Nova Scotia Utility and Review Board

IN THE MATTER OF The Public Utilities Act, R.S.N.S. 1989, c.380, as amended

Post-Tropical Storm Arthur

Vegetation Management

Stakeholder Consultation Report

February 13, 2015
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1.0 INTRODUCTION

At the outset, Nova Scotia Power (“NS Power”) would like to thank stakeholders for their active and valuable participation. NS Power is of the view that the Stakeholder Consultation Process was very beneficial and productive. The process created an avenue for NS Power and other stakeholders to share their detailed information on vegetation management programs, as well as NS Power’s program’s impact on improving power reliability. A dialogue was initiated with all stakeholders involved and the process gave each stakeholder the opportunity to raise issues and dive deeper into vegetation management practices throughout the province of Nova Scotia.

NS Power is committed to continuing this dialogue with each stakeholder after the Stakeholder Consultation Process has ended by conducting regular vegetation management information sessions, creating committees to discuss tree species priorities, and finding program coordination opportunities with each stakeholder. NS Power will be embarking on a vegetation management engagement strategy in 2015.

According to the Union of Nova Scotia Municipalities (“UNSM”), “the UNSM views the report as a good first step. Going forward we are pleased that NSPI will maintain ongoing and regular dialogue with municipalities”. NS Power agrees with this statement and believes it reflects the general impression of the participants. NS Power looks forward to continued collaboration with stakeholders on vegetation management practices.
2.0 OVERVIEW OF PROCESS

Post-tropical storm Arthur impacted the province of Nova Scotia on July 5, 2014 leaving 245,000 NS Power customers without power over the course of an eight-day period. By July 12, 2014 all customers had their power restored.

The Nova Scotia Utility and Review Board (“UARB”) ordered NS Power to conduct an internal review of its state of preparedness and response to post-tropical storm Arthur and file an in-depth report with the UARB by August 19, 2014. In its report, NS Power concluded that more than 90 percent of the customer outages were due to tree contacts and sections 8 and 9 of that report covered current vegetation management practices and restoration due to vegetation contacts.

After NS Power filed its report, the UARB engaged Liberty Consulting (“Liberty”) to review NS Power’s response to post-tropical storm Arthur. Liberty submitted its report to the UARB on September 9, 2014 and made 32 recommendations related to NS Power’s storm practices.

The UARB issued a decision on October 6, 2014 wherein it directed NS Power to implement Liberty’s recommendations, as well as certain other recommendations of the Formal Intervenors and to file an update with the UARB on its progress to date by October 31, 2014. The UARB’s decision also included a request for a formal review of the NS Power vegetation management and storm hardening practices. The review was to start on October 21, 2014 and conclude on February 9, 2015 with a final decision from the UARB.

In order to ensure the vegetation management review was a collaborative process, NS Power recommended augmenting the proposed review by 3.5 months in order to enable NS Power to conduct a stakeholder consultation process. The intent of the process was for all stakeholders to work together in developing a common understanding of
vegetation management efforts and to work towards developing a unified vegetation
management process going forward.

On October 26, 2014 the UARB issued an order agreeing to the process proposed by NS
Power and its revised timeline. The stakeholder consultation process began on October
27, 2014 and concludes on February 13, 2015 with the filing of a final report
summarizing the results of the stakeholder process.

The formal stakeholders that were involved in the stakeholder consultation process are as
follows:

1. Nova Scotia Department of Energy (NS-DOE)
2. Nova Scotia Transportation Infrastructure Renewal (TIR)
3. Union of Nova Scotia Municipalities (UNSM)
4. Halifax Regional Municipality (HRM)
5. Nova Scotia Department of Natural Resources (NS-DNR)
6. Small Business Advocate (SBM)
7. Consumer Advocate (CA)
8. Liberty Consulting Group
9. Ms. Queenie Acker (Independent Customer)

Four group stakeholder meetings were held, as well as a number of individual meetings
with stakeholders, to discuss their respective objectives of participating in the process.
Terms of Reference and an Issues List were created in the first group stakeholder meeting
with input from all stakeholders in attendance. A copy of the Terms of Reference and the
Issues List are attached as Appendices A and B respectively. NS Power reported on the
status of each issue and provided background data for each item in the group stakeholders
meetings. Minutes from each meeting are included in Appendices C-G.

The first individual meeting was held with the Department of Natural Resources
(“DNR”) on December 9, 2014 and the following outcomes were agreed upon:
1. Starting in 2015, DNR will require all harvesters with work on crown land to submit Geographical Information System ("GIS") data files of the areas where they are harvesting. This information will be accessible to NS Power, which will allow it to prioritize efforts to mitigate issues relating to thin strips of trees being left behind by harvesters in certain areas. Of note, is that thin strips of trees are generally left behind for two reasons: (a) aesthetics or (b) safety in terms of not being able to work near power lines.

2. The NS Power Forestry team will ensure that a representative attends the Woodlot Owner events hosted three times a year by DNR. This will provide more opportunities for woodlot owners to share harvesting information with NS Power.

3. DNR provided a direct contact within their department for coordination on widening of crown lands. NS Power will work directly with this team to ensure that the approval process is efficient.

NS Power also met with the Halifax Regional Municipality ("HRM") vegetation team multiple times throughout the process and discussed the following:

1. Both parties agreed to review the existing Vegetation Management Memorandum of Understanding that had recently expired and create a new Service Agreement for vegetation work within HRM. As both HRM and NS Power conduct vegetation management within the HRM, the efforts to promote cross efficiencies as set out in the MOU will continue to be a component of the pending Service Agreement.

2. It was agreed that a Street Tree Committee would be formed with members from NS Power, HRM, Landscape Nova Scotia, and Subdivision Developers to discuss the “right tree in the right location” approach and compatible species of trees for power lines.
An individual meeting was also held with representatives from Transportation Infrastructure Renewal ("TIR") on January 15, 2015 and the following was agreed upon:

1. NS Power and TIR will meet on a semi-annual basis to communicate priorities of each party’s vegetation right-of-way management program and discuss areas of work that can be completed through a coordinated approach. Rural and remote geographical areas will have a renewed focus.

2. NS Power will share its annual vegetation management plan on a yearly basis with TIR.

3. TIR Operations Managers will meet with NS Power Forestry Coordinators on a regular basis to discuss priorities.

In addition to the foregoing, NS Power also conducted a Vegetation Management workshop with all available representatives from the Union of Nova Scotia Municipalities ("UNSM") in Truro on January 9, 2015. The purpose of the workshop was to start an ongoing dialogue between NS Power and UNSM on vegetation management in Nova Scotia. The workshop included presentations on vegetation practices from NS Power, Halifax Regional Municipality and the Town of Truro. A round table discussion was also conducted to capture feedback from the municipalities on the proposed recommendations for the final stakeholder report. The feedback received from the municipalities that were in attendance was that they did not feel comfortable supporting a rate increase for vegetation management, as they felt it was not their position to speak for rate payers.

NS Power has committed to meeting on a quarterly basis with members of UNSM to discuss upcoming priorities of the NS Power vegetation management program and to work toward greater coordination/efficiencies with the vegetation programs being managed by individual municipalities. NS Power recognizes that there can be significant
differences in vegetation practices between towns and rural units, and will work with UNSM to try and ensure these differences are taken into account in the NS Power vegetation management program.
3.0 NS POWER DISCUSSION & RECOMMENDATIONS

The objectives NS Power set out to achieve as part of the stakeholder consultation process are directly linked to the following two key recommendations contained in Liberty’s report on NS Power’s response to post-tropical storm Arthur:

A. Develop a comprehensive plan for widening 69 kV line corridors. The highest priority for widening involves line sections where adjacent land clearing operations have left a thin strip of trees.

B. Develop a comprehensive plan for reclaiming and/or widening the overgrown ROW corridors. The Integrated Vegetation Management (IVM) program has reduced tree events per length in normal weather, but it has not addressed overgrown ROWs sufficiently. NS Power should estimate costs, schedule options and funding options.

Liberty had two additional recommendations for vegetation management in its report that did not end up being reviewed in detail during the stakeholder consultation process. Those two additional recommendations were as follows:

C. Develop a cyclical program for three phase lines being aerially trimmed along the highways (Asset Protection and Urban Management). Normal industry practice for long term reduced unit costs and consistent reliability consists of cyclical trimming on a feeder basis. The three phase line segments should represent a priority, because they are more susceptible to tree contact outages.

D. For the worst performing feeder program, use a weighted multi-year performance evaluation approach rather than an annual performance method.
NS Power agreed to implement these two recommendations in their vegetation management program and the status of the implementation will be communicated in the next work plan update.

3.1 Liberty Recommendation A: 69 kV Right-of-Way Widening

Develop a comprehensive plan for widening 69 kV line corridors. The highest priority for widening involves line sections where adjacent land clearing operations have left a thin strip of trees.

Liberty made the following comment on page 33 of its report on the Review of NS Power’s Response to Post-Tropical Storm Arthur: “69 kV transmission lines are very susceptible to outages from hazard trees. Narrow rights of way contribute significantly to the risk”. In response to this concern, NS Power will examine the entire 69 kV transmission system to develop a comprehensive plan for widening rights-of-way associated with this voltage class. Widening of rights-of-way is considered by NS Power to be a contributor to ensuring the reliability of the transmission system. While NS Power does carry out some widening of the 69 kV system, the vast majority of work for preventing trees from falling into the system is associated with individual hazard tree mitigation. Hazard trees are identified as a risk based on poor health, decay or leaning. Mitigation of hazard trees eliminates the outage risk associated with those trees, however, it does not address the issue of the multitude of healthy trees which, during major storms, fail and fall into power lines. In NS Power’s view, the only way to mitigate the risk of healthy trees falling into power lines is through right-of-way widening.

