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Coquitlam For Council

September 12, 2016

Our File: 12-6300-20/HZ01/2016-1
Doc #: 2330431.v1

To: City Manager
From: General Manager Parks, Recreation & Culture Services
Subject: Results of Tree Risk Assessment in Northeast SPEA's
For: Council

Recommendation:
That Council:

1. Authorize the expenditure of up to \$650,000 from the Extreme Weather Fund to complete the wind-firming treatments in the Northeast Streamside Protection and Enhancement Areas ("SPEAS") including tree removal, debris management and tree planting;
2. Authorize the City's consultant(s) to enter onto private properties in Northeast Coquitlam as necessary to finalize outstanding Tree Risk Assessments; and
3. Direct staff to bring forward an operating request for the 2017 budget process to address the growing service needs in Urban Forestry.

Report Purpose:

The Northeast SPEA Tree Risk Assessment is well underway with only a small number of private covenant areas not yet inspected. This report seeks Council authorization to complete this important project. Staff proposes that Council authorize the expenditure of funding required to implement the recommendations in the Northeast Coquitlam SPEA Wind-throw Hazard Assessment. Staff has also reviewed budget and resource capacity in Urban Forestry services to determine the additional resources needed to meet the sharp increases in demand in this area.

Strategic Goal:

The actions proposed in the report support the strategic goal of enhancing the sustainability of City services and infrastructure.

Background:

A staff report entitled, "Initiatives to Manage Trees within SPEAs in Northeast Coquitlam" was received by Council at the May 30, 2016 Council meeting (Attachment 1). This report outlined the challenges with the stability of trees in these SPEAs and recommended actions for both managing trees in existing SPEAs and options to consider for future SPEAs in the Northeast. In response to this report Council directed staff to:

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1. Initiate the completion of a comprehensive Tree Risk Assessment ("TRA") of forested Streamside Protection and Enhancement Areas ("SPEAs") in Northeast Coquitlam utilizing the Parks operating budget, with an estimated cost of \$70,000;
2. Bring forward the completed TRA, along with a budget request for funding to implement the TRA recommendations, including hazard tree removal and compensatory tree planting; and
3. Investigate and prepare, for Council consideration and consultation with the development industry, policy options and/or regulations for future development applications, such as establishing a mandatory SPEA maintenance period for developers before these lands may be transferred to the City.

This report is intended to report back on the TRA initiatives noted in actions 1 and 2 above. Staff has since hired a Consultant to complete the TRA. The TRA process began in July and is nearly complete with only a small number of private property covenant areas remaining to be assessed. In regards to actions 3 above, Planning and Development staff, with assistance from Parks, Recreation & Culture (the "PRC"), will begin work on the policy options for future development applications this fall, and a future report will be presented to Council.

Discussion/Analysis:

Results of the Tree Risk Assessment

The Consultant, B.A. Blackwell, was tasked with the assessment of all SPEA areas outlined in Attachment 2 and found that the stability of each stand did vary significantly based on a number of factors. The Consultant conducted a TRA as part of their overall Windthrow Hazard Assessment (WHA), which also involved an analysis of forest stand composition, underlying soils and site conditions. There were several sites where a small number of trees are recommended for removal while other sites will require a significant number of tree removals to make the area windfirm.

Attachment 3 provides an excerpt of the preliminary report from the Consultant, which is based on the completion of a sample of SPEAs as a basis for projecting the potential scope of work and cost to manage hazardous trees in existing SPEAs in Northeast Coquitlam. Rather than complete a full inventory for all SPEAs, the City has recommended this method to obtain as quickly as possible a reasonably reliable project scope, and a general estimate of the overall project and cost. This will enable the City to expedite the required hazard mitigation work in advance of the winter storm season.

To date, the Consultant has evaluated approximately one third of total SPEA areas to be assessed. The areas assessed demonstrate the need for a high level of intervention, noting that a majority of trees identified for removal are western hemlock, which have shallow root systems and have a higher

risk of wind throw, particular when located in steep ravine slopes, as root systems tend to grow along the slope and do not form strong roots. In summary, for the sample areas evaluated, the Consultant recommends for the removal of 218 trees and "wildlifing" or "snagging" of another 81 trees. The latter refers to the pruning and modification to a tree to eliminate its potential hazard, while retaining it within the ecosystem. This sample result (299 trees removed or converted to wildlife trees within a third of the study area), once applied and projected to the entire inventory of the SPEA areas, indicates that in the range of 900 trees will be impacted, with in excess of 600 hazard trees needing to be fully removed from City SPEAS.

The sample areas are only a guide, and the actual magnitude of hazard tree management work will vary across the inventory as the Consultant works through every part of the SPEA inventory. However, based on this projection, the anticipated cost for all tree work, debris management and subsequent tree planting to complete the required tree hazard mitigation is likely to be required will be in the range of \$650,000. This cost includes the work required both on City-owned parkland and privately owned SPEA covenant areas.

Outstanding Covenant Assessments

The scope of the project includes all Northeast SPEAs wholly or partially owned by the City as parkland. This includes the assessment of covenanted portions of SPEAs located on private property. Staff approached all 188 private property owners affected to secure written permission to enter onto their property to complete the Tree Risk Assessments. To date, the City has received signed consent forms from 178 of these property owners. Due to the interconnected nature of the SPEAs and the associated forests, it is critical that all of these areas are assessed comprehensively by our Consultant to develop a prescription for each SPEA that will optimize the potential to create a windfirm forested area. While City staff have the statutory authority to enter on to private property without the owners' or occupiers' consent, external parties like the Consultant team do not have the automatic right and must be specifically authorized to do so by Council. Section 16 of the *Community Charter* authorizes Council to grant such authority by resolution. To this end, staff recommends that Council resolve to permit the City's Consultant, to enter on to the outstanding 10 properties to complete the tree risk assessments.

Next Steps

Should Council direct staff to move to the implementation phase then the project would move forward with completion of the TRA by early Fall, and proceed to issuing a tender for the tree removal debris management and tree planting by October 2016. Staff intend to complete the tree hazard work, as well as debris management, by end of 2016, subject to weather-related delays.

Public Communications

PRC staff has worked closely with Corporate Communications to spread the word about the Northeast SPEA Tree Risk Assessment. These efforts included letters to affected residents, FAQ webpage, information bulletins and signage on roadsides and trailheads. Should Council approve the expenditure to complete the work outlined in the Consultant's report, then staff will move quickly into the next phase of the Communications Plan to ensure residents of the Northeast are fully aware of the upcoming work and why the work is required. Depending on the results of this process, staff will determine the level of additional consultation required, which may include more public notices and/or possibly an Open House, or even further information updates to Council.

Urban Forestry Budget and Resources

As noted in the May 30, 2016 report to Council, resourcing and budget pressures in the Urban Forestry area have risen sharply, and are anticipated to remain high given increased development in the Northeast. The City has already seen the annual number of requests for tree risk assessments climb from 800 per year to 1,800 per year between 2011 and 2016. This is in sharp contrast to the fact that the resources dedicated to these services have not increased over the past 15 years. Although the implementation of windfirming treatments in the Northeast SPEAs would help reduce demand for tree risk assessment within these areas, staff advise that the staffing and budget demands required to effectively undertake pro-active management of trees in the growing inventory of SPEAs will continue to grow, and as such additional operational resources in this area are needed. Staff therefore proposes to bring forward a service enhancement request for the 2017 budget process for Council consideration to address the need for resources and ensure effective management of public risks and appropriate response times for these services.

