WHENEVER. WHEREVER.
We'll be there.

NEWFOUNDLAND POWER
A FORTIS COMPANY

DELIVERED BY HAND

July 13, 2018

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

Attention: G. Cheryl Blundon
Director of Corporate Services
and Board Secretary

Ladies & Gentlemen:

Re: Approval of Capital Expenditures Supplemental to Newfoundland Power Inc.'s (the "Company") 2018 Capital Budget Application – Duffy Place Roof Replacement

Introductory

Please find enclosed the original and ten (10) copies of an application (the "Application") for approval of capital expenditures supplemental to the Company's approved 2018 Capital Budget Application.

The Company's Duffy Place facility ("the Facility") was constructed in 1988 and is located at 50 Duffy Place in St. John's. It is the primary operations facility for St. John's region and consists of a main building and a service building. The Facility houses line crews, line inspectors, regional engineering, meter reading and associated support management and staff. Corporate functions such as the stores warehouse, metering, customer service, information services, the production centre, maintenance, transportation and dispatch are also located at the Facility.

Duffy Place Roof Condition Assessment

All roofs are original to the Facility's 1988 construction. The Facility is covered by two types of roofing. The main building consists of (i) a built-up roof and (ii) a metal roof. The service building is covered by a metal roof. The estimated service life of the upper and lower level built-up roofs is 20-25 years. These roofs are approaching 30 years old and have reached the end of their useful service lives.

In late 2017, the Facility's built-up roofs experienced a number of leaks in multiple locations. As a result of the amount of water infiltration that was occurring, the Company undertook a number of repairs during the fall of 2017 and winter 2018. The repairs were largely unsuccessful due to the age and condition of the built-up roofs and the environmental conditions that existed at the time the repairs were required.

Newfoundland Power Inc.
55 Kenmount Road • P.O. Box 8910 • St. John's, NL A1B 3P6
PHONE (709) 737-5364 • FAX (709) 737-2974 • **khopkins@newfoundlandpower.com**

Due to persistent leaks and the age and condition of the Facility's upper and lower level built-up roofs, Newfoundland Power retained Morrison Hershfield to conduct a roof assessment. The assessment found that Facility's built-up roofs are at the end of their useful service life as the roof is no longer functioning as intended. The assessment recommends replacement of the upper and lower level built-up roofs. The Company estimates the total required capital expenditures to be approximately $900,000. A report detailing the replacement of the Facility's built-up roofs is included as Schedule A to the Application.

The Application Filing

Schedule A to the Application is a report titled *Duffy Place Roof Replacement* which provides additional details on the requirement to replace the built-up roofs at Duffy Place.

Schedule B provides a formal project description and details on project expenditures.

The Application is filed in accordance with the revised Capital Budget Application Guidelines issued in October 2007 (the "Guidelines"), in particular, part *B.1. Application for Approval of Supplemental Capital Expenditures*. The Guidelines provide for approval of a supplemental capital expenditure where a utility determines that a capital expenditure that was not anticipated and included in the annual capital budget is necessary in the year and should not be delayed until the following year.

This project was originally intended to be completed in 2019 and be included in Newfoundland Power's 2019 Capital Budget Application. However, given the occurrence and severity of leaks in the Facility's upper and lower level built-up roofs during the 2017-2018 winter season, the Company determined that completing this work in 2018 is necessary.

Concluding

A draft of the Order requested is enclosed for the Board's convenience. If there are any questions in relation to this matter, please contact the undersigned at the direct number noted below.

Yours very truly,

Kelly C. Hopkins
Corporate Counsel

Enclosure

c. Geoffrey Young
Newfoundland and Labrador Hydro

Dennis Browne, QC
Browne Fitzgerald Morgan & Avis

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IN THE MATTER OF the *Public Utilities Act*, (the "Act"); and

IN THE MATTER OF an Application by Newfoundland Power Inc. (the "Applicant") for approval to proceed with the construction and purchase of certain improvements and additions to its property pursuant to Section 41(3) of the Act.

TO: The Board of Commissioners of Public Utilities (the "Board")

THE APPLICATION OF Newfoundland Power Inc. (the "Applicant") **SAYS THAT:**

A. Introduction

1. The Applicant is a corporation duly organized and existing under the laws of the Province of Newfoundland and Labrador, is a public utility within the meaning of the Act, and is subject to the provisions of the *Electrical Power Control Act, 1994.*

2. The Applicant operates transmission lines, distribution lines, substations and other facilities to provide service to customers throughout its service territory on the island portion of the Province of Newfoundland and Labrador.

3. The Application proposes total 2018 capital expenditures of $900,000 as summarized in Schedule B.

4. The Applicant's Duffy Place facility (the "Facility") is located at 50 Duffy Place in St. John's. It is the primary operations facility for St. John's region and houses line crews, line inspectors, work dispatchers, regional engineering, meter reading and associated support management and staff. Corporate functions such as the stores warehouse, metering, customer service, information services, the production centre, maintenance, transportation and dispatch are also located at the Facility.

B. Duffy Place Roof Replacement

5. The Facility consists of a main building and a service building. All roofs are original to the Facility's 1988 construction. The Facility is covered by two types of roofing. The main building consists of (i) a built-up roof and (ii) a metal roof. The service building is covered by a metal roof. The estimated service life of the upper and lower level built-up roofs is 20-25 years. The existing roofs are approaching 30 years old and have reached the end of their useful service life.