An area of high priority will be NS Power’s ability to understand where adjacent forest harvest operations are leaving thin buffer strips of trees between cleared area and the power line. Although such narrow strips are identified by line inspection, NS Power is of the view that a more immediate or proactive response is necessary to remove or prevent the tree threat. As such, in addition to the information DNR will obtain from harvesters working on crown land, NS Power will develop a broader engagement strategy with the
Department of Natural Resources, large industry and woodlot owner cooperatives to improve NS Power’s awareness of all harvest operations in close proximity to the transmission system.

3.1.1 Widening Potential of the 69 kV Transmission System

The standard right-of-way width of a 69 kV transmission line is 66 feet (20m). As the power line structure is usually in the centre of the right-of-way, it results in a cleared area of 10m each side of the centre line; however, the distance between the forest edge and conductors varies depending on structure type. While this distance provides ample clearance for the safe maintenance and operation of all structure variability, it is not wide enough to prevent many tree species that are tall enough to span the entire width and make contact with the power line when they fall. Increasing the current standard right-of-way width for 69 kV transmission lines to 30m, or in some cases 40m, would significantly reduce the risk of trees contacting the power line. Even at these increased widths, the risk associated with falling trees, while significantly reduced, would not be completely eliminated.

NS Power’s records indicate that the right-of-way area of the 69 kV transmission system is approximately 1,400 km in total length. Given that in most cases both sides of the right-of-way are impacted by adjacent trees, the widening effort would be double that total (2,800 km). The potential to widen the 69 kV right-of-way depends on the geographical location of the transmission lines. In some cases, where 69 kV lines exist in more residential neighbourhoods, the potential to widen the right-of-way is diminished. In these areas, NS Power will continue with a hazard tree program approach. By removing the residential portion of urban areas from the widening total, it is estimated that about 2,000 km of forest edge has the potential for widening.

The ability to access the 69kV transmission line right-of-way with tree harvesting machinery is critical for right-of-way widening. The topography or drainage in many areas may prevent site access by machines for removing the trees. NS Power will
undertake an analysis of the terrain to better understand the opportunities for mechanical harvesting versus manual operations.

### 3.1.2 Property Ownership and Widening Privileges

Given that the majority of land in Nova Scotia is privately owned, an aspect of developing the comprehensive right-of-way widening plan will be the analysis of property ownership. As such, obtaining easement rights for widening or hazard tree removal on private property and the associated costs will be factored into the plan. To date, clearing for most widening projects has been completed through informal landowner permission. Developing a new right-of-way width standard would have the impact of potentially doubling the size of the right-of-way, resulting in extensive property clearing. It is recommended that such clearing rights be obtained by NS Power from the property owner through formal grants of easement. Based on its past experiences with the development of new rights-of-way, NS Power has a good understanding of the potential costs associated with easement rights, property valuation, and land agent costs. Such costs would be used as an aspect of the prioritization process.

With respect to publicly owned lands, NS Power will work with the Department of Natural Resources to ensure the approval process on crown land is as efficient as possible.

### 3.1.3 Stakeholder Discussions

The following comments reflect feedback provided by stakeholders during various meetings held to discuss the 69 kV widening recommendation.
Halifax Regional Municipality (“HRM”)

HRM were concerned with the proposal of managing to a greater right-of-way width within the HRM area. HRM advised that such action would be counter-productive with respect to the implementation of its Urban Forest Management Plan. HRM also expressed the view that since at-risk trees are the real issue associated with tree failure, NS Power should consider a more intensive hazard tree removal program within HRM as opposed to full widening of the right of way.

NS Power Response to HRM: NS Power recognizes the importance of the right-of-way widths within the core of the HRM and will work with HRM to find opportunities for both widening and hazard tree removal based on transmission line location and multiple use of the right-of-way. Many of the 69 kV transmission rights-of-way in HRM are located in neighbourhoods where widening is not possible and therefore outside the scope of NS Power’s comprehensive plan. Where there is the ability to increase the width, NS Power’s preferred approach is to widen the right-of-way.

Nova Scotia Department of Natural Resources (“DNR”)

DNR has no direct access to cutting operations on private land; however, it has committed to assisting NS Power as much as possible with data access for harvesting on provincial land. DNR is designing a new harvest tracking database, which functions on voluntary participation. This new database could provide NS Power with additional information on private land; however, this project is still in the development stage. All data associated with harvesting provided by DNR will assist NS Power in discovering new harvests adjacent to power lines for proactive removal of buffer strips. DNR has recommended that NS Power establish working relationships with the largest forest industry companies, woodlot cooperatives, and other agencies, such as the Association for Sustainable Forestry, for obtaining harvesting site layout data.
**Vegetation Management Stakeholder Consultation Report**

**NS Power Response to DNR:** NS Power is committed to communicate regularly with all those who work in Nova Scotia’s forests through a province-wide engagement strategy that will be developed and implemented in 2015. In addition to establishing contacts with those with harvest records, NS Power will actively participate in already existing workshops and forums designed by DNR to inform and educate woodlot and property owners about best vegetation management practices. NS Power will focus on the safety of harvesting trees adjacent to power lines and the risks associated with leaving thin buffer strips. An element of the comprehensive plan for widening 69 kV transmission rights-of-way will take into account the possibilities of First Nation’s restrictions on crown land, which will influence the prioritization process.

### 3.1.4 Financing

Right-of-way widening is essentially the creation of a new right-of-way adjacent to an existing right-of-way. The costs associated with the landowner contact, easement acquisitions and land-clearing have been determined to be capital expenses. At the outset of the widening program (estimated to begin in 2016), NS Power intends to utilize a capital routine for widening rights-of-way.

### 3.1.5 69 kV Right-of-Way Widening Recommendations

Given the magnitude of the length of the 69 kV transmission system, in developing the comprehensive plan, NS Power will make determinations for widening based upon a prioritization process. Through the stakeholder consultation process, NS Power was able to gain an increased understanding of the importance of trees to the well-being of more populated areas. As a result, NS Power will give careful consideration to a more site specific plan for 69 kV rights-of-way.
Recommendation 1

The distance between the forest edge and the transmission conductor is dependent on the transmission structure type. Conductor affixed to ‘H-frame’ structures is closer to the wooded edge than conductor strung on single-pole structures. NS Power will determine areas of greater risk associated with shorter distances due to differing structure types, thereby determining the optimum right-of-way on a line-by-line basis. NS Power recommends increasing the right-of-way width for 69 kV ‘H-frame’ construction to 40m and for 69 kV lines where the structure type is single-pole, NS Power recommends increasing the right-of-way width to 30m.

Recommendation 2

69 kV transmission lines are often dedicated to large industry, entire towns or suburbs. Higher priority will be given in such cases where there is no alternative means to transmit power to that area. Conversely, lower priority will be given in situations where redundancy of transmission supply exists. NS Power recommends increasing the 69 kV right-of-way width to 40m for areas where no alternative transmission supply exists and increasing the 69 kV right-of-way width to 30m for areas where redundancy exists.

Recommendation 3

Although many of the native tree species in Nova Scotia can grow tall enough to span a 69 kV transmission right-of-way, certain species are of greater concern of failure during major storms. Areas of susceptible species will be identified and a higher priority will be given to these areas over species known to better withstand damaging winds. NS Power recommends increasing the 69 kV transmission line right-of-way width to 40m for an area of higher priority and to 30m for an area of lower priority.
In the event of a conflict among the above three (3) recommendations then Recommendation 1 (structure-type) will prevail over Recommendation 2 or Recommendation 3.

**Recommendation 4**

The estimated costs to implement the above noted widening recommendations on all 69 kV right-of-ways throughout the province is approximately $36 million. Please refer to Appendix H for the high-level cost analysis associated with this recommendation. NS Power recommends, starting in 2016, spending $4.5 million per year for a period of 8 years on 69 kV transmission right-of-way widening.

**Recommendation 5**

In addition to the development of a comprehensive widening plan, NS Power recommends implementing an engagement strategy in 2015, which will give the NS Power Forestry team a greater opportunity for interacting with the forest industry, woodlot owners and harvesting companies in order to increase the potential for both preventative measures or timely reaction to be taken when harvest operations are adjacent to 69 kV rights-of-way. In the HRM area, NS Power will develop an engagement strategy for interacting with housing development companies to proactively remove buffer strips prior to building construction.

### 3.2 Liberty Recommendation B: Distribution Right-of-Way Program

Develop a comprehensive plan for reclaiming and/or widening the overgrown ROW corridors. The Integrated Vegetation Management (IVM) program has reduced tree events per length in normal weather, but it has not addressed overgrown ROWs sufficiently. NS Power should estimate costs, schedule options and funding options.
Activities within the scope of the existing NS Power distribution right-of-way management program are carried out through a blend of reactive and predictive management approaches; with the majority of work being carried out under the preventative program. Preventative work activities are scheduled for full feeder sections and are grouped into the following categories: Asset Renewal, Asset Protection, Urban Management, and Sustainability.

