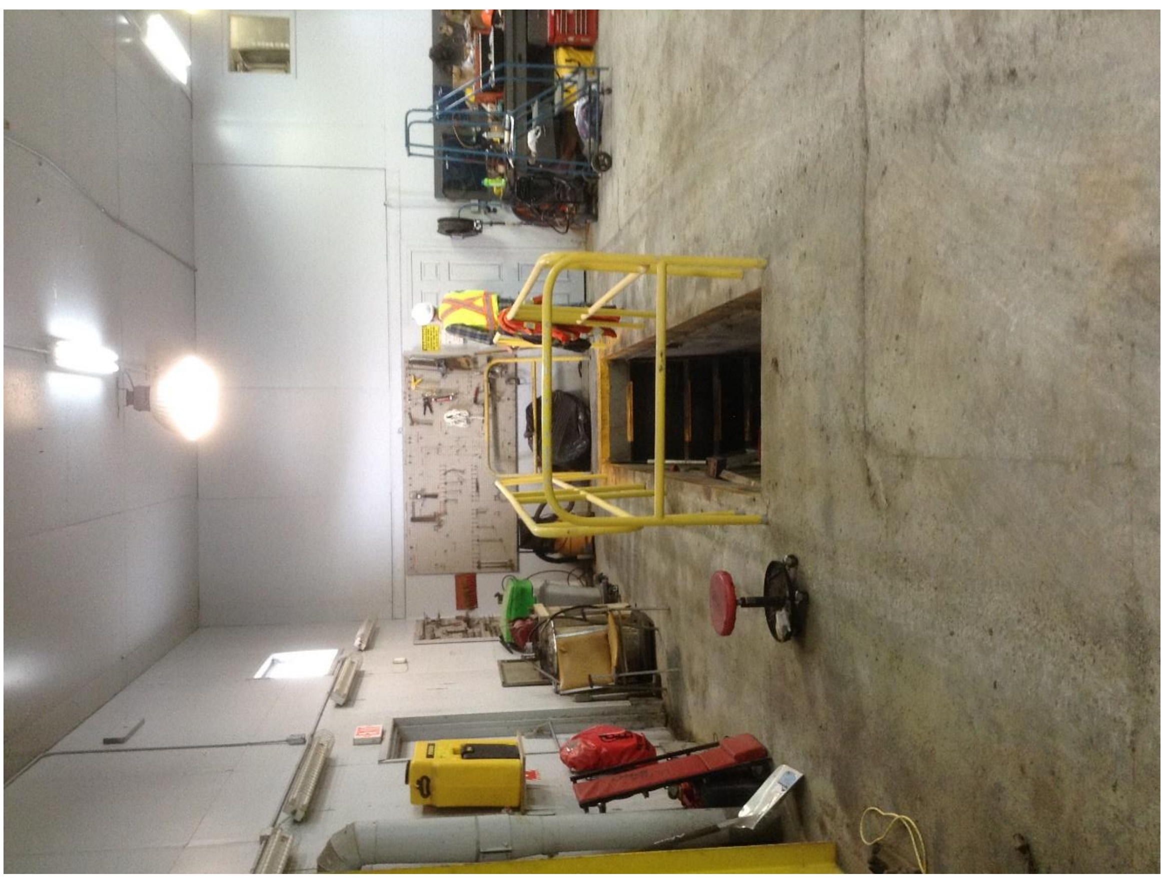


Photo 11

Nalcor Assessments – Whitbourne
Architectural – Maintenance Garage

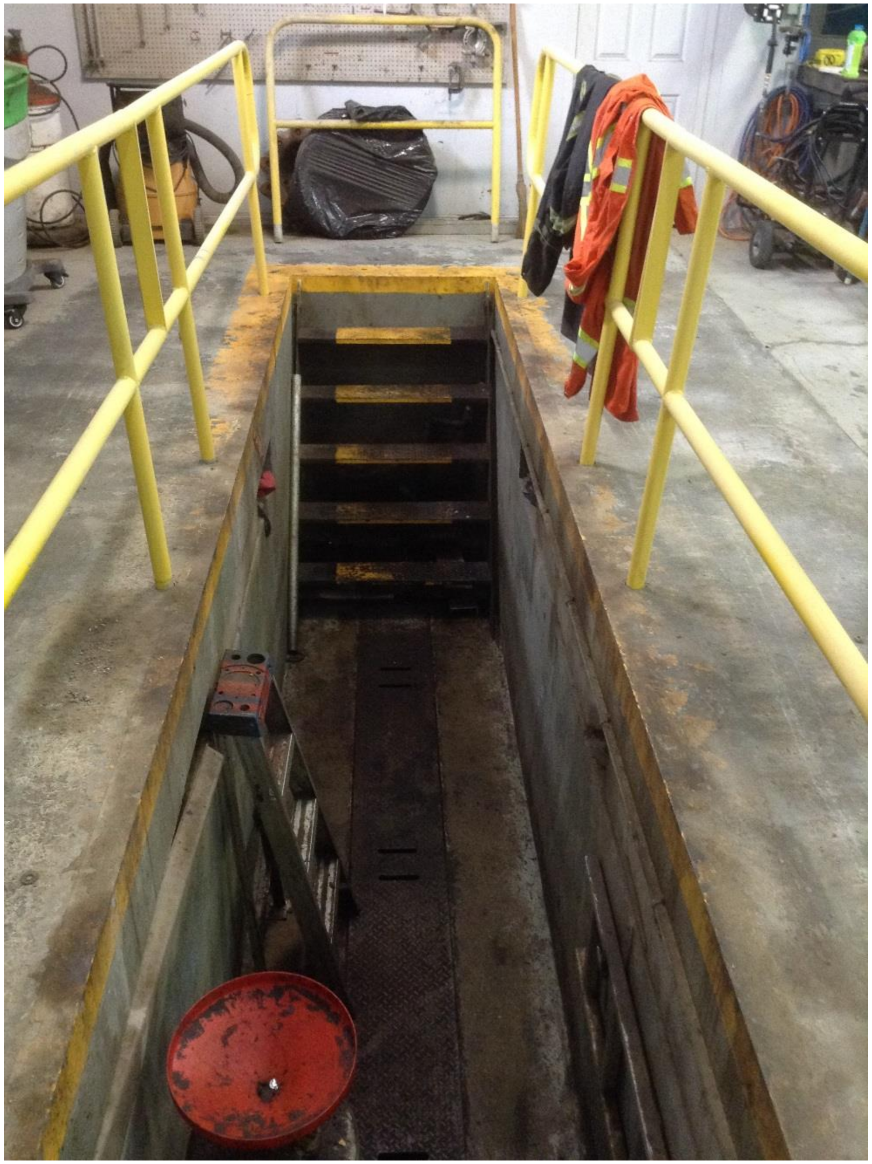


Photo 13

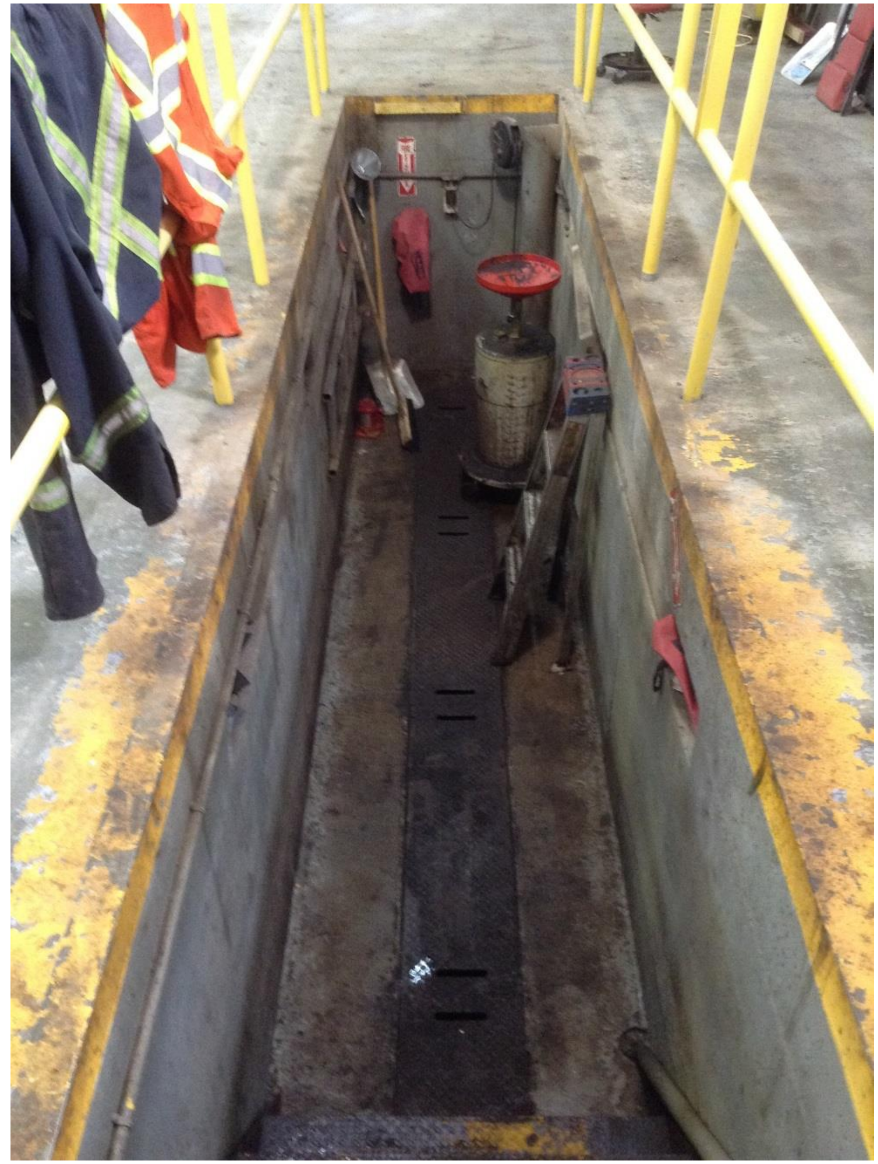


Photo 14

Nalcor Assessments – Whitbourne
Architectural – Maintenance Garage

Photo 15

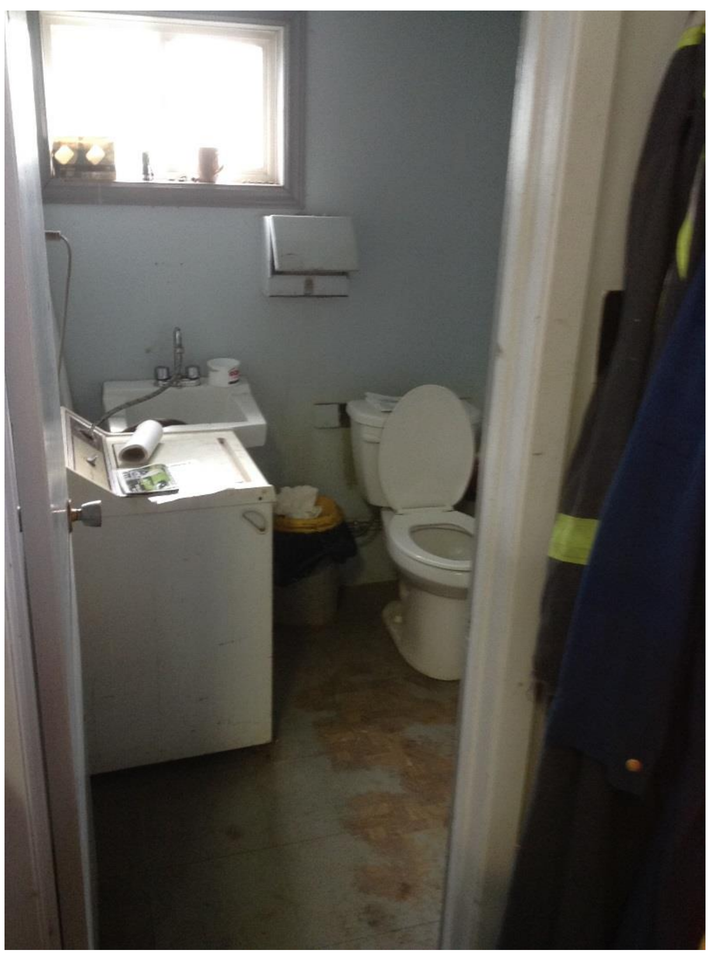


Photo 16

Nalcor Assessments – Whitbourne
Architectural – Maintenance Garage

Photo 17

Photo 18

Nalcor Assessments – Whitbourne
Architectural – Maintenance Garage

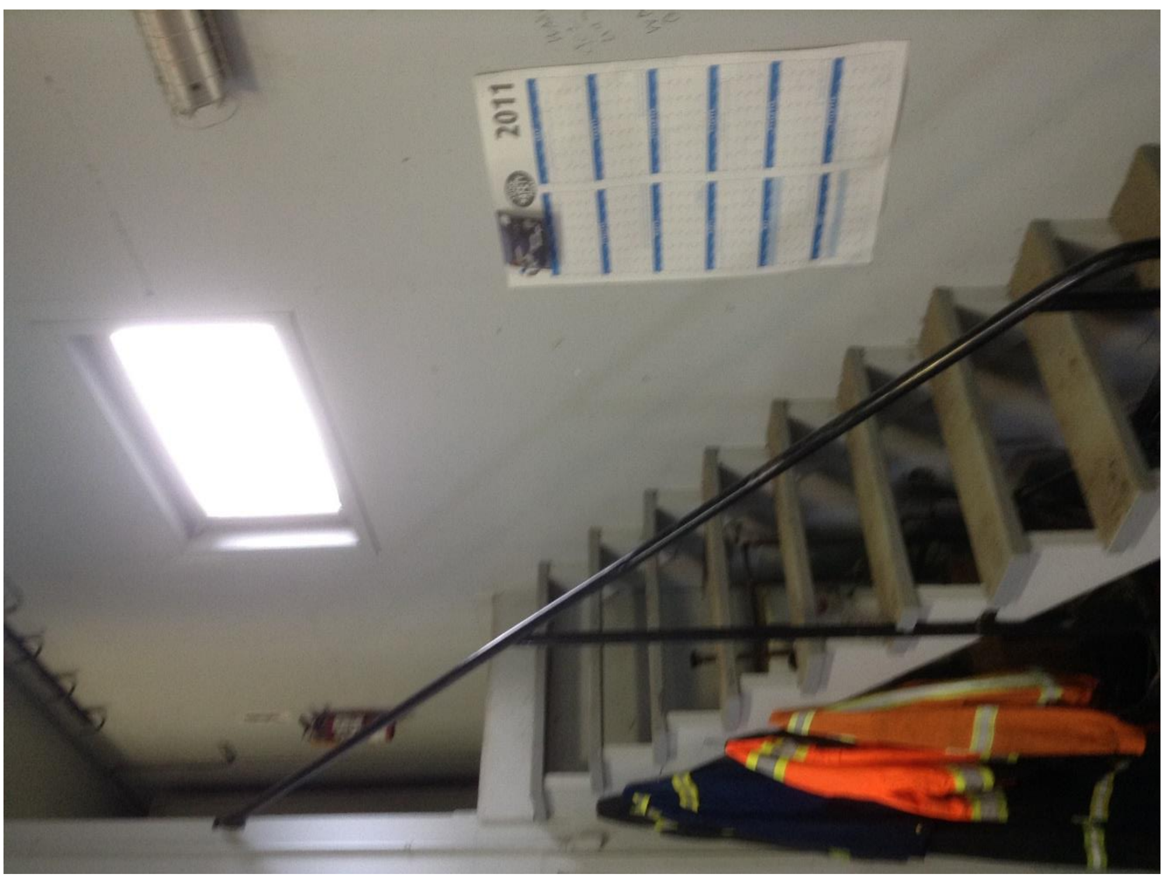


Photo 19

Photo 20

Nalcor Assessments – Whitbourne
Architectural – Maintenance Garage

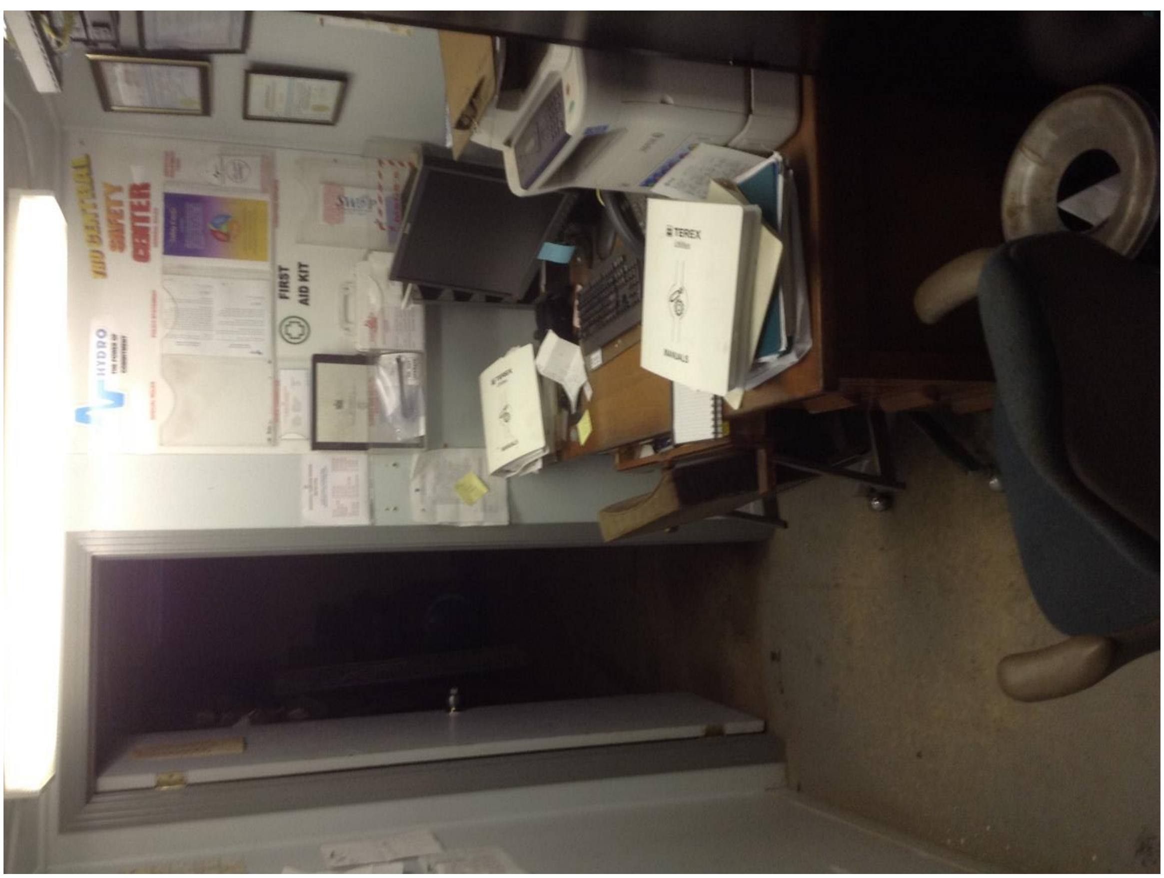


Photo 21

Photo 22

Nalcor Assessments – Whitbourne
Architectural – Maintenance Garage

Photo 23

APPENDIX B

STRUCTURAL PHOTOS

Nalcor Assessments – Whitbourne
Structural – Maintenance Garage

Photo 1 - Small Vertical Crack in Foundation Wall

Photo 2 - Concrete Spall on Foundation Wall

Nalcor Assessments – Whitbourne
Structural – Maintenance Garage

Photo 3 - Interior of Maintenance Garage

Photo 4 - Shrinkage Crack in Garage Interior Slab

Nalcor Assessments – Whitbourne
Structural – Maintenance Garage

Photo 5 - Moisture or Staining by Equipment

APPENDIX B

MECHANICAL PHOTOS

Nalcor Assessments – Whitbourne
Mechanical – Maintenance Garage

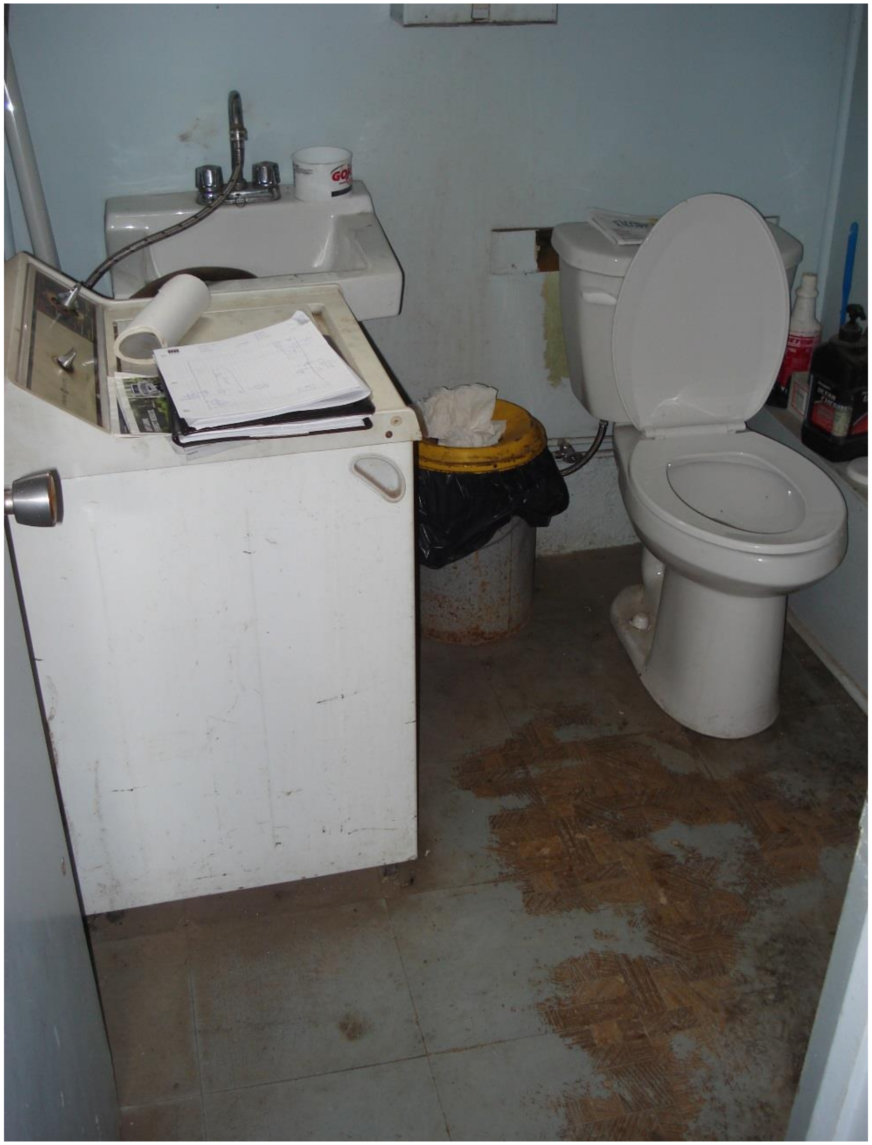


Photo 1 - Washroom Fixtures

Photo 2 - Service Sink

Nalcor Assessments – Whitbourne
Mechanical – Maintenance Garage

Photo 3 - Non Code Compliant Vent Piping

Photo 4 - Service Pit Sump Pump

Nalcor Assessments – Whitbourne
Mechanical – Maintenance Garage

Photo 5 - Hot Water Tank

Photo 6 - Garage Exhaust Fan Hood

Nalcor Assessments – Whitbourne
Mechanical – Maintenance Garage

Photo 7 - Service Pit Sidewall Exhaust Fan

Photo 8 - Service Pit Exhaust Duct

Nalcor Assessments – Whitbourne
Mechanical – Maintenance Garage

Photo 9 - CO Gas Detection System

APPENDIX B

ELECTRICAL PHOTOS

Nalcor Assessments – Whitbourne
Electrical – Maintenance Garage

Photo 1

Photo 2

Nalcor Assessments – Whitbourne
Electrical – Maintenance Garage

Photo 3

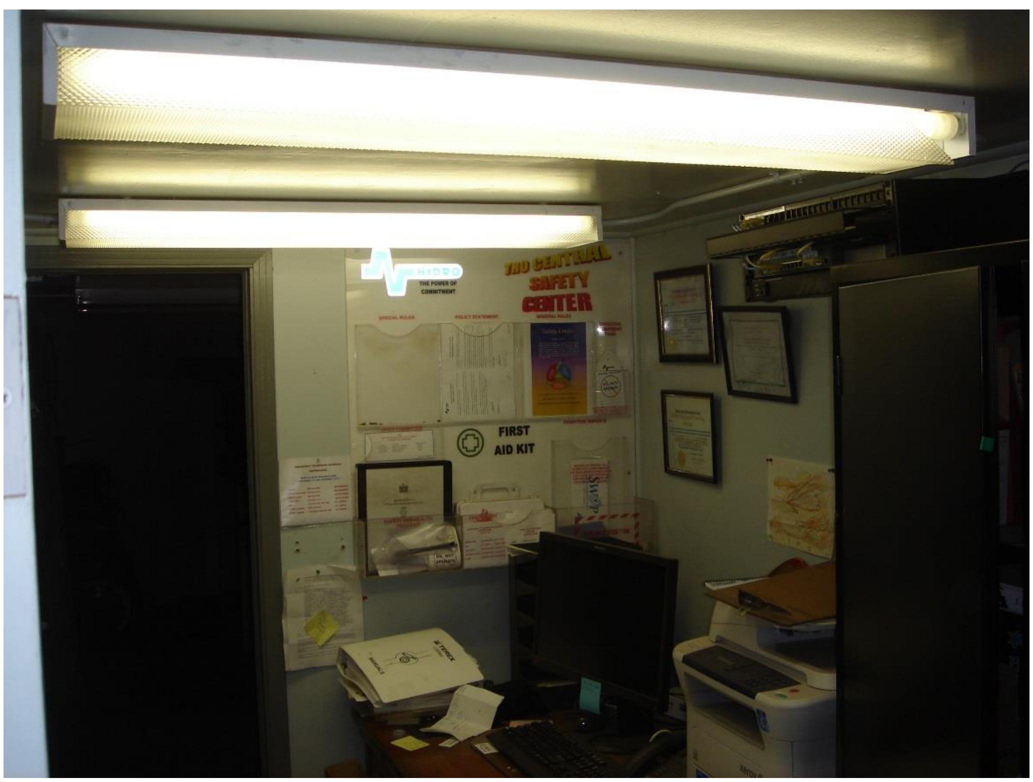


Photo 4

Nalcor Assessments – Whitbourne
Electrical – Maintenance Garage

Photo 5

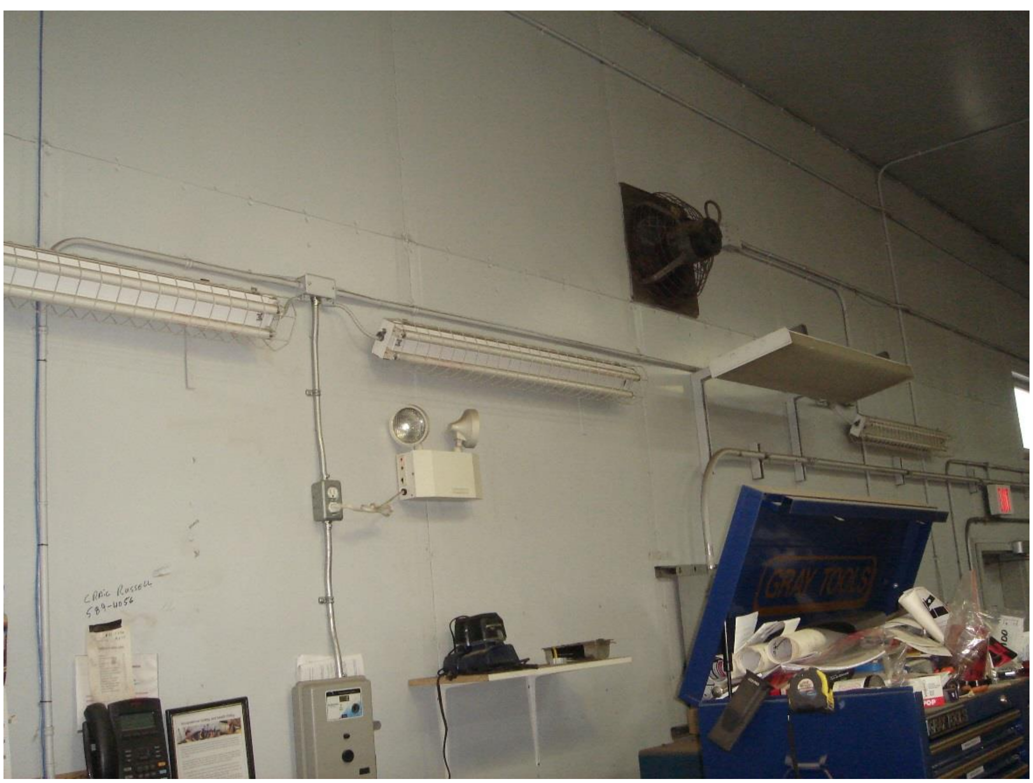


Photo 6

Nalcor Assessments – Whitbourne
Electrical – Maintenance Garage

Photo 7

APPENDIX C

Site Photos – Storage Building

APPENDIX C

ARCHITECTURAL PHOTOS

Nalcor Assessments – Whitbourne
Architectural – Storage Building

Photo 1

Photo 2

Nalcor Assessments – Whitbourne
Architectural – Storage Building

Photo 3

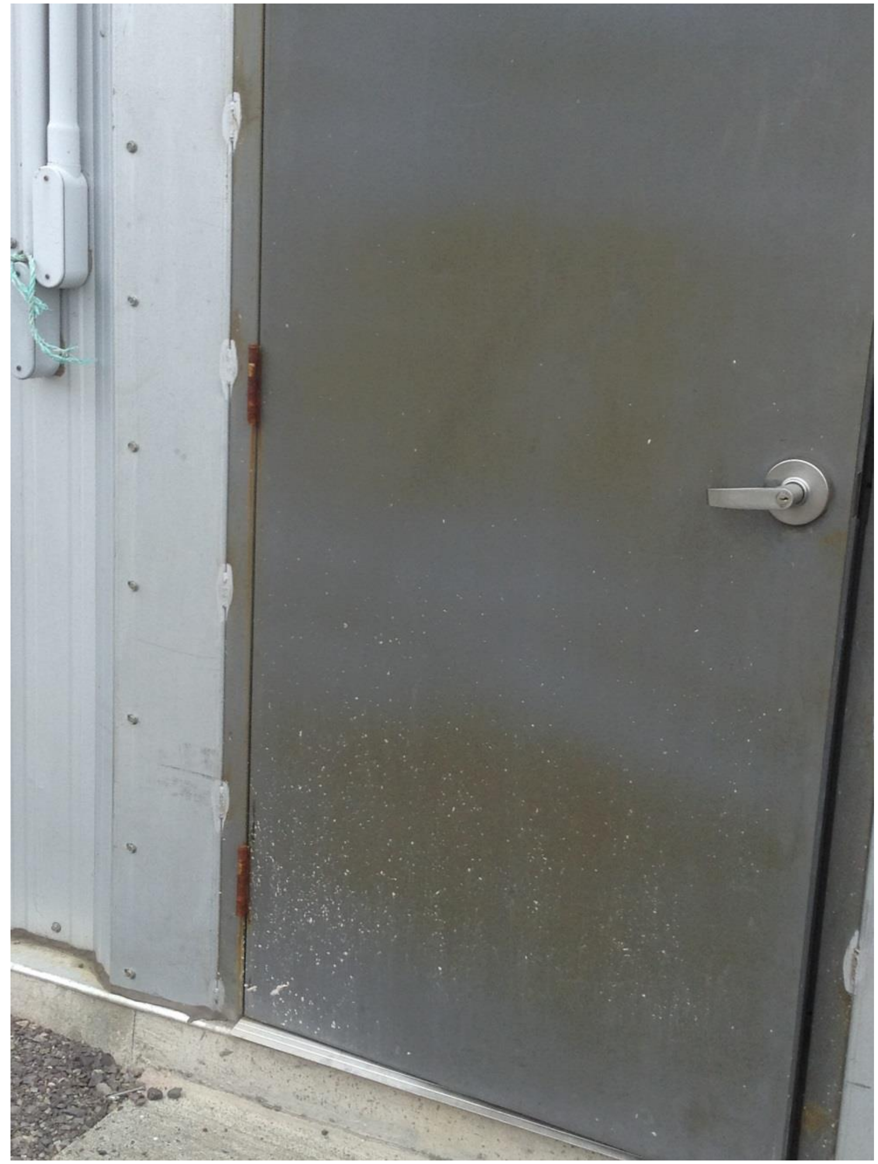


Photo 4

Nalcor Assessments – Whitbourne
Architectural – Storage Building

Photo 5

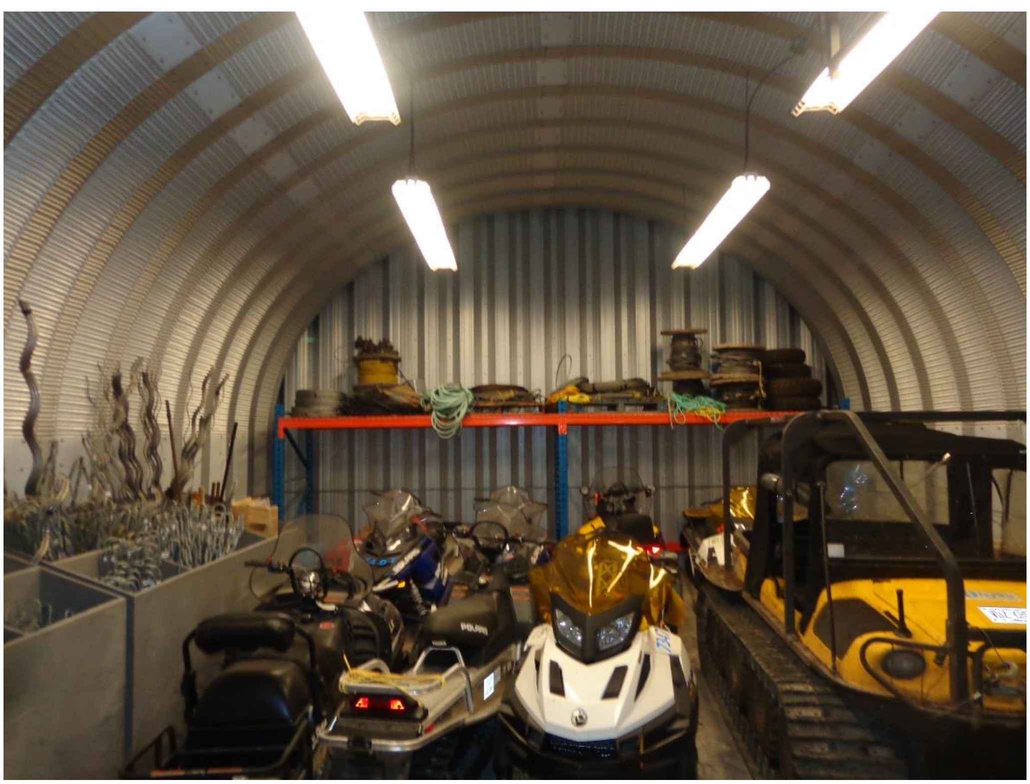


Photo 6

Nalcor Assessments – Whitbourne
Architectural – Storage Building

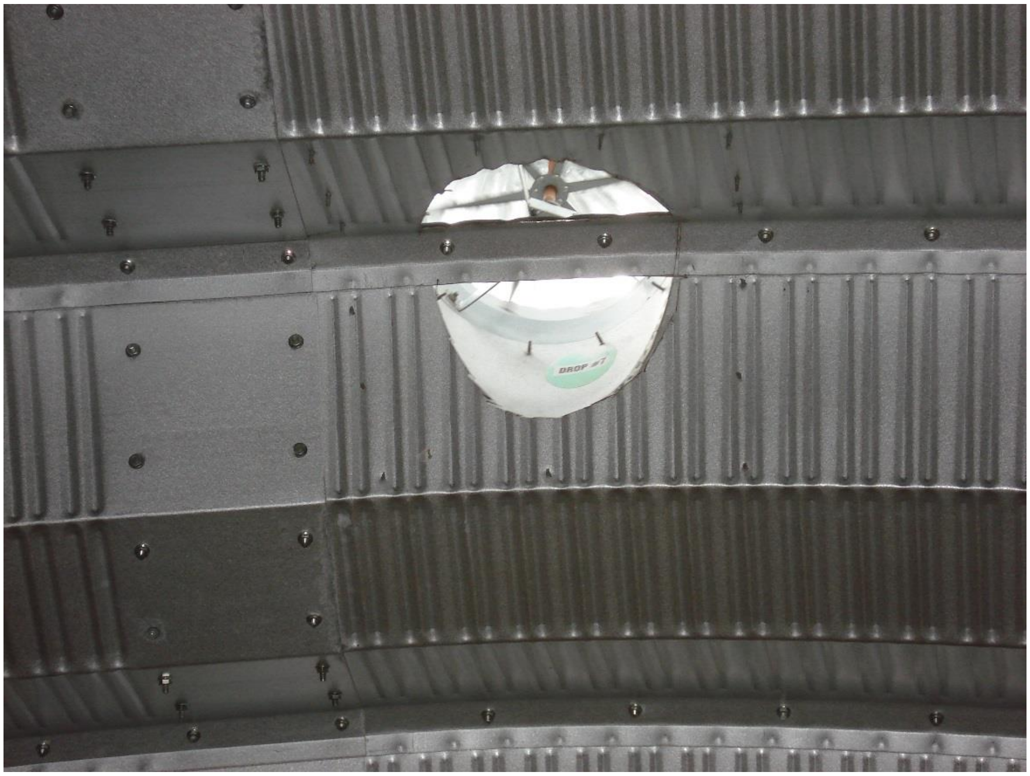


Photo 7

APPENDIX C

STRUCTURAL PHOTOS

Nalcor Assessments – Whitbourne
Structural – Storage Building

3

Photo 1 - Quonset Hut Structure

Photo 2 - Floor Shrinkage Cracks

Nalcor Assessments – Whitbourne
Structural – Storage Building

Photo 3 - Interior Structure

APPENDIX C

ELECTRICAL PHOTOS

Nalcor Assessments – Whitbourne
Electrical – Storage Building

Picture 1

Picture 2

Nalcor Assessments – Whitbourne
Electrical – Storage Building

Picture 3

Picture 4

APPENDIX D

Site Photos – Carpentry Building

APPENDIX D

ARCHITECTURAL PHOTOS

Nalcor Assessments – Whitbourne
Architectural – Carpentry Building

Photo 1

Photo 2

Nalcor Assessments – Whitbourne
Architectural – Carpentry Building

Photo 3

Photo 4

Nalcor Assessments – Whitbourne
Architectural – Carpentry Building

Photo 5

Photo 6

Nalcor Assessments – Whitbourne
Architectural – Carpentry Building

Photo 7

Photo 8

Nalcor Assessments – Whitbourne
Architectural – Carpentry Building

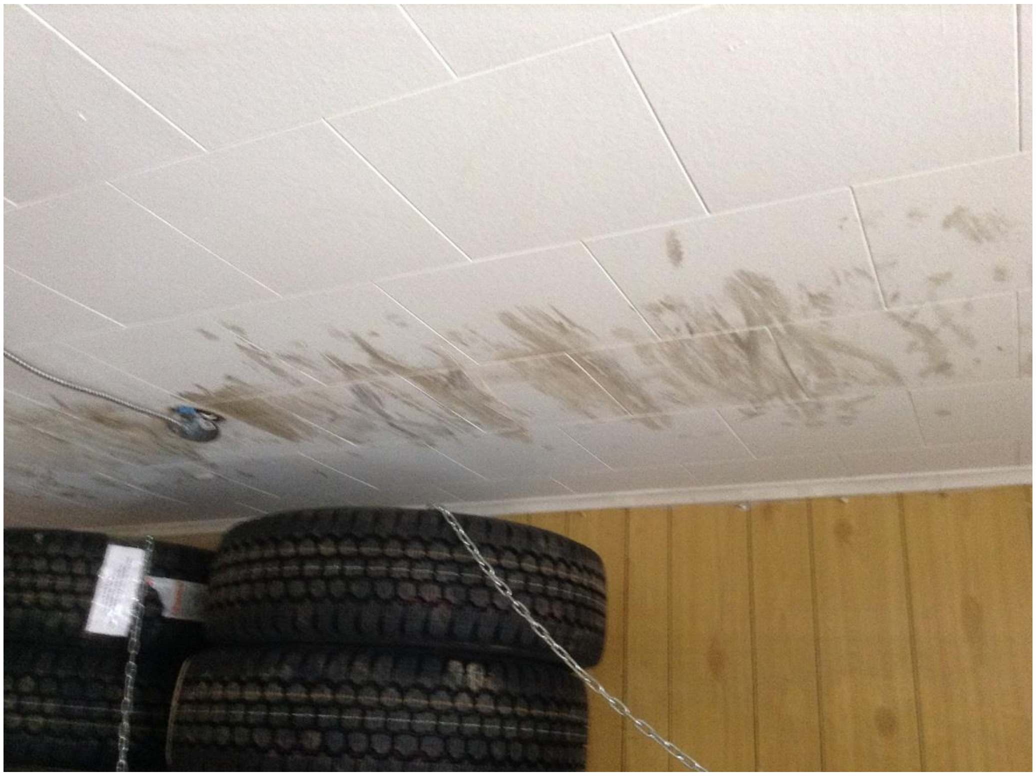


Photo 9

APPENDIX D

STRUCTURAL PHOTOS

Nalcor Assessments – Whitbourne
Structural – Carpentry Building

Photo 1 - Skirting Along Bottom of Building

Photo 2 - Marks Made by Tires on Ceiling

APPENDIX D

ELECTRICAL PHOTOS

Nalcor Assessments – Whitbourne
Electrical – Carpentry Building

Photo 1

Photo 2

Nalcor Assessments – Whitbourne
Electrical – Carpentry Building

Photo 3

Photo 4

APPENDIX E

Site Photos – Site/Civil

Nalcor Assessments – Whitbourne
Civil – Site Civil Photos

Photo 1 - Office Entrance

Photo 2 - Front Parking Area

Nalcor Assessments – Whitbourne
Civil – Site Civil Photos

Photo 3 - Yard South of Main Building

Photo 4 - Office Leg of Building

Nalcor Assessments – Whitbourne
Civil – Site Civil Photos

Photo 5 - East End of Main Building

Photo 6 - Rear of Main Building

Nalcor Assessments – Whitbourne
Civil – Site Civil Photos

Photo 7 - Maintenance Garage

Photo 8 - Path of Storm Drainage

Nalcor Assessments – Whitbourne
Civil – Site Civil Photos

Photo 9 – Fencing Off From Bottom

Photo 10 – Fence Leaning

Nalcor Assessments – Whitbourne
Civil – Site Civil Photos

Photo 11 – Barbed Wire Support Off

Photo 12 - Fence Leaning

Nalcor Assessments – Whitbourne
Civil – Site Civil Photos

Photo 13Pole Split and Brace Off

Photo 14 - Braces Bent and Off

Nalcor Assessments – Whitbourne
Civil – Site Civil Photos

Photo 15 - Brace Fitting Broken

Photo 16 - Fence Leaning and Off From Bottom

Nalcor Assessments – Whitbourne
Civil – Site Civil Photos

Photo 17 - Barbed Wire Supports Off

Photo 18 - Top Brace Bent and Fence Leaning

Nalcor Assessments – Whitbourne
Civil – Site Civil Photos

Photo 19 - Barbed Wire Supports Off

APPENDIX F

Site Photos – Environmental

Nalcor Assessments – Whitbourne
Environmental Photos

Photo 1 – Stained Floor

Photo 2 – Stained Ground

Nalcor Assessments – Whitbourne
Environmental Photos

Photo 3 – Stained Ground

Photo 4 – Warehouse Safety Cabinets

Nalcor Assessments – Whitbourne
Environmental Photos

Photo 5 – Warehouse Safety Cabinet Contents

Photo 6 - Aerosol Spray Paint in Safety Cabinet