6. In the fall of 2017, the Facility's built-up roofs experienced a number of leaks in multiple locations. As a result of the amount of water infiltration that was occurring, the

Company undertook a number of repairs during the fall of 2017 and winter of 2018. Since the repairs, the Company's built-up roofs continue to experience leaks.

7. Due to persistent leaks and the age and condition of the Facility's upper and lower level built-up roofs, Newfoundland Power retained Morrison Hershfield to conduct a roof assessment. Morrison Hershfield's roof assessment found that the built-up roof is no longer functioning as intended. The assessment recommends replacement of the Facility's built-up roofs. The estimated cost of replacing the built-up roofs is $900,000. Schedule B contains a formal description of the project.

8. Schedule A to this Application is a report titled *Duffy Place Roof Replacement* which provides a detailed assessment of the results of an engineering assessment which determined that replacement of the roof is required within the next year and provides estimates of the expenditures necessary to return the facility to a safe condition.

C. Justification and Relief Requested

9. The Applicant submits that the proposed expenditures for 2018, as described in paragraphs 7 and 8 hereof, are necessary to provide service and facilities that are reasonably safe and adequate, all as required pursuant to Section 41 of the Act.

10. Communications with respect to this Application should be sent to Kelly C. Hopkins, Counsel for the Applicant.

11. **THE APPLICANT REQUESTS** that the Board approve:

    (i) pursuant to Section 41 (3) of the Act, the capital expenditures associated with the purchase and construction of the improvements and additions to the Applicant's property as set out in this Application.

DATED at St. John's, Newfoundland and Labrador, this 13th day of July, 2018.

NEWFOUNDLAND POWER INC.

Kelly C. Hopkins
Counsel for the Applicant
Newfoundland Power Inc.
P.O. Box 8910
55 Kenmount Road
St. John's, NL A1B 3P6

Telephone: (709) 737-5364
Telecopier: (709) 737-2974

IN THE MATTER OF the *Public Utilities Act,* (the "Act"); and

IN THE MATTER OF an Application by Newfoundland Power Inc. (the "Applicant") for approval to proceed with the construction and purchase of certain improvements and additions to its property pursuant to Section 41(3) of the Act.

AFFIDAVIT

I, Gary Murray, of St. John's in the Province of Newfoundland and Labrador, make oath and say as follows:

1. That I am Vice-President, Customer Operations and Engineering of Newfoundland Power Inc.
2. To the best of my knowledge, information and belief, all matters, facts and things set out in this Application are true.

SWORN to before me at St. John's
in the Province of Newfoundland and
Labrador this 13th day of July, 2018:

Barrister

Gary Murray

Duffy Place Roof Replacement

July 2018

Prepared by:
Sheldon Baikie, B.Eng.

Approved by:
Monty Hunter, P.Eng.

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Appendix A: Morrison Hershfield Assessment Report

1.0 Introduction

The Duffy Place building (the "Facility") is Newfoundland Power's (the "Company") primary operations facility for St. John's Region (the "Region").[1] The Region serves approximately 112,000 customers on the Northeast Avalon. This represents approximately 42% of all Newfoundland Power customers.

The Facility houses the employees and equipment necessary to support operations throughout the Region.[2] This includes line crews, line inspectors, regional engineering, meter reading and associated support staff. In addition, the Facility houses corporate functions such as stores warehouse, metering, customer service, information services, the production center, maintenance, transportation and dispatch.

The Facility includes a main building and a service building. All roofs are original to the Facility's 1988 construction. The Facility has reached an age where capital improvements are necessary to maintain the integrity of the Facility and ensure it continues to support the Company's operations. This project includes $900,000 in estimated capital expenditures associated with the replacement of the Facility's deteriorated roof.

2.0 Facility Description

The Facility is covered by two types of roofing. The main building consists of a (i) built-up roof and (ii) a metal roof.[3] The service building is covered by a metal roof.

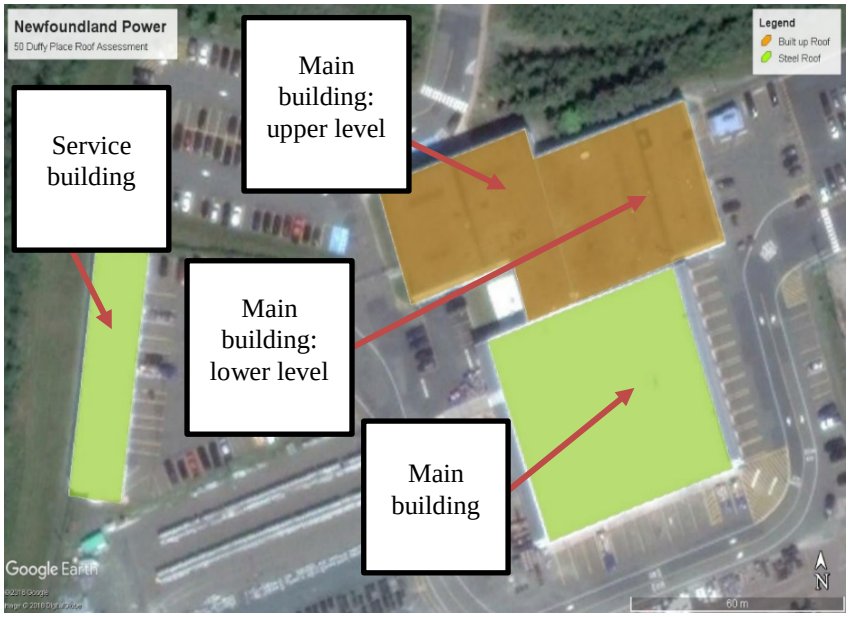

Figure 1 – Duffy Place Regional Building

Built-up Roof Construction

The office space on the north side of the main building is covered by a dual level roof. The upper level roof is approximately 1,455 m^2 and covers the customer contact center, meeting spaces and various office space. The lower level roof is approximately 1,576 m^2 and covers training rooms, the meter shop, the telecommunications shop, the backup control center and the production center.