Financial Implications:

The cost for the contract came in at \$60,000, which was funded by the PRC operating budget in accordance with Council's direction on May 30, 2016. Based on sampling from SPEAS in Northeast Coquitlam for roughly one third of the entire inventory, the Consultant has identified an estimate of \$650,000 for a contractor to complete the full scope of required tree hazard mitigation work. Should Council direct staff to move forward to the implementation phase then staff recommends that funding be immediately allocated from the Extreme Weather Fund to enable this project to proceed. This fund currently has a balance of \$2 million, and is considered the appropriate funding source as the proactive actions and initiatives in hazard tree mitigation should reduce future extreme hazard and storm impacts in relation to trees. Finally, staff also proposes to bring forward a service enhancement request as part of the 2017 budget discussions for Council consideration in order to address service needs for the growing demands in Urban Forestry services.

Conclusion:

The assessment work completed to date by the Consultant has identified the need for substantial tree removal, debris management and tree planting in order to establish the Northeast SPEAs as windfirm and ecologically sustainable forest stands. Staff recommends that the Consultant's recommendations be implemented and that the required funding, which is expected to be in the range of \$650,000, be allocated to this project from the Extreme Weather Fund. This would mean significant visual changes in some SPEAs, but these areas will be replanted and will become healthy, windfirm riparian forests with high ecological value.

Staff also proposes that Council resolve to allow the Consultant's staff access to the small number of outstanding properties to finalize the Tree Risk Assessment portion of the project. Further work on possible policies to manage the transfer of SPEAS by developers to the City in order to better manage these assets will be completed and presented to Council in the future. Finally, a service enhancement request will be brought forward by staff as part of the 2017 budget process for Council consideration to ensure the City has appropriate resources in order to enable proactive and timely assessment and management of the City's SPEAs.



Raul Allueva, RPP

Attachments:

- Attachment 1 – May 30, 2016 Staff Report
- Attachment 2 - City-Owned SPEAs in Northeast Coquitlam
- Attachment 3 –Excerpt from the Northeast Coquitlam Preliminary Windthrow Hazard Assessment (B.A. Blackwell)

This report was prepared by Lanny Englund, Urban Forestry and Park Services Manager and Raul Allueva, General Manager of Parks Recreation and Culture and reviewed by Kathleen Reinheimer, Manager Parks, Sheena MacLeod, General Manager Financial Services, Wade Pierlot, Fire Chief and Kathleen Vincent, Manager Corporate Communications.

Coquitlam

For Council

May 24, 2016

Our File: 12-6300-20/TP01/2016-1

Doc #: 2237004.v2

To: City Manager

From: General Manager Parks, Recreation & Culture

Subject: Initiatives to Manage Trees within SPEAs in Northeast Coquitlam

For: Council

Recommendation:

That Council direct staff to:

1. Initiate the completion of a comprehensive Tree Risk Assessment ("TRA") of forested Streamside Protection and Enhancement Areas ("SPEAs") in Northeast Coquitlam utilizing the Parks operating budget, with an estimated cost of \$70,000;
2. Bring forward the completed TRA, along with a budget request for funding to implement the TRA recommendations, including hazard tree removal and compensatory tree planting; and
3. Investigate and prepare, for Council consideration and consultation with the development industry, policy options and/or regulations for future development applications, including establishing a mandatory SPEA maintenance period for developers before these lands are transferred to the City.

Report Purpose:

Staff proposes to undertake various actions to manage the tree inventory on SPEAs in Northeast Coquitlam, including completion of a comprehensive TRA using the existing Parks budget, and initiation of a review of best practices and measures to better manage the transfer of ownership of SPEAs to the City. Staff is also reviewing budget and resource capacity in Urban Forestry services in order to meet sharp increases in demand in this area.

Strategic Goal:

The actions proposed in the report support the strategic goal of enhancing the sustainability of City services and infrastructure.

Executive Summary:

Watercourse areas, and the adjacent natural corridors that form part of the watercourse areas, are protected by Federal and Provincial statute, and often are transferred to the City through development application approval as linear, forested Streamside Protection and Enhancement Areas (SPEAs). Recent severe weather events, including drought and winstorms, have highlighted the need to review the condition of trees within the dynamic and changing

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environments within SPEAs. Recent evaluations of several SPEAs in the Northeast confirm the need to re-establish a baseline inventory of conditions in SPEAs throughout Northeast Coquitlam. The City has seen a marked increase in requests from property owners adjacent to these SPEAs seeking risk assessments of trees at unprecedented levels in response to tree failures and changing conditions.

To respond to these new demands and conditions, staff will be immediately undertaking a comprehensive TRA of existing SPEAs, as well as necessary selective hazard tree mitigation, in Northeast Coquitlam, with the aim of presenting the TRA to Council prior to the summer break for approval of the required tree hazard mitigation and SPEA restoration work, including required budget, to be completed prior to the storm season in late fall. Staff also seeks to review policy and regulatory options to manage the transfer of ownership of SPEAs to the City from developers, and to review budget and resource levels in Urban Forestry activities based on the growing needs in this area.

Background:

The City has experienced tremendous growth in recent years and the vision for Northeast Coquitlam is rapidly being realized. There are many watercourses in this area of the City that are protected and often transferred to the City through development application approval as linear, forested Streamside Protection and Enhancement Areas (SPEAs). The SPEAs around these watercourses are determined by Qualified Environmental Professionals (QEPs) utilizing methods that meet the requirements of the Province of British Columbia's Riparian Area Regulations (RAR) under the Provincial Fish Protection Act. Developers in the Northeast have been hiring QEPs, submitting the appropriate reports, retaining the specified SPEAs and mitigating the hazardous trees that are identified at the time of development. One of the measures that must be determined by a Qualified Environmental Professional (QEP) as part of this process is the delineation of a wind firm edge for SPEAs, which is effectively actions needed to ensure that the new forest edge is stable based on the standards set by professionals involved. The intent of the wind firm measure is to ensure that the SPEA will remain intact over time to sustain the values of the SPEA and not be significantly degraded by loss of trees due to wind throw.

Unfortunately, over the past year, a number of recent severe weather events, including the 2015 drought and several frequent and significant windstorms, have brought attention to the changing stability and evolving conditions in SPEAs, and have resulted in a higher than usual number of tree failures. These tree failures have caused significant property damage and have put residents' safety at risk. There are likely multiple factors at play, but the trend has been significant to the point where there is a need for immediate action to proactively manage these changing conditions in order to effectively address public risks. These actions should be targeted to three areas, as discussed below: completion of a comprehensive re-assessment of existing northeast SPEA trees through completion of a TRA; management of how SPEAs are

transferred to the City by land developers; and re-evaluation of the need for increased budget and staff resourcing to meet sharply increasing service demands in Urban Forestry.