*Asset Renewal* involves the reclaiming of rights-of-way. The area is cleared of tree growth and trees adjacent to the right of way are trimmed or topped to achieve long-term control of all growth with the potential to impact reliability. Control treatment options include mowing, manual cutting and chipping, herbicide application (cut stump and foliar treatments), as well as trimming.

*Asset Protection* involves the management of feeder lines that are defined by the lack of space within the roadside right-of-way. Trees that are both in and adjacent to the right-of-way are trimmed for clearance around the conductors and ground clearing is carried out less frequently.

Similar to projects under Asset Protection, *Urban Management* projects are defined by the lack of space for power line infrastructure, and the management of that space is compounded by conflicting interests; mainly the desire to have municipal street trees exist in the same space.

*Sustainability* defines feeder lines where previous management of the right-of-way has resulted in the control of all incompatible vegetation both below and adjacent to the conductors. The right-of-way is more frequently managed from the ground by means of cutting, mowing and herbicide application and trimming is carried out less frequently.

Liberty made the following comment on page 36 of its report on the Review of NS Power’s Response to Post-Tropical Storm Arthur: “Since 2005, NS Power has improved its vegetation management practices by implementing an integrated vegetation
management plan (IVM) for distribution. NS Power’s pace of addressing the vegetation issues, however, is slow”. The below recommendation is NS Power’s response to addressing this pace.

3.2.1 Distribution Right-Of-Way Budget Recommendation

The current budget for vegetation management is $10.4M annually, of which approximately $3M relates to Asset Renewal, Asset Protection and Urban Management efforts. This budget allows NS Power to manage the vegetation in pockets of distribution feeders. However, in order to move the vegetation management program to a sustainable level there is a significant amount of the vegetation program that must still be implemented. There is approximately 10,875 km of distribution right-of-way remaining to reclaim throughout the province and at the current budget for vegetation management it is estimated to take approximately 32 years (at $3M per year) to get the program to a sustainable level. The table below shows the estimated costs to reach a sustainable level:

<table>
<thead>
<tr>
<th>Vegetation Management Type</th>
<th>Length of Right of Way (km)</th>
<th>Cost per Kilometer ($)</th>
<th>Total ($)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Urban</td>
<td>1,205</td>
<td>6,485</td>
<td>7,814,425</td>
</tr>
<tr>
<td>Asset Protection</td>
<td>2,560</td>
<td>8,172</td>
<td>20,920,320</td>
</tr>
<tr>
<td>Asset Renewal</td>
<td>7,110</td>
<td>9,700</td>
<td>68,967,000</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>10,875</strong></td>
<td><strong>N/A</strong></td>
<td><strong>97,701,745</strong></td>
</tr>
</tbody>
</table>

In addition to the increased reliability improvements, upon completion of the reclamation effort, NS Power estimates that its annual vegetation management budget could be reduced indefinitely, as it would be primarily focused on sustainability. In addition, the storm budget could be reduced, as there would be fewer failed trees to remove and less damage to repair.

Given the estimated cost, there was considerable conversation with and among stakeholder participants regarding potential impact on affordability. Although an acceleration of the program was supported by participants, their general preference was to do so without creating increased rate pressure.
Obviously, one way to avoid increased rate pressure would be to maintain the status quo. This would mean that the annual budget for vegetation management would stay at $10.4M (plus inflation) for the next 32 years. The vegetation program would continue using integrated management techniques focusing on areas of lesser reliability and working with stakeholders to ensure coordination in all areas of the program. After 32 years the program would be at a sustainable level and the vegetation management and storm response budgets could be correspondingly reduced on a go forward basis.

Although maintaining status quo meets the desire to avoid rate pressure, there was discussion amongst the participants as to whether one could potentially utilize the projected vegetation management and storm response savings (to be realized upon reaching a sustainable program) to support the program’s acceleration without adding rate pressure. Ideas such as deferring or capitalizing the accelerated expenses were discussed as possibilities. The primary benefit of this potential approach is that customers would be able to receive the reliability gains from an accelerated program much sooner than the status quo approach while avoiding upward rate pressure.

For context, it is estimated that the distribution right-of-way reclamation program could reach a sustainable level in 8 years if the vegetation management budget was increased by $10M per annum ($10.4M to $20.4M) – resulting in an estimated annual spend on Asset Renewal, Asset Protection and Urban Management of about $13M. If this amount was expensed, this acceleration would increase rate pressure by approximately 1 percent. Once again, by accelerating the distribution vegetation program, customers would receive the reliability benefits much sooner than the 32-year status quo approach.

The following graph illustrates the current budget versus the proposed budget for the next 50 years if the program was to be accelerated from 32 to 8 years:
Recommendation 6

Although there was not the opportunity to canvas this concept in great detail with the stakeholder group, based on initial stakeholder feedback and on the basis that reaching a sustainable level of the vegetation management program will result in improved reliability sooner and reduced costs on an ongoing basis, NS Power recommends pursuing an option that would utilize future reduced costs (savings) to support the acceleration of the program now, while working to avoid additional rate pressure in the future (i.e., utilize future expected savings to fund the present program).
4.0 CONCLUSION

We would like to thank the Board for the opportunity to conduct the stakeholder sessions and thank stakeholders for their active and valuable participation. The sharing of information and views among the participants has been invaluable and will only serve to make the remaining portion of the Vegetation Management and Storm Hardening review process that much more productive. We look forward to participating in the remainder of the review process, continuing collaboration with stakeholders and ultimately achieving a Vegetation Management and Storm Hardening program that brings the most value to our customers.

All of which is respectfully submitted.
1) Objective

To collaboratively develop recommendations to the NS-UARB on the future Vegetation Management and Storm Hardening practices for NS Power. Specifically, the final recommendations will focus on two items:

i) Development of the future standard right-of-way widths for 69kV transmission lines throughout Nova Scotia

ii) Establishment of the pace of spend for the annual NS Power vegetation management of distribution line right-of-ways

2) Introduction

A direct outcome of the NS-UARB review of NS Power’s State of Preparedness and Response to Post-Tropical Storm Arthur was a formal review of NS Power’s Vegetation and Storm Hardening Practices. The original timeline for the review was from October 21, 2014 to February 9, 2015, but NS Power requested a 3 ½ month extension to complete a Stakeholder Engagement process prior to the formal review, which extended the timeline to May 25, 2015. Individual stakeholders were consulted on this proposal and Transportation Infrastructure Renewal, Department of Natural Resources, Union of NS Municipalities, Halifax Regional Municipality, and the Department of Energy were all in agreement to this collaborative approach.

3) Approach

In support of the development of recommendations for the NS Power Vegetation Management and Storm Hardening practices, NS Power will:

a) Consult and collaborate with all stakeholders to gain and share knowledge and experience with vegetation management and storm hardening;

b) Consider successful approaches used in other jurisdictions for annual vegetation management programs and practices;

c) Meet individually with stakeholders to discuss options for jointly achieving objectives;
d) Build consensus on recommendations for future vegetation management and storm hardening practices;

e) Create drafts of documentation for review and input from stakeholders;

f) Prepare and file a Stakeholder Engagement Final Report to the NS-UARB; and

g) Implement required changes based upon the NS-UARB decision.

4) Scope

As indicated in the NS-UARB Supplemental Order M06321, the Vegetation Management and Storm Hardening Stakeholder Engagement process will begin on October 27, 2014 and end on February 6, 2015. The final deliverable will be the filing of a report summarizing the recommendations developed by NS Power and the registered stakeholders. The following items are ‘in-scope’ for the Final Report:

a) Standards for 69 kV transmission line right-of-ways throughout the province

b) Pace and spend of the annual NSPI distribution line vegetation management program

c) Stakeholder Objective List developed during November 24 Kick-Off Meeting

d) Off-Right-of-Way tree management program

e) ‘Storm Hardening’ practices as applicable to vegetation management

5) Consultation Framework

NS Power will seek stakeholder input throughout the process, and will schedule four (4) stakeholder sessions to facilitate direct stakeholder input.

A timeline for meetings and filings is provided below for the engagement process. The final report summarizing the Stakeholder Engagement process will be filed by NS Power on February 6, 2015.