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1 The Facility is located on 6 hectares of property and measures approximately 8,400 m^2.

2 The Region's service territory extends from Cappahayden in the south, to Cape St. Francis in the north, and from Cape Spear in the East to Holyrood in the west. Approximately 200 employees work from the Facility.

3 Generally, built-up roofing systems, or tar and gravel roofing systems, are composed of alternating layers of bitumen and reinforcing fabrics that create a water resistant membrane.

Metal Roof Construction

The warehouse and service building are covered with metal roof assemblies. The warehouse roof measures 3,150 m^2 and covers the indoor loading ramps and stores area. The roof is attached by metal fasteners affixed to metal stringers. The service building roof measures 800 m^2 and is similar in construction to the warehouse.

3.0 Roof Condition Assessment

In late 2017, the Facility's built-up roofs experienced a number of leaks in multiple locations. As a result of the amount of water infiltration that was occurring, the Company undertook a number of repairs in the fall of 2017 and winter of 2018.[4] The repairs were largely unsuccessful due to the age and condition of the built-up roofs and the environmental conditions that existed at the time the repairs were required. Locations where leaks persist are described below.

Upper Level Leaks

Field Service Representative Room

This area is located under the upper level built-up roof and includes a meeting space and workstations. The Company attempted to repair leaks in this area by improving drainage and patching 42 m^2 of surrounding roof. The Field Service Representative Room continues to experience leaks in this area.

Figure 2 – Field Service Representative Room

[4] Completing roof repairs in the late fall and winter seasons poses a number of challenges. For example, snow and ice accumulation on the roof must be removed and melted to access areas where leaks have occurred. Furthermore, dry conditions are required and sufficient heat must be applied to roofing materials to ensure a watertight repair is completed. These conditions are difficult to achieve in the winter season.

Customer Contact Center

This area is located under the upper level built-up roof and leaks have occurred directly above a number of workstations used by customer service representatives. The Company attempted to repair leaks in this area by improving drainage. The Customer Contact Center continues to experience leaks in this area.

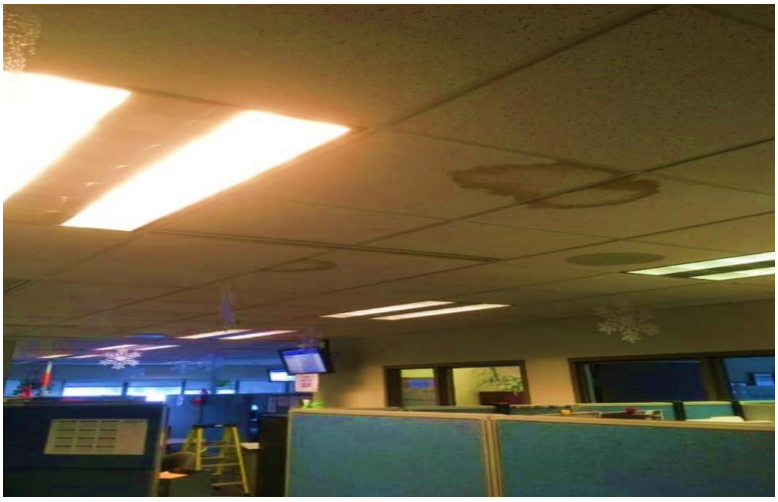

Figure 3 – Customer Contact Centre

Lower Level Leaks

Meter Shop Office Space

This area is located under the lower level built-up roof and leaks have occurred directly above a number of workstations used by meter technicians. The Company attempted to repair leaks in this area by improving drainage and replacing an expansion joint.[5] The Meter Shop office space continues to experience leaks in this area.

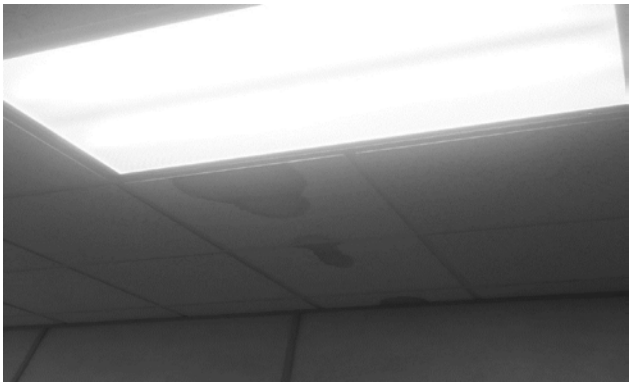

Figure 4 – Meter Shop Office Space

[5] A roof expansion joint is a flexible closure used to minimize the effects of building movement or stress on a roof system.

Powerline Technician (PLT) Training Room and Storm Room

These areas are in adjacent rooms under the lower level built-up roof. The PLT Training Room is used for training and meetings. The Storm Room is critical for emergency operations during major outages. The Company attempted to repair leaks in these areas by improving drainage and completing patching work. Both rooms continue to experience leaks in these areas.