Discussion/Analysis:

Trees and Public Safety

Severe weather events in 2015 and the early part of 2016, including drought and severe winds, have highlighted concerns with the stability of trees in the retained SPEAs in the Northeast. As development in Northeast Coquitlam continues to proceed, the inventory of newly created SPEAs and the associated new forest edges continue to grow (Attachment 1). Though there have been some tree failures in these areas prior to 2015, the number rose sharply in the last year. Within the last year 49 trees have failed from these areas onto private property or onto public open spaces/roadways and 109 additional trees were removed from these SPEAs to address hazards identified through follow-up tree risk assessments. There were three cases in the last six months that the City is aware of where these trees fell and struck homes from the Burke Mountain Creek corridor alone. These cases were highly visible and the profile of this issue was further heightened by the tragic case in Port Moody where a tree failure resulted in a death. The public attention on this issue has resulted in an elevated level of calls to the City from residents living next to SPEAs requesting TRAs. In cases of drought, these corridors also may present fire risks that may be exacerbated and heightened in the absence of the necessary proactive management.

Transfer of Ownership of SPEAs to the City

As noted above, the City obtains the majority of properties within SPEAs as a condition of development, as these lands are protected by statute due to their environmental restrictions. The transfer of many of these SPEAs to the City in many cases is desirable, as these may include adjacent public trails, and otherwise possess natural, environmental, and aesthetic values that mandate the City's ownership. However, Provincial RAR requirements are subject to specific evaluation by QEPs, and these can vary over time as practices and measures evolve, often under pressure by developers to minimize or reduce riparian areas that limit developable lands. For example, what was previously a 30m setback requirement for developments under historical Provincial riparian requirements has now evolved to a situation where a 10m setback is not uncommon, where supported by measures in the SPEA that will, in the opinion of environmental professionals, meet the regulatory requirements intended to create a wind firm edge.

A key issue in this process is that, despite the efforts from regulatory staff and QEPs to establish zoning and subdivision requirements, and establish and adhere to measures to ensure remaining trees on SPEAs are wind firm, the current process and resulting narrow SPEAs has resulted in increased pressure on the remaining tree stands over time that often do not become apparent until the site "settles" several years after the adjacent lands are developed. The higher frequency of intense storms is also a factor over time. Once the

land is developed, however, these adjacent SPEAs are often transferred to the City, along with all of the responsibility and public liability to monitor and maintain a safe tree stand.

SPEAs: A Dynamic Environment

The City currently has an inventory in the Northeast of 11,300 linear metres of new forest edge adjacent to private lots or public roadways. SPEAs are dynamic environments, and trees that may be stable today may become unstable in a short time due to impacts from severe weather, naturally changing conditions, and man-made activities. As trees come down in these SPEA corridors the wind dynamics continue to change, further destabilizing these areas and increasing public risk. There have been recent initiatives, as noted below, that have brought greater focus for staff on the dynamics of the tree environments within SPEAs, and the pro-active actions that are needed to address these issues.

In one example, in early 2016, Urban Forestry staff worked with the owners of a strata property in the Northeast adjacent to a SPEA along a creek as there had been numerous tree failures over the previous six months. In this case, it was necessary to work with the strata as a portion of the SPEA is owned by the strata and the remainder by the City, which is not an uncommon situation. A consultant was hired to complete a TRA report to evaluate all of the trees, prescribe necessary tree removal and pruning for any trees deemed to be a high risk of failure, and to establish an appropriate restoration plan. The report in this case called for the removal of 43 trees and the pruning of 39 additional trees to stabilize the SPEA. The total cost for this one site including tree risk assessment, tree removal and restoration is more than \$20,000. These actions, while necessary, significantly stretch resources and operating budgets that have not been adjusted to meet the unpredictable reality of changing conditions in SPEAs.

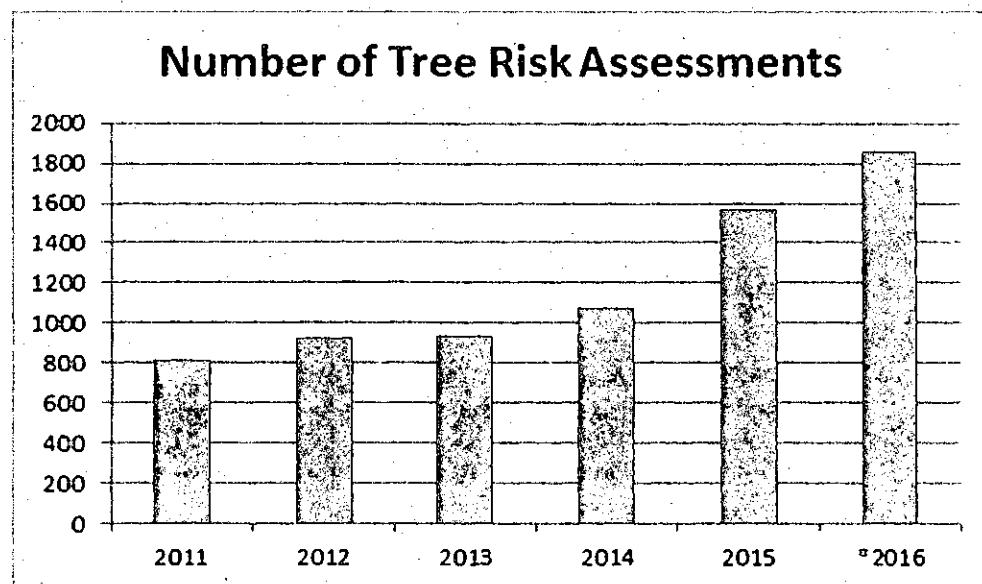
SPEAs on both Private and Public Land

A key complicating factor is the situation where a portion of the SPEA has been retained as covenanted area on private single-family or multi-family lots, while the adjacent remainder of the SPEA is owned by the City. Of the identified 11,300 linear metres of City SPEA forest edge identified, approximately 2,800 linear metres includes parallel areas of private SPEA. In such cases, it is not effective to assess and mitigate for tree hazards in the parkland areas of these SPEAs while ignoring the adjacent SPEA trees on private property. For this reason, staff must assess all of the trees within the SPEAs and, where hazardous trees are identified; these must be removed or pruned as prescribed regardless of whether they are located on City property or private property.

Tree Risk Assessment Demands and Service Response Times

The growth of the City and the increasing demand from residents for tree risk assessments on City-owned lands has stretched staff resources and increased response times. The City employs one full-time staff person dedicated primarily to tree risk assessments on City-owned trees for the past 15 years,

which has generally allowed for good customer service and response times in non-emergency situations of less than two weeks. With the rapid growth in recent years and the subsequent increase in the City's inventory of forested parkland, staff is seeing levels of requests for tree risk assessments that are beyond our ability to respond quickly. The graph below indicates how the number of these requests has grown from 2011 to 2016, which for 2016 shows a projection for year-end, based on 679 tree risk assessment work orders generated between January 1 and May 13, 2016:



As noted, this sharp increase in work volume has meant that the two-week service standard is unachievable given existing resources. Staff anticipates that this level of work demand will continue, given the increased need to proactively manage these SPEA corridors to manage public risk in light of future development in the Northeast, such as the remaining sections of Smiling Creek and future new developments in Partington Creek. As such, updated resourcing and budget levels will need to be considered as part of the strategy to manage trees in the Northeast.