Nalcor Assessments – Whitbourne
Environmental Photos

Photo 7 - Aerosol Primers and Cleaners

Photo 8 - Warehouse Extension Safety Cabinets

Nalcor Assessments – Whitbourne
Environmental Photos

Photo 9 - Warehouse Extension Safety Cabinet Contents

Photo 10 - Warehouse Extension Safety Cabinet Contents

Nalcor Assessments – Whitbourne
Environmental Photos

Photo 11 - Warehouse Extension Safety Cabinet Contents

Photo 12 - Compressor Oil

Nalcor Assessments – Whitbourne
Environmental Photos

Photo 13 - Degreaser

Photo 14 - Transformer Oil

Nalcor Assessments – Whitbourne
Environmental Photos

Photo 15 - Transformer Oil

Photo 16 - Transformer Oil

Nalcor Assessments – Whitbourne
Environmental Photos

Photo 17 - Aviation Fuel Drums

Photo 18 - Propane Cylinders

Nalcor Assessments – Whitbourne
Environmental Photos

Photo 19 - Propane BBQ with Cylinder

Photo 20 - Nitrogen Cylinder

Nalcor Assessments – Whitbourne
Environmental Photos

Photo 21 - Sulfur Hexafloride Cylinder

Photo 22 - Sulfur Hexafloride

Nalcor Assessments – Whitbourne
Environmental Photos

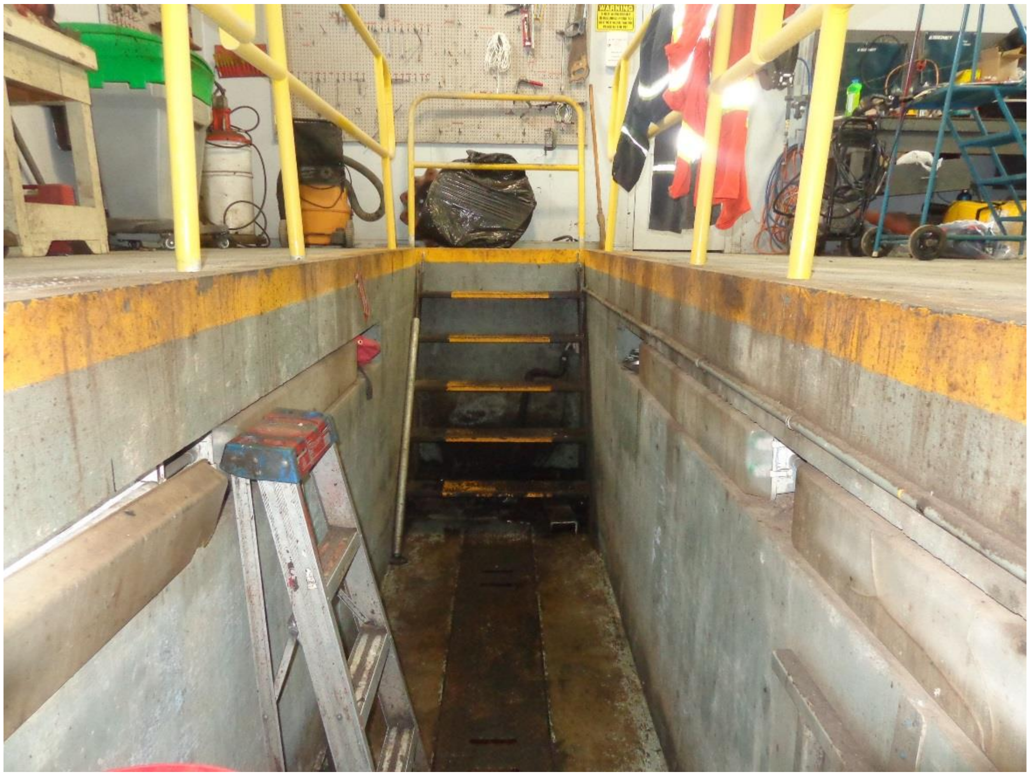


Photo 23 - Service Pit Staining

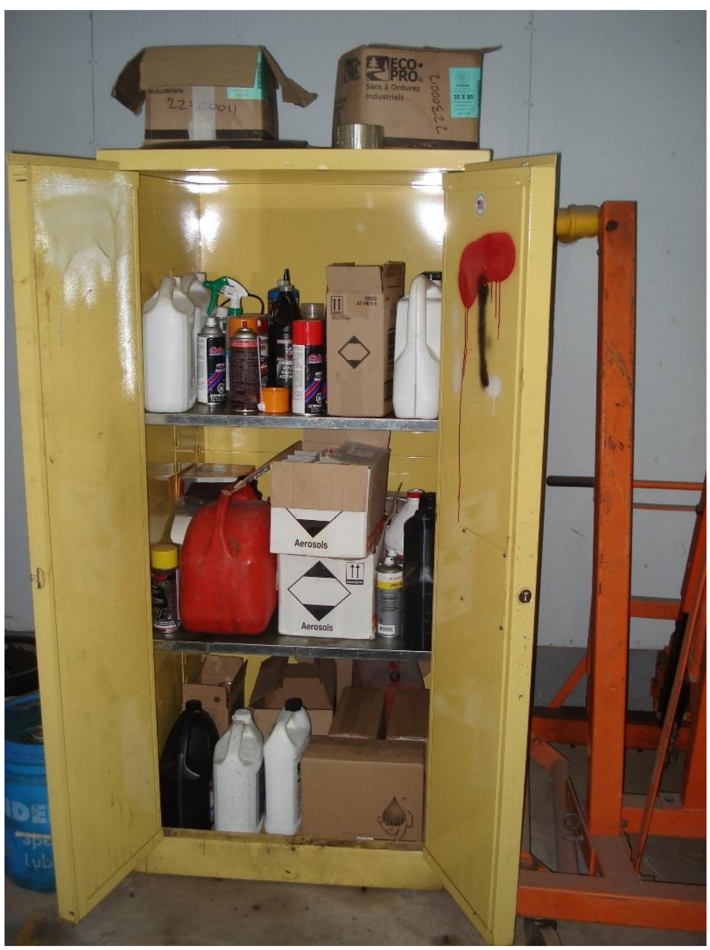


Photo 24 - Safety Cabinet Contents

Nalcor Assessments – Whitbourne
Environmental Photos

Photo 25 - Oil Containers

Photo 26 - Oil Container

Nalcor Assessments – Whitbourne
Environmental Photos

Photo 27 - Waste Oil Receptacle

Photo 28 - Oxy-Acetylene Torch

Nalcor Assessments – Whitbourne
Environmental Photos

Photo 29 - Small Gasoline Can


Photo 30 - Staining on Floor

Nalcor Assessments – Whitbourne
Environmental Photos

Photo 31

Photo 32 - Safety Cabinet Contents

Nalcor Assessments – Whitbourne
Environmental Photos

Photo 33 - Diesel Fuel Containers

Photo 34 - Insulator Coating

APPENDIX G

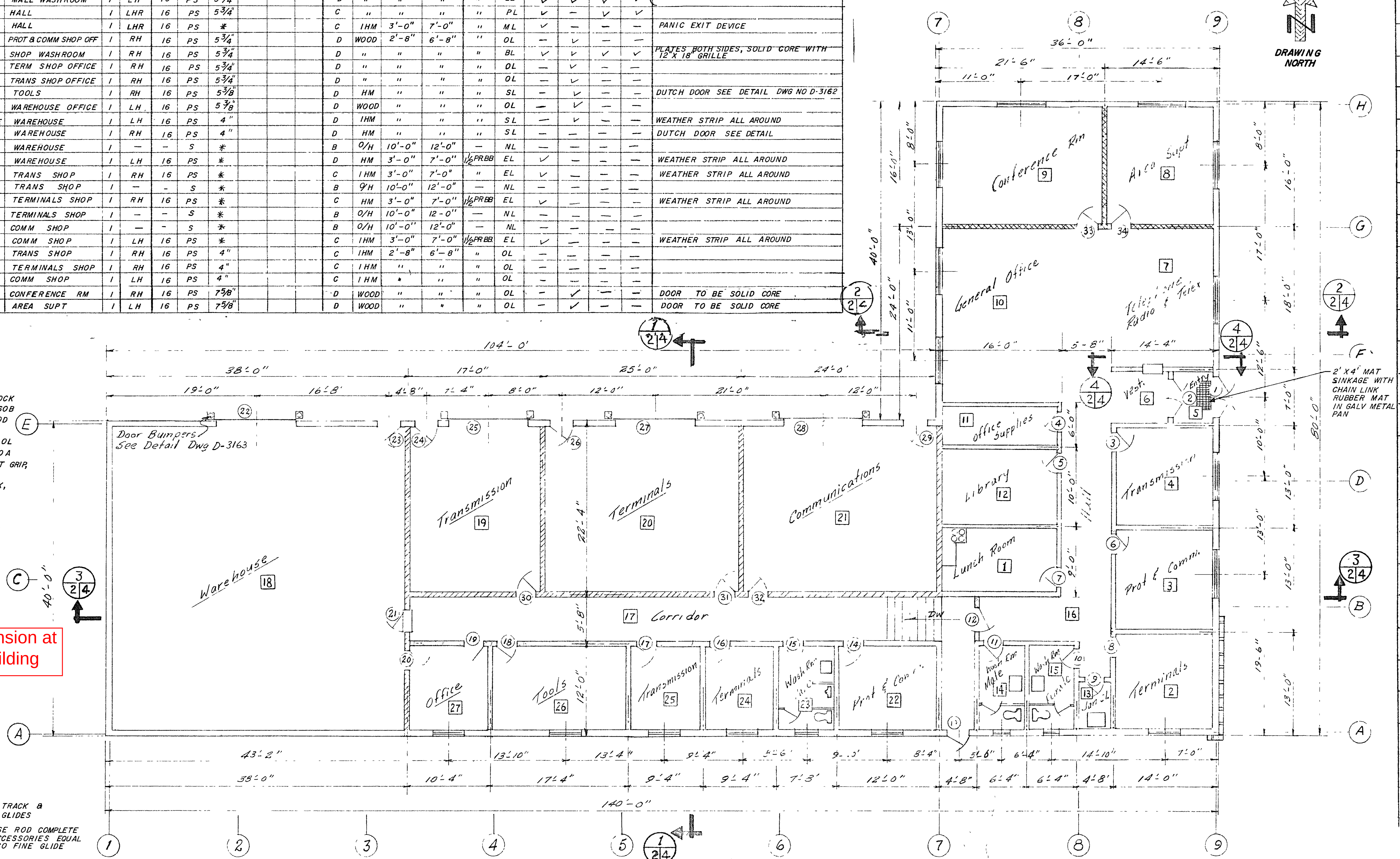
Existing Floor Plans

DOOR SCHEDULE

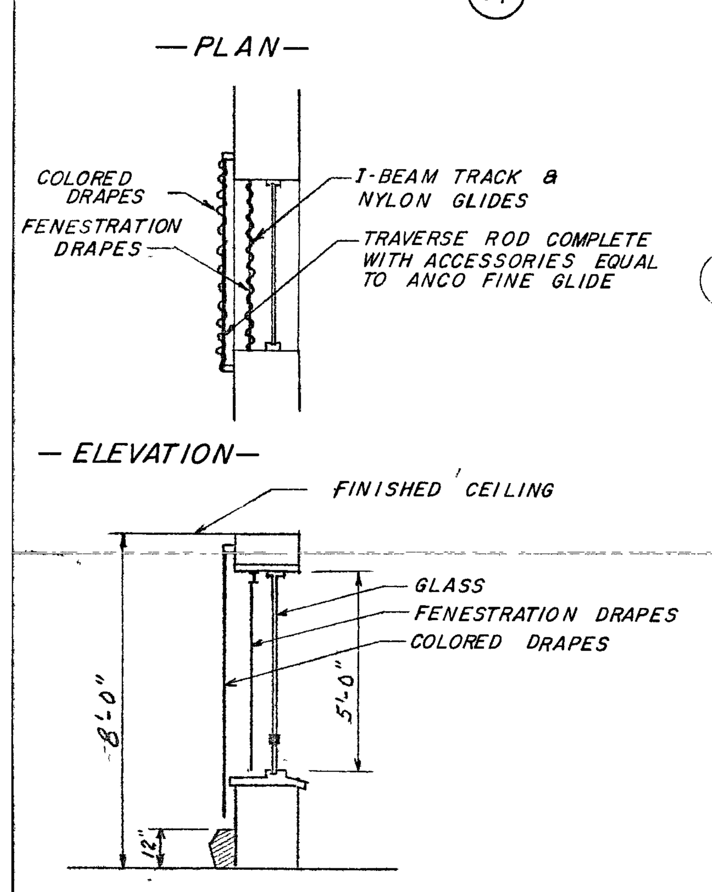
ITEM NO	ARCH NO	LOCATION FROM	LOCATION TO	QTY	HAND	FRAMES GAUGE	FRAMES TYPE	FRAMES DEPTH	DETAILS HEAD	DETAILS SILL	DETAILS JAMB	DOORS MARK	DOORS TYPE	DOOR OPENING WIDTH	DOOR OPENING HEIGHT	HINGES	LOCK	CLOSER	DOOR STOP	PUSH PLATE	KICK PLATE	REMARKS
1	1	EXTERIOR	ENTRANCE	2	RHR/LHR	16		*				A	—	3'-0"	7'-0"	PIVOT	CL	TOP	—	—	—	ALUMINIUM ENTRANCE UNIT WEATHERSTRIPPED - SAFETY GLAZED
2	2	ENTRANCE	VESTIBULE	2	RHR/LHR	16		*				A	—	3'-0"	7'-0"	PIVOT	CL	TOP	—	—	—	ALUMINIUM ENTRANCE UNIT SAFETY GLAZED
3	3	HALL	TRANSMISSION	1	RH	16	PS	5 3/4"				D	WOOD	2'-8"	6'-8"	1½ PR BB	OL	—	✓	—	—	
4	4	HALL	OFFICE SUPPLIES	1	LH	16	PS	5 3/4"				D	"	"	"	"	SL	—	✓	—	—	DOOR TO BE SOLID CORE WITH 12"X18" GRILLE
5	5	HALL	LIBRARY	1	LH	16	PS	5 3/4"				D	"	"	"	"	OL	—	✓	—	—	
6	6	HALL	PROT & COMM	1	RH	16	PS	5 3/4"				D	"	"	"	"	OL	—	✓	—	—	
7	7	HALL	LUNCH ROOM	1	LH	16	PS	5 3/4"				D	"	"	"	"	PL	—	✓	—	—	WITH 12"X18" GRILLE
8	8	HALL	TERMINALS	1	RH	16	PS	5 3/4"				D	"	"	"	"	OL	—	✓	—	—	
9	9	HALL	JANITOR	1	LH	16	PS	5 3/4"				D	"	"	"	"	SL	—	✓	—	—	DOOR TO BE UNDERCUT ½"
10	10	HALL	FEMALE WASH ROOM	1	LH	16	PS	5 3/4"				D	"	"	"	"	BL	✓	✓	✓	✓	PLATES BOTH SIDES, SOLID CORE WITH 12" X 18" GRILLE
11	11	HALL	MALE WASHROOM	1	LH	16	PS	5 3/4"				D	"	"	"	"	BL	✓	✓	✓	✓	
12	12	CORRIDOR	HALL	1	LHR	16	PS	5 3/4"				C	"	"	"	"	PL	✓	—	✓	✓	
13	13	EXTERIOR	HALL	1	LHR	16	PS	*				C	IHM	3'-0"	7'-0"	"	ML	✓	—	—	—	PANIC EXIT DEVICE
14	14	CORRIDOR	PROT & COMM SHOP OFF	1	RH	16	PS	5 3/4"				D	WOOD	2'-8"	6'-8"	"	OL	—	✓	—	—	
15	15	CORRIDOR	SHOP WASHROOM	1	RH	16	PS	5 3/4"				D	"	"	"	"	BL	✓	✓	✓	✓	PLATES BOTH SIDES, SOLID CORE WITH 12"X 18" GRILLE
16	16	CORRIDOR	TERM SHOP OFFICE	1	RH	16	PS	5 3/4"				D	"	"	"	"	OL	—	✓	—	—	
17	17	CORRIDOR	TRANS SHOP OFFICE	1	RH	16	PS	5 3/4"				D	"	"	"	"	OL	—	✓	—	—	
18	18	CORRIDOR	TOOLS	1	RH	16	PS	5 3/8"				D	HM	"	"	"	SL	—	✓	—	—	DUTCH DOOR SEE DETAIL DWG NO D-3162
19	19	CORRIDOR	WAREHOUSE OFFICE	1	LH	16	PS	5 3/8"				D	WOOD	"	"	"	OL	—	✓	—	—	
20	20	WAREHOUSE OFFICE	WAREHOUSE	1	LH	16	PS	4"				D	IHM	"	"	"	SL	—	✓	—	—	WEATHER STRIP ALL AROUND
21	21	CORRIDOR	WAREHOUSE	1	RH	16	PS	4"				D	HM	"	"	"	SL	—	—	—	—	DUTCH DOOR SEE DETAIL
22	22	EXTERIOR	WAREHOUSE	1	—	—	S	*				B	O/H	10'-0"	12'-0"	—	NL	—	—	—	—	
23	23	EXTERIOR	WAREHOUSE	1	LH	16	PS	*				D	HM	3'-0"	7'-0"	1½ PR BB	EL	✓	—	—	—	WEATHER STRIP ALL AROUND
24	24	EXTERIOR	TRANS SHOP	1	RH	16	PS	*				C	IHM	3'-0"	7'-0"	"	EL	✓	—	—	—	WEATHER STRIP ALL AROUND
25	25	EXTERIOR	TRANS SHOP	1	—	—	S	*				B	O/H	10'-0"	12'-0"	—	NL	—	—	—	—	
26	26	EXTERIOR	TERMINALS SHOP	1	RH	16	PS	*				C	HM	3'-0"	7'-0"	1½ PR BB	EL	✓	—	—	—	WEATHER STRIP ALL AROUND
27	27	EXTERIOR	TERMINALS SHOP	1	—	—	S	*				B	O/H	10'-0"	12-0"	—	NL	—	—	—	—	
28	28	EXTERIOR	COMM SHOP	1	—	—	S	*				B	O/H	10'-0"	12'-0"	—	NL	—	—	—	—	
29	29	EXTERIOR	COMM SHOP	1	LH	16	PS	*				C	IHM	3'-0"	7'-0"	1½ PR BB	EL	✓	—	—	—	WEATHER STRIP ALL AROUND
30	30	CORRIDOR	TRANS SHOP	1	RH	16	PS	4"				C	IHM	2'-8"	6'-8"	"	OL	—	—	—	—	
31	31	CORRIDOR	TERMINALS SHOP	1	RH	16	PS	4"				C	IHM	"	"	"	OL	—	—	—	—	
32	32	CORRIDOR	COMM SHOP	1	LH	16	PS	4"				C	IHM	"	"	"	OL	—	—	—	—	
33	33	GENERAL OFFICE	CONFERENCE RM	1	RH	16	PS	7 5/8"				D	WOOD	"	"	"	OL	—	✓	—	—	DOOR TO BE SOLID CORE
34	34	TELEPHONE-TELEX	AREA SUPT	1	LH	16	PS	7 5/8"				D	WOOD	"	"	"	OL	—	✓	—	—	DOOR TO BE SOLID CORE

ABBREVIATIONS
- * - TO SUIT
- PR - PAIR
- BB - BRASS BUTT HINGES
- CL - KEY OPERATED CYLINDER LOCK
- OL - OFFICE LOCKSET FED SPEC 160B
- SL - STOROOM LOCK FED SPEC 160D
- PL - PASSAGE LOCK FED SPEC 160L
- BL - BATHROOM LOCK FED SPEC. 160L
- EL - EXTERIOR LOCK FED SPEC 160A
- ML - MORTISE LOCK WITH STRAIGHT GRIP, CYLINDER & THUMB PIECE
- NL - SURFACE MOUNTED DEAD LOCK, SECURITY TYPE TURN KNOB OPERATED
- O/H - OVERHEAD
- IHM - INSULATED HOLLOW METAL

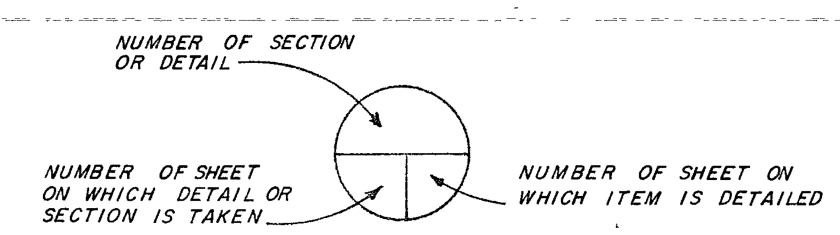
Notes:-
1. For Door Details See Dwg No D-3162.
2. Locations of doors, windows & columns may be altered slightly to suit building system.
3. All Structural members in office areas are to be furred and concealed.
4. Where steel building panel interior wall finish is called for panels shall be 8'-0" high min. & finished off-white



Floor Plan.