6) Timeline Summary

a) Stakeholder Kick-Off Meeting

Nov. 14, 2014

b) Stakeholder In-Person Meeting #1

Nov. 24, 2014

c) Meet with Individual Stakeholders

Week of Dec. 1
November 26, 2014

d) Stakeholder In-Person Meeting #2

Dec. 11, 2014
(rescheduled to Dec. 12, 2014)

e) Meet with Individual Stakeholders

Week of Dec. 15

f) Stakeholder In-Person Meeting #3

Jan. 7, 2015
(rescheduled to Jan. 13 due to UNSM meeting on Jan. 9)

g) Meet with Individual Stakeholders

Week of Jan. 12

h) Stakeholder In-Person Meeting #4

Jan. 21, 2015
(rescheduled to Feb. 2 due to winter storm)

i) Circulate Final Report for Review

Week of Jan. 26
(rescheduled to Feb. 6)

j) File Final Report with NS-UARB

Feb. 6, 2015
(rescheduled to Feb. 13)
<table>
<thead>
<tr>
<th>Stakeholder</th>
<th>Issue</th>
<th>Action</th>
<th>Notes</th>
</tr>
</thead>
<tbody>
<tr>
<td>UNSM dos not speak for municipalities directly, therefore UNSM will ensure that they engage in this process</td>
<td>Conduct Municipality Stakeholder Session in Truro on January 9 with CAO's, Mayors and Public Works employees</td>
<td>Meeting held on January 9, 2015</td>
<td></td>
</tr>
<tr>
<td>Would like to see more conversations with developers on tree education when a new subdivision is being built</td>
<td>NS Power is a member of Landscape Nova Scotia and awards a “Right Tree in the Right Place” Award annually to one of its members. NS Power will work with Landscape NS to strengthen this program through education of contractors, awareness with Municipalities and through website support. Also, through this stakeholder process, NS Power could initiate a program, administered by the municipalities for subdivision development plans which include tree planting to be reviewed by Landscape NS.</td>
<td>Reviewed in Dec. 12 group stakeholder meeting</td>
<td></td>
</tr>
<tr>
<td>Municipalities believe there is inconsistency in how Vegetation Management is done. Possibly related to who is the contractor doing the work</td>
<td>This speaks to a certain extent about social license. There is a consistent specification for vegetation management work however, the extent to which it is implemented may be inconsistent depending on customer expectations and is not related to the vegetation contractor. There is often a dichotomy in relation to the customer expectation for vegetation management and this dichotomy exists within municipal units or is represented by a municipal unit. Generally speaking, in rural areas, customers expect an improvement over previous management work (cut more trees). Contrarily, customers in more urbanized areas expect similar outcomes to those of the past as there is a greater concern for ensuring mature tree growth is maintained rather than eliminated. Based upon customer interaction and acceptance for tree clearing, NS Power may implement more aggressive standards to dramatically improve the reliability and sustain the right of way. Such work would include mature tree removal along the edge of the right of way and selective herbicide application to prevent hardwood regrowth. In areas where this level of management is less desirable by the residents, NS Power would implement traditional methods of reclaying around the lines for improved clearance which may include some tree cutting within the right of way only.</td>
<td>Reviewed in Dec. 12 group stakeholder meeting</td>
<td></td>
</tr>
<tr>
<td>Power outages are directly related to Vegetation Management, but what other options are there to decrease outages</td>
<td>Storm hardening' the power system can take several paths in addition to widening rights of way; including installing stronger insulators for conductor, adding additional guy wires to poles, installing sectionalizing devices, upgrading equipment in substations, etc.</td>
<td>Reviewed in Dec. 12 group stakeholder meeting</td>
<td></td>
</tr>
<tr>
<td>How much of a rate increase would be required for an increased NS Power annual vegetation management program?</td>
<td>Strawman for an increase in the annual vegetation management program will be presented in January 26 meeting</td>
<td>Reviewed in Feb. 2 group stakeholder meeting</td>
<td></td>
</tr>
<tr>
<td>Most power outage events are caused by trees that are off-ROW</td>
<td>Discuss power outage event history</td>
<td>Reviewed in Dec. 12 group stakeholder meeting</td>
<td></td>
</tr>
<tr>
<td>Disagree with compatible tree definition. NS Power program does not line up with HRM mandate</td>
<td>NS Power is not prepared to accept a definition for compatibility that allows for trees to grow in close proximity to power lines.</td>
<td>Reviewed in Dec. 12 group stakeholder meeting</td>
<td></td>
</tr>
<tr>
<td>Storm Hardening’ is not just about vegetation management. It also includes equipment/infrastructure management</td>
<td>Agreed. However, for the context of this stakeholder process, it should be recognized that right of way widening be the only form of storm hardening.</td>
<td>Reviewed in Dec. 12 group stakeholder meeting</td>
<td></td>
</tr>
<tr>
<td>What is the purpose of expanding the width of ROW’s? It is too extreme to widen ROW’s only for hazard trees</td>
<td>Widening the right of way reduces the line exposure to trees, thereby reducing the risk that a tree will fall and fall on the power line.</td>
<td>Reviewed in Dec. 12 group stakeholder meeting</td>
<td></td>
</tr>
</tbody>
</table>
### Halifax Regional Municipality

<table>
<thead>
<tr>
<th>Ensure that a generalized approach for vegetation management is not used across the province. Urban programs should be different than rural</th>
<th>In almost all cases, NS Power aligns vegetation management opportunities with current land use. In areas where public use of the right of way is high, the use is recognized and plans are implemented to accommodate that use. Where there is no public use, then NS Power may choose to implement more aggressive strategies for improving reliability and the sustainability of the right of way.</th>
<th>Reviewed in Dec. 12 group stakeholder meeting</th>
</tr>
</thead>
<tbody>
<tr>
<td>Recommend creating a committee with NS Power and various agencies to oversee ‘Right Tree in Right Place’ and vegetation in new subdivisions</td>
<td>Added to list from Dec. 12 meeting</td>
<td>Reviewed in Jan. 13 group stakeholder meeting</td>
</tr>
<tr>
<td>Provide more context on options like tree wire, covered feeder cable and Hendrix conductor</td>
<td>Locations where these applications are in service and reliability stats for these feeders will be discussed in January 13 meeting</td>
<td>Reviewed in Jan. 13 group stakeholder meeting</td>
</tr>
</tbody>
</table>

### Department of Natural Resources

| Notification of harvesting taking place on land adjacent to NS Power transmission or distribution ROW’s | DNR will be requiring contractors to submit GIS shape files of harvest areas that could potentially be shared with NS Power | Reviewed in Dec. 12 group stakeholder meeting |

### Infrastructure & Renewal

| No issues noted at this time |

### Small Business Advocate

| Clarify why an edge of ROW tree is topped by NS Power instead of removed | Topping would be implemented when NS Power has limited rights for widening the right of way width. Topping of softwood trees would sustain the tree growth while eliminating the amount of branches subjected to high winds, thereby causing the tree to fall or break. Topping effectively eliminates the exposure of trees falling into the lines without full removal. | Reviewed in Dec. 12 group stakeholder meeting |
| Why are transmission ROW’s managed different than distribution ROW’s? | Alternative land use of the right of way and adjacent land use requires a much higher level of consideration on distribution, whereas on transmission, the area being managed is very remote and management has little impact on alternative uses of the area. | Reviewed in Dec. 12 group stakeholder meeting |
| What vegetation practices are most effective for Arthur-type conditions? Would like to see an analysis of this | NS Power has conducted a reliability analysis of distribution feeders located in the valley area with those in the Northern area of the province during Arthur. It has been determined that while storm conditions were similar, those rights of way that were cleared of all tree growth as opposed to being trimmed only, performed better than those that were not. | Reviewed in Dec. 12 group stakeholder meeting |
| Will widening ROW’s eliminate the potential for trees to fall into power lines? | No. Widening ROW’s mitigates the risk by increasing the probability that a tree will fall without making contact with the power line, either because it was not tall enough or due to the fact that there is more clear area to fall into. | Reviewed in Dec. 12 group stakeholder meeting |
| What types of trees fell into power lines during Arthur? | Two tree types that either broke or fell over completely were aspen species and spruce/fir species. | Reviewed in Dec. 12 group stakeholder meeting |
| What types of transmission events occurred during Arthur? | Individual trees fell from the adjacent forest onto the power line. | Reviewed in Dec. 12 group stakeholder meeting |
| Would like to see an analysis on the vegetation management that has been done on the transmission lines that were affected during Arthur. What was the hazard tree program for those transmission lines? Has any outreach been done with adjacent property owners? | Will review with stakeholders in January 13 meeting | Reviewed in Jan. 13 group stakeholder meeting. Additional columns added to spreadsheet to provide context |

### Consumer Advocate

<p>| How will customers be asked to pay for Vegetation Management or other initiatives? | Vegetation management is part of NS Power’s rate base and any increase to the program will affect rates | Reviewed in Dec. 12 group stakeholder meeting |
| Are there cost sharing options? | Strawman was used to review cost options | Reviewed in Feb. 2 group stakeholder meeting |</p>
<table>
<thead>
<tr>
<th>Industrial Group</th>
<th>No issues noted at this time</th>
<th>Undergrounding power lines is an issue and DOE would like to discuss costs of undergrounding as part of the stakeholder process</th>
<th>Will be discussed in more detail in first Stakeholder meeting in January</th>
<th>Reviewed in Dec. 12 group stakeholder meeting</th>
</tr>
</thead>
<tbody>
<tr>
<td>Liberty Consulting</td>
<td>NS Power has a very comprehensive vegetation management program, but a better action plan is needed to address legacy issues. In some cases a cyclical approach is needed</td>
<td>Action Plan will be developed as part of the Stakeholder Process recommendations</td>
<td>Reviewed in Dec. 12 group stakeholder meeting</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Some power utilities have different ROW standards for single-phase lines vs. three-phase lines</td>
<td>Will consider as part of final recommendations</td>
<td>Reviewed in Jan. 13 group stakeholder meeting</td>
<td></td>
</tr>
</tbody>
</table>
Vegetation Management Stakeholder Engagement Process

Meeting Minutes
1223 Lower Water St, Halifax
November 24, 2014

In Attendance
Halifax – Angus Doyle, John Charles, John Simmons, Kevin Osmond
Liberty Consulting Group – Larry Nunnery
NS Power – Greg Blunden, Matt Drover, Rob Young, Nicole Godbout, David Rodenhiser, Linda Leffler, Mark Peachey, Paul Casey
NSDOE – Peter Craig
UNSM – Betty MacDonald, Lyle Goldberg, Brian Cullen (CAO, Municipality of Pictou County)