Proposed Initiatives to Manage Trees in SPEAs

In order to effectively manage trees within SPEAs, staff proposes proceeding with several key actions, including a comprehensive assessment of all Northeast SPEAs, potential new strategy for the hand-off or transfer of ownership of SPEAs from land developers to the City, and resource and budget adjustments to meet the new levels of demand in Urban Forestry to manage trees in SPEAs.

Action 1: Comprehensive Northeast SPEA TRA (Immediate)

The first step recommended by staff is the completion of a comprehensive TRA of all of the Northeast SPEAs that have not been recently evaluated to assess current conditions in light of recent storms and changing conditions, and ensure public safety and long term stability of these areas. This evaluation will proceed immediately and be contracted out to a qualified consultant with the goal of completing a full inventory of all trees in SPEAs and adjacent covenant areas, and determining what necessary tree removal and habitat restoration and compensation is required in the latter phase of work. The TRA is anticipated to cost in the range of \$50,000 - \$70,000, and will be funded through the Parks operating budget, with the use of contingency funding anticipated at year end as this is not currently budgeted for, as discussed in the Financial Section of this report.

The Northeast SPEA TRA will be proceeding in the next two months, with the goal of completing this as soon as possible to enable contracts for tree hazard management to be completed in the summer months and enable tree pruning, removal, and replanting to proceed and enable SPEAs to be wind firm prior to the late fall storm season. To facilitate this schedule, staff will be reporting back to Council before the summer with a summary of the work completed to date, and a full budget request for the anticipated work based on either a completed TRA or an anticipated project and budget scope based on detailed sampling of typical SPEAs in the Northeast. Should the project be supported by Council, the City should temporarily see a reduced number of calls from residents in the Northeast requesting tree risk assessments for City-owned trees near their homes as the work proceeds.

It is noted that, as the TRA and evaluation work proceeds, there may be cases where tree hazards are identified that cannot be deferred until the completion of the entire TRA. In these cases, immediate tree pruning or removal may be necessary to deal with hazardous situations as recommended by the professional consultants. This reflects the on-going operational work of the Urban Forestry staff, who will continue to use their judgment in these cases to address issues promptly when these are identified and mitigate public risk.

Action 2: Managing the Transfer of SPEAs to the City (Fall 2016)

A second important initiative is to manage how, and even if, SPEAs are transferred to the City. In some cases, particularly on disconnected or truncated SPEAs, the City does not accept the ownership of these lands and instead requires that these remain in private hands under Restrictive Covenants. However, in other instances, taking ownership of a SPEA makes sense, but in these situations the transfer of this land by the developer should not create significant and unreasonable costs to the City.

To address these concerns, some municipalities have established a maintenance responsibility to the land developer prior to the property being handed-off to the City. This approach shifts the management responsibility and cost of SPEAs to the developer of the adjacent land as a requirement of the development approval process and pre-condition of the transfer of the SPEA to the City. The developer is required to enter into maintenance and management agreement for the SPEA for a period of time, say 5 years following the completion of the development and transfer of the SPEA to the City. This approach is typically enabled by Council policy, and would be secured for performance through posting of a financial bond. If necessary, staff could draw on these funds to pay for any maintenance or repair not completed by the developer, thereby relieving the City of any financial burden resulting from site development.

Staff is completing a municipal scan to determine best practices associated with SPEA maintenance securities in municipalities with similar challenges and conditions. Once this background research is complete a separate update, including a potential policy approach and implementation plan, will be brought forward to Council with recommendations later this fall. If supported at that time by Council, staff expects to consult with the development industry prior to finalizing any new development conditions.

Action 3: Urban Forestry Budget and Resources (Fall for 2017 Budget)
As noted above, resourcing and budget pressures in the Urban Forestry area have risen sharply, and are anticipated to remain high given increased development in the Northeast. While the two initiatives noted above, the comprehensive Northeast SPEA TRA and implementation of a 5-year maintenance period for SPEAs transferred to the City, will both assist in mitigating current unprecedented resource demands in this area, the benefits of these actions will take time to realize. Staff believes that the staffing and budget demands required to effectively undertake pro-active management of trees in SPEAs will continue to grow, and as such additional operational resources in this area will be needed in the future. Staff therefore intends to prepare a service enhancement request for the 2017 budget process for Council consideration to address the need for resources and ensure appropriate response times for these services.

Next Steps

Staff recommend proceeding with the Northeast SPEA TRA, the tree risk assessment and mitigation work on existing Northeast SPEAs described above, then staff would take the following steps to complete this project.

Project Action/Phase	Proposed Timeline (2016)
Secure consultant and proceed with TRA to enable budget and overall project scope to be completed	June / July
Report to Council to obtain approval of overall TRA project scope and budget (tree cutting, pruning, and restoration planting) likely based on Sampling of SPEA areas	July
Public Communication of Tree Management in the Northeast	May-July
TRA completed	July
TRA contract tendered	August
Tree risk mitigation activities (hazard tree removal and pruning)	August-September
Tree planting and restoration	October-November

As noted above, the goal would be to have all the tree removal and pruning work completed by October to avoid the historic storm season, with all of the necessary restoration and tree re-planting complete by the end of November.

Public Communications

This project will be highly visible and will necessarily involve land owners adjacent to SPEAs, so this initiative will require the involvement of Corporate Communications to develop a communications plan to carefully manage the preliminary and ongoing information on the status of actions related to this project. Staff in PRC will be working with staff in Corporate Communications through the next couple of months, prior to the anticipated tree risk mitigation activities taking place in August-September to ensure information is made available through the normal media and communication channels.

Financial Implications:

Staff intends to move forward with the proposed comprehensive TRA, as well as any selective hazard tree mitigation work that may be needed as identified in this process, with funding from the Parks operating budget. Staff is highlighting for Council that the operating budget did not anticipate this work, therefore it will likely need to be supplemented at year end. The anticipated cost of completing the TRA is in the range of \$50,000 - \$70,000. Although the TRA may take several months to complete in order to ensure that tree hazard mitigation takes place by late fall, staff will bring forward a budget request and project scope in July for the anticipated tree mitigation and restoration work, likely based on sampling of typical SPEA areas that can provide a reasonable estimate of total projected work and costing. This will enable the work to be tendered in the summer and proceed by late fall.

Based on staff's work to date and sampling of tree volumes and conditions in SPEAs in Northeast Coquitlam, follow up work related to tree hazard mitigation (tree removal, pruning, and SPEA restoration) on the scale anticipated could be in the range of \$400,000 - \$600,000. The total project cost will need to be confirmed as work on the TRA proceeds and ultimately when staff have completed the assessments and can go to the market with the full

extent of the required tree mitigation work necessary to make these SPEAs wind firm and complete required re-planting and SPEA restoration. Staff will provide Council additional information on this in July as the TRA proceeds. Finally, staff anticipate bringing forward a service enhancement request as part of the 2017 budget discussions for Council consideration in order to address service needs for the growing demands in the Urban Forestry section.