DRAPE INSTALLATION DETAIL
Scale : 1/4" = 1'-0"



SYMBOL EXPLANATION

Legend
- Exterior Pre-engineered Construction
- 8" Concrete wall
- Steel stud and Gypsum Board
- Wood stud and gypsum board to Roof with 1" Sound insulation
- Brick Face.

FINISH SCHEDULE

Column headings — FLOOR MATERIAL: RESILIENT EPOXY SEAMLESS, CONCRETE COLORED HARDENED, VINYL ASBESTOS TILE, CARPET; WALL MATERIAL: GYPSUM BOARD, CONCRETE BLOCK, MELIMINE TILE BOARD 4' Wainscot, VINYL WALL COVERING, STEEL BUILDING PANEL, 1/4" PLYWOOD; FINISH: FACTORY FINISH, EPOXY FINISH, PAINT SEMI GLOSS ALKYD, UNFINISHED; COLOR: 29A322 FRENCH IVORY, 23A814 SAND STONE, 31C670 ANTIQUE GOLD, 23B654 BURLAY, 19A814 NEUTRAL TINT, 19D885 BEAVER; CEILING: 2X4 ACOUSTIC TILE-TEE BAR GRID, 1/2" GYPSUM BD PAINTED OFF-WHITE, UNFINISHED. (N-North S-South E-East W-West)

MARK	ROOM	REMARKS
1	LUNCH ROOM	VAT = FLINKOTE CP80; WALL VINYL = ACCENT WALL NO 4023 CODE B HERBS & BIRDS TRIM FRENCH IVORY
2	TERMINALS	VAT = FLINKOTE CP 80; DOORS AND TRIM E 29
3	PROTECTION & COMMUNICATIONS	SAME AS MARK 2
4	TRANSMISSION	SAME AS MARK 2
5	ENTRY	EPOXY FLOOR PRIMARY CHIP TO MATCH VESTIBULE WALL SECONDARY CHIP TO MATCH ENTRY.
6	VESTIBULE	EPOXY FLOOR PRIMARY CHIP TO MATCH WALL, SECONDARY CHIP TO MATCH ENTRY WALL
7	TELEPHONE RADIO & TELEX	VAT = FLINKOTE CP 80; WALL VINYL CIL BOMBAI 8-97 WHEAT GOLD DOORS AND TRIM E 329
8	AREA SUPERINTENDENT	HARDING HAWTHORN APRICOT NO. 1491 CARPET WALL VINYL CIL 075 WALLNUT - DRAPES CAYA BOUCLEAR WHITE AND JEFF BROWN CHERIMOYA 28
9	CONFERENCE ROOM	(as for mark 8)
10	GENERAL OFFICE	VAT = FLINKOTE CP 80; WALL VINYL CIL BOMBAI 8-97 WHEAT GOLD DOORS AND TRIM E 329
11	OFFICE SUPPLIES	VAT = FLINKOTE CP 80; DOORS AND TRIM E329 VICTORIAN GOLD
12	LIBRARY	VAT = FLINKOTE CP80; DOORS AND TRIM E329 VICTORIAN GOLD
13	JANITOR	MELAMINE TILEBOARD = BARKER TILE MOCH 1911 EPOXY FINISH BURLAP STIPPLE ON NEUTRAL TINT. EPOXY FLOOR AND BASE PRIMARY CHIP BURLAP, SECONDARY CHIP NEUTRAL TINT DOORS AND TRIM E 329 VICTORIAN GOLD
14	WASHROOM (MALE)	(as for mark 13)
15	WASHROOM (FEMALE)	(as for mark 13)
16	HALL	VAT = FLINKOTE CP 80; DOOR AND TRIM E 329 VICTORIAN GOLD
17	CORRIDOR	DOORS AND TRIM BEAVER 19D885; VAT = FLINKOTE CP80
18	WAREHOUSE	FLOOR FINISH MASTER PLATE NATURAL
19	TRANSMISSION SHOP	FLOOR FINISH MASTER PLATE TERRA COTTA DOORS AND TRIM E329 VICTORIAN GOLD
20	TERMINALS SHOP	SAME AS MARK 20
21	COMMUNICATIONS SHOP	SAME AS MARK 20
22	PROTECTION & COMMUNICATION	VAT = FLINKOTE CP 80; DOORS AND TRIM BEAVER 19D885
23	WASHROOM (MALE)	SAME AS MARK 13 14 & 15
24	TERMINALS	VAT = FLINKOTE CP 80; DOORS AND TRIM BEAVER 19D885
25	TRANSMISSION	SAME AS MARK 24
26	TOOLS	FLOOR FINISH MASTER PLATE TERRA COTTA, DOORS AND TRIM 19D885
27	OFFICE	VAT - FLINKOTE CP 80; DOOR AND TRIM BEAVER 19D885

COLORS SHOWN ARE MATCHLESS BY STANDARD MANUFACTURING
WHERE VINYL ASBESTOS TILE (VAT) IS USED BASE SHALL BE BROWN VINYL
ALL OFFICE WINDOWS SHALL BE DRAPED WITH WHITE FENESTRATION FABRIC AND COLORED DRAPE JEFF BROWN JERSEY NO 1 OR EQUAL ON INDIVIDUAL CORDLESS DRAWN DRAPE ROD ANCO NO 633 OR EQUAL

NO	DATE	REVISIONS	BY	CKD.

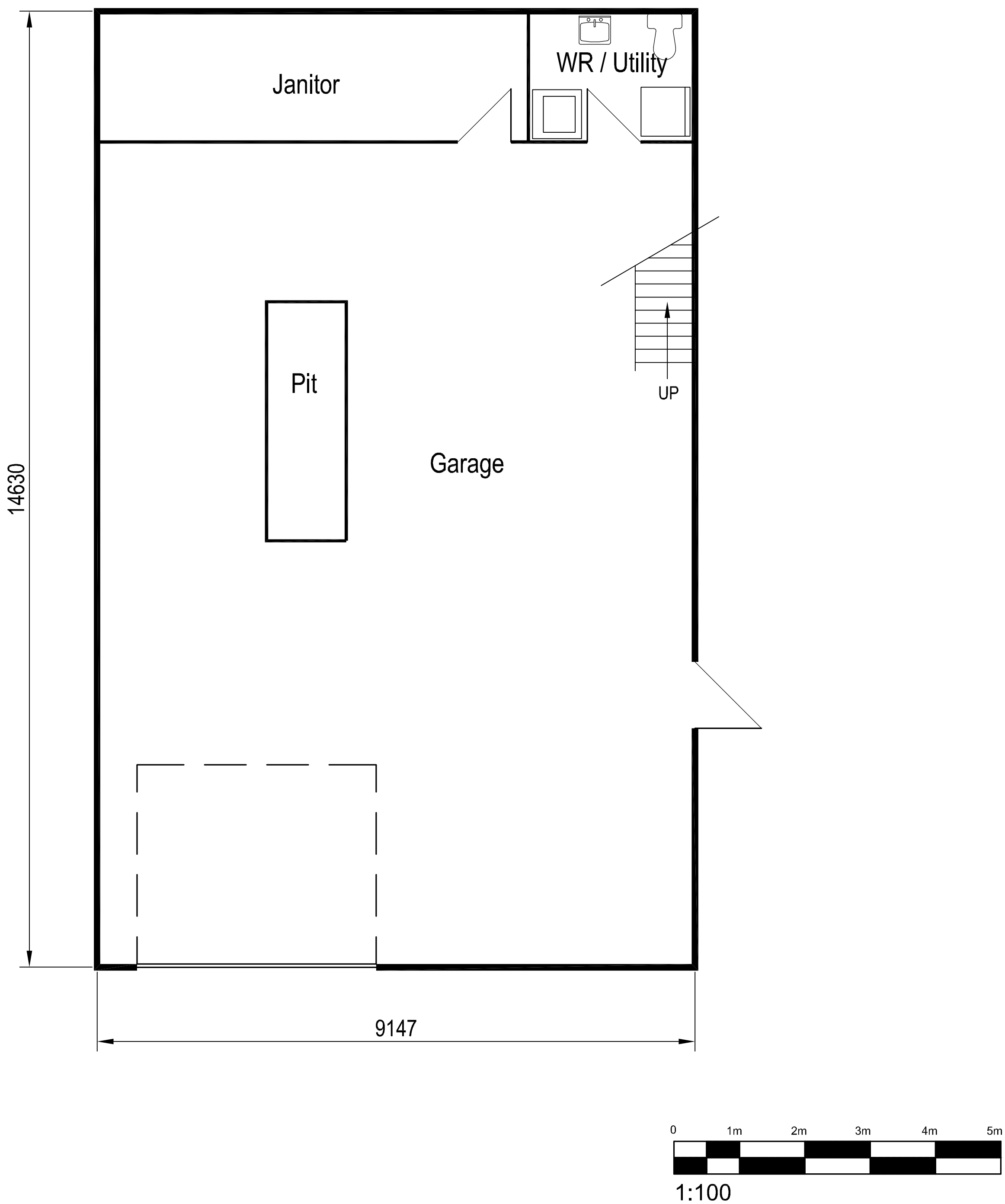
NEWFOUNDLAND & LABRADOR POWER COMMISSION
ST. JOHN'S, NEWFOUNDLAND

EASTERN AREA DEPOT WHITBOURNE

FLOOR PLAN

SCALE 1/8" = 1'-0"	DESIGNED BY P.S. Lutz	DRAWN BY
CHECKED BY	APPROVED BY	DATE July 31, 1974
PROJECT NO.	SHEET 2 OF 10	DWG. No D 3005

Reference Dwgs. DWG. NO	TITLE	APPROVAL



PRIME CONSULTANT:

CBCL LIMITED
Consulting Engineers

ARCHITECTURAL CONSULTANT:

GLENN BARNES
ARCHITECTURE INC.

PROJECT:

BUILDING & INFASTRUCTURE CONDITION ASSESSMENTS FOR LINE DEPOTS, OFFICE FACILITIES AND CONTROL BUILDINGS

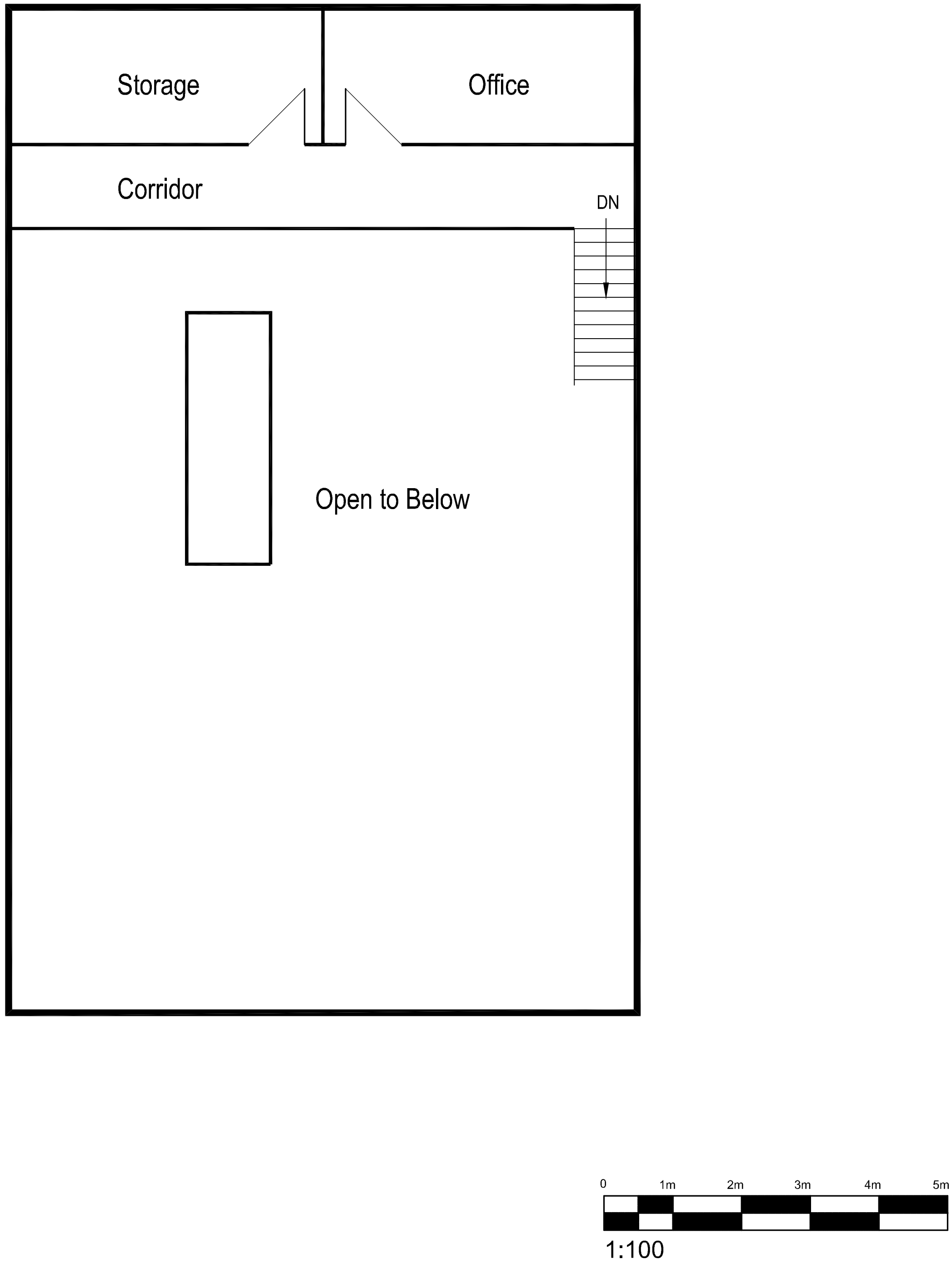
DRAWING TITLE:

SCHEMATIC PLAN - REPAIR GARAGE - LEVEL 1
WHITBOURNE NL

CLIENT:

NL HYDRO

SCALE:	DATE:	CLIENT NO.:	PROJECT NO.:	DRAWING NO.:
1:100	SEPT./16	66408 OS	163046.00	SK-8 RA



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	DRAWING TITLE: SCHEMATIC PLAN - REPAIR GARAGE - LEVEL 2 WHITBOURNE NL			CLIENT: NL HYDRO
ARCHITECTURAL CONSULTANT: GLENN BARNES ARCHITECTURE INC.	SCALE: 1:100	DATE: SEPT./16	CLIENT NO.: 66408 OS	PROJECT NO.: 163046.00
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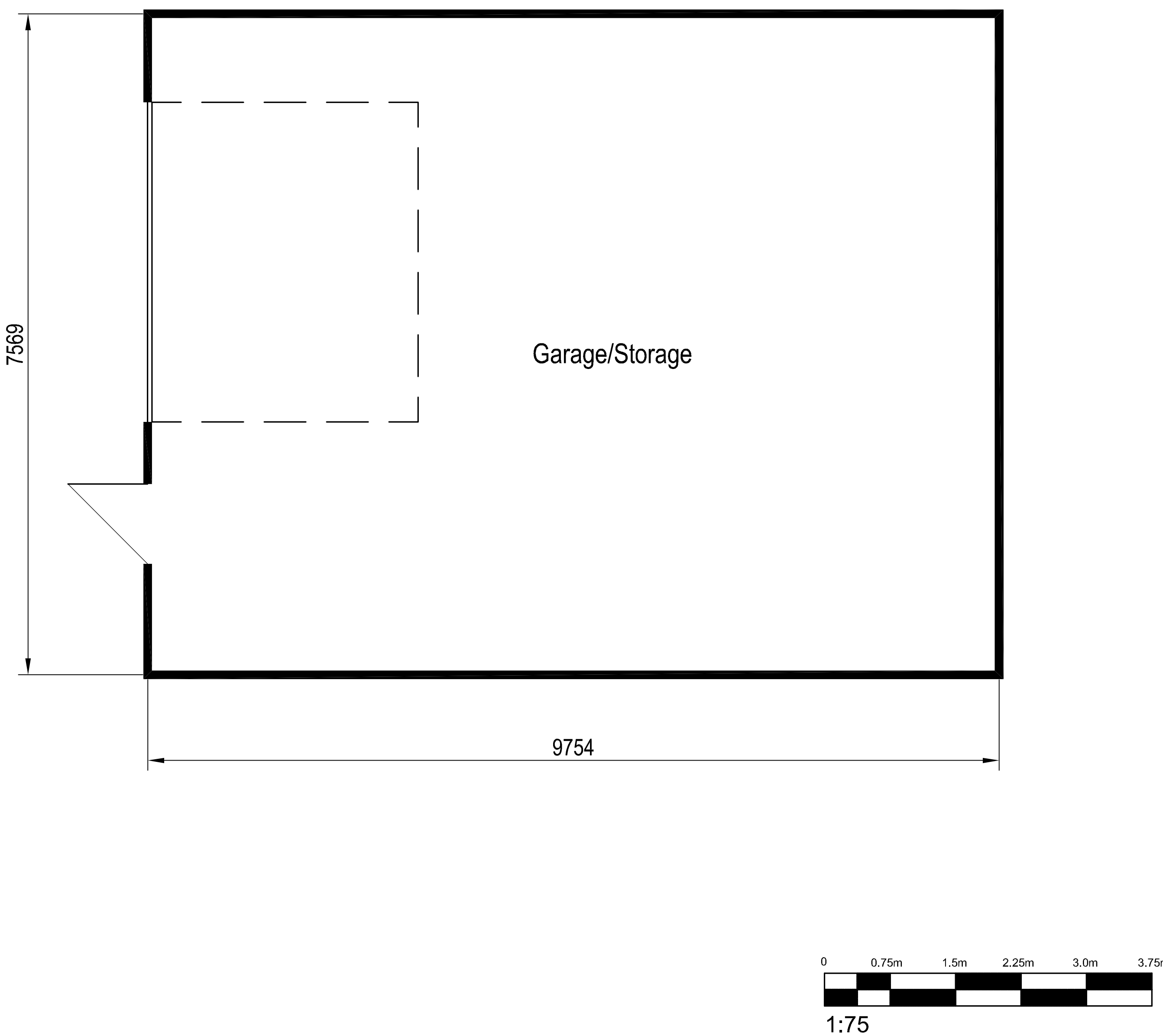

PRIME CONSULTANT: CBCL LIMITED Consulting Engineers	PROJECT: BUILDING & INFASTRUCTURE CONDITION ASSESSMENTS FOR LINE DEPOTS, OFFICE FACILITIES AND CONTROL BUILDINGS
ARCHITECTURAL CONSULTANT: GLENN BARNES ARCHITECTURE INC.	DRAWING TITLE: SCHEMATIC PLAN - QUANSIT WHITBOURNE NL — CLIENT: NL HYDRO

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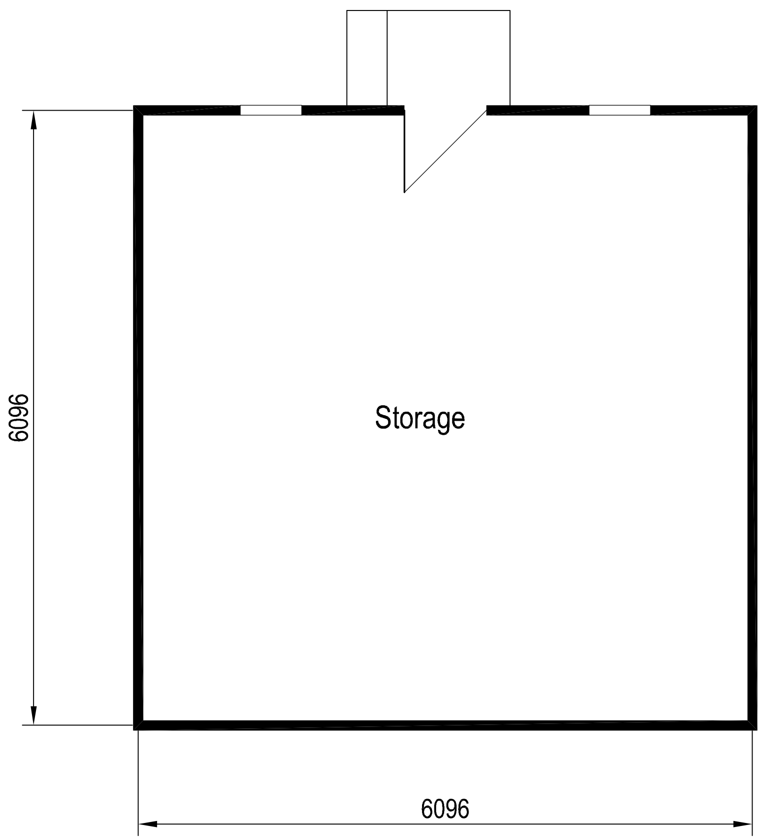

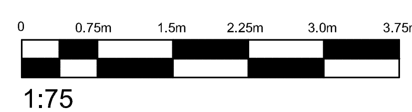

PRIME CONSULTANT:

CBCL LIMITED
Consulting Engineers

ARCHITECTURAL CONSULTANT:

GLENN BARNES
ARCHITECTURE INC.

PROJECT:

BUILDING & INFASTRUCTURE CONDITION ASSESSMENTS FOR LINE DEPOTS, OFFICE FACILITIES AND CONTROL BUILDINGS

DRAWING TITLE:

SCHEMATIC PLAN - STORAGE #2
WHITBOURNE NL

CLIENT:

NL HYDRO

SCALE:	DATE:	CLIENT NO.:	PROJECT NO.:	DRAWING NO.:
1:75	SEPT./16	66408 OS	163046.00	SK-7 RA

Hydraulic In-Service Failures

(2026)

newfoundland labrador hydro

Contents

Hydraulic In-Service Failures (2026)

Location: Various

Investment Classification: Renewal

Asset Category: Hydraulic Plant

Estimated Cost: $2,660,300

1.0 Introduction

Newfoundland and Labrador Hydro ("Hydro") conducts asset management activities to proactively identify, replace, repair, or refurbish equipment to minimize the disruption of service and to avoid unsafe working conditions due to equipment failure. An objective of Hydro's Asset Management Program is to identify refurbishment and replacement activities that require approval by the Board of Commissioners of Public Utilities ("Board") in time to be included in Hydro's annual capital budget application ("CBA"). Identification is done through the Preventive Maintenance Program using various condition-based assessments and testing procedures.

Hydro has had success in projecting the deterioration rate of equipment for submission of refurbishment or replacement work into CBAs. However, there are situations where immediate refurbishment or replacement must be completed due to the occurrence of an actual failure, the identification of an incipient failure, or the determination of faster-than-anticipated equipment deterioration. These situations can be caused by events such as vandalism, storm damage, lightning, accidental damage, abnormal system operations, cavitation, corrosion, wear of mechanical components, existing installation deficiencies, etc. Hydro uses historical data and engineering judgment to predict the magnitude of in-service failure expenditures.

2.0 Program Description and Justification

Due to the nature of hydraulic equipment and infrastructure, unanticipated failures and deterioration will occur. Under the Hydraulic In-Service Failures Program, Hydro is proposing to undertake the immediate capital refurbishment and replacement work required for its hydraulic generating assets, as needed, to maintain safe and reliable operation and to ensure the availability of capital spares required to support such work. At this time, Hydro's capital spare acquisitions for 2026 include:

- 75 kW Diesel Engine – Burnt Dam Spillway; and
- Station Service Transformer – Bay d’Espoir.

Throughout 2026, Hydro may purchase additional capital spares identified by asset management personnel as requiring immediate procurement to offset deficiencies in its capital spares.

Deferral of work that is justified under this program could result in a detrimental impact on customer power supply or an unacceptable risk to workers or public safety.

Depending on the relevant circumstances, the required work will be evaluated to determine the appropriate form of execution as an in-service failure, an allowance for unforeseen items, or a supplemental project.

3.0 Asset Overview

3.1 Asset Background

The assets requiring immediate, unplanned replacement or refurbishment work in a given year cannot be identified in advance. The hydraulic generating assets covered within the Hydraulic In-Service Failures Program are generally included in the following broad asset classes:[1]

- Hydraulic generating units;
- Hydraulic structures;
- Reservoirs; and
- Auxiliary equipment.

For further information on the work executed under the Hydraulic In-Service Failures (2024) Program, please refer to Hydro's “Capital Expenditures and Carryover Report for the Year Ended December 31, 2024.”[2]

[1] Historically, in-service failures to site buildings and services had been included in this program; however, this work will now be captured under the new Perform Facilities Refurbishment project going forward.
[2] Provided as Appendix B to Schedule 5 of this application.

3.2 Asset Condition

Assets replaced or refurbished under this program have experienced unplanned failure or exhibit signs of incipient failure.

3.3 Condition-Based Remaining Life

Assets replaced or refurbished under this program have experienced unplanned failure or exhibit signs of incipient failure; therefore, these assets have reached the end of their serviceable life.

3.4 Asset Ages

The age of assets potentially covered under this program varies. Unplanned replacement or refurbishment activities due to failure may be necessary at any time during the asset lifecycle.

4.0 Trending

Hydro implemented the Hydraulic In-Service Failures Program in 2018. Over the past five years, on average, Hydro has executed 15 unplanned projects per year under the program.

4.1 Assets Installed/Replaced/Upgraded

The number of unplanned In-Service Failures projects executed under the program over the past five years is provided in Chart 1. Details of each project, and the associated assets and costs, are filed within Hydro's annual Capital Expenditures and Carryover Report.

Hydro anticipates that unplanned failures will continue to occur given the age and number of hydraulic assets covered under the program. Hydro continues to plan the budget for this program based on historical information.

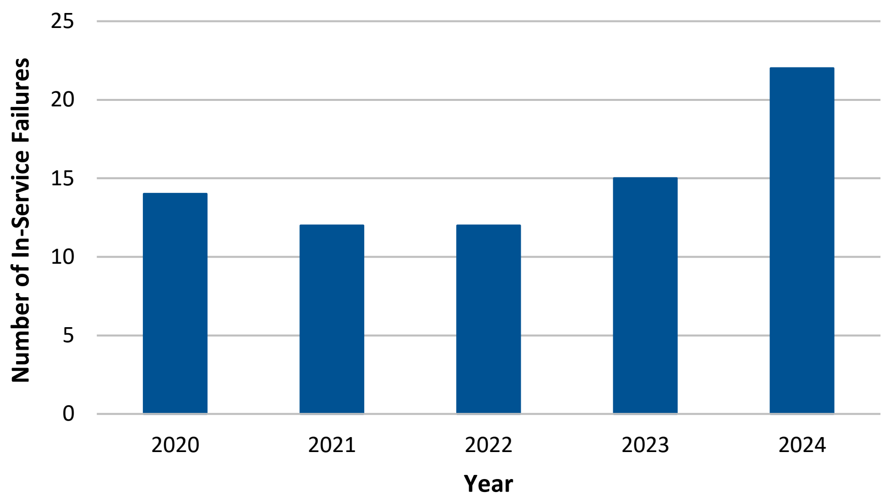

Chart 1: In-Service Failure Frequency

4.2 Historical and Forecast Average Unit Costs

Historical and forecast program costs are provided in Chart 2 in Section 6.1. Due to the nature of this program and the range of assets covered, average unit cost information is not applicable. An increase in program cost is forecast based on the anticipated escalation of both material and labour costs.

4.3 Historical Reliability

Hydro tracks performance data for its hydraulic units using the Derated Adjusted Forced Outage Rate ("DAFOR");[3] this data is filed quarterly with the Board.[4] This program plays a key role in allowing Hydro to minimize the DAFOR of its hydraulic units to ensure the provision of reliable service to customers. As this program addresses a wide range of asset types and the specific assets to be addressed within this program for 2026 are not known, historical reliability data for the individual assets covered within this program is not applicable.

[3] DAFOR is a metric that measures the percentage of time that a unit or group of units is unable to generate at its maximum continuous rating due to forced outages or unit deratings.
[4] Most recent "Quarterly Report on Asset Performance in Support of Resource Adequacy for the Twelve Months Ended March 31, 2025," Newfoundland and Labrador Hydro, April 30, 2025.

5.0 Analysis

5.1 Evaluation of Alternatives

Depending on the nature of each failure or incipient failure, Hydro reviews viable technical alternatives to determine the most appropriate solution to address the unplanned event while balancing urgent safety and operational risks.

Due to the urgent nature of work executed under this program, seeking approval through a supplemental capital expenditures application or deferring the work for inclusion in the next capital budget application are not viable alternatives. The alternative of executing required unplanned work under the Allowance for Unforeseen Items Account is also considered on a case-by-case basis, subject to the requirements set out by the Board for use of the account.

5.2 Risk of Asset Stranding

Assets replaced or refurbished under this program have an inherently low risk of asset stranding. The assets covered under this program are critical to Hydro's ability to meet customer requirements. The risk of asset stranding would be considered on a case-by-case basis, if applicable.

5.3 Risk Mitigation

Hydro assessed the pre- and post-implementation risk of the scope of work for the 2026 program in accordance with Hydro's Capital Risk Assessment process, as outlined in Section 7.0 of Schedule 1. The outcome of this assessment is provided in Table 1.

Table 1: Risk Scoring Pre- and Post-Implementation

	Impact	Likelihood	Score
Pre-Implementation	3	5	**15**
Post-Implementation	3	1	**3**
		Risk Mitigated	**12**
		Risk Mitigated per $1 Million	**4.5**

6.0 Scope of Work

Work executed under the 2026 program will be reported to the Board in Hydro's 2026 Capital Expenditures and Carryover Report.[5]

6.1 Program Budget

The estimate for this program is shown in Table 2. The estimate is based on the average expenditures from 2022 to 2024, and the purchase of two capital spares identified for 2026.[6] The details of each project covered under this program, including the associated assets and costs and the total program expenditures for each year, are filed with the Board within Hydro's annual Capital Expenditures and Carryover Report.

The expenditures in 2023 associated with the refurbishment of the Penstock 1 rupture in Bay d'Espoir were not included in the average calculation, as this cost was considered an outlier due to the unlikelihood of this failure to recur.[7] Hydro will re-evaluate the inclusion of this cost in future program budgets if Penstock 1 rupture refurbishment expenditures continue to increase the program estimate beyond the 2020–2022 average.

Table 2: Program Estimate ($000)

Program Cost	**2026**	**2027**	**Beyond**	**Total**
Material Supply	349.5	0.0	0.0	**349.5**
Labour	482.0	0.0	0.0	**482.0**
Consultant	130.0	0.0	0.0	**130.0**
Contract Work	1,601.5	0.0	0.0	**1,601.5**
Other Direct Costs	27.3	0.0	0.0	**27.3**
Interest and Escalation	70.0	0.0	0.0	**70.0**
Contingency	0.0	0.0	0.0	**0.0**
Total	**2,660.3**	**0.0**	**0.0**	**2,660.3**

The Hydraulic In-Service Failures Program started in 2018. Chart 2 provides the five-year historical program expenditures, the forecast 2025 expenditures, the proposed 2026 program budget, and the forecast budget through 2030.[8] Since Hydro is unable to predict the quantity and nature of failures that

[5] Hydro's 2026 Capital Expenditures and Carryover Report is to be filed on or before April 1, 2027.
[6] The capital spares are estimated at a cost of $275,000, not including engineering labour.
[7] The cost associated with refurbishment of the Penstock 1 rupture in Bay d'Espoir was $1,450,000.
[8] Forecasted numbers assume no capital spares are required or have been identified.

will need to be addressed within this program in future years, the forecasted expenditures for this program are based on the 2026 program budget with cost escalation factored in.