Via WebEx
NSTIR – Barb Baillie
Small Business Advocate – Alex Cochis
NSDNR – Allan Eddy
Consumer Advocate – Erin Cain
Industrial Group – Maggie Stewart

Items to issue to parties:
- Terms of Reference
- Vegetation Management presentation
- ‘Storm Hardening’ definition contributed by John Charles
- Soft copy of Halifax urban forest plan contributed by John Charles

Items requested for next meeting:
- Analysis of what Vegetation Management or Storm Hardening practices were most effective in the Valley in terms of withstanding PTS Arthur. (SBA)
- Map of provincial 69 kV lines (UNSM)

Minutes

HRM
- Halifax would like to clarify that most outage events are trees that are off-ROW
- Dislike the use of ‘amenity tree’ wording
- Disagree with compatible tree definition; NS Power program does not line up with HRM mandate
- This stakeholder process is also about Storm Hardening, which is not just about Vegetation Management. John Charles provided a definition of Storm Hardening to the group
- What is the purpose of widening the width of ROW’s? It’s too extreme to widen ROW’s just for hazard trees
- The MOU with Halifax is a symbol of ongoing collaboration and an example for other Municipalities
- Want to ensure that a generalized approach for vegetation management is not used as part of this process

UNSM
- Power outages are a function of Vegetation Management, but what other options are there to decrease outages?
- Would like to see more conversations with developers on tree education when a new subdivision is being built
- Would like to see a map of 69kV lines throughout the province
- UNSM does not speak for municipalities directly so UNSM will ensure that they engage in this process
- Municipalities believe there is inconsistency in how Vegetation Management is done. Possibly related to who is the contractor doing the work.
- How is vegetation management done for Municipal Utilities?

Small Business Advocate
- Clarify why an edge of ROW tree is topped by NS Power instead of removed
- Why are transmission ROW’s managed different than distribution ROW’s?
- What vegetation management practices are most effective for the Arthur type conditions? Would like to see an analysis of this as part of the stakeholder process
- Will widening ROW’s eliminate the potential for trees to fall into power lines?
- What types of trees fell into lines during Arthur?
- What types of transmission events occurred during Arthur?
Consumer Advocate

- How will customers be asked to pay for Vegetation Management or other initiatives? Are there cost sharing options?

Industrial Group

- Similar concerns to the Consumer Advocate

NSDOE

- Undergrounding power lines is an issue and DOE would like to discuss costs of undergrounding as part of the stakeholder process
- There is undergrounding related info already available on Tomorrow’s Power website, but needs to be communicated/promoted to customers

Liberty Consulting

- NS Power has a very comprehensive vegetation management program, but a better action plan is needed to address legacy issues. In some cases a cyclical approach is needed
- ‘Storm Hardening’ is related more to infrastructure issues. Undergrounding is being done in other jurisdictions with the City helping to share the costs

NS Power

- Agreed to include context around ‘Storm Hardening’ in Terms of Reference
- NS Power is a member of Landscape Nova Scotia
- The ‘Right Tree in the Right Place’ is not the main focus of the stakeholder process, as it is not specifically applicable to vegetation management improvements for storms
- Topping hazard trees rather than completing removing them ensures the tree stays alive, but removes the danger to the power line. This will reduce the potential for hazard trees to fall into power lines, but does not completely eliminate the risk
- Current practice for ROW widths:
  - 69 kV – 20 m
  - 138 kV – 30 m
  - 230 kV – 40 m
  - 345 kV – 50 m
- NS Power will bring provincial map of 69kV lines to one-on-one meeting with UNSM
- ‘Compatible trees’ mean the tree won’t grow tall enough to reach the power line. If the wires are lower (secondary) then a shorter tree is required. Mandate is that no vegetation will encroach on the power lines from underneath.

- Municipal Utilities are public utilities and perform their own Vegetation Management.

**Next Stakeholder Meeting**
Will be held on December 11 from 9:00am to 12:00pm at the Westin Hotel in Halifax.
2014-12-12 Full Stakeholder Meeting Minutes

Present

<table>
<thead>
<tr>
<th>Small Business Advocate</th>
<th>Alex Cochis – via WebEx</th>
</tr>
</thead>
<tbody>
<tr>
<td>NS Transportation and infrastructure Renewal (TIR)</td>
<td>Mark Peachey</td>
</tr>
<tr>
<td>NS Department of Natural Resources (DNR)</td>
<td>Don Cameron</td>
</tr>
<tr>
<td>HRM</td>
<td>Angus Doyle, John Simmons, Kevin Osmond, John Charles</td>
</tr>
<tr>
<td>Union of Nova Scotia Municipalities</td>
<td>Betty MacDonald, Lyle Goldberg</td>
</tr>
<tr>
<td>NS Department of Energy (DOE)</td>
<td>Peter Craig</td>
</tr>
<tr>
<td>The Liberty Consulting Group (on behalf of UARB)</td>
<td>Larry Nunnery, John Sherrod – via WebEx</td>
</tr>
<tr>
<td>NS Power</td>
<td>Matt Drover, Greg Blunden, Paul Casey, Dave Rodenhiser, Bev Ware, Rob Young, Linda Lefler</td>
</tr>
</tbody>
</table>

Items to issue to parties from this meeting

- Updated Issues List
- PowerPoint Presentation on Issues list

Items requested at this meeting

- Analysis of effectiveness of Vegetation Management practices in preventing Transmission outages; specifically related to the transmission lines that were out during Arthur
- Information from NS Power and UNSM in preparation for the NS Power - municipalities meeting in Truro on January 9.

Minutes

Matt Drover and Rob Young went through the Issues list with the aid of a powerpoint presentation.

Comments from group:

HRM
- Right tree in the right place is utility-centric. Trees by the roadway meet resident’s needs more than trees in the back yard. Aesthetic values higher.
- Most developers are members of the Canadian Society of Landscape Architects. Trees need to be included in the concept plan but often they are an afterthought. If trees are
planned ahead of time perhaps the conflict with power poles could be avoided. HRM is looking at amending the subdivision bylaw. NSHBA, NS Power and other groups should participate in a committee to discuss issues like this as they plan placement of trees as well.

- When power poles originally installed, were the ROW’s clear of trees?

**NS Power**

- In most cases ROW’s were clear of trees when power poles originally installed.
- Arthur related outages were due to trees too close to the power lines.
- It was many healthy trees that broke; they were hazard trees, but not danger trees. It was the trees as shown on the right of the Roadside Management slide that caused the outages.

UNSM asked if there was a risk of flooding if clearing is done near a watercourse?

**NS Power**: we maintain a buffer zone near streams.

SBA asked what it means to “re-establish distribution right of way?”

**NS Power**: it is about the growth under and to the side of the road ROW. Re-establishing or reclaiming is needed to cut all the incompatible vegetation. Cutting from the ground to the sky. It is a 20 foot clearance on each side of the ROW, since 2003.

**Tree caused outage slide**
SBA requested the study of effectiveness in avoiding storm outages of the hazard tree program on transmission segments, specifically affected by Arthur. Also, how many landowners were contacted in the cycle before Arthur and what was the response?

**NS Power**

- Will provide this analysis for the next meeting, as we had taken the previous request mean a distribution analysis. 100% of the Transmission outages were caused by off-ROW trees.
- 90% of the transmission outages during Arthur were caused by trees and off the tree related outages, 100% were due to off-ROW trees.
- A hazard tree is any outside-ROW tree tall enough to fall on the line. They are identified by condition, way of growth (leaning) and rotting. A danger tree is in the ROW, already in a dangerous zone; requires action immediately.
- During Arthur, many trees that fell weren’t hazard trees, just tall but healthy trees.

HRM noted that for red spruce trees, even if they are healthy, it’s the species that is the issue.

**NS Power**

- The 69 kV ROW widening is not done by species. The intent is to decrease the number of trees that are capable of falling on the transmission line. Most of the ROW’s are bounded by soft wood forests and are considered trees that could fail. It’s a question whether a 20 m ROW is wide enough.
- Landowners ask about topping the trees instead - removing the crown which will cause the tree to blow over. Next stakeholder meeting we will talk about the 69 kV program.
- With DNR, NS Power wants to get an understanding of harvest lots near transmission lines. NS Power will harvest trees close to wires for the woodlot owner, but sometimes they are not aware of this (small woodlot owners)

DNR indicated that 70% of woodlots in Nova Scotia are privately owned, and DNR has no role there. For Crown land, they know in advance and will give notice to NS Power.

NS Power will work with DNR to try to expand reach.

SBA asked about the reclaiming the ROW slide.

**NS Power**: in Cumberland County we have done reclaiming and it decreased the time to restore an outage.

UNSM asked if that was in consultation with the municipality?

**NS Power** indicated that it was mostly with TIR.
DNR

- There is a 20 metre buffer around water courses. There is no requirement otherwise for SMZs (Special Management Zones). When DNR educates landowners, it’s to have wider green belts, cut hazard trees, and leave smaller growth.
- There was a tree committee in Truro, which was a cooperative project and worked well.

NS Power: the 20 meter buffer is not an issue, but landowners may leave trees because they are not confident to cut near a power line.

UNSM: how much is NS Power spending on tree trimming. NB Power has increased vegetation management.

NS Power is currently spending $10.4 million annually on vegetation management. Changes to the spending or a new proposal will be an outcome of this process. If the program is increased, there will be an effect on rates.