Conclusion:

The management of trees in Northeast SPEAs is an emerging issue that has significant public safety and liability implications, and requires a number of immediate actions and strategies. The regulatory process by which SPEA properties are transferred to City ownership continues to place pressure on the long-term management of trees, and changing environmental conditions and recent drought and storm events continue to alter the dynamic environments that support tree inventories. Residents are calling to request risk assessments of trees in these SPEAs at unprecedented levels in response to tree failures and as these issues are highly public. Recent evaluations of several SPEAs in the Northeast confirm the shifting conditions in SPEAs, and demonstrate the need to re-establish a baseline inventory of conditions in SPEAs throughout Northeast Coquitlam to properly manage potential tree failures and fire risk.

In response to the new demands on the system, staff propose to undertake a comprehensive TRA of existing SPEAs, as well as necessary selective hazard tree mitigation, in Northeast Coquitlam utilizing the Parks operating budget, which likely will require supplementary funding at year end as this work is not budgeted for. Staff intend to present the results of the TRA to Council prior to the summer break for approval of the project scope (full Northeast SPEA tree hazard mitigation and SPEA restoration), to be completed prior to the storm season in late fall. Staff will also bring forward to Council other recommendations to manage the ownership transfer of SPEAs to the City from developers, and to adjust budget and resource levels in Urban Forestry activities based on the emerging needs in this area.



Raul Allueva, RPP

Attachment 1: Slide Presentation on Trees in City-Owned SPEAs in Northeast Coquitlam

This report was prepared by Lanny Englund, Urban Forestry and Park Services Manager and Raul Allueva, General Manager of Parks Recreation and Culture, with input from Julia Healy, Planning Technician, and reviewed by Kathleen Reinheimer, Manager Parks, Sheena MacLeod, General Manager Financial Services, Jim McIntyre, General Manager Planning and Development Department, Wade Pierlot, Fire Chief, and Kathleen Vincent, Manager Corporate Communications.

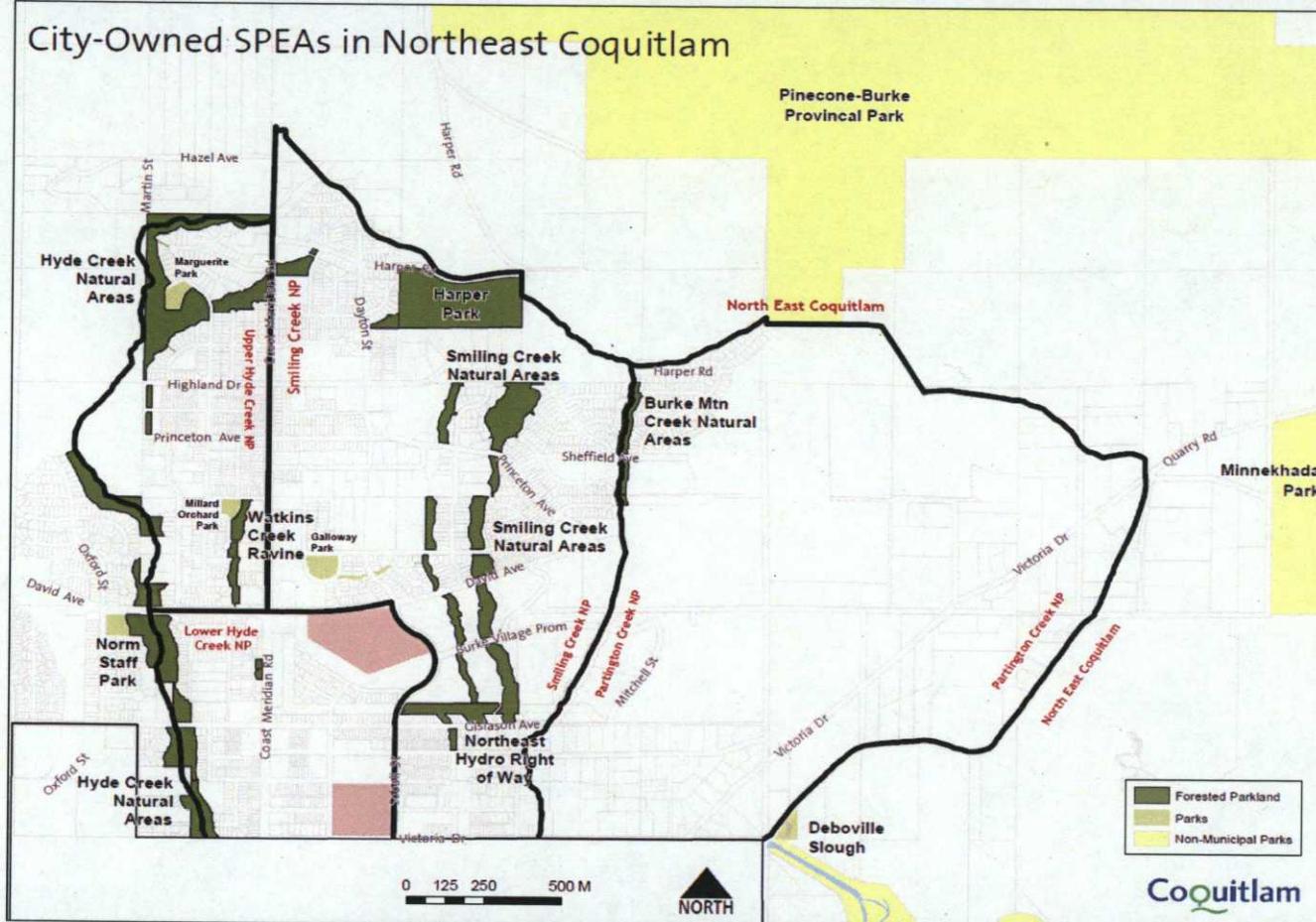
City of Coquitlam

Managing Trees in SPEAs in Northeast Coquitlam

May 30, 2016
Council

Northeast SPEAs

City-Owned SPEAs in Northeast Coquitlam



11,300 linear metres of new forest edge

2,800 linear metres adjacent private SPEA

Northeast SPEAs

- SPEAs are protected by Federal and Provincial Statutes, and regulated under the Riparian Areas Regulations (RAR), which are incorporated into the City's Zoning Bylaw
- SPEAs are not developable, and are usually transferred to the City as a condition of development following evaluation by qualified professionals to ensure SPEAs are wind firm
- Recent drought and severe wind storms has highlighted the need to re-evaluate the condition of trees in SPEAs to manage potential risks
- Sharp increases in resource impacts on Urban Forestry services are being experienced, and need to be evaluated