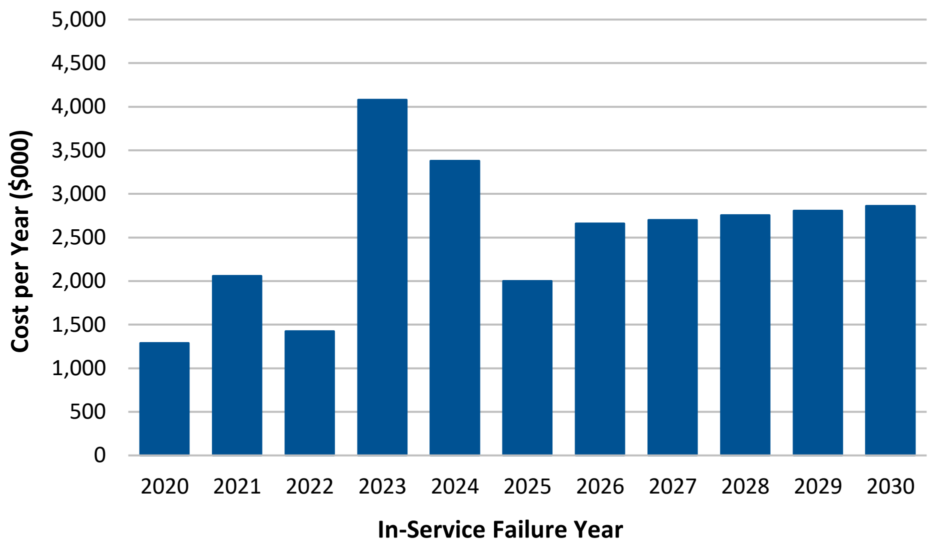

Chart 2: Historical and Forecast Program Budget[9]

6.2 Program Schedule

Work schedules are established subsequent to an unplanned failure or incipient failure event. All capital spares acquisitions are expected to be on site by the end of 2026.

7.0 Conclusion

The Hydraulic In-Service Failures Program allows Hydro to undertake timely refurbishment and replacement work that is not included in its preventive maintenance program, supporting Hydro's effort to maintain safe and reliable operations in an environmentally responsible manner. This program will also allow Hydro to continue proactively managing the pool of capital spare equipment to support hydraulic operations.

[9] The significant program cost in 2023 is associated with the aforementioned unplanned project executed for the refurbishment of Penstock 1 in Bay d'Espoir. This project required expenditures exceeding $1.4 million and was omitted from the program's average calculation.

Replace Protective Relays

(2026–2027)

newfoundland labrador hydro

Contents

List of Appendices

Replace Protective Relays (2026–2027)

Location: Various

Investment Classification: Renewal

Asset Category: Terminal Stations

Estimated Cost: $2,585,800

1.0 Introduction

Protective relaying is a vital component of an electrical system, particularly during trouble, faults, and abnormal operating conditions. Protective relays are found in all of Newfoundland and Labrador Hydro's ("Hydro") terminal stations and generating stations. Protective relays function to protect major electrical equipment such as transmission and distribution lines, transformers, buses, circuit breakers, and generators. Properly applied and functioning protective relaying initiates the disconnection or clearing of faults to protect equipment while the operation and service of the rest of the system continue. Protective relaying should not take action under normal operating conditions.

Within Hydro's system, existing protective relays are either electromechanical, solid state (digital) or microprocessor-based, and are scheduled for replacement based on criteria outlined in the Terminal Station Asset Management Strategy[1] which outlines Hydro's approach to protection, control, and modernization of asset management.

2.0 Program Description and Justification

The replacement of protective relays is driven by condition and/or obsolescence. Hydro replaces electromechanical and solid-state relays with modern digital relays, improving reliability and, in some cases, providing additional functionality.

This program was initiated in 2016, with a plan to replace all existing electromechanical protective relays for transformers, buses, and line protection relays with modern digital relays. The 230 kV relays are the priority for the first phase of the plan, with 138 kV and 69 kV to follow. Installation of redundant transformer protection relays was also included in the program, in line with Hydro's Transformer

[1] Provided as Appendix F to Schedule 1 of this application.

Protection Standard. Generator protection relays were added to the program in recognition of the vital role they play in system reliability.

This program is required to ensure the reliable operation of protective relaying. Aging or non-standard protective relays can fail or inadequately protect the system during faults or abnormal operating conditions. This would prevent the timely isolation of the fault(s) or hazards, thus compromising power system reliability, stability, and overall equipment health. Hydro proposes to replace seven different protection systems located at terminal stations and generating stations across the system.

3.0 Asset Overview

3.1 Asset Background

Protective relays continuously monitor for abnormal operating conditions in the electrical system. Hydro completes routine maintenance on a six-year cycle for protective relays and identifies any deficiencies for follow-up. The assets designated for upgrade herein have been selected by Hydro's Asset Management staff to align with Hydro's commitment to ensure the delivery of safe, reliable, least-cost electricity in an environmentally responsible manner.

The protective relays in this program are operational, and the justification for each replacement is obsolescence.

3.2 Asset Condition

Existing protective relays are either electromechanical, solid state (digital) or microprocessor-based. The oldest of these are electromechanical; wear and heating issues may cause them to fail or operate incorrectly. Digital or static relays have little to no moving parts; however, they do experience failure associated with aging internal components (e.g., power supplies, capacitors, LCD[2] displays), most of which are unrepairable or obsolete.

A deficient relay may have two failure modes—it may not operate when needed to protect electrical equipment (which may result in widespread outages and/or equipment damage) or it may operate inadvertently (causing unplanned outages).

[2] Liquid-crystal display ("LCD").

Each relay in Hydro's fleet is tested on a six-year preventive maintenance cycle. This program intends to replace aging and obsolete relays prior to finding them deficient during the six-year preventive maintenance test or upon failure.

3.3 Asset Ages

The age of assets covered under this program varies. Unplanned replacement or refurbishment activities due to failure may be necessary at any time during the asset lifecycle.

Chart 1 provides asset age for all assets covered under the program. All protective relays in the scope of the Replace Protective Relays (2026–2027) Program are 40-70 years old and are obsolete electromechanical relays.

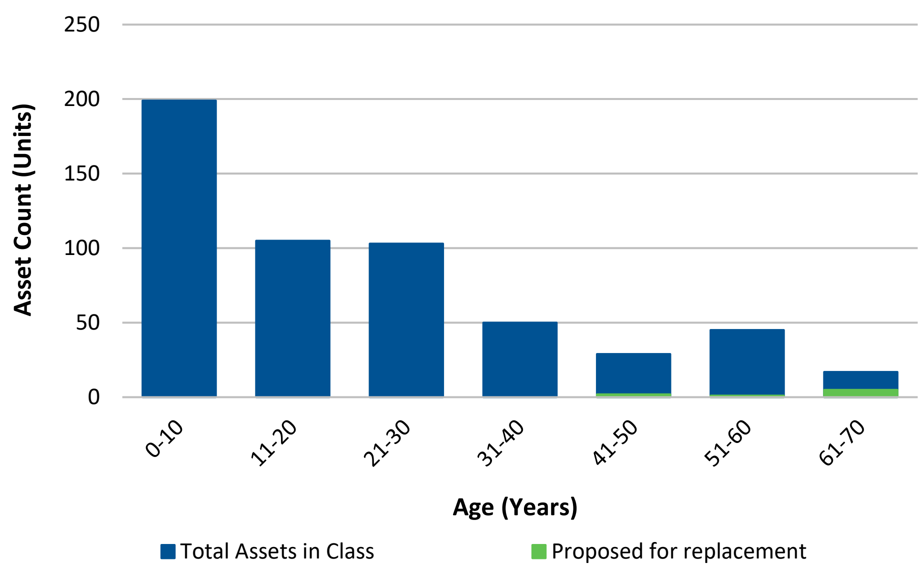

Chart 1: Asset Counts by Asset Age

4.0 Trending

Hydro's Asset Management staff maintains a list of in-service protective relays categorized by voltage class, equipment (i.e., type of protection—transmission line, feeder, transformer, bus, etc.), protection system (i.e., distance, overcurrent, differential, primary, secondary, backup, etc.), main relay model number (i.e., auxiliary relays are not tracked), and age. This is the basis for planning program replacements/upgrades.

4.1 Assets Installed/Replaced/Upgraded

Chart 2 provides the five-year historical, current, and five-year forecast number of protective relays installed, replaced, or upgraded per year. The program was paused in 2020 to complete installations through 2020 and 2021 that had carried over from previous years. This resulted in fewer installations in 2021. The number of installations in 2023 was deliberately planned to be lower due to execution constraints; however, a reduction in installations is not sustainable, and therefore the number of assets through 2030 will be more reflective of a typical execution year. The number of installations in 2025 is higher than in other years as it includes a number of carry-over jobs from previous years.

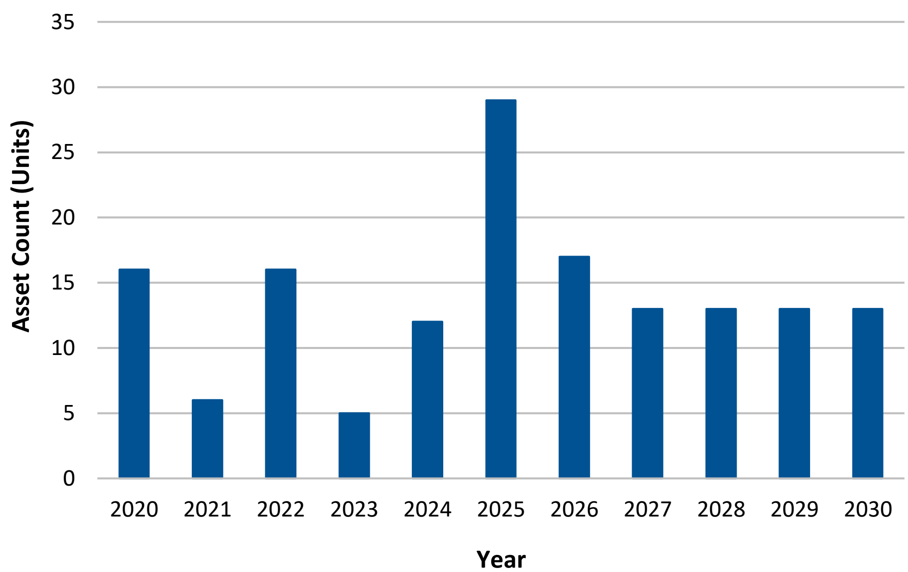

Chart 2: Historical and Forecast Number of Assets Installed/Replaced/Upgraded

4.2 Historical and Forecast Average Unit Costs

Chart 3 provides the five-year historical, current, and five-year forecast average unit cost of protective relay installations, replacements, or upgrades per year. Unit costs can vary due to the types of protections. That is, line protections and generator protections are typically more complex than others and thus require more engineering and installation effort. For example, line protections make up approximately half of the protections planned for execution in 2026 and thus contribute to the higher unit cost in that year.

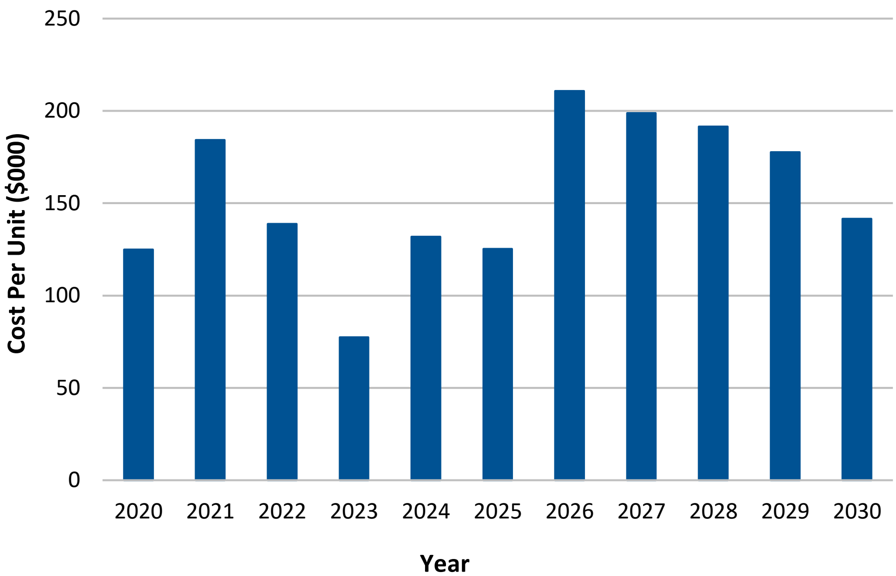

Chart 3: Historical and Forecast Average Unit Costs of Assets Installed/Replaced/Upgraded

4.3 Historical Reliability

Hydro does not record protective relay outage statistics; therefore, Hydro is unable to provide this data at this time.

5.0 Analysis

5.1 Evaluation of Alternatives

The following alternatives were considered:

- Pace reduction;
- Pace advancement; and
- Continue program at current pace.

5.1.1 Pace Reduction

The protective relays proposed for replacement have been identified as obsolete. Hydro has developed the replacement program, which was initiated in 2016, considering system criticality and ability to execute along with resource and outage constraints. At various points since 2016, it was discovered that the pace of this program was causing problems due to resource and outage concerns. This has resulted in a fluctuation in the number of units completed each year. Hydro plans to reduce the pace of installations to a number that better reflects its past execution rate. The protective relay replacements identified in a planned, strategic manner, as outlined in this proposal, are prudent. This approach enables Hydro to complete these upgrades to support its mandate to provide safe, reliable, least-cost service in an environmentally responsible manner.

5.1.2 Pace Advancement

Pace advancement is not a viable option due to resource and outage availability concerns.

5.1.3 Continue Program at Current Pace

Continuing the protective relay replacements at the current rate may result in continued fluctuation in execution completion rates due to resource and outage constraints.

5.2 Least-Cost Evaluation

Hydro has not identified any viable alternatives to facilitate a least-cost evaluation.

5.3 Recommended Alternative

Hydro recommends proceeding with the proposed protective relay replacements.

5.3.1 Risk of Asset Stranding

For the assets included within the 2026–2027 program, there is no undue risk that these capital additions will be stranded before their useful life has been reached, as there are no plans to retire any existing terminal or generating stations.

5.3.2 Risk Mitigation

Hydro assessed the pre- and post-implementation risk of the scope of work for the 2026–2027 program in accordance with Hydro's Capital Risk Assessment process, as outlined in Section 7.0 of Schedule 1. The outcome of this assessment is provided in Table 1.

Table 1: Risk Scoring Pre- and Post-Implementation

	Impact	Likelihood	Score
Pre-Implementation	4	2	**8**
Post-Implementation	4	1	**4**
		Risk Mitigated	**4**
		Risk Mitigated per $1 Million	**1.5**

6.0 Scope of Work

Hydro's five-year plan for the Replace Protective Relays Program is provided in Appendix A.[3] Based on current conditions and asset data, Hydro plans to replace seven different protection systems located within terminal stations and generating stations under this program. All work is planned to be completed by the end of 2027. Based on asset condition and outage, and resource availability at the time of execution, Hydro may advance or defer the replacement of specific assets to ensure efficient and effective implementation of this program.

Hydro will also refurbish or replace protection and control panels, wiring, cables, or auxiliary relays as required due to deterioration from environmental conditions, accidental damage, or the modification/addition of protection and control equipment required for the relay replacements.

6.1 Program Budget

The estimate for this program is shown in Table 2.

Table 2: Program Estimate ($000)[4]

Program Cost	2026	2027	Beyond	Total
Material Supply	250.8	294.5	0.0	**545.4**
Labour	268.2	1,105.3	0.0	**1,373.5**
Consultant	0.0	21.0	0.0	**21.0**
Contract Work	0.0	165.0	0.0	**165.0**
Other Direct Costs	18.6	104.0	0.0	**122.6**
Interest and Escalation	24.6	111.0	0.0	**135.6**
Contingency	53.8	169.0	0.0	**222.7**
Total	**616.0**	**1,969.8**	**0.0**	**2,585.8**

Chart 4 provides the five-year historical program expenditures, current year's estimated expenditures, the proposed 2026 program budget, and the forecast budget through 2030. The actual expenditures and budget for the program vary due to the variation in the number of relays installed and the average cost from year to year. The higher cost in 2025 is due to the carryover of jobs planned to be completed in 2024, as well as the planned use of contractors for construction at some sites.

[3] Replacement of line, generator, or transformer protection may involve replacement of multiple protective relays.
[4] Numbers may not add due to rounding.

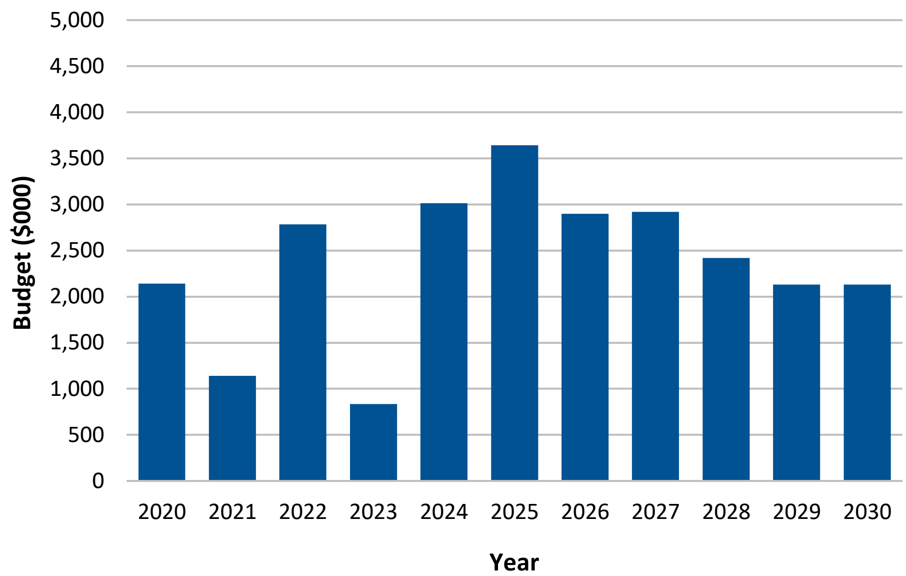

Chart 4: Historical and Forecast Program Budget

6.2 Program Schedule

The schedule for this program is shown in Table 3.

Table 3: Program Schedule

Activity	Start Date	End Date
Planning:		
Initial planning and scheduling.	January 2026	March 2026
Design:		
Prepare drawings and settings.	May 2026	August 2027
Procurement:		
Order relays and long lead items.	May 2026	March 2027
Construction/Commissioning:		
Complete protection upgrades.	May 2027	November 2027
Closeout:		
Completion of closeout documentation.	November 2027	December 2027

7.0 Conclusion

The work identified within this program is required to replace aging and obsolete equipment to allow Hydro to continue to provide safe, reliable, least-cost electricity in an environmentally responsible manner. The replacements are based upon assessments of the in-service equipment, consistent with Hydro's Terminal Station Asset Management Strategy. Hydro recommends completing these upgrades and replacements to ensure that protective relays will operate when required to protect electrical equipment during abnormal operating conditions.

Appendix A

Five-Year Plan

newfoundland labrador hydro

Assets planned for replacement from 2026 to 2030 under the Replace Protective Relays Program are provided in Table A-1 to Table A-5.

Table A-1: Assets Planned for Replacement in 2026

Name	Voltage of Protected Equipment (kV)
Berry Hill Transmission Line TL227	69
Cat Arm Transformer T2	230
Come By Chance Transformer T1	230
Come By Chance Transformer T2	230
Deer Lake Transformer T2 & Bus B3	230
Deer Lake Transmission Line TL226	69
Sunnyside Transmission Line 100L	138
Sunnyside Transmission Line TL219	138
Stony Brook Transmission Line TL210	138
Western Avalon Transformer T3	230

Table A-2: Assets Planned for Replacement in 2027

Name	Voltage of Protected Equipment (kV)
Bay d'Espoir Terminal Station 2 Transformer T11	69
Cat Arm Unit G1	13.8
Hardwoods Transformer T1	230
Massey Drive Bus B2B3	69
Massey Drive Transformer T2	230
Oxen Pond Transformer T2	230
Wabush Terminal Station Transmission Line L6	46

Table A-3: Assets Planned for Replacement in 2028

Name	Voltage of Protected Equipment (kV)
Cat Arm Unit G2	13.8
Deer Lake Bus B2	69
Deer Lake Transformer T1	138
Hardwoods Bus B6B7	66
Howley Transformer T2	138
Stony Brook Bus B1B2	230
Stony Brook Bus B3	138
Sunnyside Bus B1	230
Sunnyside Transmission Line 109L	138
Sunnyside Transmission Line TL212	138

Table A-4: Assets Planned for Replacement in 2029

Name	Voltage of Protected Equipment (kV)
Bottom Waters T1	69
Cow Head Transmission Line TL227	69
Deer Lake Transmission Line TL239	138
Hardwoods Transformer T4	230
Hinds Lake Iso-Phase Bus	13.8
Hinds Lake TL243	138
Wabush TS Station Service BND Transformer SS2	46
Western Avalon Bus B1	66
Western Avalon Bus B2	66

Table A-5: Assets Planned for Replacement in 2030

Name	Voltage of Protected Equipment (kV)
Barachoix Transformer T1	69
Berry Hill Bus 1	138
Berry Hill Transmission Line TL239 metering & synchronization panel	138
English Harbour West Transformer T1	69
Howley Bus B1	138
Oxen Pond Bus B2	230
Oxen Pond Bus B5	230
Springdale Bus 1	138
Springdale Synchronization Check	138
Wabush TS Bus B1	230

Replace Disconnects

(2026–2028)

Contents

List of Appendices

Replace Disconnects (2026–2028)

Location: Various

Investment Classification: Renewal

Asset Category: Terminal Stations

Estimated Cost: $2,494,700

1.0 Introduction

High voltage disconnect switches ("disconnect switches") are used as a means of electrically-isolating equipment within a terminal station or as a means of bypassing equipment to maintain service during maintenance activities. Disconnect switches are an important part of the Work Protection Code,[1] as they provide utility workers with a visible air gap (i.e., visible isolation). Proper operation of disconnect switches is essential for a safe work environment and terminal station reliability.

2.0 Program Description and Justification

All the disconnect switches planned for replacement in the Replace Disconnects (2026–2028) Program are currently in service. As a result of increased equipment lead times, beginning in 2026, the work will be executed over three years instead of two, as is typically completed under the Replace Disconnects Program.

As detailed in the Terminal Station Asset Management Strategy,[2] Newfoundland and Labrador Hydro ("Hydro") replaces disconnect switches when damaged beyond refurbishment, when parts required for refurbishment are unavailable due to obsolescence, when it is not economical to refurbish, when switches are damaged or defective and have reached a service life of 50 years, or when they have reached a service life of 60 years, regardless of condition.

[1] This system is used to produce the necessary documentation to isolate pieces of equipment that require maintenance safely.
[2] Provided as Appendix F to Schedule 1 of this application.

3.0 Asset Overview

3.1 Asset Background

Under this program, 18 disconnect switches require replacement, as they meet the applicable replacement criteria. All disconnect switches planned for replacement in this program are currently in service. These units will be between 40 and 62 years of age at the scheduled time of replacement, some of which have experienced operational deficiencies over the years, and part obsolescence has become a concern.

3.2 Asset Condition

Hydro monitors the condition of disconnect switches by conducting regular visual and infrared inspections to determine the existence of hot spots. Reports from station personnel also identify issues such as mechanical problems and broken insulators.

3.3 Condition-Based Remaining Life

Disconnect switches that experience failures are repaired, if feasible, as part of ongoing maintenance activities, provided that required parts are available. Disconnect switches that have operating deficiencies and have reached a service life of at least 50 years or have become obsolete are replaced under this program.

3.4 Asset Ages

Chart 1 provides the asset age for all assets covered under the program.

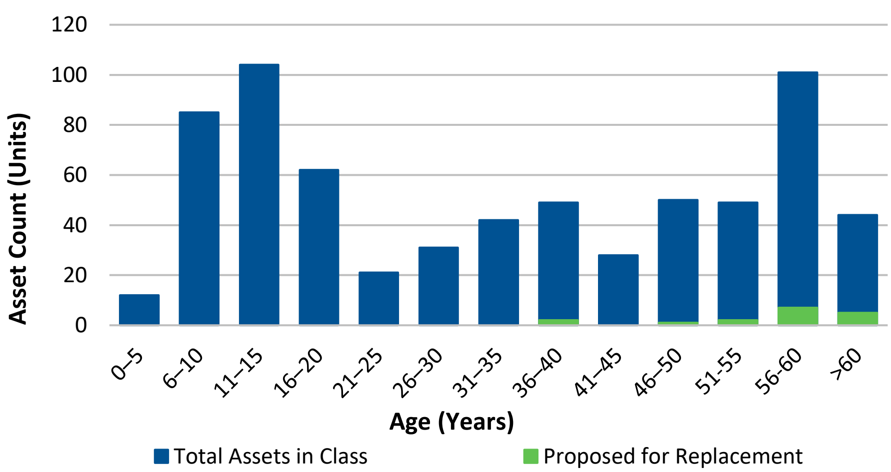

Chart 1: Asset Counts by Asset Age[3]

[3] Assets over 50 years of age and under 60 years of age without operating deficiencies are not replaced.

4.0 Trending

4.1 Assets Installed/Replaced/Upgraded

Chart 2 provides the five-year historical, current, and five-year forecast number of assets replaced per year. The number of disconnect switches requiring replacement will vary as switches reach the end of their service life and as deficiencies are identified. As such, the quantity of disconnect switches replaced per year varies.

Due to an increase in lead time for disconnects, a lower number of disconnects will be installed as part of this program in 2027.[4]

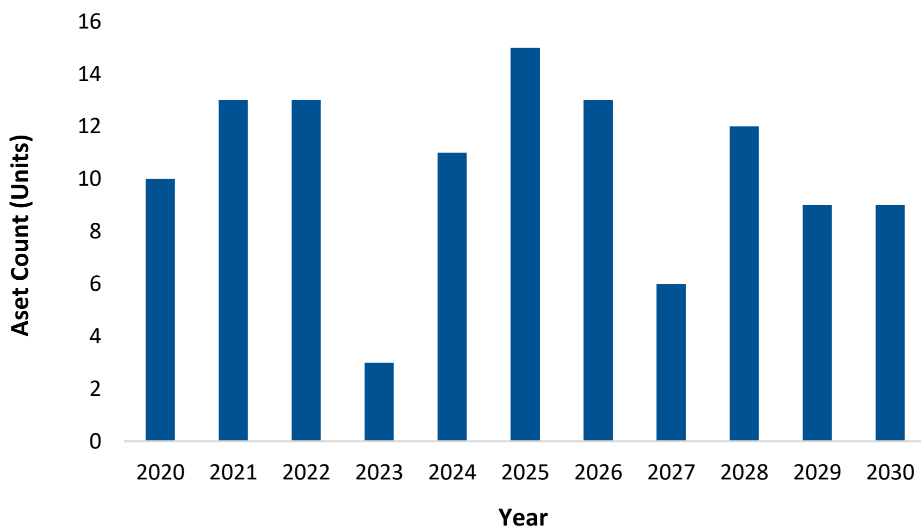

Chart 2: Historical and Forecast Number of Assets Replaced[5,6]

[4] Lead time for disconnect switches have been in excess of 52 weeks, which has resulted in their receipt during the summer timeframe of the following year. In Hydro's experience, this has not provided sufficient time to complete installation work. As such, beginning in 2026, the work will be executed over three years instead of two.

[5] The historical number of assets replaced in 2024 as part of the 2025 Capital Budget Application ("CBA") has been updated and reforecast for 2025–2030 as per the current five-year Capital Plan for disconnect switch replacements. Hydro has amended its reporting of assets in this program to exclude units that were replaced or installed through another capital project or program. This prevents duplicative reporting and ensures the provision of accurate historical information for capital work directly related to this program.

[6] Due to longer-than-anticipated delivery timelines, 2023 saw a decrease to the number of disconnect switches replaced compared to the number originally approved in Hydro's 2023 CBA in Board Order No. P.U. 2(2023). These switches were deferred to subsequent years.

4.2 Historical and Forecast Average Unit Costs

Chart 3 provides the five-year historical, current, and five-year forecast average unit cost of asset replacement in each year. The number and type of disconnect switches requiring replacement will vary as switches reach the end of their service life and as deficiencies are identified. As such, the average cost per unit varies.

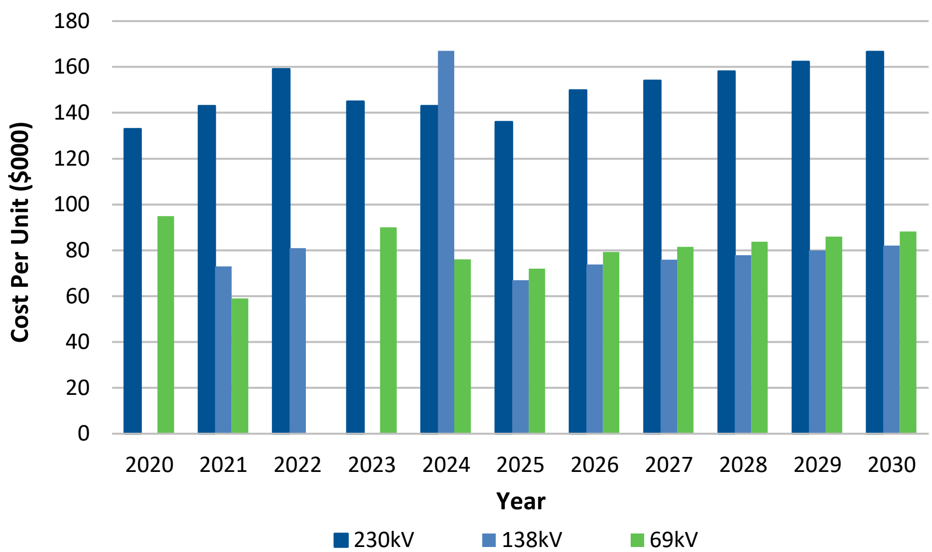

Chart 3: Historical and Forecast Average Unit Costs of Assets Replaced

4.3 Historical Reliability

Hydro does not currently record disconnect switch outage statistics; therefore, historical reliability data for the assets covered within this program is not available.

5.0 Analysis

5.1 Evaluation of Alternatives

For the assets recommended for replacement within this program, the following alternatives were considered:

- Pace reduction;
- Pace advancement; and
- Continue program at current pace.

Hydro has not identified any other alternatives for this program.

5.1.1 Pace Reduction

Reducing the overall pace of replacement for the disconnect switches identified in the current program would extend the in-service time of these units past Hydro's identified replacement criteria and increase the risk of in-service failures. This would present an increased risk to terminal station reliability and threaten the safe working environment. As such, pace reduction is not considered a viable alternative at this time.

5.1.2 Pace Advancement

Hydro has developed the replacement program considering system criticality, ability to execute, and resource and outage constraints. As such, pace advancement for disconnect switch replacement is not an option.

5.1.3 Continue Program at Current Pace

Proceeding with the identified upgrades ensures the assets identified as candidates for capital intervention in this proposal would be replaced based on age and condition in a timely manner, as per Hydro's established practices, providing sufficient time to ensure the least-cost procurement and installation. With the planned implementation now over three years, Hydro anticipates increased execution success in future years by having disconnects available for outages earlier in a given year.

5.2 Least-Cost Evaluation

Hydro has not identified any viable alternatives to facilitate a least-cost evaluation.

5.3 Recommended Alternative

Hydro recommends the replacement of the identified disconnect switches to minimize the potential of in-service failures at the affected operational sites.

5.3.1 Risk of Asset Stranding

Hydro has no plans to retire the stations identified within this program from service; therefore, the risk of asset stranding is low.

5.3.2 Risk Mitigation

Hydro assessed the pre- and post-implementation risk of the scope of work for the 2026–2028 program in accordance with Hydro's Capital Risk Assessment process, as outlined in Section 7.0 of Schedule 1 The outcome of this assessment is provided in Table 1.

Table 1: Risk Scoring Pre- and Post-Implementation

	Likelihood	Impact	Score
Pre-Implementation	5	3	**15**
Post-Implementation	5	1	**5**
		Risk Mitigated	**10**
		Risk Mitigated per $1 Million	**4.0**

6.0 Scope of Work

Hydro's five-year plan for the Replace Disconnects Program is provided in Appendix A. Based on current condition and asset data, Hydro proposes the replacement of disconnect switches that meet Hydro's established criteria for replacement based on a combination of factors including age, obsolescence, and deteriorated condition. The scope of this program includes engineering design, procurement, installation, and commissioning of disconnect switches. All of these units are planned for replacement before the end of 2028. Based on asset condition and outage and resource availability at the time of execution, Hydro may advance or defer the replacement of specific assets to ensure efficient and effective implementation of this program.

6.1 Program Budget

The estimate for this program is shown in Table 2.

Table 2: Program Estimate ($000)[7]

Program Cost	2026	2027	Beyond	Total
Material Supply	0.0	918.7	76.0	**994.7**
Labour	115.2	441.1	417.7	**974.0**
Consultant	26.0	26.0	26.0	**78.0**
Contract Work	0.0	0.0	0.0	**0.0**
Other Direct Costs	7.9	68.0	7.0	**82.9**
Interest and Escalation	5.1	94.8	52.3	**152.1**
Contingency	14.9	145.4	52.7	**213.0**
Total	**169.1**	**1,694.0**	**631.6**	**2,494.7**

[7] Numbers may not add due to rounding.