Figure 5 – PLT Training Room

Figure 6 – Storm Room

Telecommunications Shop

This area is located under the lower level built-up roof and houses sensitive technology and spare equipment. The Company attempted to repair leaks in these areas by improving drainage and installing new roof material around the perimeter of the roof in that area. The Telecommunications Shop continues to experience leaks in this area.

Figure 7 – Telecommunications Shop

Assessment

Due to persistent leaks and the age and condition of the Facility's upper and lower level built-up roofs, Newfoundland Power retained Morrison Hershfield to conduct a roof assessment (the "Roof Assessment"). The Roof Assessment is provided in Appendix A.

The Roof Assessment found that the Facility's built-up roof is at the end of its useful service life, as it is no longer functioning as intended due to the numerous deficiencies observed.[6] The Roof Assessment concluded that an annual maintenance strategy would not provide the same level of water infiltration mitigation and would cost significantly more than the value of the roof. The Roof Assessment recommends replacement of the Facility's built-up roof.

[6] Deficiencies observed by Morrison Hershfield included bitumen/asphalt blisters, vegetative/moss growth visible throughout both levels of the built-up roof area and exposed areas of modified bitumen base sheet.

4.0 Project Proposal

4.1 Project Description

This project involves the replacement of the Facility's upper and lower level built-up roofs. This includes removal of the existing roofing membranes, gravel surfacing and insulation. The new roof will be engineered in accordance with CSA standards. The scope of work also includes reconstruction of parapet walls, roof dividers and mechanical curbs, as well as installation of new roof drains, scuppers, vent stacks and roof anchors in accordance with the National Building Code of Canada 2010 and the Canadian Roofing Contractors Association ("CRCA").[7]

4.2 Project Cost

The total project cost for the replacement of the Facility's upper and lower level built-up roofs is estimated to be $900,000. Table 1 shows the cost breakdown.

Table 1
Project Cost
($000s)

Cost Category	Cost
Material	808
Labour - Internal	7
Engineering	53
Other	32
Total	**900**

4.3 Project Schedule

Activities associated with the replacement of the Facility's upper and lower level built-up roofs will commence immediately following Board approval and will be completed within approximately 3 months.

The weather conditions present in the summer and early fall months are optimal for building construction, including roof replacement work. Undertaking roof replacement work beyond this time of year increases the risks associated with construction quality. In addition, due to generally poorer weather conditions, construction time and cost would likely increase.

[7] See the Roof Assessment, page 5.

5.0 Conclusion

The Facility's upper and lower level built-up roofs are approaching 30 years old and have reached the end of their useful service life. In 2018, capital improvements are necessary to maintain the integrity of the Facility. Deferral of the project to 2019 could result in further deterioration of the Facility. In addition, persistent leaks could potentially disrupt the Company's regional operations and corporate functions such as metering, customer service, information services, the production center and dispatch.

Appendix A
Morrison Hershfield Assessment Report

MORRISON HERSHFIELD

May 15, 2018 MH Ref. No.: 1802893.00

Monty Hunter, P.Eng.
Newfoundland Power
55 Kenmount Road
St. John's, NL
A1B 3P6 via email: mhunter@newfoundlandpower.com

Dear Mr. Hunter:

Re: Roof Assessment - Newfoundland Power, 50 Duffy Place, St. John's, NL

Morrison Hershfield Limited (Morrison Hershfield) was retained by Newfoundland Power Inc. (NP) to provide engineering consulting services in regards to a roof assessment at their facility located at 50 Duffy Place in St. John's, NL. The scope of our services was provided in our proposal dated March 28, 2018 with "Authorization to Proceed" received via signed Standing Agreement #15-001Q dated April 10, 2018.

BACKGROUND

There are two buildings associated with the NP facility located at 50 Duffy Place; the Main Building and the Service Building (Figure 1). The Main Building is comprised of two roofing assemblies; a flat built-up roofing (BUR) over two levels and a pitched metal roof. The Service Building has a pitched metal roof only. All roofs are known to be original to the building's construction (1988). We understand there has been on-going water infiltration associated with the various roofing assemblies on both buildings with the BUR being the most severe (Figure 2). Recent repairs (i.e., roof patches with modified bitumen roofing membrane and drain replacement) have been made to the BUR in an attempt to stop the persistent leaks but mostly unsuccessful.