Northeast Tree Failures



Northeast Tree Failures



Northeast Tree Failures



Crane required to remove a fallen tree from a home

Burke Mountain Creek Corridor



Narrow forested area exposed to southeast winds

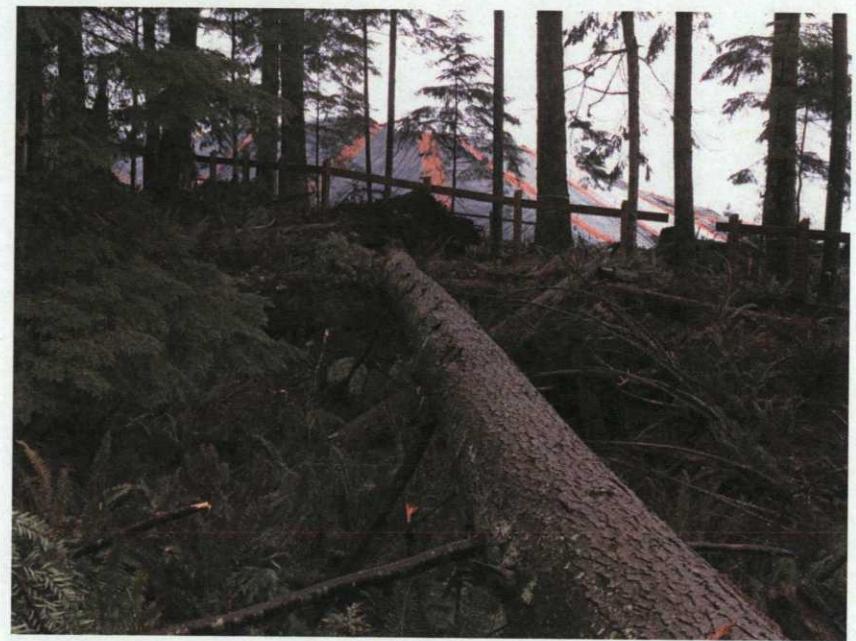


Photo of one of many trees that have come down in this corridor in the last year

3470 Highland Drive



Blow down area prior to treatment



Blow down area after treatment

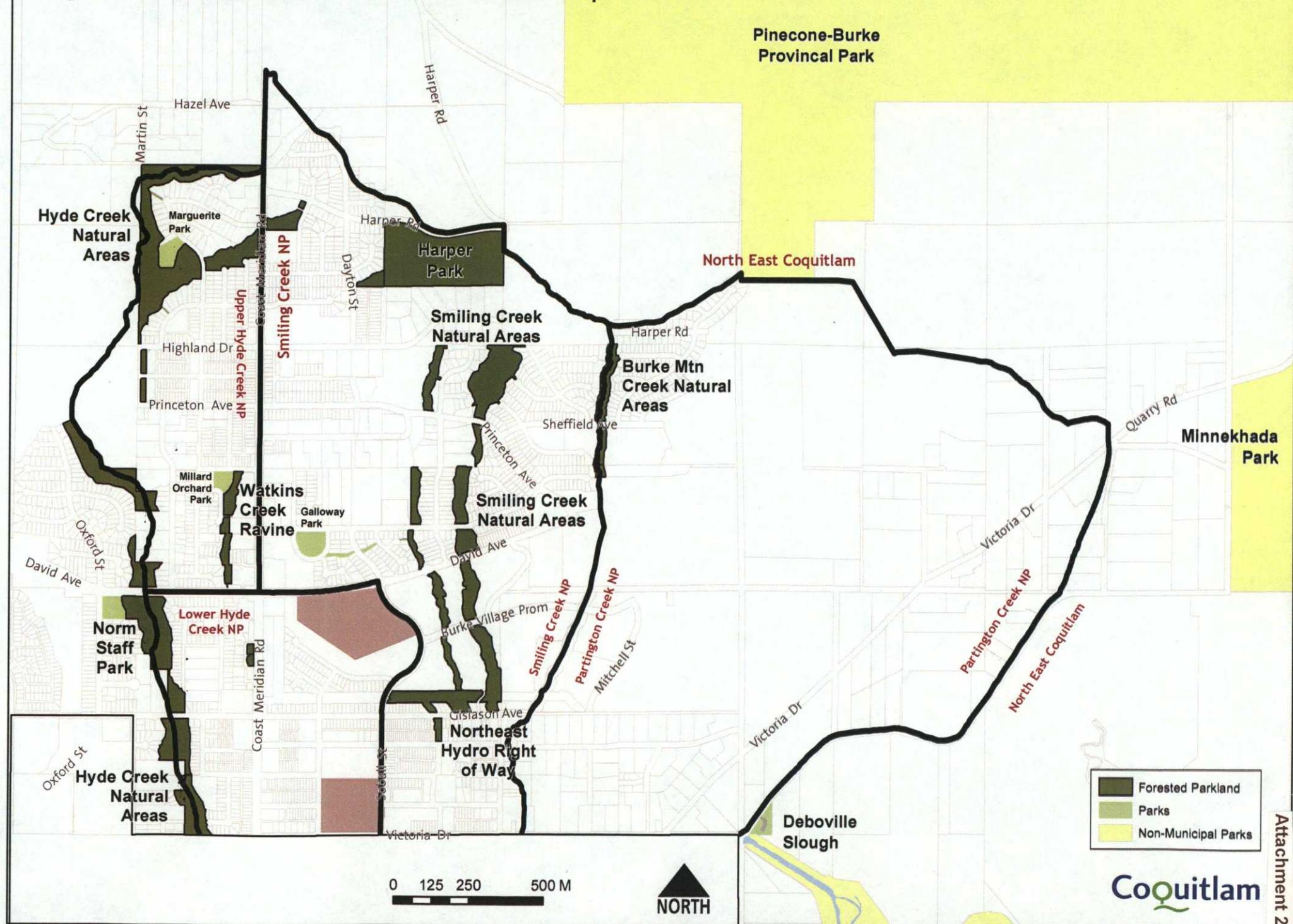
Proposed Actions

- Action 1 - Proceed with a comprehensive Tree Risk Assessment (TRA) of Northeast SPEAs
- Action 2 - Initiate a review of policy and regulatory options to manage the transfer of ownership of SPEAs by land developers, including the establishment of a maintenance period for developers
- Action 3 - Review existing resources and operating budget in Urban Forestry services to ensure these are appropriate to meet increased demands

Next Steps

- Proceed with TRA (anticipated \$50-70,000)
- Bring forward results of TRA before the summer break for review and approval by Council of required scope of work (tree hazard mitigation, pruning, and tree and SPEA restoration) and budget approval
- Staff intend to procure and proceed with the work in late summer and early fall 2016
- Staff will also report back on policy work and resourcing plan later in 2016

City-Owned SPEAs in Northeast Coquitlam





**Excerpt from the Northeast Coquitlam
Preliminary Windthrow Hazard Assessment
(BA Blackwell)**

1.0 INTRODUCTION

B.A. Blackwell & Associates Ltd. were retained by the City of Coquitlam to conduct windthrow, fire hazard and danger tree assessments and prescriptions for hazard abatement and ecosystem restoration for 28 defined polygon units within municipal parks, Streamside Protection and Enhancement Areas (SPEAs) and Covenants in Northeast Coquitlam totalling 35.27 hectares in area. Each polygon has a unique identifier corresponding with the naming convention for the Northeast Coquitlam Neighbourhood Area Plans (Figure 1):

- | | |
|--|-------------|
| • Burke Mountain Creek
(within Partington Creek Neighbourhood), | 2 polygons |
| • Smiling Creek, | 15 polygons |
| • Upper Hyde Creek, | 6 polygons |
| • Lower Hyde Creek | 5 polygons |