1 Chart 4 provides the five-year historical program expenditures, the forecast 2025 expenditures, and the
2 proposed 2026 budget and the forecast costs through 2030. Variability in budgets can be attributed to
3 the quantity and voltage class of disconnects to be replaced in a given year.

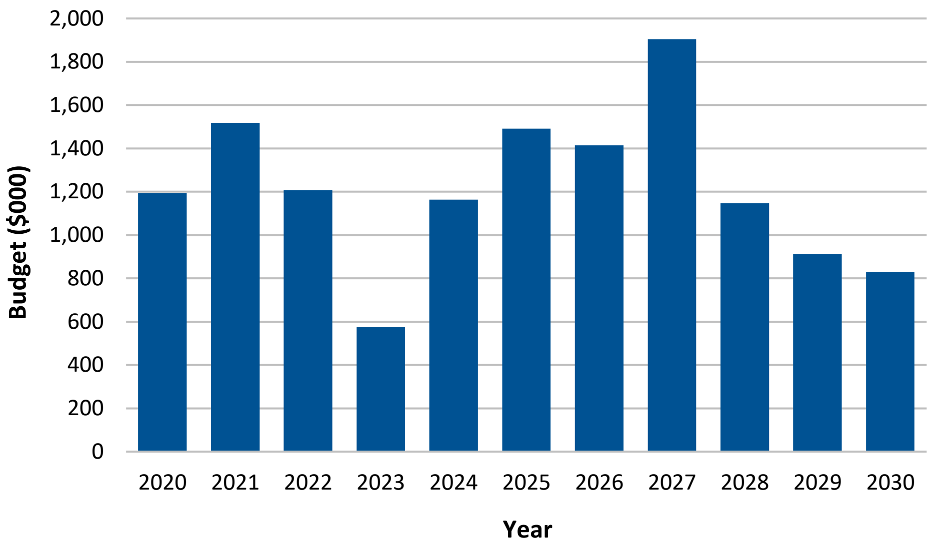

Chart 4: Historical and Forecast Program Budget[8,9]

[8] As noted in Section 4.2, average unit prices can vary, and as such, annual expenditures do not necessarily directly correspond with the number of replaced units.

[9] The increased program cost forecast in 2027 is due to the expected delivery of 18 disconnect switches in 2027 as part of the 2026–2028 program, which are planned for installation in 2027–2028. Six of these disconnect switches will be installed in 2027 post-delivery. The remaining twelve will be installed in 2028.

6.2 Program Schedule

The schedule for the program is shown in Table 3.

Table 3: Program Schedule

Activity	Start Date	End Date
Planning:		
Initial planning and scheduling.	January 2026	February 2026
Disconnect Procurement:		
Conduct site visits, develop disconnect tender package.	March 2026	May 2026
Tender and award.	May 2026	July 2026
Engineering Design:		
Complete detailed design.	January 2027	November 2027
Procurement of Parts:		
Order miscellaneous materials.	March 2027	November 2027
Construction:		
Replace disconnect switches.	August 2027	October 2028
Commissioning:		
Commission new disconnect switches.	August 2027	October 2028
Closeout:		
Complete closeout documentation.	November 2028	December 2028

7.0 Conclusion

Under the Replace Disconnects 2026–2028 Program, 18 disconnect switches require replacement, as they meet the applicable replacement criteria. Three of these do not meet the age criterion of 50 years or more, but have been identified for replacement due to obsolescence of replacement parts. The other 15 disconnect switches meet the age criterion, with ten of those also having no replacement parts available due to obsolescence.

Appendix A

Replace Disconnects Program

2026–2030 Plan

Assets planned for replacement from 2026 to 2030 under the Replace Disconnects Program are provided in Table A-1 to Table A-5.

Table A-1: Assets Planned for Replacement in 2026

Name	Voltage (kV)
Doyles B1L15-1	69
Hardwoods B2T3	230
Massey Drive B1L28-1	230
Massey Drive B1L28-2/L28G	230
Stony Brook B2L04-1	230
Stony Brook B2L04-2/L04G	230
Stony Brook B3T1-1	138
Stony Brook B3L130-1	138
Stony Brook B3L130-2/L130G	138
Wabush Terminal Station B1T1/T1G	230
Wabush Terminal Station B1L23-1	230
Wabush Terminal Station B1T3/T3G	230
Wabush Terminal Station B4L34-1	46

Table A-2: Assets Planned for Replacement in 2027

Name	Voltage (kV)
Doyles L14AG	138
Doyles L14T1/L14G	138
Doyles B1T1-1	69
Holyrood B7L2-2/L2G	69
Holyrood B7L38-1	69
Parson’s Pond L27-1/L27G-1	69

Table A-3: Assets Planned for Replacement in 2028

Name	Voltage (kV)
Churchill Falls 24L24/L24G	230
Holyrood B15T6	230
Holyrood B8T6	138
Holyrood B8T8	138
Happy Valley B13L03-1	138
Happy Valley B13L03-2/L03G	138
Massey Drive B1T1	230
Stony Brook B1L31-1	230
Stony Brook B1L31-2/L31G	230
Stony Brook B1L35-1	230
Sunnyside L02L07-2	230
Wabush Terminal Station B1L24-1	230

Table A-4: Assets Planned for Replacement in 2029

Name	Voltage (kV)
Bay d’Espoir B1B10-1	230
Bay d’Espoir B2B3-1	230
Bay d’Espoir B4B5-2	230
Bay d’Espoir B5L04/L04G	230
Holyrood B8T7	138
Holyrood B15T7	230
Massey Drive B1L48-1	230
Massey Drive B1L48-2/L48G	230
Sunnyside B3L19-1	138

Table A-5: Assets Planned for Replacement in 2030

Name	Voltage (kV)
Holyrood B7L2-1	69
Indian River B1L363-BP	138
Massey Drive B3L351-1	69
Massey Drive B3L357-1	69
Oxen Pond B2SSVT1	69
South Brook L22-1/L22G-1	138
Stony Brook B2T2	230
Sunnyside B2B3	138
Sunnyside B3L19-2/L19G	138

Overhaul Diesel Units

(2026)

Contents

Overhaul Diesel Units (2026)

Location: Various

Investment Classification: Renewal

Asset Category: Generation

Estimated Cost: $2,353,700

1.0 Introduction

Newfoundland and Labrador Hydro ("Hydro") has 23 diesel generating stations, serving approximately 4,500 customers. Of these stations, 19 are isolated and the sole source of power to a community. The number of diesel generation units ("genset") at each generating station ranges from three to six, while the rated output of the units ranges from 40 kW to 2,500 kW. The gensets across the system range in age from less than one year to 54 years, and currently range in operating hours from 326 hours to over 114,000 hours.[1]

The genset models proposed for overhaul within this program are anticipated to reach or exceed the number of operating hours for recommended overhauls based on the rotational speed of the unit in 2026. All of Hydro's gensets operate at either 1,200 rpm or 1,800 rpm.

2.0 Program Description and Justification

Hydro's diesel generating stations are isolated and, in most cases, are the sole sources of power to a community. This program is required to maintain the reliable operation of the components of these stations. Hydro has maintained overhauls at 20,000 operating hours for 1,800 rpm engines and has moved to 30,000 operating hours for 1,200 rpm engines, based on the reliable performance and the condition of parts observed during previous overhauls. To defer or skip an overhaul would increase the risk of an engine or generator failure, resulting in reduced reliability of the generating station and increasing the likelihood of customer outages. Hydro is proposing to overhaul seven diesel units in 2026.

[1] As of May 2025.

While Hydro occasionally advances diesel unit overhauls when dictated by unit condition, the units proposed for overhaul under this program in 2026 are due to reach 30,000 operating hours for 1,200 rpm units, or 20,000 operating hours for 1,800 rpm units in that year. These units are:[2]

- Makkovik Diesel Unit 593;
- Ramea Diesel Unit 2077;
- Postville Diesel Unit 2084;
- Black Tickle Diesel Unit 582;
- Rigolet Diesel Unit 2081;
- Paradise River Diesel Unit 585; and
- Mary’s Harbour Diesel Unit 2104.

3.0 Asset Overview

3.1 Asset Background

A diesel genset is the combination of a diesel engine with an electric alternator[3] used to generate electrical energy as shown in Figure 1.

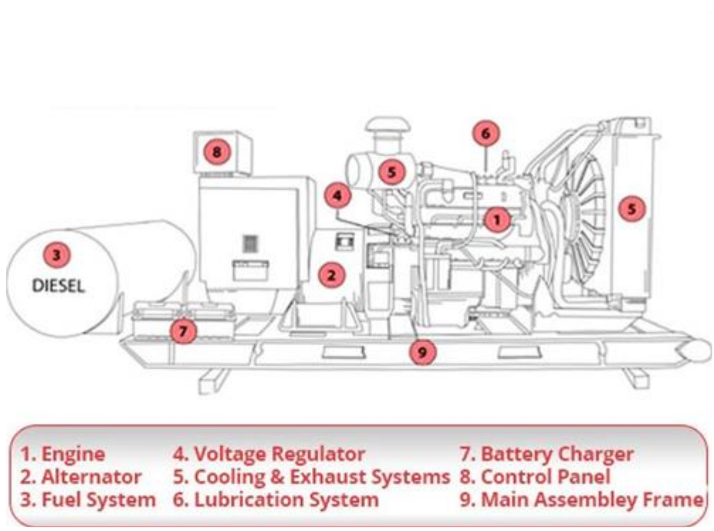

Figure 1: Diesel Genset

[2] Unit hours can change based on system and loading conditions, and on occasion, a unit in one of the diesel generating stations across Hydro’s operating area will experience an issue that necessitates an unplanned overhaul, or reach the number of operating hours earlier than anticipated. Where appropriate, Hydro may complete such an overhaul under this program and, if possible, defer the overhaul of one of the planned units.

[3] An alternator is an electric generator that converts mechanical energy to electrical energy in the form of alternating current.

Gensets can be classified in one of three ways depending on their mode of operation: continuous, prime, and standby/emergency. Continuous and prime gensets are very similar—they both function as a main source of power and are designed to operate continuously or for extended periods. The major difference between the two is that continuous gensets are designed to operate continually with a consistent load, while prime gensets are designed to operate for long durations at variable loads. Standby/emergency gensets are to be run only when there is an outage or in a backup situation. Hydro purchases prime power gensets based on the mode of operation for use in its isolated locations.

3.2 Asset Condition

While Hydro occasionally advances diesel unit overhauls when dictated by unit condition, the units proposed for overhaul are due to reach 30,000 operating hours for 1,200 rpm units, or 20,000 operating hours for 1,800 rpm units in 2026. These units, and their remaining operating hours before due for overhaul, are provided in Table 1.

Table 1: Planned 2026 Unit Overhauls – Asset Condition

Engine	Remaining Operating Hours Before Due for Overhaul[4]	RPM	Forecasted Overhaul Year
Makkovik Diesel Unit 593	2,984	1,200	2026
Ramea Diesel Unit 2077	3,968	1,200	2026
Postville Diesel Unit 2084	5,586	1,800	2026
Black Tickle Diesel Unit 582	5,657	1,800	2026
Rigolet Diesel Unit 2081	6,162	1,800	2026
Paradise River Diesel Unit 585	7,658	1,800	2026
Mary's Harbour Diesel Unit 2104	8,346	1,800	2026

3.3 Condition-Based Remaining Life

Generally, Hydro replaces diesel units upon reaching 120,000 operating hours for 1,200 rpm units, or 100,000 operating hours for 1,800 rpm units. Unit overhauls are required to ensure diesel units operate reliably for the duration of their useful lives.

[4] As of December 31, 2024.

3.4 Asset Ages

Diesel units across Hydro's system range in age from less than one year to 54 years, and currently range in operating hours from 326 hours to over 114,000 hours. Gensets are overhauled based on operating hours.

Chart 1 provides in-service years for all assets covered under the program.

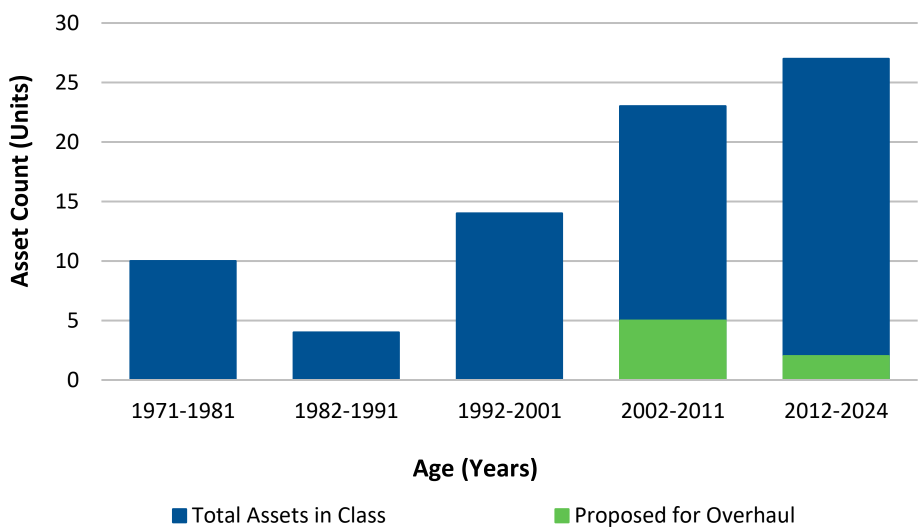

Chart 1: Asset Counts by Asset Age

4.0 Trending

Hydro's Overhaul Diesel Units Program was implemented in 2012. During the most recent five-year interval from 2020 to 2024, 43 units were overhauled, an average of approximately nine units per year.

4.1 Assets Overhauled

Chart 2 provides the five-year historical, current, and five-year forecast numbers of diesel units overhauled per year.

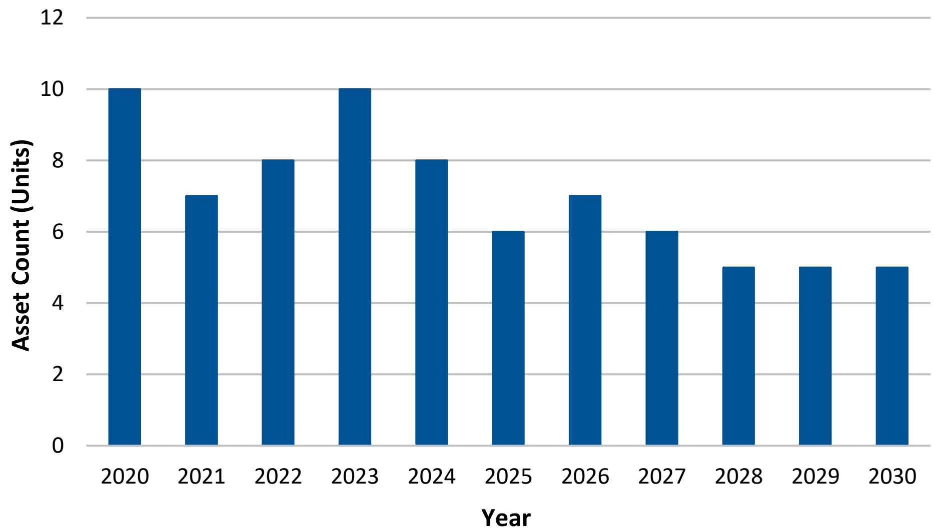

Chart 2: Historical and Forecast Number of Assets Overhauled

4.2 Historical and Forecast Average Unit Costs

Overhaul costs vary significantly based on unit engine ratings. The ratings of genset units under this program vary from 40 kW to 2,500 kW. Variability in annual budgets can be attributed to the rating and number of units overhauled each year.

Chart 3 provides the five-year historical, current, and five-year forecast average unit cost of a unit.

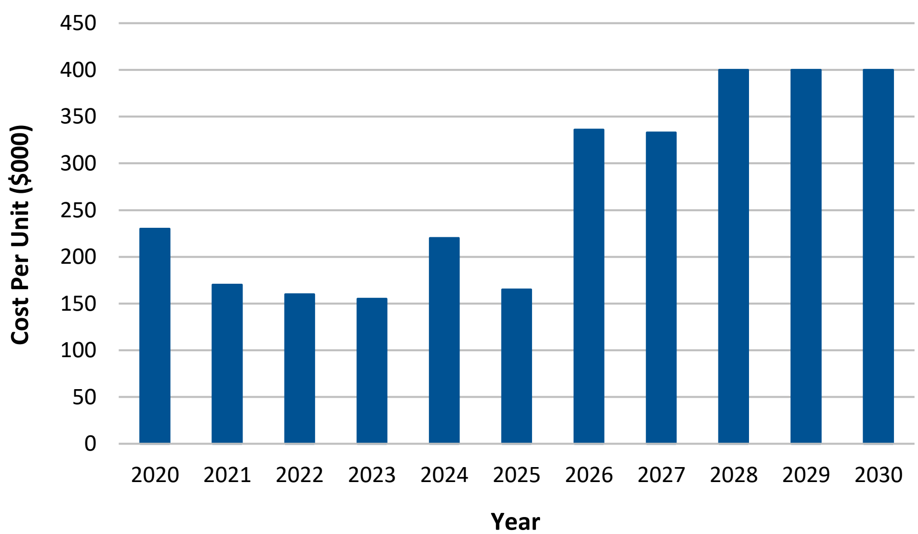

Chart 3: Historical and Forecast Average Unit Costs of Assets Overhauled

4.3 Historical Reliability

Hydro's overhaul program is configured to ensure a balance of reliability and cost-effectiveness while taking into account the original equipment manufacturers' ("OEM") recommendations for overhaul intervals. Performing overhauls at this interval is critical to maintaining reliability in isolated communities, which often rely on Hydro's diesel generating stations as their sole source of power. Failure to perform a required overhaul could have negative consequences and may lead to equipment failure in communities with limited accessibility.

Hydro tracks the reliability of diesel communities, similar to its other locations, using SAIDI[5] and SAIFI;[6] however, it is tracked at a system level, not by individual generating units. These statistics do not distinguish between the different outage causes, such as line outages, recloser issues, blown fuses, fuel system problems, or generator issues. If Hydro does not perform overhauls as per OEM recommendations as proposed under this project, diesel units may experience catastrophic failure prior to their operating hour lifespan.

5.0 Analysis

5.1 Evaluation of Alternatives

Hydro evaluated the following alternatives:

- Pace reduction;
- Continue program at current pace; and
- Alternative strategies.

Hydro has not identified any alternative strategies for this program.[7]

5.1.1 Pace Reduction

Hydro has determined that the current number of operating hours for recommended overhauls based on the rotational speed of the unit is appropriate based on OEM recommendations, the condition of the

[5] System Average Interruption Duration Index ("SAIDI").
[6] System Average Interruption Frequency Index ("SAIFI").
[7] Hydro has determined the pace of this program based on operating hours; however, Hydro does consider advancing diesel unit overhauls when dictated by unit condition. Based on the current condition of Hydro's diesel unit fleet, pace advancement was not required within the 2026 program.

units during overhaul, and the unit reliability. Extending the timing of these overhauls is not a viable option, as this would present an unacceptable risk to reliability.

5.1.2 Continue Program at Current Pace

Hydro has maintained overhauls at 20,000 operating hours for 1,800 rpm engines and 30,000 operating hours for 1,200 rpm engines, based on the reliable performance and the condition of parts observed during previous overhauls. The overhaul of diesel units based on Hydro's existing criteria is consistent with OEM recommendations and Hydro's experience with diesel unit overhauls and is necessary to proactively maintain the assets to ensure safe and reliable service.

5.1.3 Alternative Strategies

Hydro has not identified any alternative strategies that would support the safe and reliable operation of its diesel generating units.

5.2 Least-Cost Evaluation

Hydro has not identified any viable alternatives to facilitate a least-cost evaluation.

5.3 Recommended Alternative

Hydro recommends completing the planned overhauls to maintain the reliable operation of its diesel generating facilities.

5.3.1 Risk of Asset Stranding

Hydro's diesel generating stations are isolated and, in most cases, are the sole sources of power to communities. As such, the risk of asset stranding is low.

5.3.2 Risk Mitigation

Hydro assessed the pre- and post-implementation risk of the scope of work for the 2026 program in accordance with Hydro's Capital Risk Assessment process, as outlined in Section 7.0 of Schedule 1. The outcome of this assessment is provided in Table 2.

Table 2: Risk Scoring Pre- and Post-Implementation

	Impact	Likelihood	Score
Pre-Implementation	4	4	**16**
Post-Implementation	4	2	**8**
		Risk Mitigated	**8**
		Risk Mitigated per $1 Million	**3.4**

6.0 Scope of Work

The Overhaul Diesel Units Program for 2026 includes the planned overhaul of seven diesel unit models.

Unit hours can change based on system and loading conditions, and on occasion, a unit in one of the diesel generating stations across Hydro's operating area will experience an issue that necessitates an unplanned overhaul or reach the number of operating hours earlier than anticipated. Where appropriate, Hydro may complete such an overhaul under this program and, if possible, defer the overhaul of one of the planned units.

The units currently proposed for overhaul under this program in 2026 are:

- Makkovik Diesel Unit 593;
- Ramea Diesel Unit 2077;
- Postville Diesel Unit 2084;
- Black Tickle Diesel Unit 582;
- Rigolet Diesel Unit 2081;
- Paradise River Diesel Unit 585; and
- Mary's Harbour Diesel Unit 2104.

Hydro will utilize an existing capital spare for the overhaul of Mary's Harbour Diesel Unit 2104. As the cost of parts may fluctuate, Hydro will determine the cost of the overhaul parts and replacement engines and select the least-cost option with acceptable delivery timelines. If an overhaul occurs, it will include replacement or refurbishment of such items as pistons, liners, main bearings, connecting rod bearings, fuel injectors, oil coolers, turbochargers, water pumps, oil pumps, cylinder heads, fuel lines, fuel pumps, and gaskets.

6.1 Program Budget

The estimate for this program is shown in Table 3.

Table 3: Program Estimate ($000)[8]

Program Cost	2026	2027	Beyond	Total
Material Supply	1,385.5	0.0	0.0	**1,385.5**
Labour	496.1	0.0	0.0	**496.1**
Consultant	0.0	0.0	0.0	**0.0**
Contract Work	0.0	0.0	0.0	**0.0**
Other Direct Costs	153.4	0.0	0.0	**153.4**
Interest and Escalation	115.1	0.0	0.0	**115.1**
Contingency	203.5	0.0	0.0	**203.5**
Total	**2,353.7**	**0.0**	**0.0**	**2,353.7**

Chart 4 provides the five-year historical program expenditures, the forecast 2025 expenditures, the proposed 2026 program budget, and the forecast budget through 2030.

Genset units range in size from 40 kW to 2,500 kW. Overhaul costs vary significantly based on engine ratings and usage; as such, the number and size of units overhauled in a year create budget variability.

Forecast budgets and average costs per unit are anticipated to increase significantly in 2026 and beyond due to a number of factors. The introduction and increase of tariffs on spare parts for diesel units will lead to higher prices for the same, as well as add to supply chain issues that are still being experienced from the after-effects of the COVID-19 pandemic. A fluctuating Canadian dollar can also affect prices if it is relatively weaker at the time of purchase. Therefore, Hydro has assumed both a price increase related to tariffs, as well as a higher exchange rate within its materials estimate, as well as increased its contingency budget this year to help mitigate uncertainty surrounding these unknowns. Forecast unit costs and overall budget expenditures are further affected by the unit's engine size and required work for the unit overhaul—within the 2026 budget, Hydro has two larger units within scope. Hydro has assumed the same scope and external impacts within 2026 to forecast its program budget in future years.

[8] Numbers may not add due to rounding.

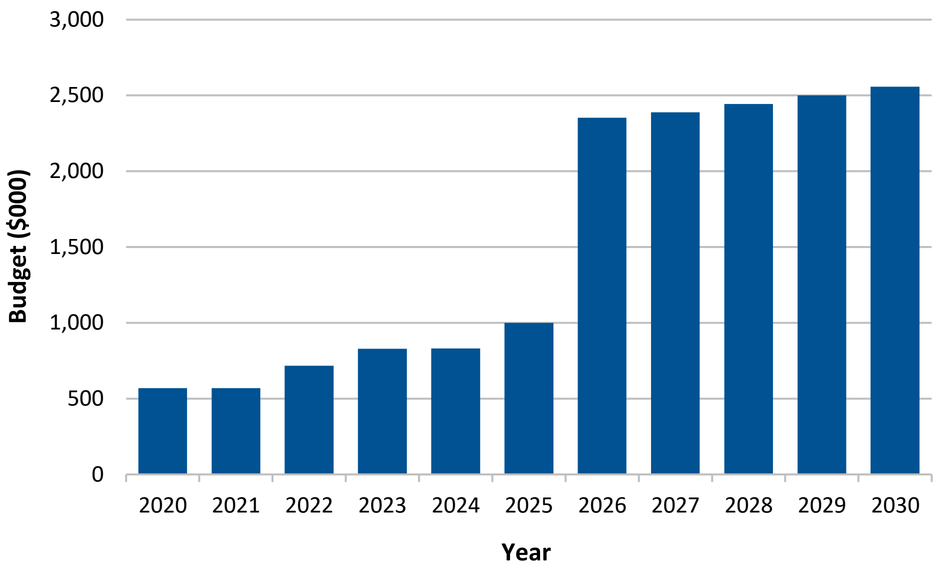

Chart 4: Historical and Forecast Program Budget

6.2 Program Schedule

The schedule for this program is shown in Table 4.

Table 4: Program Schedule

Activity	Start Date	End Date
Planning: Schedule annual overhauls.	February 2026	September 2026
Procurement: Purchase overhaul components.	March 2026	October 2026
Construction: Complete overhaul.	April 2026	November 2026
Commissioning: Testing after overhaul.	April 2026	November 2026
Closeout: Release for service and asset assignment.	December 2026	December 2026

7.0 Conclusion

To support the continued safe and reliable operation of Hydro's diesel units, Hydro is proposing the overhaul of seven diesel units in 2026. Units are scheduled for overhaul based on the number of hours used, in comparison to their rpm rates. Overhauls are critical to maximizing the life expectancy of units to limit larger replacement costs. Hydro has determined—based on the cost of replacement parts, installation, and travel—that it may be cost-effective to replace an engine instead of overhauling it if a replacement engine is available with acceptable delivery. As the cost of parts can fluctuate, Hydro will execute the least-cost alternative for each of the engine overhauls.

Purchase Tools and Equipment

(2026)

Contents

Purchase Tools and Equipment (2026)

Location: Various

Investment Classification: General Plant

Asset Category: Tools and Equipment

Estimated Cost: $1,849,400

1.0 Introduction

Newfoundland and Labrador Hydro ("Hydro") requires specific tools and equipment to ensure the delivery of safe, reliable, least-cost electricity in an environmentally responsible manner. This program outlines the purchase of tools and equipment that support the operation of Hydro's generation, transmission, and distribution systems.

2.0 Program Description and Justification

Hydro requires an adequate supply of tools and equipment to safely maintain reliable service to customers; therefore, it is necessary to add or replace tools and equipment required to complete system work.

Tools and equipment procured through this program are primarily driven by the operating requirements of Hydro's Generation, Telecontrol, and Transmission and Rural Operations ("TRO") groups. Required tools and equipment differ for each group, and cannot be shared due to operational restrictions. Proposed expenditures in 2026 are primarily the result of increased live line work, replacement of deteriorated tools or equipment, and required safety equipment.[1]

3.0 Asset Overview

3.1 Asset Background

Assets purchased as part of this program vary based on the requirements of the business in the year of project execution. Tools and equipment purchased under this program support daily operations, align with safety procedures and allow Hydro to maintain reliable service to customers.

[1] Examples of tools and equipment proposed for purchase as part of the 2026 program include: thermal imager, chain/brush saws, snake camera, and hand tools.

3.2 Asset Condition

Assets replaced or refurbished under this program have experienced unplanned failure or exhibit signs of incipient failure.

3.3 Condition-Based Remaining Life

Assets replaced or refurbished under this program have experienced unplanned failure or exhibit signs of incipient failure; therefore, these assets have reached the end of their serviceable life.

3.4 Asset Ages

The age of assets replaced or refurbished under this program varies. Unplanned replacement or refurbishment activities due to failure may be necessary at any time during the asset lifecycle.

4.0 Trending

4.1 Assets Installed/Replaced/Upgraded

Relating to historical, proposed and planned units, Hydro has begun trending the purchasing of tools and equipment, tracking the three main groups – Generation, TRO, and Telecontrol, as seen in Chart 1, Chart 2, and Chart 3, respectively. The trending identifies the historical and forecasted budgets each year within the three main groups.

Assets within this program vary from large equipment such as snowblowers and scissor lifts to minor miscellaneous power/hand tools; therefore, individual tracking of each item is unrealistic and provides no comparative value.

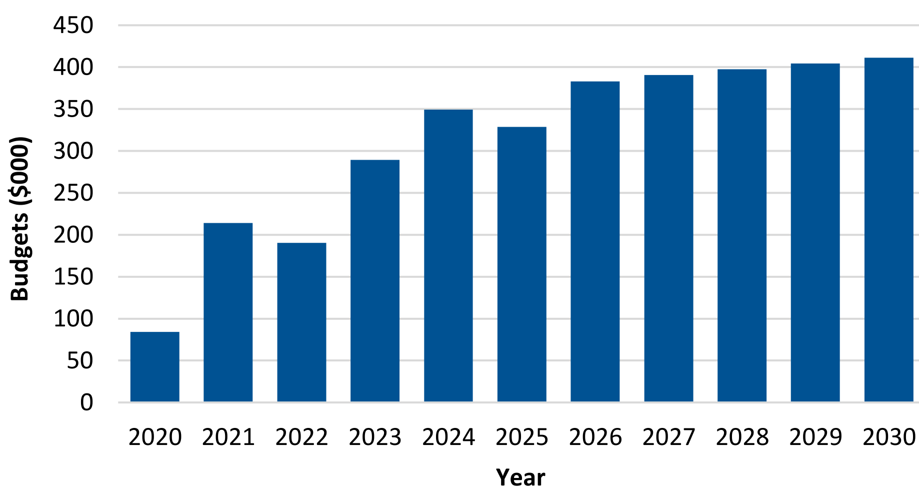

Chart 1: Generation Historical and Forecast Budgets

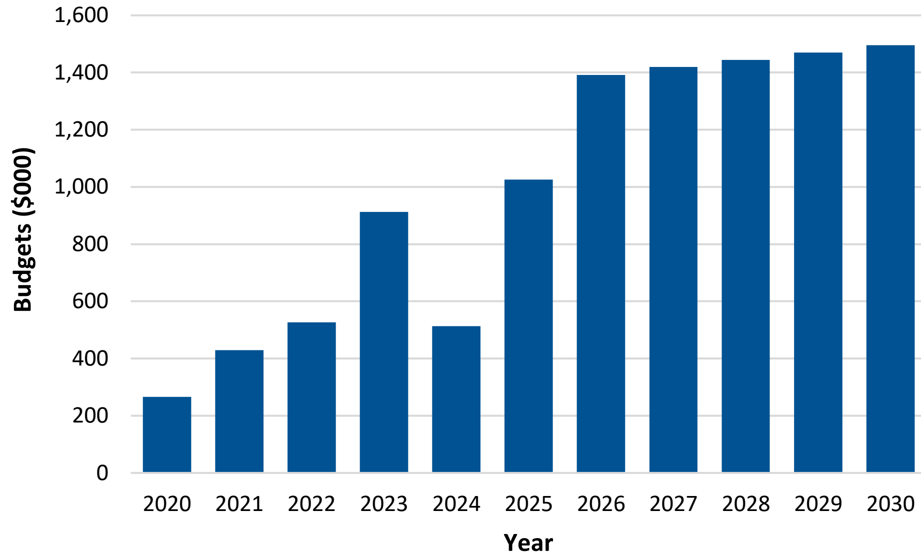

Chart 2: TRO Historical and Forecast Budgets

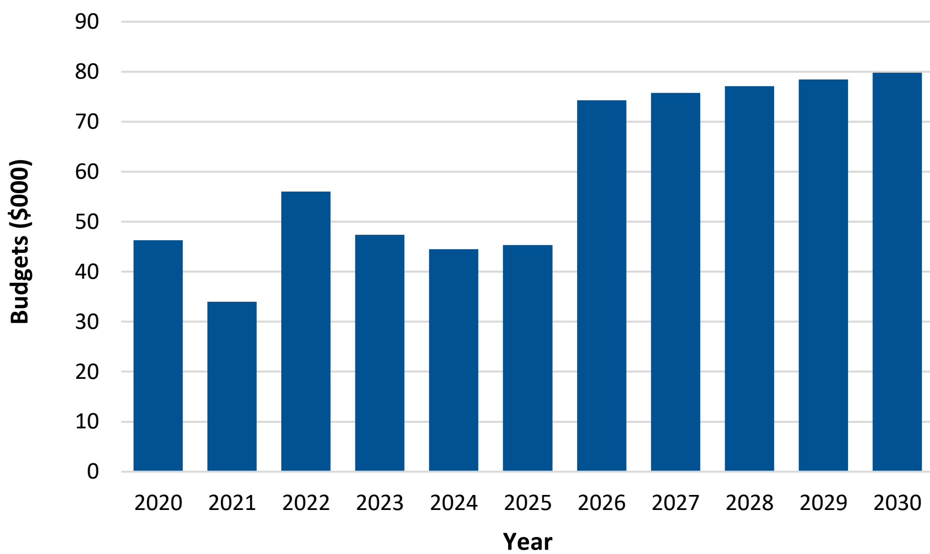

Chart 3: Telecontrol Historical and Forecast Budgets

4.2 Historical and Forecast Average Unit Costs

Historical and forecast program costs are provided in Chart 4 in Section 6.1. Due to the nature of this program and the range of assets covered, average unit cost information is not applicable. An increase in program cost is forecast based on the anticipated escalation of both material and labour costs.