Department of Energy: undergrounding should be discussed at the January meeting.

HRM: NS Power initial Arthur report gave information on shielded cable – is that still part of the conversation?

NS Power: there are a few technologies related to covered cable; rubber shielded or Hendrix cables, but the trees need to be trimmed to the same clearance. Sometimes used to meet other design needs, for example, Keltic Drive in Sydney.

Liberty – ROW Management slide – is there a different ROW standard for 1-phase or 3-phase?

NS Power: The picture on the left-hand side of slide is 3-phase and is inadequate from a standard point of view. The right-side of the slide is adequate for a 1-phase line. Sometimes inconsistency is fine, but not a disparity of service between urban and rural.
Note: Slide 9 is customer hours not outages.

Round table

UNSM: the municipalities will raise issues other than Vegetation Management at January 9 meeting in Truro and we will have to ensure that the conversations come back to VM.

DNR (per conversations Matt Drover):
- DNR will supply some info from harvester contractors on where harvests occur.
- NS Power will join DNR education sessions for woodlot owners.
- DNR will work with NS Power to discuss options for acquiring land permits on crown land

Next steps

- Individual meetings will be scheduled with TIR and HRM.
- Municipalities meeting in Truro scheduled for January 9.
- Next larger stakeholder meeting will be scheduled for January 13.
M06321 Vegetation Management and Storm Hardening

**Union of NS Municipalities Workshop – Truro Holiday Inn**
January 9, 2015

**In Attendance:**

<table>
<thead>
<tr>
<th>Unit Name</th>
<th>Job Title</th>
<th>First Name</th>
<th>Last Name</th>
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<tbody>
<tr>
<td>Town of Port Hawkesbury</td>
<td>Chief Administrative Officer</td>
<td>Maris</td>
<td>Freimanis</td>
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<tr>
<td>Town of Truro</td>
<td>Councillor</td>
<td>Tom</td>
<td>Chisholm</td>
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<tr>
<td>Town of Truro</td>
<td>Director of Public Works</td>
<td>Andrew J.</td>
<td>MacKinnon, P.Eng.</td>
</tr>
<tr>
<td>Town of Truro</td>
<td>Urban Forestry Coordinator</td>
<td>Andrew</td>
<td>Williams</td>
</tr>
<tr>
<td>Town of Westville</td>
<td>Superintendent of Public Works &amp; Water/Wastewater Services</td>
<td>Samuel</td>
<td>Graham</td>
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<tr>
<td>Town of Wolfville</td>
<td>Director of Public Works</td>
<td>Kevin</td>
<td>Kerr, P.Eng.</td>
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<tr>
<td>CBRM</td>
<td>Manager – Public Works North</td>
<td>Louis</td>
<td>Ferguson</td>
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<tr>
<td>CBRM</td>
<td>Manager, Public Works East Division</td>
<td>John</td>
<td>Phalen</td>
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<tr>
<td>CBRM</td>
<td>Manager, Public Works Central Division</td>
<td>Allan</td>
<td>Clarke</td>
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<tr>
<td>County of Colchester</td>
<td>Deputy Mayor</td>
<td>Bill</td>
<td>Masters</td>
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<td>Tom</td>
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<td>Adams</td>
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<td>Deputy Warden</td>
<td>David</td>
<td>Clark</td>
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<tr>
<td>Department of Natural Resources</td>
<td>Regional Forester</td>
<td>Donald</td>
<td>Cameron, BScF, RPF</td>
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<tr>
<td>Environmental Sciences—Dalhousie University</td>
<td>Assistant Professor</td>
<td>Carol</td>
<td>Goodwin</td>
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<tr>
<td>Halifax</td>
<td>Planner</td>
<td>John</td>
<td>Charles</td>
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<td>Halifax</td>
<td>Urban Forester/Acting Superintendent of Parks</td>
<td>John</td>
<td>Simmons</td>
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<tr>
<td>UNSM</td>
<td>Policy Analyst</td>
<td>Lyle</td>
<td>Goldberg</td>
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<tr>
<td>UNSM</td>
<td>Municipal Sustainability Coordinator</td>
<td>Debbie</td>
<td>Nielsen</td>
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<tr>
<td>NS Power</td>
<td>Senior Manager</td>
<td>Matt</td>
<td>Drover</td>
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<td>NS Power</td>
<td>Forestry Manager</td>
<td>Rob</td>
<td>Young</td>
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<td>Regulatory Council</td>
<td>Brian</td>
<td>Curry</td>
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<tr>
<td>NS Power</td>
<td>Senior Communications Advisor</td>
<td>Beverley</td>
<td>Ware</td>
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</tbody>
</table>
Items to issue to parties from the workshop:

- Summary of NS Power Vegetation Management Program
- Rob Young’s Presentation on Vegetation Management

Minutes

- Matt Drover (NSPI) gave an overview of the Vegetation Management Stakeholder engagement process and the timelines involved.

- Rob Young (NSPI) gave a presentation on the current vegetation management practices that are conducted at NS Power and an overview of the program itself.
- A question was asked regarding options for installing underground power lines rather than trimming trees? NS Power responded that they are not opposed to installing underground lines but there is an incremental cost to install new power lines underground. Not to mention all of the existing overhead lines that would still feed the new underground lines. From reliability standpoint undergrounding power lines is not a cost effective solution.
- A discussion occurred regarding NS Power interaction with municipalities when vegetation management is happening in their area. District of St. Mary’s indicated they have had great success with meeting with NS Power before prior to work being done. NS Power indicated that this workshop is a start of a dialogue between NS Power Forestry department and UNSM. The plan is to meet on a more regular basis going forward.
- A question was asked regarding the mitigation of hazard trees and why they are being topped and all branches being removed? NS Power responded that hazard trees on the edge of power line right-of-ways are topped so that they are not tall enough to fall into a power line during a storm and cause an outage.

- Halifax Regional Municipality (John Charles and John Simmons) gave a presentation on their Urban Forest Management plan and talked about the various ways they interact with NS Power.
- A discussion was had regarding street trees and the value they bring to a municipality. Most municipalities agreed with HRM.
- Most municipalities indicated that it would be difficult for them to have a similar vegetation program as HRM due to their size.

- The Town of Truro (Andrew Williams) gave a presentation on Truro’s vegetation management program and the interactions that they have with NS Power.
- Andrew urged all municipalities to have a similar program to Truro.
- Andrew indicated that in some cases Truro’s vegetation objectives may not align with NS Power’s objectives, but he works closely with the NS Power Forestry Coordinators and they often come to an agreement that benefits everyone.
- The Town of Yarmouth was scheduled to give a presentation on their program, but due to the weather had to send their regrets.

- Lunch

- After lunch NS Power discussed their recommendations for the outcome of the Stakeholder Engagement process:
  1. Develop a comprehensive plan for widening 69kV transmission right-of-ways throughout the province that would focus on the criticality of the transmission line and take into consideration urban requirements, customer requirements and any other factors that affect the delivery or use of the power line. Increased right-of-way widths would be recommended in some cases, which involves obtaining easements from property owners and the cost to physically widen the right-of-way.

  2. The current budget for NS Power’s transmission and distribution vegetation management program is $10.4M annually, which at the current rate of will take about 30 years to get to a sustainable level of vegetation management. NS Power is proposing to recommend increasing the annual budget by an agreed upon amount, which would also increase power rates, but would allow NS Power to get the program to a sustainable level much faster.

- NS Power then led a workshop for the remainder of the afternoon where each table discussed their responses to three questions posed by NS Power:
  1. How much of an increase in power rates would municipalities be willing to agree to in order to complete our vegetation management program faster? Ultimately improving reliability sooner.
  2. Would municipalities be willing to work with NS Power to promote increases in 69kV ROW width standards? Are you comfortable with our recommendation of a comprehensive plan using criticality of the transmission line as a driver?
  3. Given that branches and limbs in close proximity fail during wind events, what is your position for establishing trees in the same right of way space as power lines? Is the need for an urban forest a significant priority even though there may be a significant impact on reliability under storm conditions? What activity has your town taken to mitigate the potential for outages while maintaining a healthy urban forest?
M06321 Vegetation Management and Storm Hardening

2014-01-13 Full Stakeholder Meeting Minutes

Present

| La Capra (on behalf of Small Business Advocate) | Alex Cochis – via WebEx |
| Small Business Advocate                      | Ellen Burke – via phone |
| Consumer Advocate                            | Erin Cain |
| Individual                                   | Queenie Acker- via phone |
| Halifax                                      | John Simmons |
| Union of Nova Scotia Municipalities          | Lyle Goldberg |
| NS Department of Energy (DOE)                | Peter Craig |
| The Liberty Consulting Group (on behalf of UARB) | Larry Nunnery, John Sherrod – via phone |
| NS Power                                     | Matt Drover, Rob Young, Paul Casey, Brian Curry, Bev Ware, Linda Lefler |

Items to issue to parties from this meeting

- Issues List
- Hendrix Feeder analysis
- PTS Arthur Transmission analysis

Items requested at this meeting (documented in Issues List)

- Cost of Hendrix installation (will be discussed at next meeting)
- Historical data on the cyclic Vegetation Management on the transmission lines affected by Arthur
- Vegetation Management strategy and IVM plan for transmission and distribution systems

Minutes

Item 1: Matt Drover and Rob Young went through the Issues list, speaking to the following remaining items.