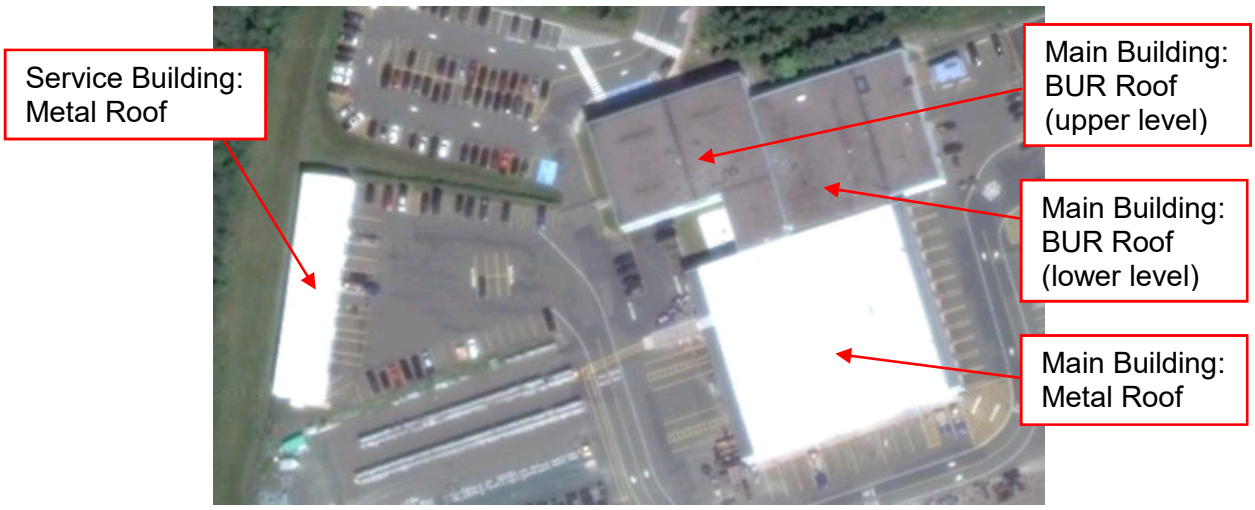

Figure 1 – Aerial site plan of 50 Duffy Place (courtesy of Google Maps)

Figure 2 – Examples of typical water infiltration

NP requested MH to assist with a condition assessment of the existing roof assemblies, to identify the cause of the leaks as well as provide short and long term remediation solutions. This report summarizes our investigation to date.

OBSERVATIONS

On April 13, 2018, David Noel, P.Eng. of Morrison Hershfield conducted a roof assessment of both the Main Building and the Service Building. Access was provided by NP. During our visit, cut tests were conducted through the BUR assembly by J&T Construction retained by NP. No exploratory openings were conducted through the metal roofing. Our observations are as follows (Note: all referenced photographs are contained in Appendix A of this report):

Main Building – BUR

- In general, the condition of the build-up roof membrane was unable to be reviewed due to the presence to gravel surfacing (Photographs 1 to 4). However indicators such as, bitumen / asphalt blisters (i.e., “blueberry” blisters) and vegetative / moss growth were visible throughout the roof area (both levels). These are suggestive to potential roofing problems such as prolonged moisture exposure and weathering of the membrane.

- Unsuccessful attempts to stop the roof leaks were made. We reviewed the previously “repaired” areas associated with existing mechanical penetrations, roof dividers and roof drains (Photographs 5 to 8). In general, the repair consisted of a granulated modified bitumen roof membrane applied directly over the existing BUR (with the gravel surfacing removed). Existing roof drains were left in place and retrofit drains installed. In general the repairs were found to be ineffective with the following additional observations:

    - Exposed areas of modified bitumen base sheet.

  - Unbonded seams due to insufficient heat applied during installation.
  - Additional areas at cap sheet overlaps where the underlying sheet was not degranulated prior to installation.
  - Poor installation detailing at curb corners.

- Existing junctions between the roof dividers and the roof edge / parapet were originally poorly constructed as the height of both the roof divider and parapet were insufficient resulting in a poorly executed parapet cap flashing (Photograph 11). Repairs to the BUR membrane over the roof divider exhibited similar poor construction installation practices (as noted above) with unbonded seams, etc. (Photograph 12).

- Two (2) exploratory roof openings were conducted through the BUR assembly to expose the metal roof deck (Photographs 13 and 14). One opening was conducted on each level of the roof. It was noted that the insulation of the upper BUR roof assembly was wet.

- Typical roof BUR assembly consisted of the following:

  - 4-ply built-up roofing felts with gravel surfacing
  - 4" (100mm) fibreboard insulation
  - Roofing Felt
  - 1-1/2" (38mm) fibreboard insulation
  - Metal deck

<u>Main Building – Metal Roof</u>

- The metal roof on the Main Building is a pitched standing-seam metal roof and is in fair condition. The standing seams are approximately 2" (50mm) high and spaced approximately 16" (400mm) on-center with a single crimp spaced approximately 20" (500mm) along the length of the seam (Photographs 15 and 16).

- In general, the surface / finishing of the metal panels is in fair to poor condition (Photographs 17 and 18). While no major deficiencies was observed that would effect performance, the general surface of the metal roof is "peppered" with numerous scratches, rust spots, etc. Previous repairs have been made at localized areas which included the application of a liquid-applied membrane in the field of the roof as well as at splice details (i.e., sheet overlaps) and at exposed fasteners.

- Another "modification" was made along the eave / lower edge of the roof (both sides). Strips of modified bitumen roofing membrane has been installed between standing seams (Photograph 19). According to NP this was done to prevent ice sliding off the roof. Several areas also have a liquid-applied membrane installed around the leading edge of the membrane.

Service Building – Metal Roof

- In general, the condition and construction of the metal roof on the Service Building was similar to the Main Building (Photographs 20 to 23). In general, the surface / finishing of the metal panels is in fair to poor condition. While no major deficiencies was observed that would affect performance, the general surface of the metal roof is "peppered" with numerous scratches, rust spots, etc. Previous repairs have been made at localized areas which included the application of a liquid-applied membrane in the field of the roof as well as at splice details (i.e., sheet overlaps) and at exposed fasteners (Photograph 24).

DISCUSSION

Built-up Roofing

A typical BUR would have a life expectancy of approximately 20 to 25 years (current roof is approximately 30 years old). Based on our findings from the field investigation program, the BUR is at the end of its useful service life as the roof is no longer functioning as intended due to the numerous deficiencies observed (i.e. scouring, debonded membrane, wet insulation, blisters, water infiltration, etc.). Attempts have been made to increase the roof's life with "patches" over localized areas. However these attempts appear to be ineffective as water infiltration continues to persist.