4.3 Historical Reliability

Due to the nature of this program and the range of assets covered, historical reliability data for the individual assets covered within this program is not applicable.

5.0 Analysis

5.1 Evaluation of Alternatives

Hydro evaluated the following alternatives:

- Pace reduction;
- Pace advancement;
- Continuation at current pace; and
- Alternative strategies.

5.1.1 Pace Reduction

Hydro has not identified any pace reduction options for this program. Hydro requires tools and equipment to support the safe and reliable operation of the electrical system and evaluates tool and equipment requirements on an annual basis, proposing the procurement of those necessary to support system operations. Delayed procurement of these tools and equipment is therefore not considered a viable option.

5.1.2 Pace Advancement

Hydro has not identified any need to advance the procurement of tools and equipment and evaluates its tools and equipment needs on an annual basis, proposing procurement of those necessary to support the safe and reliable operation of the electrical system.

5.1.3 Continuation at Current Pace

Continuing the program at the current pace would allow for the purchase of necessary tools and equipment for employees to complete their work in managing the province’s electricity grid, without undue cost to customers.

5.1.4 Alternative Strategies

This program is for the purchase of specific tools and equipment that have been identified for purchase in 2026. These tools and equipment are required to ensure the delivery of safe, reliable, least-cost electricity in an environmentally responsible manner; therefore, there are no other alternatives.

5.2 Least-Cost Evaluation

Hydro has not identified any viable alternatives to facilitate a least-cost evaluation.

5.3 Recommended Alternative

Hydro believes procuring the proposed tools and equipment at the current pace allows for the provision of components to complete the necessary work to manage the province's electrical grid, which achieves an appropriate balance of reliability, lowest cost, and environmental responsibility.

5.3.1 Risk of Asset Stranding

Assets replaced or refurbished under this program have an inherently low risk of asset stranding. The assets covered under this program are critical to Hydro's ability to meet customer requirements and support Hydro's day-to-day operations. The risk of asset stranding would be considered on a case-by-case basis. The assets purchased under this program can generally be redeployed should the service requirements change in a given location.

5.3.2 Risk Mitigation

Hydro assessed the pre- and post-implementation risk of the scope of work for the 2026 program in accordance with Hydro's Capital Risk Assessment process, as outlined in Section 7.0 of Schedule 1. The outcome of this assessment is provided in Table 1.

Table 1: Risk Scoring Pre- and Post-Implementation

	Impact	Likelihood	Score
Pre-Implementation	4	3	**12**
Post-Implementation	4	1	**4**
		Risk Mitigated	**8**
		Risk Mitigated per $1 Million	**4.3**

6.0 Scope of Work

The scope of work of this program covers the annual expenditures required for the purchase of tools and equipment to execute safe, reliable work. Tools and equipment identified under this program are required to support day-to-day operations within Hydro's Generation, Telecontrol, and TRO groups. The scope of work includes the purchase and procurement of tools and equipment, and does not include any costs associated with the installation of these items.

6.1 Program Budget

The estimate for this program is shown in Table 2.

Table 2: Program Estimate ($000)[2]

Program Cost	2026	2027	Beyond	Total
Material Supply	1,574.8	0.0	0.0	**1,574.8**
Labour	58.2	0.0	0.0	**58.2**
Consultant	0.0	0.0	0.0	**0.0**
Contract Work	0.0	0.0	0.0	**0.0**
Other Direct Costs	0.0	0.0	0.0	**0.0**
Interest and Escalation	43.2	0.0	0.0	**43.2**
Contingency	173.1	0.0	0.0	**173.1**
Total	**1,849.4**	**0.0**	**0.0**	**1,849.4**

The program costs are broken down between Generation, TRO, and Telecontrol as follows:[3]

- Generation: $383,100
- TRO: $1,391,900
- Telecontrol Services Cost: $74,300

Chart 4 provides the five-year historical program expenditures, the forecast 2025 expenditures, the proposed 2026 program budget, and the forecast budget through 2030. Increased expenditures in 2026 are primarily the result of new tools and equipment required for continued increases in live line work in 2026,[4] replacement of deteriorated tools or equipment, and required safety equipment.

[2] Numbers may not add due to rounding.
[3] Numbers may not add due to rounding.
[4] As more live line work is now being conducted by internal TRO crews, this has driven an increase in the tools and equipment required to safely complete this work.

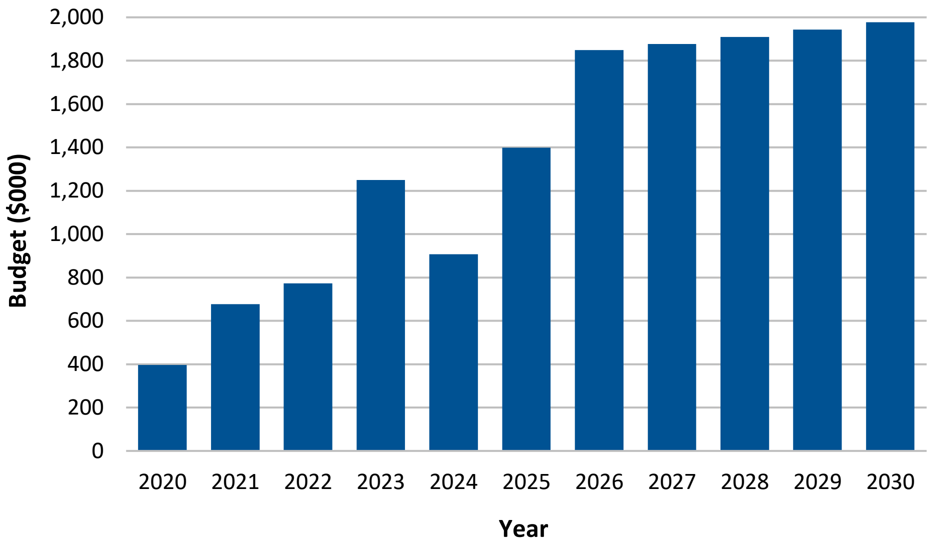

Chart 4: Historical and Forecast Program Budget

6.2 Program Schedule

This program is for the purchase of specific tools and equipment in 2026 that involves no construction or unit outages; therefore, the main milestone for this program is to have the identified tools and equipment on-site as required and before the end of 2026.

7.0 Conclusion

Hydro requires specific tools and equipment to ensure the delivery of safe, reliable, least-cost electricity in an environmentally responsible manner. This program outlines the purchase of tools and equipment that support the operation and maintenance of Hydro's generation, transmission, and distribution systems; it is necessary to add or replace tools and equipment that are required to complete this work. Hydro proposes to purchase the tools and equipment to ensure all operational groups have the proper tools and equipment to safely perform required tasks.

Replace Light-Duty Mobile Equipment

(2026)

newfoundland labrador hydro

Contents

Replace Light-Duty Mobile Equipment (2026)

Location: Various

Investment Classification: General Plant

Asset Category: Tools and Equipment

Estimated Cost: $1,212,900

1.0 Introduction

Newfoundland and Labrador Hydro (”Hydro”) operates a fleet of mobile equipment comprised of more than 350 light-duty assets. The light-duty group consists of snowmobiles, all-terrain vehicles (“ATVs”), trailers, and a small number of boats, compressors, and other equipment.

Hydro employees work throughout the province, including many locations that require alternative modes of transportation. As such, Hydro’s staff requires reliable mobile equipment to effectively fulfill their duties. The fleet is utilized daily to support staff engaged in the operation and maintenance of the electrical system.

2.0 Program Description and Justification

Hydro’s mobile equipment fleet is strategically distributed across Hydro’s operating areas throughout the province. This equipment is utilized daily by staff engaged in the maintenance and repair of the electrical system and shared amongst work groups as required. As equipment ages, it experiences increased downtime that could negatively impact emergency outage response times or planned maintenance.

The scope of this program includes light-duty equipment, such as trailers (both over and under 4,500 kilograms (kg)), ATVs/smaller off-road vehicles, forklifts, snowmobiles, compressors and boats. Hydro’s age-based replacement criteria for the main light-duty mobile asset categories are shown in Table 1.

Table 1: Hydro's Replacement Criteria for Mobile Equipment

Equipment	Average Age at Replacement (Years)
Snowmobiles	8
ATVs	7
Trailers <4,500 kg	9
Trailers >4,500 kg	18

In addition to age, Hydro considers the equipment's condition before its replacement, as usage of mobile equipment will vary considerably, resulting in retention and continued use of some assets well beyond the average age criteria. Miscellaneous equipment, such as forklifts, boats, compressors, etc., has no formally defined replacement criteria. Replacement is based on equipment condition, age, and availability of spare parts and service.

Historically, the replacement of heavy-duty mobile equipment, such as heavy-duty track machines, excavators and maintenance equipment, was included within this program scope. In Board of Commissioners of Public Utilities ("Board") Order No. P.U. 28(2024), approving Hydro's 2025 Capital Budget Application ("CBA"), the Board had noted concerns with including scopes of light- and heavy-duty mobile equipment in the same program, stating:

> The Board finds that Hydro has not provided sufficient justification for the combining of light- and heavy-duty vehicles/assets. While there may be some efficiencies gained in grouping the different types of vehicles/assets together, the Board finds that separation will allow for greater transparency, clarity, and better reflect delivery time and cost.[1]

Upon further review of the program scopes and consideration of the Board's request, Hydro has separated light- and heavy-duty mobile equipment into separate programs beginning in this CBA.

In addition, as described further in Section 5.1, due to additional price uncertainty caused by socioeconomic factors, Hydro has elected to increase the amount of cost escalation and contingency included within the budget for this program.

[1] Board Order No. P.U. 28(2024), p. 7/19–22.

3.0 Asset Overview

3.1 Asset Background

Hydro's fleet of mobile equipment is essential to performing planned and unplanned work on critical transmission and distribution systems, in particular the extensive off-road sections that cannot be reached or serviced by the regular highway-driven fleet of light-duty and heavy-duty vehicles.

3.2 Asset Condition

As equipment ages, it experiences increased downtime that could negatively impact emergency outage response times or planned maintenance. In many cases, light-duty mobile equipment is regularly operated under rough conditions and is subject to accelerated wear and tear. Mobile equipment is routinely inspected in accordance with the preventive maintenance schedule, and all maintenance and repairs are performed by Hydro maintenance personnel or third-party service providers as needed to ensure that maximum potential reliable service life is attained.

3.3 Condition-Based Remaining Life

Hydro evaluates assets as they near the retirement criteria to determine if it is appropriate to extend the life of the assets or replace them. This could include reassignment to an area with less or different usage or usage in easier terrain, among other considerations. Hydro has found it appropriate to maintain some mobile assets beyond the average replacement age, as those units are both in adequate condition, and the risk of their failure is considered to be a manageable event. For some assets, failure risk is much less tolerable, and a fixed lifecycle period endpoint is more prudent.

3.4 Asset Ages

Chart 1 provides asset age and count for the aggregate of all light-duty equipment types. As replacement criteria vary between asset types, the quantity of replacement units in various age groups is appropriate.

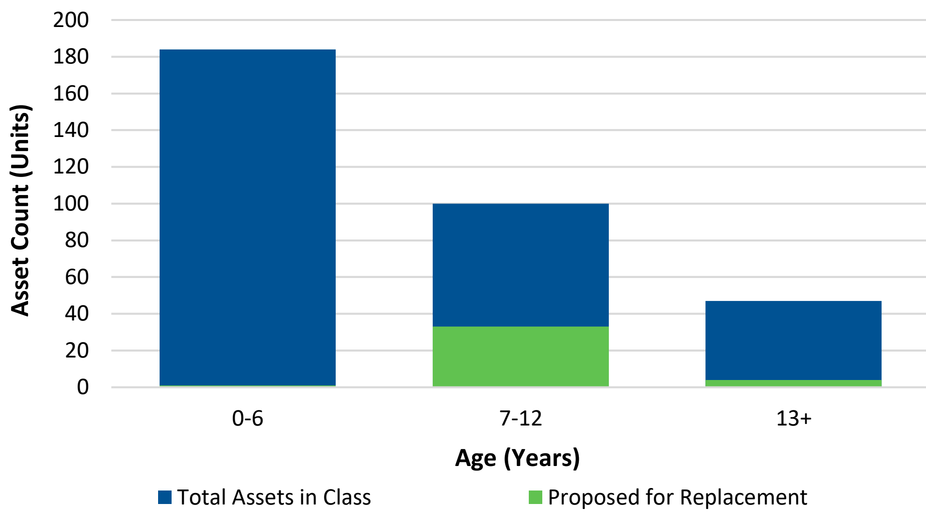

Chart 1: Asset Counts by Asset Age

3.5 Assets Installed/Replaced/Upgraded

Chart 2 provides the five-year historical, current, and five-year forecast numbers of aggregated light-duty mobile equipment replacement under this program. Pandemic-period challenges resulted in zero acquisitions in 2020 and 2021, with a subsequent catch-up in 2022. Going forward, Hydro is aiming to stabilize the pace of replacements. The replacement scope for 2026 is estimated to include 10 trailers, 14 snowmobiles, 11 ATVs, 2 Argos, and 1 forklift for a total of 38 units.

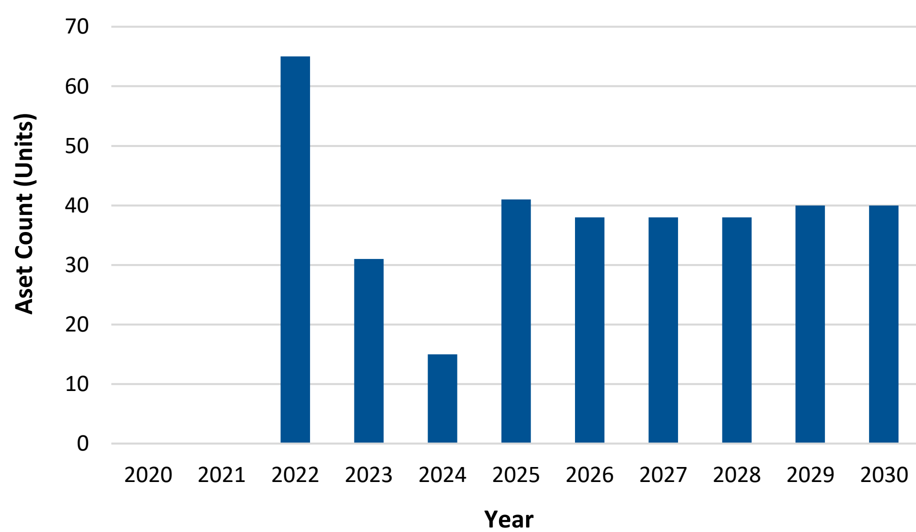

Chart 2: Historical and Forecast Number of Assets

4.0 Analysis

4.1 Evaluation of Alternatives

Hydro considered the following alternatives:

- Pace reduction;
- Pace advancement;
- Continue program at current pace; and
- Alternative strategies.

4.1.1 Pace Reduction

Hydro's annual long-term asset planning review incorporates asset condition and risk review that permits the lifecycle extension of some units. Further pace reduction is not considered a viable option. Unplanned pace reduction imposed by supply chain constraints from 2020 to present confirmed an increased rate of equipment failure that has resulted in challenges to completing required work. The increased rate of failure among aging equipment whose replacement has been delayed has validated that the current planning criteria and review methodology are near optimal.

4.1.2 Pace Advancement

Advancing the pace of this program would result in premature retirement of existing, functional assets, requiring a level of investment that is not required for the continuation of safe, least-cost, environmentally responsible, and reliable power. For this reason, pace advancement is not considered a viable option.

4.1.3 Continue Program at Current Pace

Hydro has determined the current criteria are appropriate based on industry standards, the condition of the units upon replacement, and vehicle usage statistics. This approach allows Hydro to balance cost with the reliability of Hydro's mobile equipment fleet. The mobile equipment is required to facilitate required maintenance and timely response to system events and, as such, is required to be available and in appropriate, reliable working condition.

4.1.4 Alternative Strategies

Many of the light-duty mobile equipment assets Hydro depends on, such as ATVs, snowmobiles and trailers, are support vehicles used to transport personnel and material to remote locations when needed. To ensure that Hydro will have the right equipment to maintain its system, Hydro does not consider there to be any viable alternative for this program.

4.2 Least-Cost Evaluation

Hydro has not identified any viable alternatives to facilitate a least-cost evaluation.

4.3 Recommended Alternative

Hydro's recommended alternative is to continue the program at the current pace and proceed with the identified replacements based on its replacement criteria. Replacement of mobile equipment, based on Hydro's replacement age criteria along with asset condition, is necessary to ensure the safe and reliable operation of mobile equipment, which is required to safely and reliably operate Hydro's electrical system.

4.3.1 Risk of Asset Stranding

This program is necessary to maintain a safe and reliable mobile equipment fleet. Failure to replace this equipment will lead to delays in scheduled and unscheduled work and possible safety risks for operators. Hydro does not foresee any changes in its requirements for mobile equipment; therefore, the risk of asset stranding is low.

4.3.2 Risk Mitigation

Hydro assessed the pre-and post-implementation risk of the scope of work for the 2026 program in accordance with Hydro's Capital Risk Assessment process, as outlined in Section 7.0 of Schedule 1. The outcome of this assessment is provided in Table 2.

Table 2: Risk Scoring Pre- and Post-Implementation

	Impact	Likelihood	Score
Pre-Implementation	3	4	**12**
Post-Implementation	3	1	**3**
		Risk Mitigated	**9**
		Risk Mitigated per $1 Million	**7.4**

5.0 Scope of Work

The 2026 program proposes the replacement of 38 light-duty assets (10 trailers, 14 snowmobiles, 11 ATVs, 2 Argos, and 1 forklift) in accordance with Hydro's replacement criteria. Deliveries of all light-duty assets are anticipated in 2026. This program also includes $60,000 in 2026 to address in-service failures for mobile equipment. Hydro will evaluate the cost of repair or refurbishment versus replacement prior to executing in-service failure repairs.

5.1 Program Budget

The estimate for this program is shown in Table 3.

Table 3: Program Estimate ($000)

Program Cost	2026	2027	Beyond	Total
Material Supply	977.0	0.0	0.0	**977.0**
Labour	12.8	0.0	0.0	**12.8**
Consultant	0.0	0.0	0.0	**0.0**
Contract Work	0.0	0.0	0.0	**0.0**
Other Direct Costs	0.0	0.0	0.0	**0.0**
Interest and Escalation	26.4	0.0	0.0	**26.4**
Contingency	196.7	0.0	0.0	**196.7**
Total	**1,212.9**	**0.0**	**0.0**	**1,212.9**

Chart 3 shows the five-year historical expenditures, the forecast 2025 expenditures, the proposed 2026 program budget, and the forecast budget through 2030.

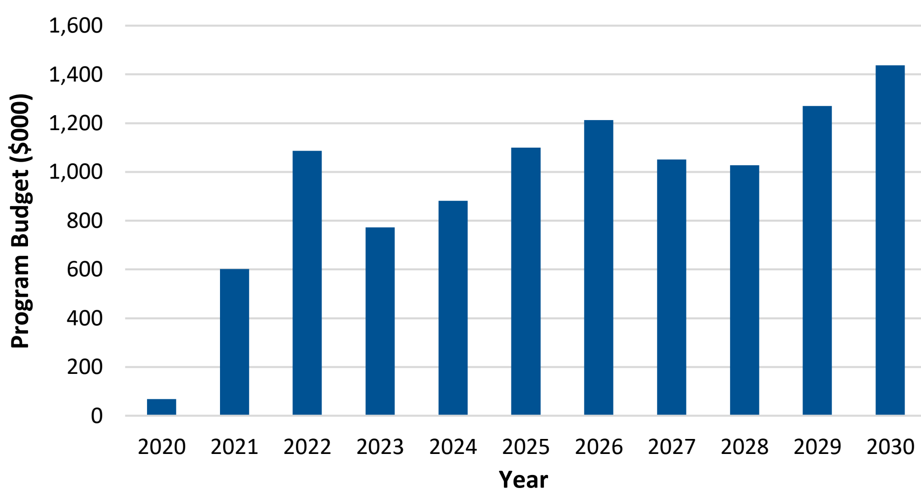

Chart 3: Historical and Forecast Program Budget

For the purchase of mobile equipment, Hydro includes cost contingency in its budget, typically about 10%, to accommodate potential price increases relating to an array of socioeconomic factors. Recent implementation and adjustments of tariffs on this type of equipment, as well as the components and materials used to fabricate the equipment, have increased uncertainty and potential volatility in the end unit price of these assets. To accommodate a larger range of price possibilities, Hydro has increased the amount of contingency included within this proposal to about 20%. As price effects relating to tariffs become more apparent, and in cases where tariffs are adjusted in the future, Hydro will reevaluate the amount of contingency included in future mobile equipment proposal budgets.

5.2 Program Schedule

The schedule for this program is shown in Table 4.

Table 4: Program Schedule

Activity	Start Date	End Date
Planning:		
Open work orders, plan, and develop detailed schedules.	January 2026	February 2026
Procurement:		
Tender and award contracts.	February 2026	April 2026
Receive and commission short-lead equipment.	May 2026	November 2026
Closeout:		
Close work orders, complete all documentation, and complete lessons learned.	November 2026	December 2026

6.0 Conclusion

Hydro utilizes a fleet of reliable mobile equipment to maintain the electrical system. Failure to replace the mobile equipment will lead to increased maintenance costs, less reliable equipment, and safety concerns for all users. The established replacement guidelines have been determined to be appropriate. Hydro proposes to continue with the replacement of light-duty mobile equipment under this program for 2026.

Replace Network Communications Equipment

(2026–2027)

newfoundland labrador hydro

Contents

Replace Network Communications Equipment (2026–2027)

Location: Various

Investment Classification: General Plant

Asset Category: Telecontrol

Estimated Cost: $1,137,400

1.0 Introduction

Newfoundland and Labrador Hydro's ("Hydro") administrative network is vital to the day-to-day operation of employees and information systems. The administrative network ties together users and systems, and carries voice and data communications between all significant offices, depots, terminal stations, generating facilities, and remote monitoring sites. The administrative network also provides critical communications interfaces to the Internet and the public telephone system.

Beginning in 2026, this program will also encompass Hydro's operational network, which is vital for the operation and control of the electrical grid. The operational network connects operational assets, which allow for remote monitoring, control, and maintenance, including Supervisory Control and Data Acquisition ("SCADA").

The goal of this program is to maintain a consistent refresh of devices used in Hydro's administrative and operational networks, ensuring that the technology in use remains current. This program will replace devices that are at or nearing End-of-Support ("EOS") from the manufacturer. Devices at EOS are no longer eligible for software support, leaving them vulnerable to hardware and/or software defects and security threats. In 2026, this program includes the replacement of 87 switches deployed on Hydro's administrative and operational networks.

2.0 Program Description and Justification

This program is required to maintain up-to-date administrative (i.e., routers, switches, and wireless devices) and operational (i.e., routers and switches) network hardware. Hydro's administrative network currently consists of approximately 375 routers and switches and 312 wireless access devices, while the operational network consists of approximately 55 routers and switches. Both of these networks consist of hardware in various stages of their lifecycle. The renewal of these devices is critical, as manufacturer support for security patches, as well as any support/maintenance contracts, ends upon reaching the manufacturer's EOS date.[1] Devices at the end of support are vulnerable to hardware and software defects and security threats. Replacement may also be required to keep up with changes in technology to ensure maximum interoperability.

An analysis based on device criticality and age is performed every year to prioritize the replacement of network devices. Of the devices at or nearing EOS, those with the highest operational impact are replaced first.[2] In order to levelize the program, lower-priority devices may be kept in service past their EOS date based on risk profile and number of spares in inventory. When considering the schedule for replacement of lower priority devices of the same product series, those in service longer would be replaced first.

As a result of increased equipment lead times, beginning in 2026, the work will be executed over two years instead of one, as is typically completed under the Replace Network Communications Equipment Program.

3.0 Asset Overview

3.1 Asset Background

Hydro considers many factors when selecting a network device, including the asset's lifecycle support, as well as the functional requirements of the system the device is serving. Hydro supports many sites, from area offices, microwave radio sites, line depots, terminal stations, generating plants, and remote monitoring sites. The goal of the network design is to match the device to the location in order to provide the most cost-effective service, while providing an acceptable quality of service and end user experience. Once the required device functionality is identified, the next step is to choose among available device models. Hydro will only purchase models that are fully supported by the original equipment manufacturer ("OEM") with no known end-of-sale date, in order to maximize asset lifespan.

The OEM classifies the end-of-sale date as the last date to purchase the equipment. The EOS date is typically five years after the end-of-sale date and represents the last date to receive applicable service and support for the product, including software updates to mitigate cybersecurity vulnerabilities, as

[1] This date is typically five years after the manufacturer's end-of-sale date for these devices.
[2] For example, devices not serving operational sites related to power generation and transmission, such as those in area offices, would obtain a lower classification than devices that support operational sites or core network connectivity.

entitled by active service contracts or by warranty terms and conditions. After this date, all support services for the product are unavailable, and the product becomes obsolete.

3.2 Asset Ages

Hydro typically removes network devices from service within one to two years of the EOS date; however, this may vary depending on their criticality, risk profile and operational impact.

Assets within this program have varying lifetimes, which are established in relation to the vendor's end-of-sale announcement and are not known at the time of purchase. Given that Hydro's primary driver for the replacement of network devices is product lifecycle status, Hydro has presented assets based on the known EOS date. Those assets for which EOS have not yet been announced are grouped together as TBA.[3]

3.2.1 Switches

Network switches provide access connectivity to devices within the Hydro administrative network (e.g., personal computers, Internet Protocol telephones, printers) and the Hydro operational network (e.g., including Remote Terminal Units, Intelligent Electronic Devices, Programmable Logic Controllers). Depending on technology requirements, such as switching speed and port density, vendors typically provide support for network access switches for 10–15 years.

The majority of the switches in Hydro's administrative and operational network have published end-of-sale dates in 2026 and 2027. These represent three different switch models, which were a common choice for Hydro and industry in general, and were installed over a number of years.

The EOS status for Hydro's switches is shown in Chart 1,[4] this consolidates both the administrative and operational network switches. In the chart, TBA[5] represents devices that do not yet have a published EOS date.

[3] To be announced ("TBA").
[4] Note that the switches to be replaced in 2025 have been included in the TBA category, as they are assumed to have been replaced.
[5] EOS date TBA.

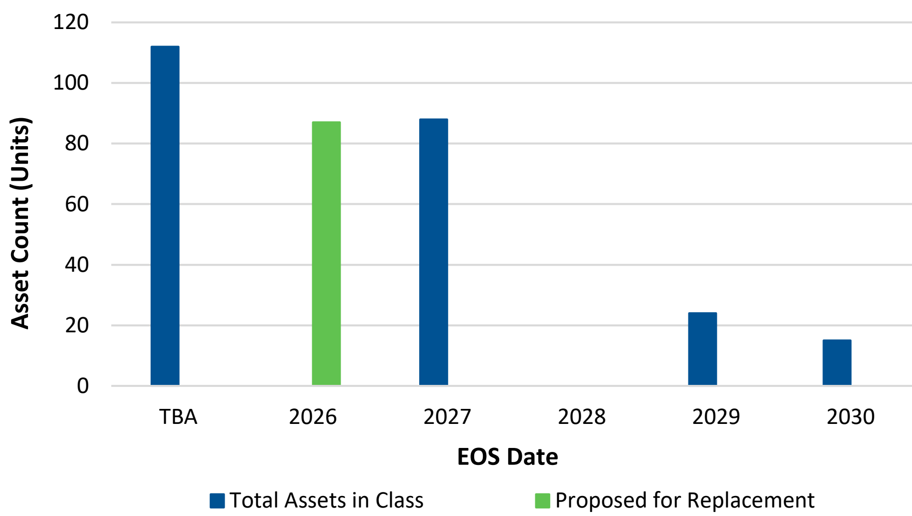

Chart 1: Switch EOS Status

3.2.2 Routers

Routers are networking devices that forward data packets between different computer networks, and in some cases, provide voice and data services. The average lifecycle of a router is 15 years. The majority of the routers in Hydro's administrative and operational network are still currently supported by the manufacturer, with no EOS date announced yet.

The EOS status for Hydro's administrative and operational network routers is shown in Chart 2. In the chart, TBA represents devices that do not yet have a published EOS date. Note that there are no routers proposed for replacement under this project.

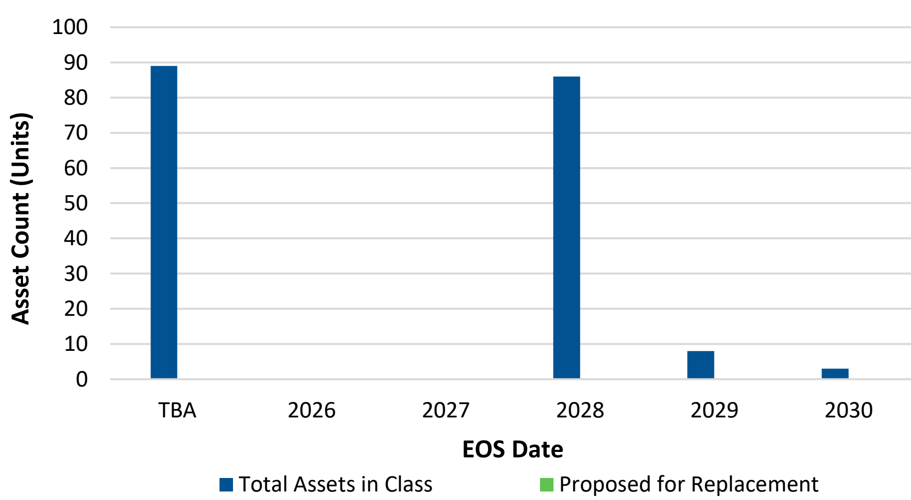

Chart 2: Router EOS Status

3.2.3 Wireless Devices

Wireless devices include wireless access points (“WAP”), wireless local area network controllers (“WLC”), and wireless bridges, all of which are deployed on Hydro’s administrative network. Users connect to a wireless network via signals provided by WAPs. Wireless bridges connect disparate networks via a wireless signal. WLCs manage WAPs and wireless bridges. The average lifecycle of a wireless device is ten years.

The EOS status for Hydro’s wireless devices is shown in Chart 3. In the chart, TBA represents devices that do not yet have a published EOS date. Note that there are no wireless devices proposed for replacement under this project.