**UNSM**

- **UNSM does not speak for municipalities directly.**

NS Power had a session on January 9 to which all municipal representatives were invited, and UNSM has assisted in providing information and contacts. This workshop was the beginning of a dialogue and the members of UNSM – regular meetings will be held going forward.
- *How much of a rate increase would be required for an increased NS Power annual vegetation management program?*

NS Power presented an indication of the upward pressure on rates for a 15 million dollar annual increase in spending.

**HRM**
- Recommended creating a committee with NS Power and various agencies to oversee 'Right Tree in Right Place' and vegetation in new subdivisions

- *Provide more context on options like tree wire, covered feeder cable and Hendrix conductor*

A summary of the experience with Hendrix conductor was provided. While the Hendrix cable has performed well, outages were still caused by adjacent lines not using Hendrix. NS Power is continuing to assess it.

**SBA**
- *Would like to see an analysis on the vegetation management that has been done on the transmission lines that were affected during Arthur.*

The analysis was provided and discussed. NS Power will provide historical data on the cyclic Vegetation Management on these lines, and meet with Alex Cochis to discuss the assumptions.

**Liberty**
- *Some power utilities have different ROW standards for single-phase lines vs. three-phase lines*

  - Lyle Goldberg asked if clear cutting behind poles limits NS Power’s ability to do work, and is there any discussion with DNR to modify clear-cutting rules. Rob Young indicated the buffer is only for waterways, and most landowners want to cut to the road. NS Power is in favour of increased buffer zones near highways with power lines. This will be included in the final report.

  - Peter Craig asked about outages caused by “in-Right-of-Way” trees vs “off-Right-of-Way trees”. Ninety percent of the transmission outages in Arthur were caused by trees and 100% of the tree events were caused by off-Right-of-Way trees.

  - John Simmons asked about the criteria for hazard trees. Even healthy trees of certain species can be hazardous, for example red spruce, trembling aspen. This is the type of vegetation on Right-of-ways NS Power is looking to widen. John emphasized that they agree with removed spruce but don’t agree with cutting all backyard trees. (Caledonia Road example).

  - Rob Young provided clarification on the Hazard Tree definition ???
Item 2: Larry Nunnery asked about other Liberty recommendations. Matt confirmed they will also be reflected in an Action plan.

Item 3: Discussion of workshop with municipal reps (UNSM) on January 9. The municipalities do not seem to support a rate increase. Feedback indicated town and rural areas have different ideologies for clearing. Main streets need special consideration, and different towns have different abilities. Cost sharing should be equitable. The municipalities would welcome more visits and their Annual general meeting is a good place to visit as it will have 300 officials in attendance – NS Power agreed. Municipalities are interested in seeing the MOU between NS Power and HRM when concluded and seeing which of the approaches might be adopted for their areas.

Item 4: Final Report Recommendations

- **Recommendation 1:** Develop a comprehensive plan for widening 69kV transmission right-of-ways throughout the province that would focus on the criticality of the transmission line and take into consideration urban requirements, customer requirements and any other factors that affect the delivery or use of the power line. Increased right-of-way widths would be recommended in some cases, which involves obtaining easements from property owners and the cost to physically widen the right-of-way.

- **Recommendation 2:** The current budget for NS Power’s transmission and distribution vegetation management program is $10.4M annually, which at the current rate of will take about 30 years to get to a sustainable level of vegetation management. NS Power is proposing to recommend increasing the annual budget by an agreed upon amount, which would also increase power rates, but would allow NS Power to get the program to a sustainable level much faster. NS Power will obtain stakeholder input about a plan to increase spend for Vegetation Management.

- **John Simmons** - qualified support, but not for a rate increase

- **Peter Craig** – is the current budget inflation adjusted? *NS Power: a standard increase in the budget will relate to escalation in contracts*

- **Alex Cochis** – what internal criteria will NS Power use to allocate spending with municipalities? Do the municipalities identify areas of priority for Integrated Vegetation Management? *NS Power: there are three ways Vegetation Management is executed:
  
  i. **Reliably in relation to observed poor feeder performance (reactive). This spend has dropped over time due to improvements in reliability**
  
  ii. **Vegetation overgrowth**
iii. **Sustainability, managed from the ground up**

- Alex Cochis asked to see this strategy. *NS Power will send him the Vegetation Management strategy and IVM plan for transmission and distribution systems*

- Peter Craig pointed out only a General Rate Application (GRA) can increase power rates. *NS Power indicated they are trying to assess support of an increase in the vegetation management budget. The spending on Vegetation Management would be much greater than the amount spent on restoration after a storm, because it is designed for long term power reliability improvements*

Item 5: Larry Nunnery asked if NS Power is meeting CSA Standard 22.3. *NS Power replied that in some cases it is not being maintained due to the funding that is required to manage all power lines in the province.*
Final Vegetation Management Group Stakeholder Meeting Minutes

| La Capra (on behalf of Small Business Advocate) | Alex Cochis – via WebEx |
| Small Business Advocate | Ellen Burke – via WebEx |
| Consumer Advocate | Erin Cain |
| Individual | Queenie Acker – via phone |
| NS Transportation and Infrastructure Renewal (TIR) | Stephen Maclsaac |
| Halifax | John Simmons, John Charles |
| Union of Nova Scotia Municipalities | Betty MacDonald |
| The Liberty Consulting Group (on behalf of UARB) | Larry Nunnery, John Sherrod, John Antonuk – via WebEx |
| NS Power | Matt Drover, Rob Young, Paul Casey, Brian Curry, David Landrigan, Bev Ware, Linda Lefler |

**Items to issue to parties from this meeting**

Draft NS Power Report to UARB
Verify number of km on Slide 4 for L Nunnery.
Any better available info for Steve Maclsaac on number of km adjacent to TIR ROW.

The following topics were discussed in the final group stakeholder meeting:

1. **Issues List**

Alex Cochis – easement question about right-of-way widening. The widening NS Power are proposing with our recommendation is more encompassing than edge of ROW hazard tree trimming. This would involve the removal of healthy trees as well to mitigate against fall-ins during storms

The issues list was closed.

2. **Update on NS Power and TIR meeting**
   - focused on ways to make sure the two groups communicate on regular basis and priorities for work plans are discussed
   - TIR Operations managers to meet regularly with NS Power forestry managers

3. **HRM – Service Agreement discussion**
the existing MOU between NS Power and HRM will be replaced with a Service Agreement that is more encompassing and allows for cost sharing options.
- Street Tree committee with stakeholders will be created to focus on right tree in the right place and species of trees that are compatible with power lines.

4. Recommendation 1:
NSPI will develop a comprehensive plan for widening 69 kV line corridors. The highest priority for widening involves line sections where adjacent land clearing operations have left a thin strip of trees. This plan will be focused on a number of prioritization factors and will cost $36M to implement – which would be considered a capital expenditure.

Alex Cochis - would like to see comparison of edge Vegetation Management approach which we had pursued until this point and was the subject of spreadsheets updated for SBA. NSPI had good reliability from this approach. Edge of ROW management vs km costs of general widening.

Rob Young – costs for harvesting are same as costs for edge, but edge has no costs for and acquisition for easements (land agreements, land agents, land valuation). Also, the widening with a harvester- as opposed to individualized with bucket truck which can be more expensive.

Paul Casey - This proposal is more sustainable than what we do now – it focuses on all trees in the ROW (including healthy trees) and does not just target edge of ROW trees.

Steve MacIsaac – who will do the work?

Rob Young - 2 foresters and 4 forestry coordinators at NS Power and contractors with forestry technicians.

Steve MacIsaac - DOT right of ways – access points, traffic control, etc. Is this all considered?

Rob Young – Yes, and NSPI will also go through people’s property and access roads, etc.

Steve MacIsaac - What about people who don’t want you to take trees down along properties. Do you expropriate?

Rob – Also where there are sensitive habitats, so we manage with individual tree removal, visit in another way.

Steve MacIsaac – how much of widening will be along provincially owned roads?

Rob – typically not on roads, more remote, forested landscape, back of agricultural properties.

Steve MacIsaac – debris, large material – isn’t it a hazard for forest fire?

Rob – used as brush matting for machinery, corduroy on softer ground, or property owner will get it themselves.

Steve MacIsaac - how many hectares of timber?

Rob - 5000 acres.
Matt- sorting and details for different structure types, criticality, etc. will be in the plan

Alex Cochis – for capital expenses NSPI gets a return on it - is the ROW widening capitalized?
Matt- Yes, as in all capital as widening extends the life of the ROW asset
Alex – what is expensed?
Matt - ROW widening is capital. Regular vegetation work in existing ROW is operating expense ($10.4 million/year)
Alex – What about trimming along the side of a ROW?
Matt- if working within the existing ROW its O&M

Larry Nunnery - Slide 4 – 1640 km was the figure I had
Rob – the 69 kV is 1400 km
Larry – is that a subset of the total 69 kV?
Rob Young – we will get back to you (NS Power has responded in a DR to Liberty on this)
Larry - are you widening area you already widened, are you taking more this time?
Rob – yes, the widening area is being expanded
Larry – existing costs was for only widening one edge but now you are doing two edges
Rob – yes
Larry - How much of the 1036 km is in the valley?
Rob – the majority of it

5. Recommendation 2:
   Develop a comprehensive plan for reclaiming and/or widening the overgrown ROW corridors.

Option 1: maintain status quo

Steve MacIsaac – is there growth in option 1?
Matt – yes, it is factored in
Steve - if it is in TIR ROW – our Department has a stance on use of pesticides. Will have to coordinate the use of them together. In last 5 years in west TIR have only used herbicides twice in small amounts. When NSP uses herbicide, TIR receives complaints from public.