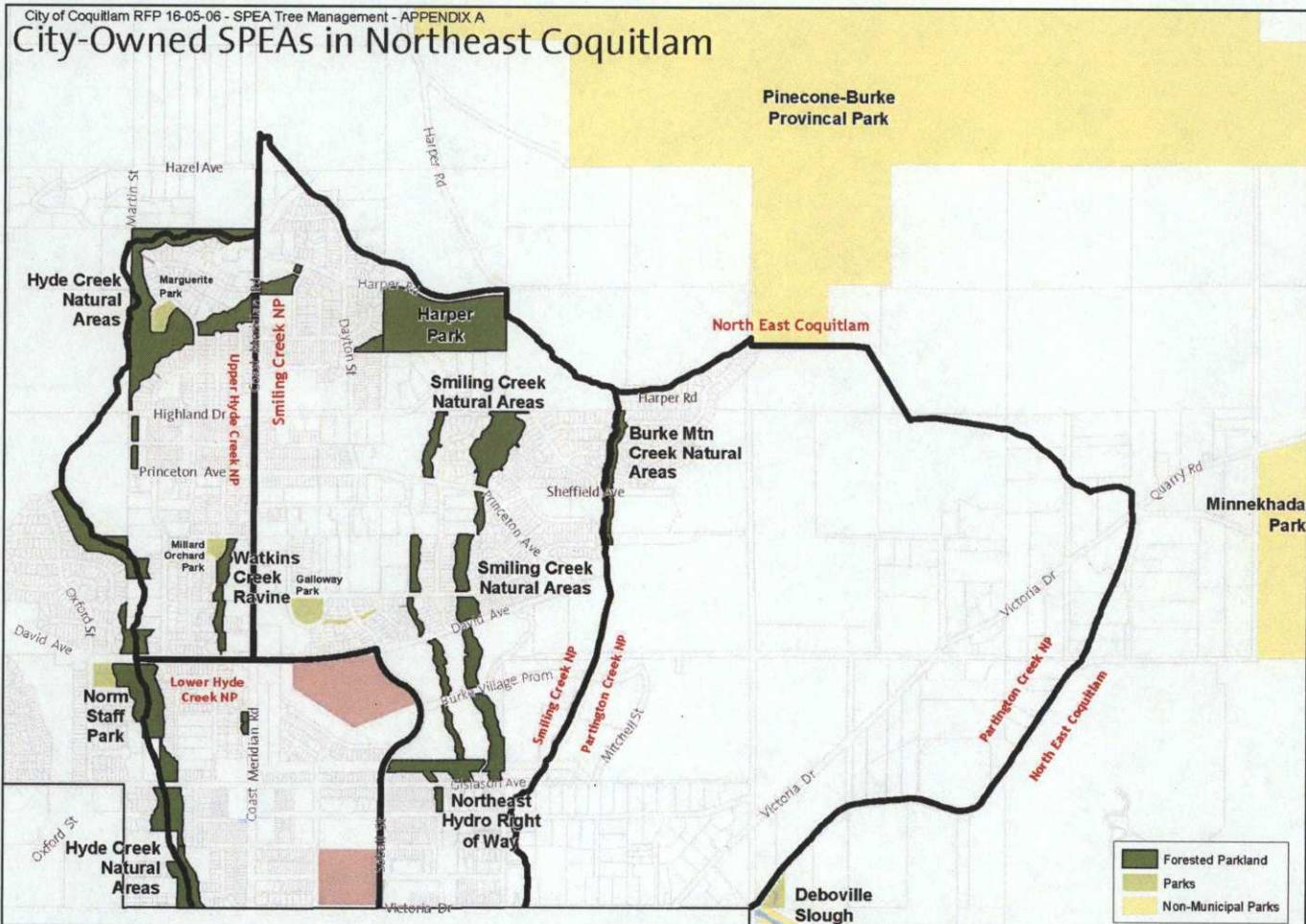


Figure 1. The Streamside Protection and Enhancement Areas or 'Forested Natural Areas' are highlighted in dark green.



2.0 BACKGROUND

The forests on the slopes of Burke Mountain established following logging in the early 1900's. The original old growth forests were dominated by Douglas-fir (*Pseudotsuga menziesii*), western redcedar (*Thuja plicata*) with a component of western hemlock (*Tsuga heterophylla*), based on remnant stumps visible from the old logging. Logged areas experienced fires of varying intensities as logging slash burned after harvesting. Forest regeneration established naturally, comprised predominantly of Douglas-fir, western redcedar, and western hemlock. Douglas-fir and redcedar tended to establish on mineral soil that had been disturbed or burned, while hemlock favoured decayed logs and intact forest floors accumulated after logging. The resulting forests that have grown over the past 100 years are generally dense with heights averaging 30-45m. Some of the hemlock trees are infected with Dwarf mistletoe (*Arceuthobium tsugense*), a parasitic plant that contributes to internal decay in tree stems. Dense stands like these are generally relatively windfirm because of interlocking root systems, crowns that support each other during wind-induced swaying, and lower wind penetration into the stand. Opening these forests up or clearing portions of them leaving new exposed edges often results in windthrow of some remaining trees which are not windfirm in isolation (Stathers, et. al. 1994). Of the three main tree species, hemlock is the least windfirm because of its naturally shallow root systems that lack a well-defined taproot, even on deep well-drained soils which characterize much of the project area (Klinka et al. 2000).

The SPEAs and associated covenant areas on adjacent private property represent protected riparian zones that were excluded from the initial clearing for subdivision development that began in 2008. Since that time, a number of windthrow events have occurred that have taken down a significant number of trees through stem breakage and overturned root plates. The majority of these downed trees are western hemlock. The remaining trees in the stand are dominant specimens, many of which have been spiral pruned the full length of their crowns to reduce wind drag. The two polygons under review in this report (Burke Mountain 1&2) are bisected by Burke Mountain Creek which flows in a north-south direction down the face of Burke Mountain and forms part of the Partington Creek Watershed. That section of Burke Mountain Creek running through polygons 1 & 2 has seasonally influenced flows as the channel bed was mostly dry, as observed during site assessment. Scour processes and fine sediment deposition indicate this creek section supports high water volumes at peak run-off and rain event periods.

The long-term goal for Burke Mountain 1 & 2 (and for the Northeast Coquitlam Area in general) is to promote the development of resilient and healthy forest ecosystems suited to the inherent site conditions, which have a reduced risk of personal injury or property damage caused by falling trees. These ecosystems will be dominated by Douglas-fir and western redcedar and minor bigleaf maple (*Acer macrophyllum*), in varying proportions according to site conditions. Western hemlock will be kept to a minor component because of its relatively low resistance to windthrow. Forest structure will have a moderately open canopy that will promote windfirmness of individual trees and encourage the development of native understory vegetation and regenerating trees.

3.0 METHODS

Danger tree assessments were conducted following the International Society of Arboriculture (ISA) Tree Risk Assessment Qualification (TRAQ) for all coniferous and deciduous trees greater than 20cm dbh. This system of investigation is a current and accepted standard of care for hazard tree inspection in BC.



The following methods were used for windthrow assessment:

- Biogeoclimatic site series identification using the Field Guide for Site Identification and Interpretation for the Vancouver Forest Region, Land Management Handbook Number 28, Province of BC.
- 'Windthrow Field Assessment Card #712-2, developed by the Ministry of Forests, Forest Practices Branch, Province of BC was filled out for each treatment unit polygon
- Diagnostic considerations framed as a series of questions (Mitchell, et al. 2012) were generated in order to understand the inter-relationship between tree, weather and site conditions (Table 1).

Table 1. Diagnostic Considerations for Windthrow Assessment procedures.