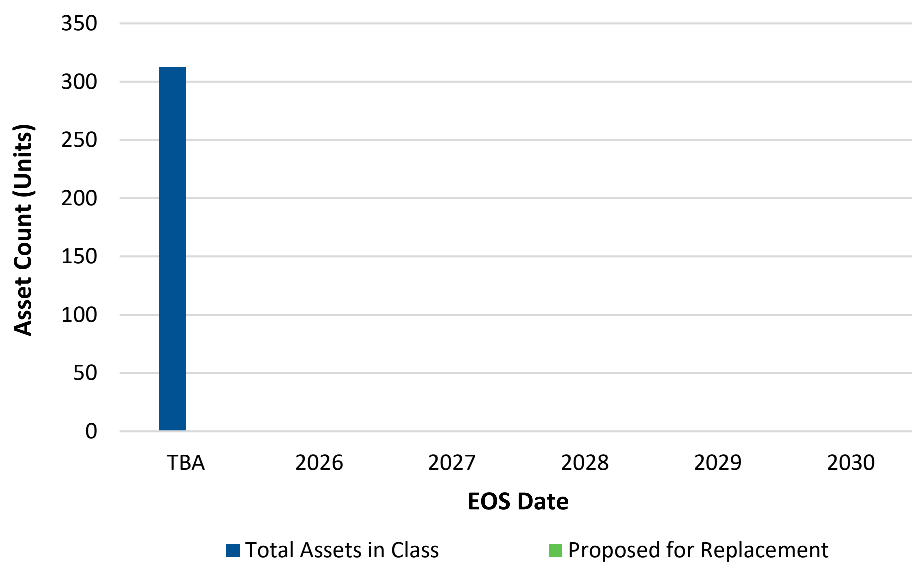

Chart 3: Wireless Device EOS Status

4.0 Trending

4.1 Assets Installed

Chart 4 provides the five-year historical, current, and five-year forecast number of network communications devices replaced under this program.

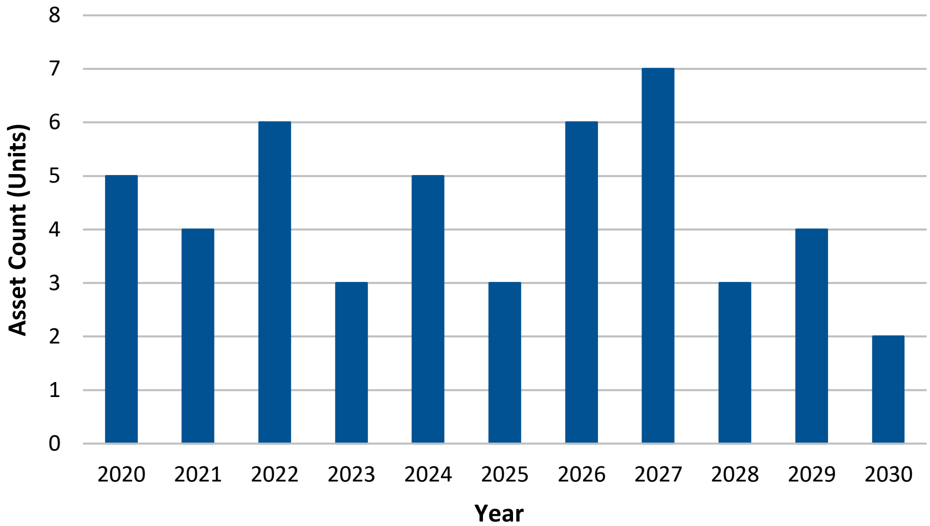

Chart 4: Historical and Forecast Number of Assets Installed

4.2 Historical and Forecast Average Unit Costs

Chart 5 provides the five-year historical average unit costs of assets installed the current projected per-unit costs for 2025, the proposed 2026 average unit costs of assets to be installed, and the forecast average unit costs of assets to be installed until 2030.

Years 2022 and 2024 are outliers as these years purchased WAP, which have a lower unit asset cost when compared to routers and switches.

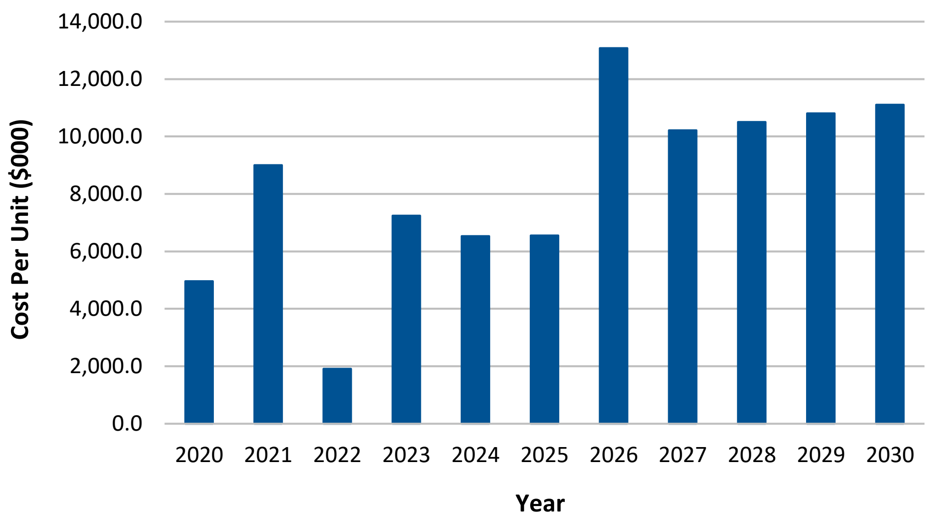

Chart 5: Historical and Average Unit Costs of Assets Installed

4.3 Historical Reliability

The assets covered in the program have a very low failure rate. Impacts to operation are generally mitigated through redundant design.

5.0 Analysis

5.1 Evaluation of Alternatives

Hydro evaluated the following alternatives for the replacement of the identified switches and routers:

- Pace reduction;
- Pace advancement; and
- Continue program at current pace.

No alternative strategies were identified for this program.

5.1.1 Pace Reduction

Reducing the pace of network communications equipment replacement would result in a critical number of devices remaining in service beyond the manufacturer's EOS date. Operation of network communications equipment beyond the EOS date poses an unacceptable risk to the security, availability, and integrity of Hydro's networks. Hydro, therefore, does not consider pace reduction to be a viable alternative.

5.1.2 Pace Advancement

Hydro has developed the replacement program considering system criticality, ability to execute, and resource constraints. As such, pace advancement for network communications equipment replacement is not an option.

5.1.3 Continue Program at Current Pace

As a result of increased equipment lead times, beginning in 2026, the work will be executed over two years instead of one, as is typically completed under the Replace Network Communications Equipment program, taking away space. The pace of network device replacement is determined by the lifecycle and criticality of the devices, as well as add space availability of spares. The pace of replacement proposed by Hydro aims to balance reliability with criticality such that devices may be replaced up to five years beyond their EOS date.

5.2 Least-Cost Evaluation

Hydro has not identified any viable alternatives to facilitate a least-cost evaluation.

5.3 Recommended Alternative

Hydro recommends replacement of the identified networking devices with equivalent devices over a two-year program scope in order to address risks associated with hardware and software vulnerabilities for devices which are at or near manufacturer EOS. This is critical to the security, availability, and integrity of Hydro's administrative and operational networks.

5.3.1 Risk of Asset Stranding

Before planning to replace a network device, the risk of asset stranding is evaluated. For example, a replacement may be deferred if a future project or initiative is planned which may change the functional requirements of the device. As such, the risk of asset stranding is low. Assets with remaining service life can also generally be redeployed.

5.3.2 Risk Mitigation

Hydro assessed the pre- and post-implementation risk of the 2026–2029 program in accordance with Hydro's Capital Risk Assessment process as outlined in Section 7.0 of Schedule 1. The outcome of this assessment is provided in Table 1.

Table 1: Risk Scoring Pre- and Post-Implementation

	Impact	Likelihood	Score
Pre-Implementation	4	4	**16**
Post-Implementation	4	1	**4**
		Risk Mitigated	**12**
		Risk Mitigated per $1 Million	**10.6**

6.0 Scope of Work

This program includes the replacement of 87 switches deployed on Hydro's administrative and operational networks. Most locations have more than one switch that will be replaced, the scope of which includes design, procurement, implementation, testing and documentation. Work packages and system drawings are developed on a per-location basis to facilitate the successful implementation of this program. The replacement process consists of the following major activities:

- Switch procurement;
- System and site design modifications, including drawing creation and/or modification;
- Device configuration and work packages;
- Removal of existing equipment;
- Installation, commissioning, and testing of new switches;
- As-built drawing updates;
- Management configuration for new devices; and
- Program closeout.

6.1 Program Budget

The estimate for this program is shown in Table 2.

Table 2: Program Estimate ($000)

Program Cost	2026	2027	Beyond	Total
Material Supply	610.7	0.0	0.0	**610.7**
Labour	286.3	61.1	0.0	**347.4**
Consultant	0.0	0.0	0.0	**0.0**
Contract Work	0.0	0.0	0.0	**0.0**
Other Direct Costs	26.7	25.9	0.0	**52.6**
Interest and Escalation	22.3	3.3	0.0	**25.6**
Contingency	92.4	8.7	0.0	**101.1**
Total	**1,038.4**	**99.0**	**0.0**	**1,137.4**

Chart 6 provides the five-year historical program expenditures, the revised 2025 planned expenditures, the proposed 2026 program budget, and the forecast budget through 2030. The forecast budget is derived from the average unit cost per device for the 2024 and 2025 applications, adjusted for inflation.

Years 2026 and 2028 are considered to be outliers, as the cost of devices recommended for replacement during these years is much higher than others.

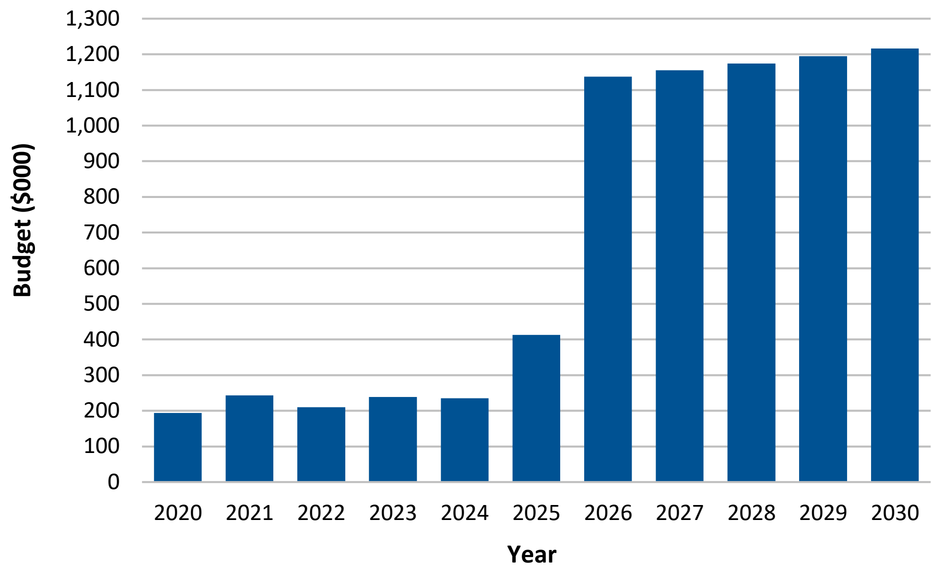

Chart 6: Historical and Forecast Program Budget

1 ## 6.2 Program Schedule

2 The program schedule is shown in Table 3.

Table 3: Program Schedule

Activity	Start Date	End Date
Planning: Develop program scope statement, develop resource and network outage schedule.	January 2026	March 2026
Design: Develop network drawings and design packages, finalize bill of materials.	January 2026	April 2026
Procurement: Prepare and award tender for new equipment.	February 2026	May 2026
Construction: Configure and install new equipment.	July 2026	March 2027
Commissioning: Test network connectivity.	July 2026	March 2027
Closeout: Update as-built drawings and closeout program.	December 2026	March 2027

7.0 Conclusion

This program is required to replace networking devices on Hydro's administrative and operational networks as manufacturer support becomes unavailable. Lack of manufacturer support can result in unplanned network outages as well as security vulnerabilities. To mitigate these risks, Hydro recommends the removal of devices from the network within two to five years of their EOS date based on their criticality and operational impact. Under this program, Hydro plans to replace 87 switches in 2026–2027.

Program 17

Purchase Personal Computers

(2026)

Contents

Purchase Personal Computers (2026)

Location: Various

Investment Classification: General Plant

Asset Category: Information Systems

Estimated Cost: $1,115,700

1.0 Introduction

Newfoundland and Labrador Hydro ("Hydro") personnel have been assigned a laptop, rugged mobile, desktop, or workstation computer to access business software applications. To support its business and maintain operational reliability for its software applications and information, Hydro must keep personal computing devices and accessories current.

2.0 Program Description and Justification

Hydro schedules replacement of desktop and workstation computers on a six-year lifecycle and laptop and rugged mobile computers on a five-year lifecycle. The replacement of monitors and other ancillary hardware is assessed based on failure, compatibility, breakage, loss, and application requirements.[1] If a user leaves the organization and their computer has not reached the maximum age/lifespan, it will be reimaged and redeployed.

Personal computing devices must be current to provide the required performance and capacity to effectively run business applications. If personal computing devices are not current, the following scenarios could occur:

- Inability to install new software applications and upgrade existing applications;
- Decreased processing speed and increased potential for lost data;
- Cybersecurity risks due to unsupported operating systems, patches and vulnerability updates; and
- Decreased productivity during the repair or reimaging processes.

[1] Hydro aims to repurpose existing devices where possible to address inventory replacements, and only purchases a replacement in cases where there are no devices of the correct type and minimum requirements available.

In December 2024, the *Hydro Corporation Act, 2007*, was repealed and replaced by the *Hydro Corporation Act, 2024,* which served to finalize the legal amalgamation of Nalcor Energy and Hydro. Resulting from amalgamation, Information Systems ("IS") assets were now subject to regulatory oversight, having been exempt under previous legislation.

In line with the Intercompany Costing Transactions Guidelines, computer purchases are charged directly to the applicable line of business. Historically, this program purchased personal computing equipment required for Hydro's regulated business segment only. Post-amalgamation, new IS assets and capital expenditures, as well as sustaining capital for existing assets, are subject to regulation under the *Public Utilities Act*. As a result, in 2026, the scope of devices and the associated budgets that are included within this program have increased to include assets historically purchased by Nalcor Energy for the corporate services functions that are now part of the Hydro legal entity. There are currently about 215 personal computers which have been added to the asset counts covered under this program.

3.0 Asset Overview

3.1 Asset Background

Hydro operates and maintains approximately 1,400 personal computing devices, which include desktops, workstations, laptops, and rugged mobile devices, in addition to ancillary hardware (i.e., monitors, etc.) associated with those devices.[2]

A preliminary analysis based on Hydro's age-based replacement criteria identified the need to replace 415 personal computing devices.[3] Hydro has also budgeted for an additional 22 inventory replacements, to take care of in-service failures, breakage or loss that occurs in 2026, totalling the number of computing devices purchased in this program's scope to 437. In 2026, the program budget also includes the replacement of ancillary hardware at a cost of $66,000.[4]

3.2 Asset Condition

Devices identified in this budget have been in service for a period of more than five years for laptops and rugged mobile computers, and more than six years for desktop and workstation computers, and

[2] Excludes personal computing devices purchased directly by another line of business per the Intercompany Transaction Costing Guidelines.
[3] Resulting from concurrent completion of typical five- and six-year lifecycles, there are a higher-than-average number of personal computers requiring replacement in the 2026 iteration of this program.
[4] In 2026, Hydro is proposing to replace 264 monitors at a unit cost of approximately $250 each.

have exceeded the expected reliable lifespan. The replacement of monitors and other ancillary hardware is assessed based on failure, compatibility, and application requirements.

3.3 Asset Ages

The personal computing equipment proposed for replacement was purchased in 2020–2021. Chart 1 provides asset age for personal computing devices covered under the program.

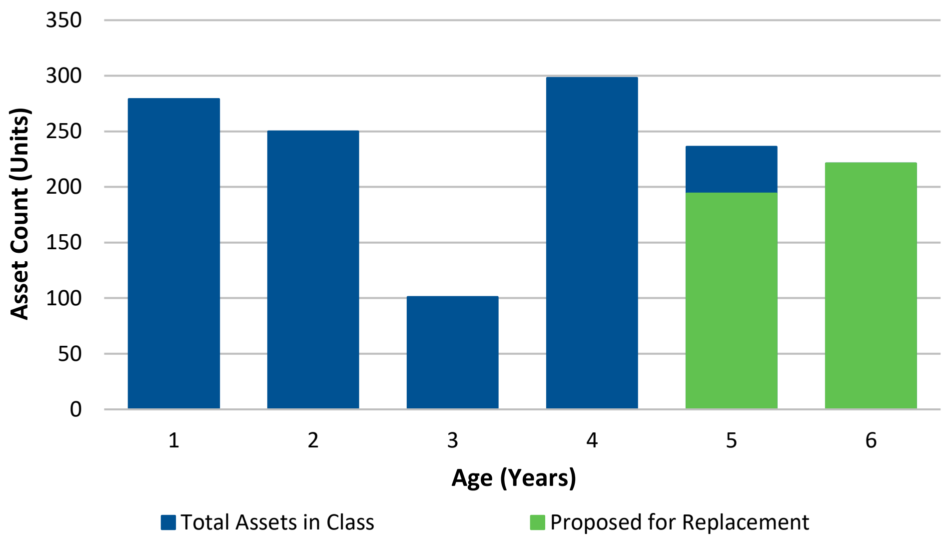

Chart 1: Asset Counts by Asset Age

4.0 Trending

4.1 Assets Replaced

Hydro replaces personal computers each year, as the devices reach the end of their life. Chart 2 provides the five-year historical, current, and five-year forecast number of assets replaced.

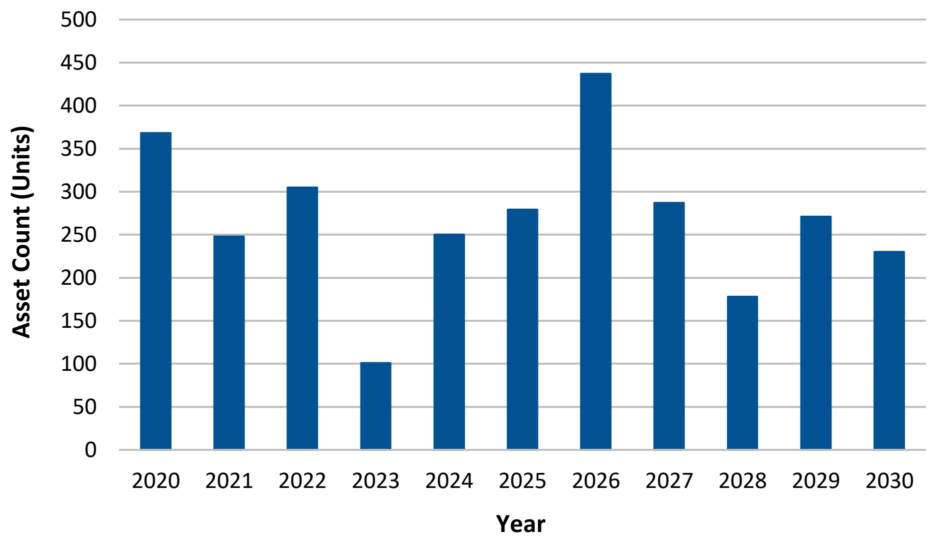

Chart 2: Historical and Forecast Number of Assets Replaced[5]

4.2 Historical and Forecast Average Unit Costs

Chart 3 provides the historical, current, and five-year forecast average unit cost of asset replacement in each year.

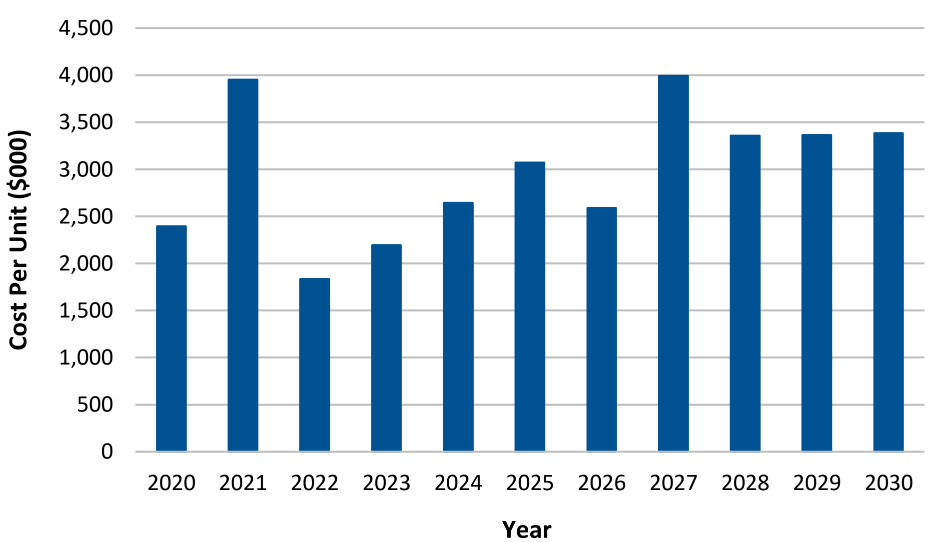

Chart 3: Historical and Forecast Average Unit Costs of Assets Replaced[6]

[5] Data for 2020–2024 reflect the historical spending within this program, which includes assets purchased for Hydro's regulated business segment only.
[6] *Supra*, f.n. 5.

4.3 Historical Reliability

Hydro has determined its replacement schedule based on maximizing the use and lifetime of personal computers and related assets without leading to reliability issues. Computing devices that are not kept current risk reliability issues, including the inability to install new software applications and upgrade existing applications; decreased processing speed and increased potential for lost data; cybersecurity risks due to unsupported operating systems for patches and vulnerability updates; and decreased productivity during the repair or reimaging process.

5.0 Analysis

5.1 Evaluation of Alternatives

Hydro has evaluated the following alternatives:

- Pace reduction;
- Pace advancement; and
- Continuation at current pace.

5.1.1 Pace Reduction

Under this scenario, the planned replacement of personal computing devices would be deferred, and the lifecycle would be increased. With this alternative, there is an increased technical risk of the existing equipment no longer supporting new applications, interfaces, and other technologies. Cyber risks increase as vendors no longer release security patches for unsupported hardware and operating systems cannot be kept up-to-date due to legacy hardware support issues. Review and historical experience have shown that the risk is not acceptable. Higher maintenance costs are also incurred when operating these devices beyond Hydro's current replacement criteria.

5.1.2 Pace Advancement

Hydro's historical experience with this program has not demonstrated a need to accelerate the replacement of personal computer devices. Hydro's current lifecycle replacement of these assets ensures performance and security needs are met without unnecessary increases to cost.

5.1.3 Continuation at Current Pace

Under this alternative, computers identified as being deployed and in service for over five years (for mobile laptop computers) and over six years (for desktop/workstation) will be replaced throughout 2026, following Hydro's established replacement criteria to maintain adequate service levels for business continuity and ensure electronic business data is secure.

5.2 Least-Cost Evaluation

Hydro has not identified any viable alternatives to facilitate a least-cost evaluation.

5.3 Recommended Alternative

Hydro recommends the replacement of computer infrastructure that has been in service for more than five to six years, based on the equipment type and associated replacement lifecycle.

5.3.1 Risk of Asset Stranding

There is minimal risk for asset stranding as these computers will be used to replace computers currently in use, which have reached the end of their useful life. If a user leaves the organization and their computer has not reached the maximum age or lifespan, it will be reimaged and redeployed.

5.3.2 Risk Mitigation

Hydro assessed the pre- and post-implementation risk of the scope of work for the 2026 program in accordance with Hydro's Capital Risk Assessment process, as outlined in Section 7.0 of Schedule 1. The outcome of this assessment is provided in Table 1.

Table 1: Risk Scoring Pre- and Post-Implementation

	Impact	Likelihood	Score
Pre-Implementation	3	3	**9**
Post-Implementation	3	1	**3**
		Risk Mitigated	**6**
		Risk Mitigated per $1 Million	**5.4**

6.0 Scope of Work

A preliminary analysis based on existing device age has identified a projected 415 personal computers due for replacement in 2026. Hydro is proposing to purchase an additional 22 computers, which will be used as replacements for unexpected failures, breakage, and loss.

A reassessment of equipment to be replaced will occur in January 2026, as the proposed quantities are a forecast based upon lifecycle retirements and the number of new units required to accommodate new software applications or work methods.

6.1 Program Budget

The estimate for this program is shown in Table 2. The personal computing devices purchased for Hydro's regulated business segment represent approximately 80% of the budget, and corporate assets represent approximately 20%.

Table 2: Program Estimate ($000)[7]

Program Cost	2026	2027	Beyond	Total
Material Supply	817.8	0.0	0.0	**817.8**
Labour	62.8	0.0	0.0	**62.8**
Consultant	128.0	0.0	0.0	**128.0**
Contract Work	0.0	0.0	0.0	**0.0**
Other Direct Costs	7.5	0.0	0.0	**7.5**
Interest and Escalation	23.5	0.0	0.0	**23.5**
Contingency	76.2	0.0	0.0	**76.2**
Total	**1,115.7**	**0.0**	**0.0**	**1,115.7**

Chart 4 provides the five-year historical program expenditures, the forecast 2025 expenditures, the proposed 2026 program budget, and the forecast budget through 2030. As outlined in Section 2.0, the scope of IS assets within this program has expanded in 2025 and beyond as a result of amalgamation.[8]

[7] Numbers may not add due to rounding.
[8] Additional computers to be purchased in 2025 as a result of amalgamation were reported to the Board of Commissioners of Public Utilities in Hydro's Report on Amalgamation Activities.

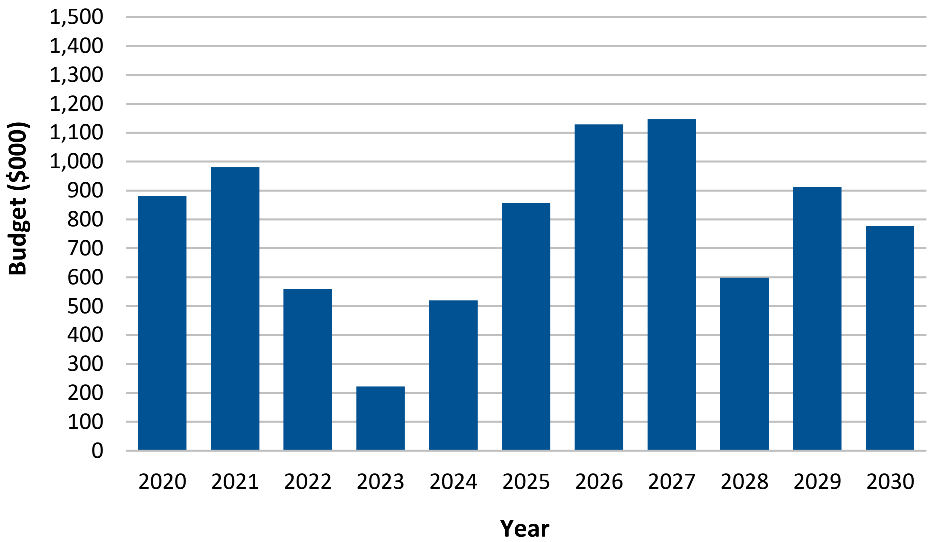

Chart 4: Historical and Forecast Program Budget[9]

1 ## 6.2 Program Schedule

2 The schedule for the program is shown in Table 3.

Table 3: Program Schedule

Activity	Start Date	End Date
Planning:		
Open the project and review the scope.	February 2026	February 2026
Design:		
Prepare baseline machine configuration.	February 2026	March 2026
Procurement:		
Order/receive equipment.	February 2026	April 2026
Commissioning:		
Configuration and deployment.	May 2026	October 2026
Closeout:		
Project closeout.	November 2026	November 2026

[9] Data for 2020–2024 reflect the historical spending within this program, which includes assets purchased for Hydro's regulated business segment only.

7.0 Conclusion

This program proposes to replace personal computing devices and accessories approaching end-of-life following Hydro's established replacement criteria. Under this program, computers identified as being deployed and in service for over five years (for mobile laptops) and over six years (for desktop, workstations, and thin client computers) will be replaced throughout 2026 following Hydro's established replacement criteria to maintain adequate service-levels for business continuity and ensure electronic business data is secure.

$750,000 to $1,000,000

Diesel In-Service Failures

(2026)

newfoundland labrador hydro

Contents

Diesel In-Service Failures (2026)

Location: Various

Investment Classification: Renewal

Asset Category: Generation

Estimated Cost: $817,000

1.0 Introduction

Newfoundland and Labrador Hydro ("Hydro") conducts asset management activities to proactively identify, replace, repair, or refurbish equipment to minimize the disruption of service and avoid unsafe working conditions due to equipment failure. One of the primary objectives of Hydro's Asset Management Program is to identify refurbishment and replacement activities that require approval by the Board of Commissioners of Public Utilities ("Board") in time to be included in Hydro's annual capital budget application ("CBA"). This is achieved through the Preventive Maintenance Program using various condition-based assessments and testing procedures.

Hydro has had success in projecting the deterioration rate of equipment for submission of refurbishment or replacement work into CBAs. However, there are situations where immediate refurbishment or replacement must be completed due to the occurrence of an actual failure, the identification of an imminent failure, or the identification of faster-than-anticipated equipment deterioration. These situations can be caused by events such as vandalism, storm damage, lightning, accidental damage, abnormal system operations, corrosion, and wear of mechanical components. Hydro uses historical data and engineering judgment to predict the magnitude of in-service failure expenditures.

2.0 Program Description and Justification

Under the Diesel In-Service Failures Program, Hydro completes immediate capital refurbishment and replacement work required for its diesel generating assets as needed to ensure the delivery of safe, reliable, least-cost electricity in an environmentally responsible manner and to ensure the availability of capital spares required to support such work. At this time, Hydro does not have any planned capital spare acquisitions; however, throughout 2026, Hydro may purchase capital spares identified by asset management personnel as requiring immediate procurement to offset deficiencies in its capital spares.

Due to the nature of internal combustion engines and diesel generation equipment, unanticipated failures and deterioration occur. This program provides an effective and timely means to undertake the immediate capital refurbishment and replacement work required for diesel generation equipment.

Deferral of work that is justified under this program could result in a detrimental impact to customer power supply or unacceptable risk to workers or public safety. In most cases, diesel generating stations are the only source of power for the community served, and equipment failures must be addressed promptly.

Required work will be evaluated to determine the appropriate form of execution as an in-service failure, an allowance for unforeseen item or a supplemental project, depending on the relevant circumstances.

3.0 Asset Overview

3.1 Asset Background

This program is to address unforeseen failures of various diesel generating station equipment where immediate refurbishment or replacement must be completed due to actual failures, the identification of an incipient failure, or faster-than-anticipated equipment deterioration. This program covers the assets associated with 23 diesel generating stations in Newfoundland and Labrador, which may include the execution of the following in-service failure work:

- Premature engine failure;
- Premature radiator failures;
- Premature generator failures; and
- Unexpected failure of auxiliary equipment.

For further information on the work executed under the Diesel In-Service Failures (2024) Program, please refer to Hydro's "Capital Expenditures and Carryover Report for the Year Ended December 31, 2024."[1]

3.2 Asset Condition

Assets replaced or refurbished under this program have experienced unplanned failure or exhibit signs of incipient failure.

3.3 Condition-Based Remaining Life

Assets replaced or refurbished under this program have experienced unplanned failure or exhibit signs of incipient failure; therefore, these assets have reached the end of their serviceable life.

3.4 Asset Ages

The diesel genset fleet ranges in age from less than 1 year to 54 years, and currently ranges in operating hours from 310 to 110,683. Chart 1 shows the age distribution of the genset fleet. Unplanned failure of diesel generating assets can occur at any time during their lifecycle.

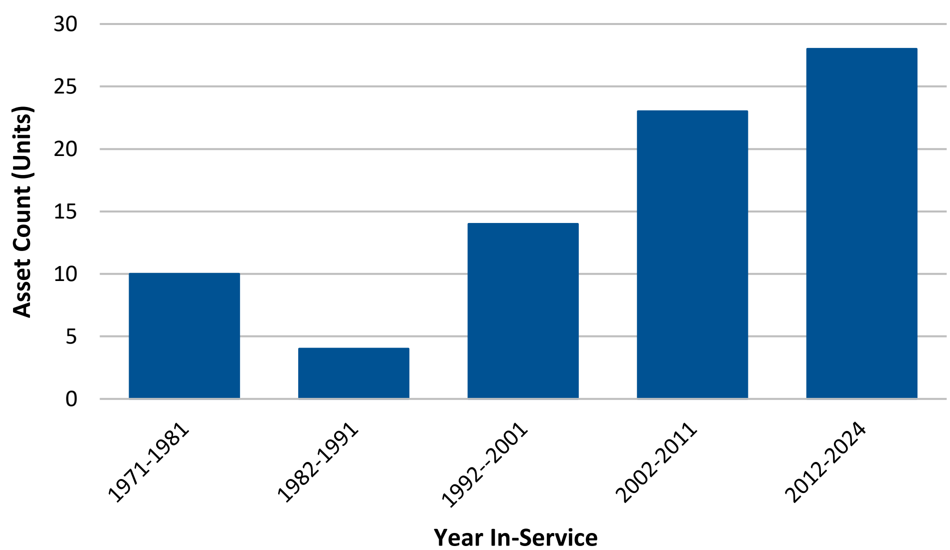

Chart 1: Asset Count by Asset Age

[1] Provided as Appendix B to Schedule 5 of this application.