Metal Roofs (Both Buildings)

A typical metal roof would have a life expectancy of approximately 30 to 40 years (current roofs are approximately 30 years old). Based on our findings from the field investigation program, the existing metal roof (on both buildings) still have some useful service life remaining; approximately 5-10 years if not longer depending on the amount maintenance / remedial work conducted. Previous attempts have been made to increase the roof's life with the use of a liquid-applied "sealing" membrane over localized areas, seams, fasteners, etc. This is a typical approach for extending the service life of a metal roof.

Due to the type of roof construction, it is difficult to pinpoint the exact location of water infiltration. Once water is able to infiltrate past the metal panels through deficiencies observed, the water will percolate through the insulation and travel along the vapour barrier. The water will continue to travel until a low point is found where the water will pool until eventually the vapour barrier fails under the weight of the water. In some instances the location of the vapour barrier failure is likely some distance away from the actual water infiltration location.

Failures in low slope metal roofs are typically a consequence of one or both of the following:

1) Defects in the various joints and junctions in the metal panels which were either the consequence of deficiencies existing from original construction or openings caused by thermal expansion, corrosion, or fatigue.

2) Perforations due to corrosion of the steel panels, including at the joints, overlaps or in the general field of the panel.

Even small defects can result in considerable amounts of water infiltration during a significant period of precipitation or snow melt due to the large spans and corresponding runoff areas.

RECOMMENDATIONS

Built-up Roofing

Given the frequency and extent of water infiltration being observed, significant repairs to the built-up roofing are required in order to improve the water management control features. As such, in order to mitigate the water infiltration problems it is our opinion that some level of repair or intervention is required to be implemented over the entire roof area. Accordingly, a "do nothing" approach is not a feasible option and therefore will not be presented in this letter report. Similarly, an annual maintenance strategy would not provide the same level of water infiltration mitigation and would cost significantly more that the value of the roof. Replacement of the BUR assembly is the only option that can be reasonably be considered.

OPTION #1 – BUR Replacement

Conceptually the work would include the removal of the existing roofing membranes, gravel surfacing and insulation to expose the existing metal deck and installation of a new roof assembly. We recommend the installation of the following roof assembly:

- 2 ply modified bitumen roofing membrane
- Cover Board (mechanically fastened)
- R30* (minimum) rigid insulation
- Torch-applied vapour barrier
- Thermal Barrier (mechanically fastened)
- Existing Metal Deck

* In accordance with the National Energy Code of Canada for Buildings 2011.

The new roof should be engineered / designed to withstand appropriate wind uplift forces in accordance with CAN/CSA-A123.21-14. It is assumed that the existing building roof structure is sloped. If not, tapered insulation will be required. In addition, we recommend reconstruction of parapet walls, roof dividers and mechanical curbs, as well as installation of new roof drains, scuppers, vent stacks and roof anchors (if required) in accordance with National Building Code of Canada 2010 and the Canadian Roofing Contractors Association (CRCA).

Metal Roofs (Both Buildings)

Given the frequency and extent of water infiltration being observed, repairs to the roof are required in order to possibility improve the water management control features. As such, in order to mitigate the water infiltration problems it is our opinion that some level of repair or intervention is required to be implemented over the entire roof area. Accordingly, a "do nothing" approach is not a feasible option and therefore will not be presented in this letter report. In addition, it is estimated that the existing roofs still have remaining service life remaining, therefore a full replacement of the metal roofing assemblies is also not a feasible option at this time and will not be presented

further in this report. The following outlines the options that could be reasonably considered in order to extend the service life of the roof:

OPTION #1 – Localized Repairs (Annual Maintenance)

Conceptually this option would include annual maintenance over the entire roof area. The option would be a similar approach to recent repair attempts with a focus on proper treatment for panel joints/seams, fasteners, penetrations, etc. The success of such a treatment is dependent on the metal panels providing a clean and sound substrate for application of the coating. Areas of surface corrosion, as well as previously "sealed' areas, would need to be appropriately cleaned and treated prior to the application of the coating to ensure adequate bond and performance of the coating.

OPTION #2 – New Elastomeric Roof Coating

Conceptually this option would include; the installation of a new elastomeric roof coating over the entire existing metal roof. The option would be a similar approach to recent repair attempts (but over the entire surface providing a uniform aesthetic appearance); it is recommended to consult with coating manufacturers to ensure the correct product is used and to obtain a manufacturer's warranty. It is also recommended proper treatment for all panel joints prior to the application of the coating. The success of such a treatment is dependent on the metal panels providing a clean and sound substrate for application of the coating, as well as existing attachment of the panels to the structure (i.e., existing clips on the purlins). Accordingly, measurements of the thickness of the panels, as well as a review of the existing panel attachments, should be completed to ensure that there has not been significant sectional loss due to corrosion. Additionally, areas of surface corrosion, as well as previously "sealed' areas, would need to be appropriately cleaned and treated prior to the application of the coating to ensure adequate bond and performance of the coating.

RECOMMENDED REPAIR STRATEGY

Based on the information currently available to us, all options presented above, for the various roof areas, would provide the desired basic performance objectives, albeit will different risk levels and service lives. The selection of the most appropriate solution would be dependent on the remaining life of the building.

For the BUR, replacement of this roof is the only viable option that should be considered at this time (Option #2). This should be completed within the next year.