Matt – This is an ongoing dialogue, Option 1 is status quo.
Steve – If you expand program, we need to address this material in our ROW together, we will need to invest some of our own funds to address it

Larry – Do you need to reclaim 18,000 km? You had said just 10,937 km needs asset renewal
Matt – the entire ROW length, some of it doesn’t have trees or vegetation. The 10,937 km is a rough number based on the estimated amount that does not have vegetation.

Option 2: increase the annual budget, which would affect rates
Option 3: defer or potentially capitalize the costs to increase the vegetation program now and pay it back over time

Betty MacDonald – explain more?
Matt – Spending more now improves reliability now and then spending less later keeps rates stable

John Simmons – proactive approach, cyclic – reduces rates over time. Proactive would reduce costs 40%. This is a great idea

Larry - Do you think existing program is sustainable at 10.4 million? For those 10,000 km you aren’t doing anything unless it’s an emergency. Your existing plan is not sustainable.

Matt - it’s difficult to keep on top of the program over 32 years. Option 2 and 3 get to sustainable rate faster
Steve – how quick could you clear the 1000 hectares?
Matt – with an increase of $25M a year, a sustainable level could be reached in about 5-6 years
Betty – have you done a rate analysis?
Matt – options
1. No rate increase
2. Increasing budget by $15M would be approximately 1.5 %
3. No net increase – it would take time but overall the approach would be net zero.

Larry - About 70% of your lines are single phase. You are widening the ROW for single and 3 phase on same widths. What about not widening single phase as much to save expense?

Matt – We will assess case by case, in some cases may not have to increase the ROW for some single phase – this will be worked out in detailed budgeting.

John Simmons – what about spending on hazard tree impacts? Would this be reduced?
Rob – yes it would.
John Charles - What are other regulatory mechanisms exist?
Dave Landrigan - Spend $7.5 M a year in addition to $10.4 M in 9 years, then $10.4 is reduced to $6M for a long period of time so that the spare room in the budget pays back the amount you have accumulated through a deferral account. Or capitalize the increase in spend, because a 35 year life to these improvements you can depreciate. Or other approaches – hybrids balance between these options.

Alex – from the storm report, were most outages from Transmission or Distribution failures?
Paul – We lost transmission lines during Arthur, but had extensive distribution damage as well – transmission outages contributed to the length of the outage, but majority of outages were in distribution.
Alex - What about edge widening on distribution ROW’s?
Rob – yes, distribution ROW widening is capitalized as well. It’s administered very similarly, to Transmission ROW widening. It’s done by permission only. Areas in the province that were already widened have performed better in general but weren’t in the main path of Arthur to demonstrate.

Paul – NS Power has presented the $98M gap on distribution reclamation. Is there any support for the work we need to do? This is about pace.

John Simmons – Agree with distribution approach – makes sense, but looking at the fall-ins on transmission, address trees of risk instead of clear-cut option.
Rob – we have a hazard tree program annually on 69 kV and other transmission ROW’s. But like Arthur or hurricanes show, that activity doesn’t storm harden the system. In a storm it’s hard to determine which trees will fail (even healthy trees fail), so it’s a mitigation approach, there will still be hazard trees even after widening.

Paul – We are trying to prevent 6 day and longer outages, there will always be outages, but we need to build sustainable ROW’s and prevent the expensive damage and long outages. Case by case – for lines deep off road in woods, we need a different clearing than side of road, difference between 3 day outage and 4 hour outage. No one size fits all.

Steve – operationally, heights of trees are varied. Standard width ROW – what about basing it on height of trees in the area? Cape Breton trees are max 15 metres, but in south shore 25 metres.
Matt – Good point, which is why each Transmission line will be looked at separately.
Matt – the Transmission outages cause the first couple outage days, after that it was distribution outages

Alex - What is the final process, who will see the draft report?
Matt - we will ask the UARB for an extension of a week due to the winter storms so we can issue draft to stakeholders.

Alex Cochis – your other improvements based on Liberty suggestions will help shorten outages, address model with Transmission outages etc. and address scenario planning differently

Paul – yes, but still had many trees on one feeder in Arthur, which is why vegetation management is such a significant focus.

6. Next steps

Matt - Report out by Friday Feb 6 to all stakeholders. Stakeholders will have until Tuesday Feb 10 to submit comments, then NS Power will file the following Friday, Feb 13. Then the UARB process resumes.
7. Round table

Betty – will update the UNSM board on Friday
Matt- will work ongoing with UNSM

Erin Cain – the main thing – option 3 – The CA would like a chance to look at it more closely, our preference is never an increase in rates, so option 3 is worth looking at.

John Simmons – appreciate the opportunity

John Charles – open question to all – opportunity to comment initially on the report - do we reserve judgment to respond as intervenors to respond at some point in future. Is NSPI looking for an endorsement of the report form stakeholder group?
Dave L – yes, we would like to know if there are any objections, the report isn’t the be all end all – won’t have a finite number of recommendations that all sign off on. The report should not handcuff you in positions on material items.

Betty – we can’t bring every municipality to the table on this, our intent is to say all efforts made. UNSM will send to all members, but we can’t say we endorse
Matt - any UNSM comments helpful

Steve Maclsaac – capitalizing and depreciating – my understanding of depreciation is a fixed amount every year, 20% per year, the quicker you get it done the less it costs to borrow money so he favors Option 3. Secondly, for TIR operations, how many km will be adjacent to TIR ROW, the TIR gets pressure to clear its ROWs. We will want to put a push forward to keep up, need to bring to deputy minister.
Paul – We use straight line depreciation over life of asset – Transmission line 35 years. ROW widening becomes part of the asset so we depreciate over life of transmission line.
Paul – There are gates to go through to determine if an expenditure is capital, and the threshold very small to denote as capital
Dave L /Paul – to capitalize would have to pass hurdles, accountants will have final say
Steve – do you have a summary of km adjacent to TIR ROW?

Rob – the majority of distribution is in road ROW, most is rural road ROW. We contact property owners and work with TIR – will increase frequency of meetings. We do send notifications monthly. Both single phase and 3 phase feeders are on road ROW’s. Ground clearing, herbicide, mowing – are all part of Integrated Vegetation Management. Span by span approach depending on what is growing there, as it’s a different species mix in locations.

Adjournment
## Widening Cost Analysis for Increasing Provincial 69 kV from 20m to 30/40m

### Description of Work By Line

<table>
<thead>
<tr>
<th>Area</th>
<th>Total Length (km)</th>
<th>Total Widen Potential (km of line)</th>
<th>Linear Length (km of forest edge)</th>
<th>Clearing Width One Side (m)</th>
<th>Total Widen Area - 2 Sided (acres)</th>
<th>Total Widen (acres)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Provincial 69 kV</td>
<td>1400</td>
<td>1036</td>
<td>2072</td>
<td>10</td>
<td>5120</td>
<td>5120</td>
</tr>
</tbody>
</table>

### Cost Analysis for Land Acquisition

<table>
<thead>
<tr>
<th>Average Number of Properties / km</th>
<th>Estimated Total Number of Properties</th>
<th>Easement Cost/customer $1k/ea (Sk)</th>
<th>Average Property Size (acres)</th>
<th>Cost/acre ($)</th>
<th>Total Customer Cost ($k)</th>
<th>Land Agent Cost ($500/cust) ($k)</th>
<th>Consultant Evaluation Estimate ($k)</th>
<th>Total Property Cost ($k)</th>
</tr>
</thead>
<tbody>
<tr>
<td>7</td>
<td>7252</td>
<td>&lt;1acre</td>
<td>0</td>
<td>0</td>
<td>7,252</td>
<td>3,626</td>
<td>250</td>
<td>11,128</td>
</tr>
</tbody>
</table>

### Cost Analysis for Forestry Work

<table>
<thead>
<tr>
<th>Equipment</th>
<th>Cost ($/day)</th>
<th>Line Length Completed / day (km)</th>
<th>Estimated Number of Days</th>
<th>Cost /km</th>
<th>Cost for Linear Length ($k)</th>
<th>Total Harvest Cost ($k)</th>
<th>Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>Harvester</td>
<td>2,000</td>
<td>0.5</td>
<td>2072</td>
<td>4,000</td>
<td>4,144</td>
<td>24,864</td>
<td>Under typical forestry conditions</td>
</tr>
<tr>
<td>X/C Bucket</td>
<td>2,000</td>
<td>0.1</td>
<td>10360</td>
<td>20,000</td>
<td>20,720</td>
<td></td>
<td>Where access permits</td>
</tr>
</tbody>
</table>

Total Cost of Property Acquisition and Harvest estimated at approximately ($M): $35.99

**NOTE 1:** Assumption that all properties are less than an acre. Additional costs for land rights are required for larger holdings.

**NOTE 2:** Assumption that the land on both sides of the right of way is one property.

**NOTE 3:** Assumption that the Land Agent does not have to make repeated visits to negotiate settlement.

**NOTE 4:** Total property valuation (appraisal of forest land) is estimated at $5.25M

**NOTE 5:** The harvester is predicted to complete only half the entire length, a cross country bucket will be required for the balance.