4.0 Trending

As Hydro implemented the Diesel In-Service Failures Program in 2023, Hydro does not yet have the requested trending data that would lead to budgetary determinations based on historical information. With two years of actual installations, replacements and upgrades in this program, Hydro will refrain from providing historical chart information at this time and provide this information as required in the 2027 CBA.

Ten unplanned projects were initiated under this program in 2024.

4.1 Historical and Forecast Average Unit Costs

Historical and forecast program costs are provided in Chart 2 in Section 6.1. Due to the nature of this program and the range of assets covered, average unit cost information is not applicable. An increase in program cost is forecast based on the anticipated escalation of both material and labour costs, which in this year's case was based on engineering judgement as an adequate amount of historical data has yet to be obtained.

5.0 Analysis

5.1 Evaluation of Alternatives

Depending on the nature of each failure, or incipient failure, Hydro reviews viable technical alternatives to determine the most appropriate solution to address the unplanned event while balancing urgent safety and operational risks.

Due to the urgent nature of work executed under this program, seeking approval through a supplemental capital expenditures application or deferring the work for inclusion in the next CBA are not viable alternatives. The alternative of executing required unplanned work under the Allowance for Unforeseen Items Account is also considered on a case-by-case basis, subject to the requirements set out by the Board for the use of the account.

5.1.1 Risk of Asset Stranding

Assets replaced or refurbished under this program have an inherently low risk of asset stranding. The assets covered under this program are critical to Hydro's ability to meet customer requirements. Diesel generating stations are isolated, and in most cases are the sole sources of power to a community;

therefore, the risk of asset stranding is inherently low. Should a facility be identified for closure due to a change in customer service requirements,[2] Hydro will retain and redeploy assets to other locations.

5.1.2 Risk Mitigation

Hydro assessed the pre- and post-implementation risk of this program in accordance with Hydro's Capital Risk Assessment process as outlined in Section 7.0 of Schedule 1. The outcome of this assessment is provided in Table 1.

Table 1: Risk Scoring Pre- and Post-Implementation

	Impact	Likelihood	Score
Pre-Implementation	3	5	**15**
Post-Implementation	3	1	**3**
		Risk Mitigated	**12**
		Risk Mitigated per $1 Million	**14.7**

6.0 Scope of Work

6.1 Program Budget

The estimate for the 2026 program is shown in Table 2. The estimate is based on engineering judgement, as there wasn't sufficient historical information to determine the budget based on an average yearly expenditure. The details of each project covered under this program, including the associated assets and costs, as well as the total program expenditures for each year, are filed with the Board within Hydro's annual Capital Expenditures and Carryover Report.[3]

[2] Such as community resettlement.
[3] Hydro's 2026 Capital Expenditures and Carryover report is to be filed on or before April 1, 2027.

Table 2: Program Estimate ($000)

Program Cost	**2026**	**2027**	**Beyond**	**Total**
Material Supply	400.0	0.0	0.0	**400.0**
Labour	314.3	0.0	0.0	**314.3**
Consultant	0.0	0.0	0.0	**0.0**
Contract Work	0.0	0.0	0.0	**0.0**
Other Direct Costs	70.0	0.0	0.0	**70.0**
Interest and Escalation	32.7	0.0	0.0	**32.7**
Contingency	0.0	0.0	0.0	**0.0**
Total	**817.0**	**0.0**	**0.0**	**817.0**

The Diesel In-Service Failure Program started in 2023. Chart 2 provides the historical expenditures since the program was initiated, the forecast 2025 expenditures, the proposed 2026 program budget, and the forecast budget through 2030. As Hydro cannot predict the quantity and the nature of failures to be addressed within this program for future years, Hydro has forecast future expenditures for this program based on the 2026 program budget with cost escalation applied.[4]

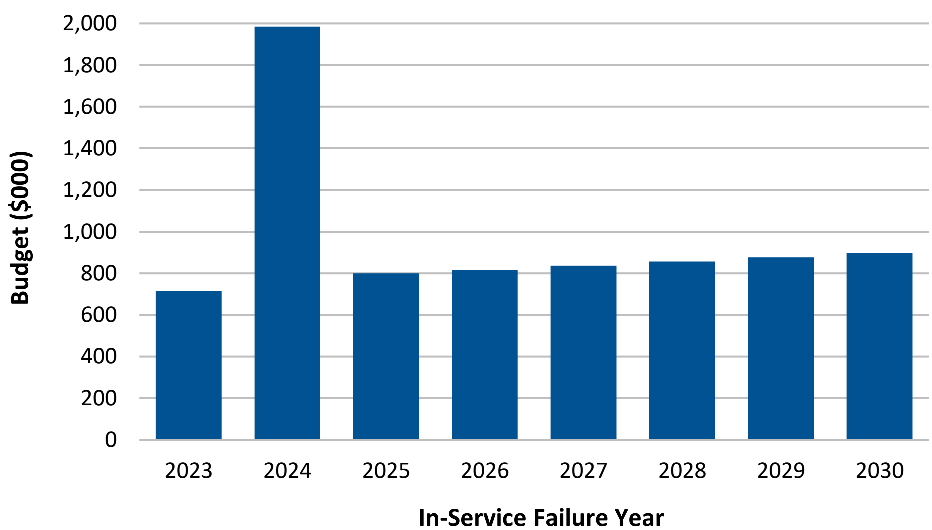

Chart 2: Historical and Forecast Program Budget

[4] As Hydro implemented the Diesel In-Service Failures Program in 2023, budgetary determinations based on historical information will be utilized beginning in the 2027 CBA, which may result in some variance from the current forecast values.

6.2 Program Schedule

Work schedules are established subsequent to an unplanned failure or incipient failure event. There are currently no planned capital spares acquisitions for 2026.

7.0 Conclusion

The Diesel In-Service Failures Program allows Hydro to undertake timely refurbishment and replacement work that is not included in its preventive maintenance program, supporting Hydro’s effort to maintain safe and reliable operations. This program will also allow Hydro to continue to proactively manage the pool of capital spare equipment to support diesel generation operations.

Program 19

Replace 48 V Battery Banks and Chargers

(2026–2027)

Contents

Replace 48 V Battery Banks and Chargers (2026–2027)

Location: Various

Investment Classification: General Plant

Asset Category: Telecontrol

Estimated Cost: $774,500

1.0 Introduction

Newfoundland and Labrador Hydro ("Hydro") uses Vdc[1] battery banks and battery chargers to power its communications equipment and ensure continuity of service in the event of a station service power loss. Hydro establishes battery bank and charger service life criteria based on performance, reliability, physical condition, and availability of support from the manufacturer.

The 2026–2027 replacement schedule consists of the replacement of seven 48 Vdc battery banks and five battery charger systems at seven Hydro sites.[2]

2.0 Program Description and Justification

This program is required for the continued reliable operation of the 48 Vdc power supply at operational sites, including generating plants, terminal stations, microwave repeater sites, and control structures. If the 48 Vdc batteries or chargers fail, reliable operation of the grid is at risk, as sufficient power may not be available at these sites for the Energy Control Center ("ECC") to maintain monitoring and control of the site. This can result in loss of generation, inability to open and close gates that maintain water levels in Hydro's reservoirs, the loss of administrative and operational communications services (voice and corporate data) which are critical to effective and safe outage restoration, as well as loss of teleprotection systems critical to timely clearing of faults on the system. An isolated terminal station or generation plant would likely need to be continually staffed in order to prevent extended customer outages until a temporary 48 Vdc power solution can be put in place.

[1] Volts of direct current ("Vdc").
[2] Sites include Blue Grass Hill Microwave/Repeater, Massey Drive Terminal Station, St. Anthony Airport Terminal Station, Bear Cove Terminal Station, Cat Arm Intake, Cat Arm Plant, and Sandy Brook Hill Microwave/Repeater.

3.0 Asset Overview

3.1 Asset Background

Hydro uses 48 Vdc battery banks and battery chargers at its operational sites to power its Supervisory Control and Data Acquisition ("SCADA"), teleprotection, administrative and operational voice and data systems, and networking equipment. In particular, Hydro's ECC uses SCADA for full-time remote monitoring and control of Hydro's provincial electrical grid. If this SCADA communication link is lost due to a 48 Vdc power system failure, the ECC's ability to monitor and control the grid is impeded and service reliability may be affected.

Hydro's 48 Vdc power systems generally contain flooded cell battery banks with a life expectancy of 20 years. Replacement is based on age as well as a combination of factors and results gathered through preventive maintenance routines, as follows:

- Remaining capacity (determined through discharge testing);
- Cell impedance (determined through annual testing); and
- Physical characteristics such as leaks, cracks, swelling, and evidence of electrolyte crystallization or deterioration of plate condition (determined through semi-annual inspections).

As the flooded cell battery banks approach the end of their service life, many cells show signs of deterioration, such as swelling and deformation around posts. Also common is fluid leakage around positive posts, as well as jar lid seals failing.

Hydro also has a small number of Valve Regulated Lead Acid ("VRLA") battery banks in service, accounting for less than 9% of its fleet. Hydro installs this technology by exception, and the life expectancy varies by manufacturer but is typically between seven to ten years. VRLA battery banks have reduced space, ventilation, and maintenance requirements, and are installed when one or more of these factors make flooded cell batteries unfeasible.

Battery chargers are tested as part of regular preventive maintenance routines to ensure they can meet the rated load requirements. The replacement of chargers is based on past failures of similar model chargers, physical condition, manufacturer support, availability of spares, and service age of greater than 20 years. The chargers proposed for replacement were manufacturer-discontinued in October 2010 and were maintained in service until the end of their recommended service life. The new chargers proposed will have the same functionality as those being replaced, but will use the latest technology and model from Hydro's standard charger manufacturer.

3.2 Asset Condition

Hydro plans its 48 Vdc battery bank and charger replacements based on age as well as a combination of factors and results gathered through preventative maintenance routines. The condition of all 48 Vdc battery banks and chargers is checked and recorded during scheduled preventative maintenance routines. If there are any signs of deteriorating condition, it is noted in the asset record and taken into consideration as replacements are planned. Signs of deteriorating condition may include:

- Decreasing capacity;
- Decreasing cell impedance; and
- Physical characteristics such as leaks, cracks, swelling, and evidence of electrolyte crystallization or deterioration of plate condition.

Of the seven sites identified, only two have been identified to have condition concerns. Individual 48 Vdc battery cells were replaced at the Blue Grass Hill Microwave/Repeater site in 2021 and 2022 due to cracks in the jars, thought to have been caused by the shifting of the battery rack due to the settling of the building. This 48 Vdc battery bank was also re-strapped with flexible leads in 2022 as further mitigation against possible building shifting. When cracks appeared again in 2023, more cells were replaced, and the cause was re-evaluated, leading to a suspicion that an ammonia-based cleaner was used on the jars during a building refurbishment project that chemically weakened the plastic of the cell jars.

Additionally, multiple cells of the St. Anthony Airport Terminal Station 48 Vdc battery bank were found to have cracks in lids, and some leakage around posts. There has been no other refurbishment work done on the 48 Vdc battery banks and chargers proposed for replacement.

3.3 Condition-Based Remaining Life

Hydro plans its 48 Vdc battery bank and charger replacements based on age, obsolescence, and condition results gathered through preventative maintenance routines, with replacement prioritization given to battery banks that meet the age and deteriorating condition criteria. All battery banks and chargers proposed for replacement under this program have reached the end of their useful life and no longer receive manufacturer support.

3.4 Asset Ages

The age of 48 Vdc battery banks and chargers managed under this program are shown in Chart 1 and Chart 2, respectively. Battery banks and charger systems may have different ages due to the 20-year expected operating lifespan of the batteries. Any assets with no record of their installation date are indicated as unknown in the charts.

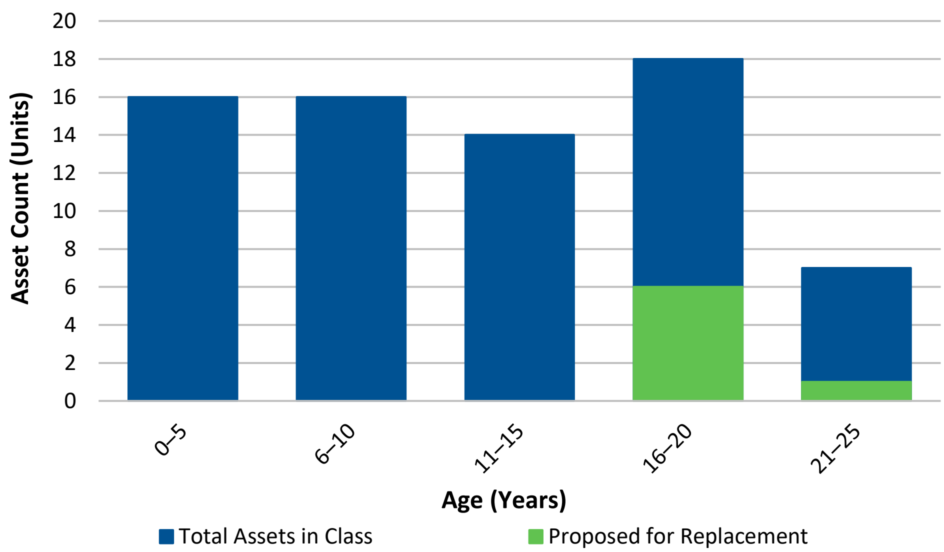

Chart 1: 48V Battery Bank Counts by Asset Age[3]

[3] Asset age data as of 2025.

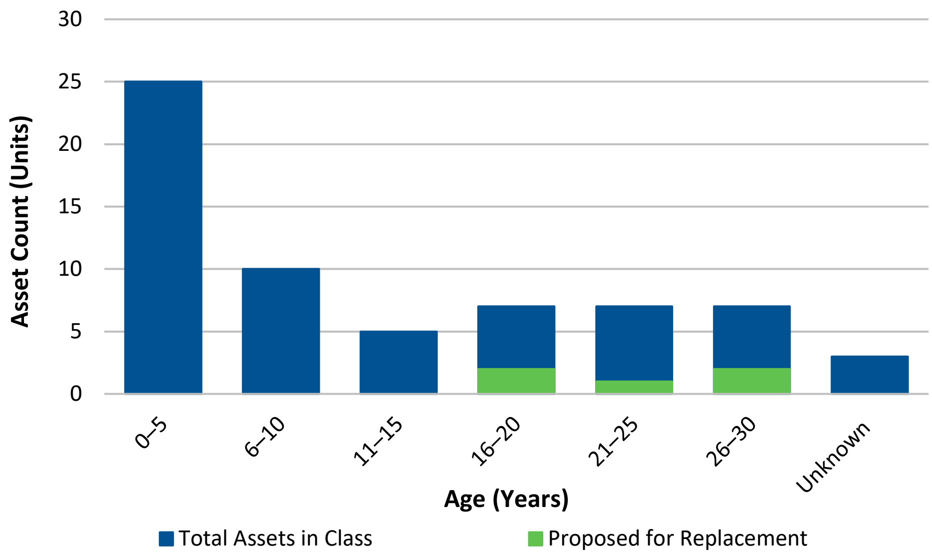

Chart 2: 48V Charger Counts by Asset Age

Unplanned replacement or refurbishment activities due to failure may be necessary at any time during the asset lifecycle.

4.0 Trending

Trending data for these assets is obtained during regular preventative maintenance routines. These records are also updated whenever the 48 Vdc battery banks and chargers are replaced at a given site.

4.1 Assets Installed/Replaced/Upgraded

Chart 3 and Chart 4 provide the historical, current, and forecast number of 48 Vdc battery banks and chargers, respectively, to be replaced. Due to the late delivery of battery banks, only one battery bank and one charger were installed in 2024. The other four battery banks and four chargers planned for 2024 were carried over for 2025 execution.

Beginning in 2026 as a result of increased equipment lead times, beginning in 2026, the work will be executed over two years instead of one, as was typically completed under the Replace Disconnects Program.

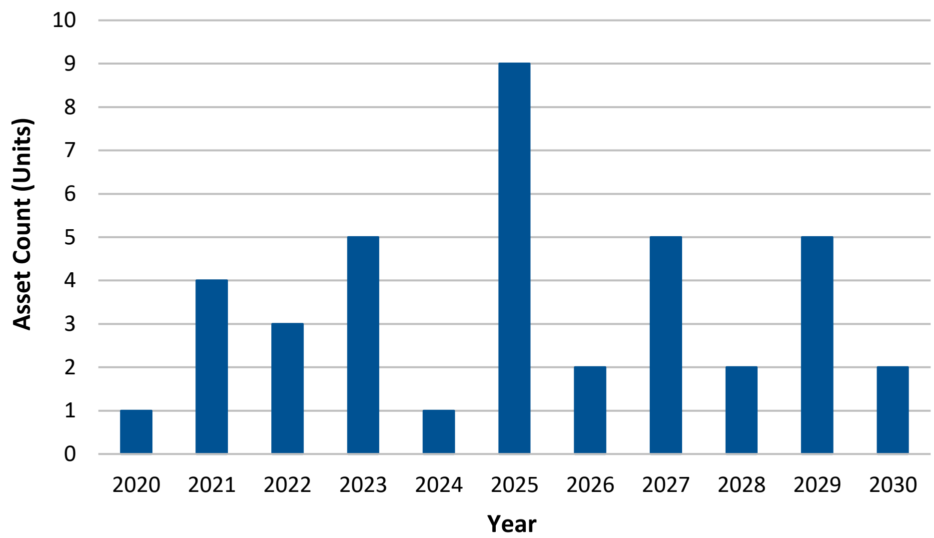

Chart 3: Historical and Forecast Number of 48 Vdc Battery Banks Replaced

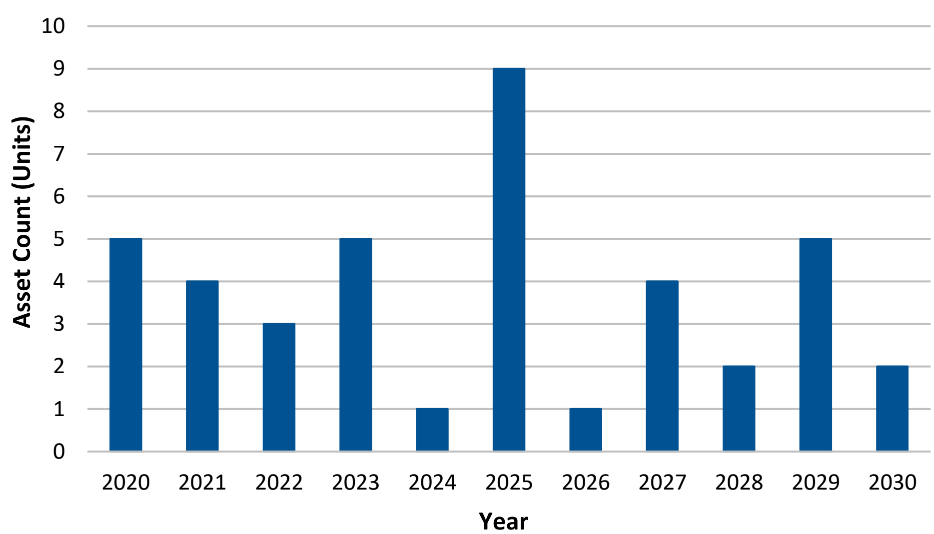

Chart 4: Historical and Forecast Number of 48 Vdc Battery Chargers Replaced

4.2 Historical and Forecast Average Unit Costs

Chart 5 and Chart 6 show the five-year historical, current and five-year forecast of the average unit cost of 48 Vdc battery bank and charger replacements, respectively.

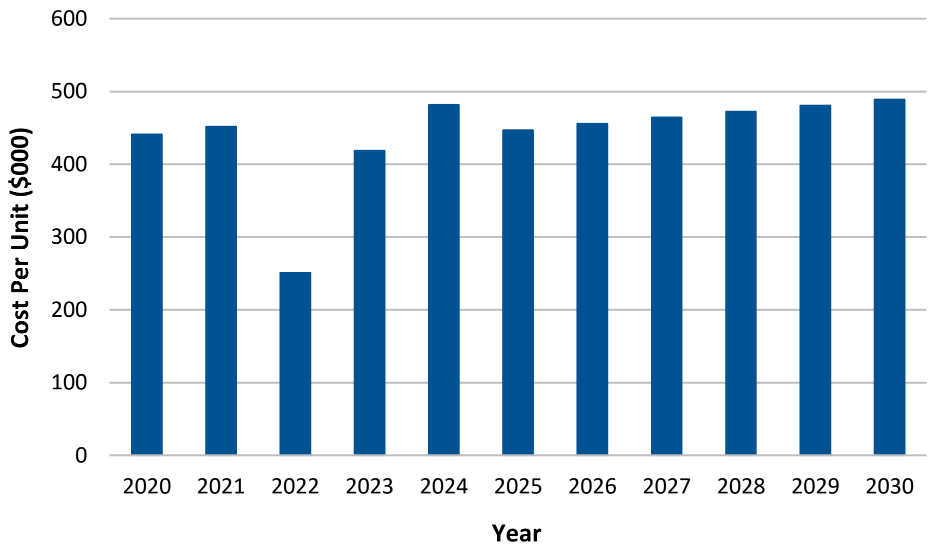

Chart 5: Historical and Forecast Average Unit Costs of 48 Vdc Battery Banks Replaced

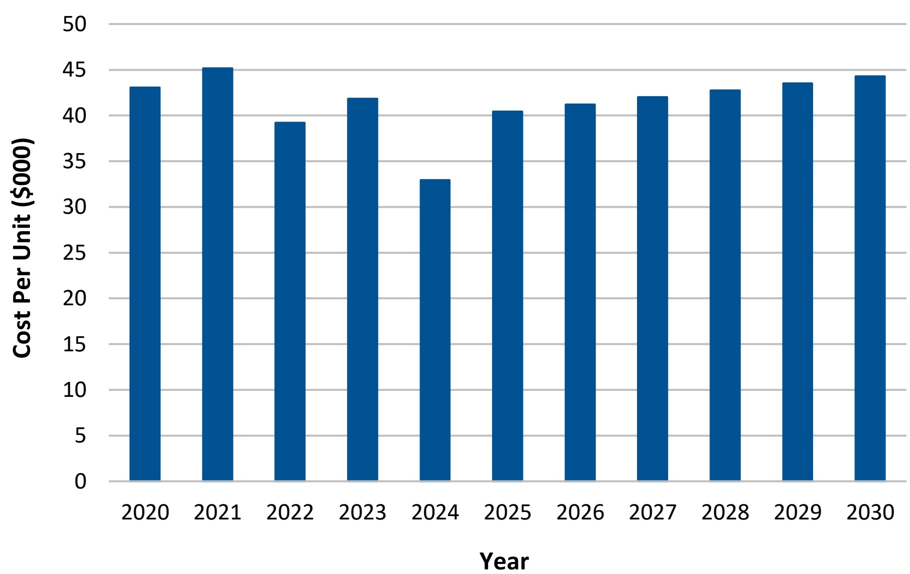

Chart 6: Historical and Forecast Average Unit Costs of 48 Vdc Battery Chargers Replaced

The overall cost per unit of battery banks and chargers is expected to continue to increase due to rising equipment and labour rates. Fluctuations in unit cost are related to external factors such as construction delays affecting installation expenses, and the use of different suppliers year to year.

Historical data from 2022 was not included in the five-year forecast of average unit costs; this year was considered an outlier due to scope requirements with lower unit costs. The replacements in 2022 were all at the same site, resulting in execution efficiencies that contributed to lower unit costs for that year.

The abnormality in unit cost in 2024 is due to only installing one battery bank and one charger in 2024 due to late delivery.

4.3 Historical Reliability

Hydro does not currently record outage statistics for its battery banks or chargers; therefore, historical reliability data for the assets covered within this program is not available.[4] Hydro can confirm that there have not been any instances over the past five years where 48 Vdc battery banks or battery chargers have contributed to forced outages.

5.0 Analysis

5.1 Evaluation of Alternatives

The following alternatives were considered:

- Pace reduction;
- Pace advancement;
- Continuation of program at current pace; and
- Individual cell replacement.

5.1.1 Pace Reduction

Reducing the pace of battery bank replacement would extend the in-service time of the flooded cell batteries past the manufacturer's design life, and in some cases, in spite of physical condition concerns.

[4] Per Hydro's response to request for information PUB-NLH-046 of the 2024 Capital Budget Application proceeding, Hydro follows the reporting guidelines outlined in Electricity Canada's "Transmission Component Forced Outages Equipment Reliability Information System" manual, which is also adhered to by other Canadian utilities. In line with these guidelines and industry norms, battery banks and chargers are not categorized as major components of transmission equipment.

Further, typical procurement lead times are three to four months for battery banks and two months for charger systems. Replacement would be required on an emergency basis with increased costs due to installation overtime and expedited shipments from suppliers. Extra costs would also be incurred for the purchase and installation of temporary banks or chargers to allow for continued operations while permanent equipment is procured and installed.

As such, pace reduction is not considered a viable alternative at this time.

5.1.2 Pace Advancement

Increasing the pace of battery bank replacement may allow Hydro to replace battery banks closer to the 20-year expected service life, rather than having some banks exceed 20 years before replacement. Advancement would not significantly increase reliability since Hydro prioritizes replacements based on a combination of age and condition. If a battery bank is found to be in deteriorated condition, it will move ahead of other battery banks of similar age that have no condition concerns.

The current pace of battery bank and charger replacements has been found to be manageable from a resource allocation perspective. Advancing the pace of replacements would also increase resource requirements and ultimately may not be achievable within the schedule constraints.

Finally, increasing the pace of advancement may lead to premature asset replacement in certain years. As such, pace advancement is not considered a viable alternative at this time.

5.1.3 Continuation of Program at Current Pace

Under this option, Hydro would continue its replacement frequency for 48 Vdc battery banks and battery chargers per year in order to replace all banks at or near the 20-year service life mark. Replacements would be planned based on a combination of age and condition, with resource availability taken into consideration in order to spread the workload across work crews located in different regions. With the planned implementation now over two years, Hydro anticipates increased execution success in future years by having disconnects available for outages earlier in a given year.

5.1.4 Individual Cell Replacement

Hydro has considered single cell replacements to extend the life of the bank; however, IEEE 450-2002[5] Standard indicates that replacement of individual cells is not recommended for a battery bank at or near the end of life due to the incompatibility of the operating characteristics of individual cells. Hydro reviews available battery and charger technology alternatives, and will consider new technologies as they are proven reliable.

5.2 Least-Cost Evaluation

Hydro has not identified any viable alternatives to facilitate a least-cost evaluation.

5.3 Recommended Alternative

Hydro recommends continuation of its replacement frequency for 48 Vdc battery banks and battery chargers, with the 2026–2027 replacement schedule consisting of seven 48 Vdc battery banks and five battery charger systems. This frequency is required to minimize the potential of communications outages at the affected operational sites and additional costs associated with emergency replacements. Under this alternative, the battery banks and chargers would be replaced based on age and condition, following Hydro's established practices, which support the continuation of reliable service, consistent with least-cost and environmental responsibility. This alternative provides sufficient time to ensure the least-cost procurement and installation.

5.3.1 Risk of Asset Stranding

The 48 Vdc battery and charger systems will be required for the service life of the sites in which they are installed. It is expected that the seven sites within the scope of this program will remain in service well beyond the battery banks and chargers replaced in this program; therefore, the risk of asset stranding is low.

5.3.2 Risk Mitigation

Hydro assessed the pre- and post-implementation risk of the scope of work for the 2026–2027 program in accordance with Hydro's Capital Risk Assessment process, as outlined in Section 7.0 of Schedule 1. The outcome of this assessment is provided in Table 1.

[5] IEEE 450-2002, *Recommended Practice for Maintenance, Testing, and Replacement of Vented Lead-Acid Batteries for Stationary Applications.*

Table 1: Risk Scoring Pre- and Post-Implementation

	Impact	Likelihood	Score
Pre-Implementation	4	4	**16**
Post-Implementation	4	1	**4**
		Risk Mitigated	**12**
		Risk Mitigated per $1 Million	**15.5**

6.0 Scope of Work

This scope of work consists of the replacement of seven 48 Vdc battery banks and five 48 Vdc battery chargers.

The program will require engineering design, specification, and tendering of the 48 Vdc battery banks as well as engineering design and specification of the 48 Vdc chargers. The chargers will be purchased directly in accordance with Hydro's standard for chargers.

Construction will be completed using internal resources and will involve the removal and recycling of existing battery banks and chargers, as well as the installation and commissioning of the new battery banks and chargers.

6.1 Program Budget

The estimate for this two-year program is included in Table 2.

Table 2: Program Estimate ($000)[6]

Program Cost	2026	2027	Beyond	Total
Material Supply	75.2	203.3	0.0	**278.5**
Labour	110.5	210.4	0.0	**320.9**
Consultant	29.3	25.8	0.0	**55.1**
Contract Work	0.0	0.0	0.0	**0.0**
Other Direct Costs	14.7	31.5	0.0	**46.2**
Interest and Escalation	5.4	20.4	0.0	**25.8**
Contingency	14.9	33.0	0.0	**47.9**
Total	**250.1**	**524.4**	**0.0**	**774.5**

[6] Numbers may not add due to rounding.

Chart 7 provides the five-year historical program expenditures, the forecast 2025 expenditures, the proposed 2026 program budget, and forecast costs through 2030.

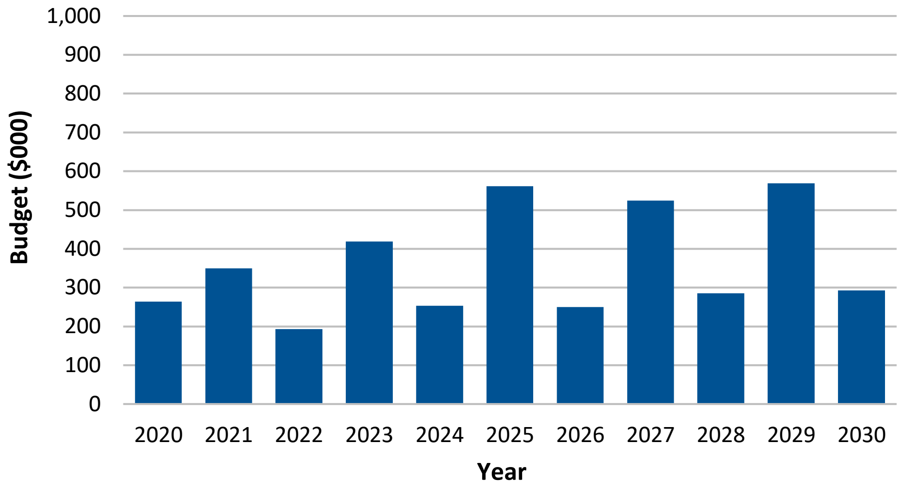

Chart 7: Historical and Forecast Program Budget

6.2 Program Schedule

The schedule for the 2026–2027 program is shown Table 3.

Table 3: Program Schedule

Activity	Start Date	End Date
Planning:		
Prepare project plan.	January 2026	February 2026
Project site visits – 2026 sites.	May 2026	June 2026
Project site visits – 2027 sites.	May 2027	July 2027
Design:		
Prepare battery banks and charger specifications.	January 2026	February 2026
Prepare battery banks and charger work packages.	May 2026	June 2026
Procurement:		
Issue purchase orders for battery banks and chargers.	April 2026	May 2026
Construction:		
2026 battery bank and charger installs.	July 2026	August 2026
2027 battery bank and charger Installs.	June 2027	September 2027
Commissioning:		
Place 2026 battery banks and chargers in service.	July 2026	August 2026
Place 2027 battery banks and chargers in service.	June 2027	September 2027
Closeout:		
Project closeout.	November 2027	December 2027

7.0 Conclusion

This program is required to replace 48 Vdc battery banks and chargers before failure to ensure service reliability. These systems are critical for the continuity of remote communications to sites in the event of a station service power loss. Loss of communications to sites can result in loss of monitoring and control, loss of teleprotection, and loss of administrative voice and data communications. This can lead to extended and more widespread customer outages as well as damage to equipment. Systems will be proposed for replacement based on performance issues, indicating reaching the end of useful, reliability, and physical condition criteria, as well as availability of support from the manufacturer.