For the metal roofs, there is still service life remaining which can be extended with annual maintenance. Therefore, we would recommend proceeding with Option #1 (Localized Repairs).

CLOSING

We trust this satisfies your requirements at this time. If there are any questions regarding the information presented herein or you would like to discuss the scope further, please do not hesitate to contact the undersigned at 613-739-2910.

Sincerely,

David Noel, P.Eng.
Principal, Project Manager
Senior Building Science Engineer

David Kayll, FMA, P.Eng.
Principal, Director Building Science East

MORRISON HERSHFIELD
Building Specialty Services

encl.

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APPENDIX A
PHOTOGRAPHS

Photograph 1: General view of upper level of the Main Building BUR roof (looking west). The Service Building is in the distance.

Photograph 2: General view of upper level of the Main Building BUR roof (looking south). The metal roof of the Main Building is in the distance.

Photograph 3: General view of lower level of the Main Building BUR roof (looking east).

Photograph 4: General view of Main Building metal roof (looking south).

Photograph 5: Typical rooftop equipment on the BUR roof with “repaired” modified bitumen roofing membrane around base, sleepers and curbs.

Photograph 6: Typical rooftop equipment on the BUR roof with “repaired” modified bitumen roofing membrane around base, sleepers, curbs and drains.

Photograph 7: Typical “repair” area on the BUR roof of the Main Building.

Photograph 8: Typical drain “repair” on the BUR roof of the Main Building.

Photograph 9: Typical unbonded seam of the modified bitumen membrane in a “repair” area.

Photograph 10: Typical unbonded seam of the modified bitumen membrane in a “repair” area.

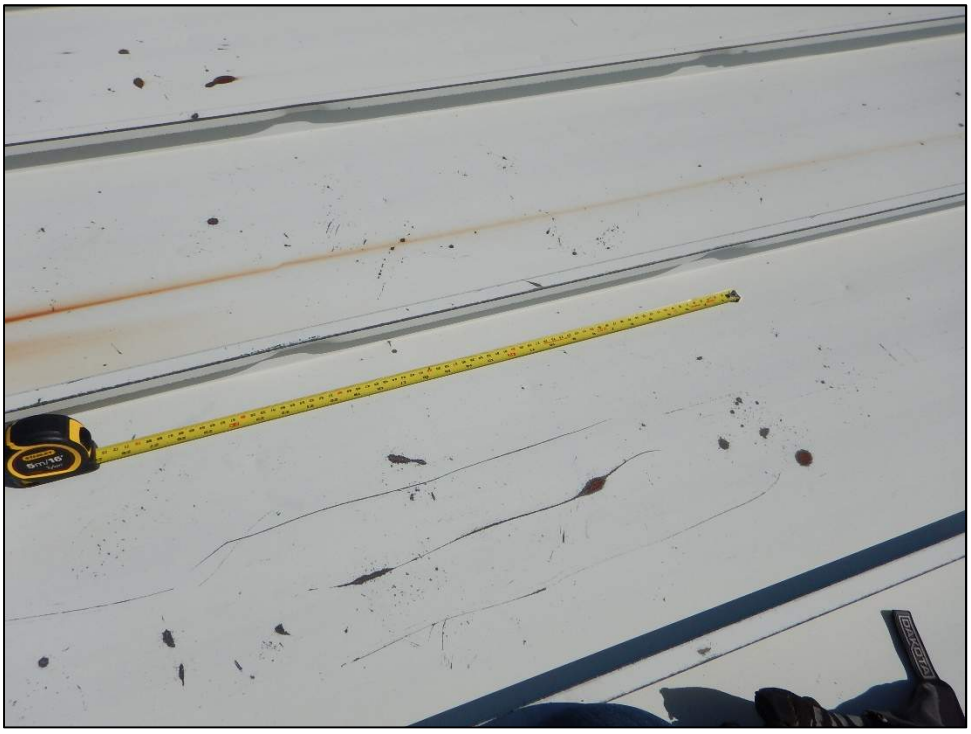
Photograph 11: Typical junction between an existing roof divider and the roof edge on the upper BUR roof. A “repair” area to the lower BUR roof is in the distance.

Photograph 12: Typical unbonded seam of the modified bitumen membrane in a “repair” area of a roof divider.

Photograph 13: Exploratory Opening #1 through the BUR roof.

Photograph 14: Exploratory Opening #2 through the BUR roof.

Photograph 15: Typical surface condition of the Main Building metal roof.



Photograph 16: Typical crimp of the standing seams.

Photograph 17: Typical patch/repair of the metal roof with a liquid-applied membrane.

Photograph 18: Typical splice condition / detailing of the Main Building metal roof.

Photograph 19: Typical modified bitumen membrane installed between seams along with an area of repair with a liquid-applied membrane on the Main Building.

Photograph 20: General view of the Service Building metal roof (looking north).

Photograph 21: Typical surface condition of the Service Building metal roof.

Photograph 22: Typical condition / detailing of the ridge cap flashing.

Photograph 23: Typical splice condition / detailing of the ridge cap flashing.

Photograph 24: Typical liquid-applied membrane installed around mechanical penetrations.

DUFFY PLACE ROOF REPLACEMENT

Project Title: **Duffy Place Roof Replacement**

Project Cost: **$900,000**

Project Description

The Duffy Place Building (the "Facility") is Newfoundland Power's (the "Company") primary operations facility for St. John's Region (the "Region").[1] The Region serves approximately 112,000 customers, or 42%, of all Newfoundland Power customers. The Region's service territory extends from Cappahayden in the south, to Cape St. Francis in the north, and from Cape Spear in the east, to Holyrood in the west.