Wind Patterns	What is the return period of high wind events and their coincidence with high rainfall or wet soils? What direction do prevailing winds originate?
Topographic Exposure	Is terrain exposed or sheltered from routine winds? What is the slope angle?
Soil	Is the soil fertile enough to support a closed-canopied stand? Does the soil restrict root anchorage or become easily saturated?
Stand Conditions	Are individual trees acclimated to above canopy winds? Are trees at stand edges windfirm? What is the stand's disturbance history?
Species Profile	Are trees shallow rooted or do they develop tap roots? What is their pattern of failure – overturning at the root plate, trunk failure or stem breakage?

Trees were inspected within the confines of the SPEA and Covenant boundaries. All assessed trees were located using an iPad and Esri Collector software using a 2014 colour orthophoto and SPEA/Covenant boundaries as baseline map data. Recommendations for tree removal were based on the diagnostic considerations outlined in Table 2, and whether targets existed within 1.5 tree lengths of the assessed tree. Residences and frequently used targets such as roads received a higher risk rating than rear yards or infrequently used trails. Assessed trees were marked with a red plastic tree tags with white, three-digit numbering. All unique tree identifier and wildlife tree codes carry over to the database and maps. In addition to dangerous characteristics, trees marked for removal were observed for signs of wildlife activity. No nesting sites were observed at the time of hazard tree assessment. The assessment was not completed by professional biologists trained in the identification of bird nesting sites, and should therefore be used as anecdotal observations only.

This hazard assessment is based on observations noted on the date specified only. The project foresters have endeavored to use their skill, education and knowledge to provide an accurate representation of the trees and site. The tree inspections are limited to visual examination only without coring, climbing or excavating. The inherent characteristics of trees are that they are unpredictable and can fail due to environmental or internal problems.



4.0 RESULTS

4.1 SUMMARY OF ASSESSMENTS – BURKE MOUNTAIN 1 & 2

A comprehensive spreadsheet of each assessed tree's TRAQ rating is compiled in an Excel spreadsheet. Of the 79 trees assessed for removal in the two polygons under review, 31 trees have a dbh (diameter-at-breast height) exceeding 50cm and therefore are candidates for converting to "wildlife" trees. The remaining 48 trees require whole tree removal (stumps and rootplate may be left intact). Approximately 90% of trees recommended for removal are western hemlock (Figure 2). A detailed prescription in Appendix A – Section 7.0 describes tree removal, debris removal, restoration planting and follow-up maintenance required to meet established goals.

4.2 SUMMARY OF ASSESSMENTS – SMILING CREEK 2 & 3

The Smiling Creek polygons are bisected by Smiling Creek which runs in a north-south direction, forming part of the Burke Mountain watershed. The creek is deeply incised for a portion of its length forming a ravine with steep side slopes leading to gentler benches above. A relatively high number of hemlock trees are marked for removal in this polygon. Aside from their inherently shallow root systems and a higher risk to windthrow, many of the western hemlock trees in this area are growing along the steep ravine slope in a relatively linear pattern. The root systems tend to be aligned along the contour and do not form as strong a network as a root system extending uniformly around the tree. As well, many hemlock trees are growing on rotting logs and stumps from the previous stand which creates a less stable root network than one fully developed within the mineral soil. Windthrow of the trees along the slope, in addition to potentially impacting residential structures, also can lead to soil instability and sloughing of sediment into Smiling Creek (Figure 3).

4.3 SUMMARY OF ADDITIONAL ASSESSMENTS TO AUGUST 25, 2016

At the time of this report assessments for additional polygons have been completed. Although not the focus of this interim report, a brief summary of completed assessments up to the date of August 25, 2016 is outlined below as it may provide relevant information about the project as a whole to City Staff and Council. All assessments were completed by Judith Cowan FIT, TRAQ and Stephan Bernhard FIT, TRAQ on the following dates: August 8 – 11 and August 22 – 25, 2016. Quality review checks were undertaken by Bob Green RPF, RPBio and Bruce Blackwell RPF, RPBio.

Approximately one third (33% or 12 hectares) of the Project Area has been assessed and 299 trees are marked for removal. Of this number, 218 trees are recommended for full removal (dbh <50cm), and 81 trees are recommended for wildlife tree retention as their dbh's exceeded the 50cm threshold. Wildlife tree height shall range from 3-5m with a minimum spacing of 5m between individuals in order to avoid a negative aesthetic effect. The minimum spacing target is not required to be met if closely spaced wildlife trees (up to 3 in a clump) have varied heights within the aforementioned range. Conversion to wildlife tree status is an important management option because enhanced habitat provisions for wildlife are addressed and cost-savings accrue from avoided debris removal.



5.0 MANAGING WOODY DEBRIS

The recommended mitigative actions will result in accumulations of woody debris and will add to the excessive amounts of debris in some areas as a result of past windthrow events. This situation elevates the fire hazard level, and reduces the aesthetic appeal for surrounding residents and trail users. Debris removal for Burke Mountain 1 & 2 is restricted as both polygons are isolated from the street network, the area has 1.5m high timber / chain link barrier fencing to protect riparian vegetation, and therefore no haul routes are available.

It is recommended that whole trees that are felled be bucked to lay flat to the ground, and all branches near the trail should be bucked and scattered from within 3m of the trailside. Where multiple trees are felled in close proximity (closer than 3m) logs should be sectioned into 3m pieces and arranged so they are not touching. This will allow the woody debris to break down more quickly and be integrated into the organic and soil layers. Scattered pieces should be well distributed, and not piled or clumped. Over-accumulations of fine fuels (woody pieces with diameters less than 7cm, i.e. branches) will lead to increased fuel hazard and must be removed from the site. Fine fuels have high ignition potential and high rates of spread once ignited. The detailed prescription for Burke Mountain 1 & 2 outlines the management of site fuel loading and Coarse Woody Debris (CWD). Where accumulations are high and site evaluations by a guiding professional find debris loadings are hazardous, material will be chipped on site or removed to limit chip accumulations to 100 m² and to a depth of <10cm.

Removal of woody debris resulting from the cut trees will be challenging in the Smiling Creek unit due to a lack of access. Road access is limited to the very southern portion of the unit and no trails exist along either side of the unit. It is likely that a narrow trail will need to be constructed along the berm on the east side of the creek to provide access for removing debris via Galloway Street.

6.0 ESTIMATED BUDGET

Preliminary costing for operations work including hazard tree removal, mobilization / demobilization, debris removal (fire hazard abatement), stock procurement, planting and 10% contingency are summarized below.

Table 2. Operational cost projections for Burke Mountain 1 & 2, Smiling Creek 2 & 3, and the entire project.

Unit Costing	Area (ha)	Hazard Tree Falling	Debris Removal and Planting	Total
		\$12,000.00 /ha*	\$6,300.00 /ha	\$18,300.00 /ha
Burke Mountain 1 & 2	1.36	\$16,320.00	\$8,568.00	\$24,888.00
Smiling Creek 2 & 3	1.25	\$9,000.00	\$4,725.00	\$22,875.00
Total Project	35.27	\$423,240.00	\$222,200.00	\$645,441.00

* These preliminary figures are based on an average cost of \$700.00 per tree for removal or wildlifing.