The Facility houses the employees and equipment necessary to support operations throughout the Region. This includes line crews, line inspectors, work dispatchers, regional engineering, meter reading and associated support staff. In addition, the Facility houses corporate functions such as stores warehouse, metering, customer service, information services, the production center, maintenance, transportation and dispatch.

The Facility was constructed in 1988 and includes a main building and a service building. All roofs are original construction and consist of (i) upper and lower level built-up roofs and (ii) metal roofs.[2] This project involves the replacement of the upper and lower level built-up roofs. The report titled *Duffy Place Roof Replacement* included as Schedule A provides a description and assessment of the Facility's roofs.

Justification

In late 2017, the Facility's built-up roofs experienced a number of leaks in multiple locations. As a result of the amount of water infiltration that was occurring, the Company undertook a number of repairs in the fall of 2017 and winter of 2018. The repairs were largely unsuccessful due to the age and condition of the built-up roofs and the environmental conditions that existed at the time the repairs were required.

Based on the age and condition of the Facility's roofs, the Company retained Morrison Hershfield to conduct a roof assessment. The assessment concluded that the built-up roofs are at the end of their useful service life and that the roof is no longer functioning as intended. The assessment recommended replacement of the upper and lower level built-up roofs.

This project was originally intended to be completed in 2019 and be included in Newfoundland Power's 2019 Capital Budget Application. However, given the occurrence and severity of leaks

[1] The Facility is located on 6 hectares of property and measures approximately 8,100 m^2 including 4,500 m^2 of office space. The stores warehouse and various workshops comprise the remaining 3,600 m^2.

[2] Built up roofing systems, or tar and gravel roofing systems, are composed of alternating layers of bitumen and reinforcing fabrics that create a water resistant membrane.

in the Facility's upper and lower level built-up roofs during the 2017-2018 winter season, the Company determined that completing this work in 2018 is necessary.

Projected Expenditures

Table 1 provides a breakdown of the proposed expenditures for 2018.

Table 1
Project Cost
($000s)

Cost Category	Cost
Material	808
Labour - Internal	7
Engineering	53
Other	32
Total	**900**

Costing Methodology

The budget estimate for this project is based on an engineering cost estimate of the required work.

To ensure this project is completed at the lowest possible cost, all material and contract labour will be obtained through competitive tendering.

Future Commitments

This is not a multi-year project.

NEWFOUNDLAND AND LABRADOR

AN ORDER OF THE BOARD OF COMMISSIONERS OF PUBLIC UTILITIES

NO. P.U. ___ (2018)

IN THE MATTER OF THE PUBLIC UTILITIES ACT, R.S.N.L. 1990, CHAPTER P-47 (THE "ACT")

AND

IN THE MATTER OF AN APPLICATION BY NEWFOUNDLAND POWER INC. (THE"APPLICANT") FOR APPROVAL OF A SUPPLEMENTAL CAPITAL EXPENDITURE FOR THE CONSTRUCTION AND PURCHASE OF CERTAIN IMPROVEMENTS AND ADDITIONS TO ITS PROPERTY PURSUANT TO SECTION 41 (3) OF THE ACT.

WHEREAS the Applicant is a corporation duly organized and existing under the laws of the Province of Newfoundland and Labrador, is a public utility within the meaning of the Act, and is also subject to the provisions of the Electrical Power Control Act, 1994, and

WHEREAS the Applicant operates transmission lines, distribution lines, substations and other facilities to provide service to customers throughout its service territory on the island portion of the Province of Newfoundland and Labrador, and

WHEREAS the Applicant's Duffy Place facility (the "Facility") is located at 50 Duffy Place in St. John's. It is the primary operations facility for St. John's region and houses line crews, line inspectors, work dispatchers, regional engineering, meter reading and associated support management and staff. Corporate functions such as the stores warehouse, metering, customer service, information services, the production center, maintenance, transportation and dispatch are also located at the Facility.

WHEREAS the Facility consists of a main building and a service building. All roofs are original to the Facility's 1988 construction. The Facility is covered by two types of roofing. The main building consists of (i) a built-up roof and (ii) a metal roof. The service building is covered by a metal roof. The estimated service life of the upper and lower level built-up roofs is 20-25 years. The existing roofs are approaching 30 years old and have reached the end of their useful service life, and

WHEREAS a number of leaks have been experienced at the Facility due to the deterioration of the upper and lower level built-up roofs. To address these leaks, the Applicant undertook a number of repairs. These repairs were conducted at various times throughout the year, including the winter season, depending on the timing and severity of the leaks, and

WHEREAS an engineering assessment of the Facility has determined that the Facility's built-up roof is at the end of its useful service life. As it no longer functions as intended, replacement of the Facility's built-up roof is recommended. The estimated cost of replacing the roof is $900,000, and

WHEREAS the proposed capital expenditures are necessary for the Applicant to provide service and facilities which are reasonably safe and adequate pursuant to Section 37 of the Act.

IT IS THEREFORE ORDERED THAT:

1) Pursuant to Section 41 (3) of the Act, the Board approves the capital expenditures in excess of $50,000.00 associated with the improvements and additions to the Applicant's property as proposed in the Application.

DATED at St. John's, Newfoundland and Labrador, this _____ day of _____, 2018.

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_____

G. Cheryl Blundon

Board Secretary