

Significant Woodlands

Guidelines for Identification, Evaluation, and Impact Assessment



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Cover photos: Left, Trillium Woods in autumn by Nancy Young. Other photos by Amy MacPherson.

1. Purpose

The following guidelines explain the significant woodland policies of the City of Ottawa and how they shall be implemented in the City's planning processes. They supplement and form part of the City's broader Environmental Impact Study Guidelines. These guidelines provide detailed, Council-approved direction on the interpretation and application of the City's significant woodland policies, for use by the public, City staff, and other parties in land use planning, review of development applications, and application of the City's By-laws.

2. How to Use these Guidelines

The City of Ottawa's guidelines for the identification and evaluation of significant woodlands reflect a comprehensive set of provincial and municipal policies. They also set out different evaluation criteria and requirements for different parts of the City. Familiarity with these policies, criteria, and requirements will help to ensure that woodlands are identified and evaluated correctly, reducing the risks of delays in review and approval.

Sections 3 and 4 of these guidelines provide essential definitions and policy background. Section 5 and Appendix A provide an overview and flowchart of the process for identification and evaluation of significant woodlands in Ottawa's rural, peri-urban, and urban areas. Section 6 and Appendix B provide direction on the application of identification and evaluation criteria. Appendices C and D provide examples of evaluations in urban expansion areas, and the existing urban area.

If you:

Are preparing an Environmental Impact Study for submission to the City of Ottawa the first time.	Please read the full Environmental Impact Study Guidelines before proceeding further.
Are identifying and evaluating significant woodlands in Ottawa for the first time under these guidelines.	Please read the full Significant Woodland Guidelines before proceeding further.
Are familiar with these guidelines and are identifying and evaluating significant woodlands in the City of Ottawa.	Proceed to Appendix A to identify the appropriate evaluation process for your case.

3. Definition of Significant Woodlands

The City of Ottawa defines significant woodlands as:

- i. Any treed area meeting the definition of woodlands in the *Forestry Act*, R.S.O. 1990, c. F.26 or forest in the Ecological Land Classification for Southern Ontario; and
- ii. In the rural area, meeting any one of the criteria in the Natural Heritage Reference Manual, as assessed in a subwatershed planning context and applied in accordance with Council-approved guidelines, where such guidelines exist; or
- iii. In the urban area, any area 0.8 hectares in size or larger, supporting woodland 60 years of age and older at the time of evaluation.

When applying these policies, a tree will be defined as a woody plant, usually with a single main stem and capable, under the right conditions, of reaching a height of 4.5 meters or greater.

4. Policy Background

4.1. Provincial Policy Statement 2020

The Provincial Policy Statement (PPS) under the *Planning Act*, “provides policy direction on matters of provincial interest related to land use planning and development” (p. 1). Section 3 of the *Planning Act* states that planning decisions, “shall be consistent with” policy statements issued under the Act, including the PPS.

Section 2.1 of the PPS provides policies for the management of natural heritage resources, including significant woodlands. With respect to significant woodlands, the policies say that:

- “Natural features and areas shall be protected for the long-term.”
- The “diversity and connectivity of natural features” and the “long-term ecological function and biodiversity of natural heritage systems” should be, “maintained, restored or, where possible, improved,” while recognizing linkages between and among these features and water features.
- Their landscape context (e.g., settlement area, rural, agricultural) should be recognized and reflected.

- There shall be no development within or adjacent to them unless it has been demonstrated that there will be, “no negative impacts on the natural features or their ecological functions.”

The PPS says that significant woodlands, “are to be identified using criteria established by the Ontario Ministry of Natural Resources.”

4.2. Natural Heritage Reference Manual 2010

The Natural Heritage Reference Manual (NHRM), “represents the Province’s recommended technical criteria and approaches for being consistent with the PPS in protecting natural heritage features and areas and natural heritage systems in Ontario” (p. 1).

The manual states that, “woodlands that meet a suggested minimum standard for any one of the criteria listed below should be considered significant” (p. 67).

These criteria are:

Table 1. NHRM Criteria

Criterion	Sub-criteria
1. Size	Woodland size
2. Ecological Functions	Woodland interior
	Proximity to other natural heritage features
	Ecological linkages
	Water protection
	Woodland diversity
3. Uncommon Characteristics	Unique species composition
	Provincially significant vegetation community
	Rare, uncommon, or restricted plant species
	Older woodlands
4. Economical and social values	High productivity of economically valuable products (while maintaining native natural attributes)
	High value in special services, such as air-quality improvement or recreation at a sustainable level
	Important identified appreciation, education, cultural or historical value

4.3. Urban Expansion Areas

Special policies exist for significant woodlands and other natural heritage features in urban expansion areas under Official Plan policies in Section 3.1 and 12.2. In these areas, development proponents are required to identify and to convey the natural heritage system and natural heritage features to the City at no cost. Significant woodlands, however, will be subject to further evaluation using these guidelines to determine if retention of the woodlot provides the greatest community benefit, or if modification or reduction of the woodlot is warranted prior to conveyance.

5. Ottawa's Significant Woodland Criteria, Measures, and Indicators

Most of Ottawa's woodlands lie in the rural area or within the National Capital Greenbelt. They consist of a mix of young and mature second-growth woodlots and forests, at varying stages of ecological succession up to mature, climax stands. Small areas of pre-colonial, "old-growth" forest may remain where topography and soils have protected them from logging, agricultural clearing, and wildfires. A substantial portion of Ottawa's rural forest cover consists of swamps, especially in areas of clay or limestone plain.

In the urban area, many of the City's woodlands lie within Federal lands managed by the National Capital Commission. Large portions lie protected within valley lands or along watercourses, often in public ownership. Other large woodlots lie within developed areas, often in association with other greenspace areas like parks and recreational pathways. Many of these reside in public ownership. Private ownership of urban woodlands (as defined in the OP policy) appears uncommon, especially in established communities. Like rural woodlands, urban woodlands consist mostly of a mix of young and mature second-growth forest.

Woodlands often occur in peri-urban areas, where the City has identified lands for future urban expansion. Frequently, these areas consist of marginal or abandoned agricultural lands, outside of designated Agricultural Resource Areas. Typically, woodlands in these areas consist of mature farm woodlots (protected for firewood or maple syrup production), young regenerating forest on abandoned fields or pasture, areas of swamp or low, wet forest, or forest on thin soils over shallow bedrock.

As permitted by the PPS and the NHRM, the significant woodland guidelines distinguish between these three general land cover and land use contexts: *i.e.*, rural, urban, peri-urban.

Appendix A provides a key and flowchart for determining the evaluation process that applies to a potentially significant woodland.

5.1. Rural Criteria and Thresholds

In the rural area, significant woodlands will be identified and evaluated using all of the NHRM criteria, as provided above and in Section 7 of the NHRM. In accordance with the NHRM recommendation, any woodland meeting the minimum standard for any one of the criteria will be considered significant. The City and proponents will apply the criteria as described in the NHRM, with the size threshold for each criterion based on the range provided and scaled to the forest cover in the planning area (see Figure 1 and Table 2, below).

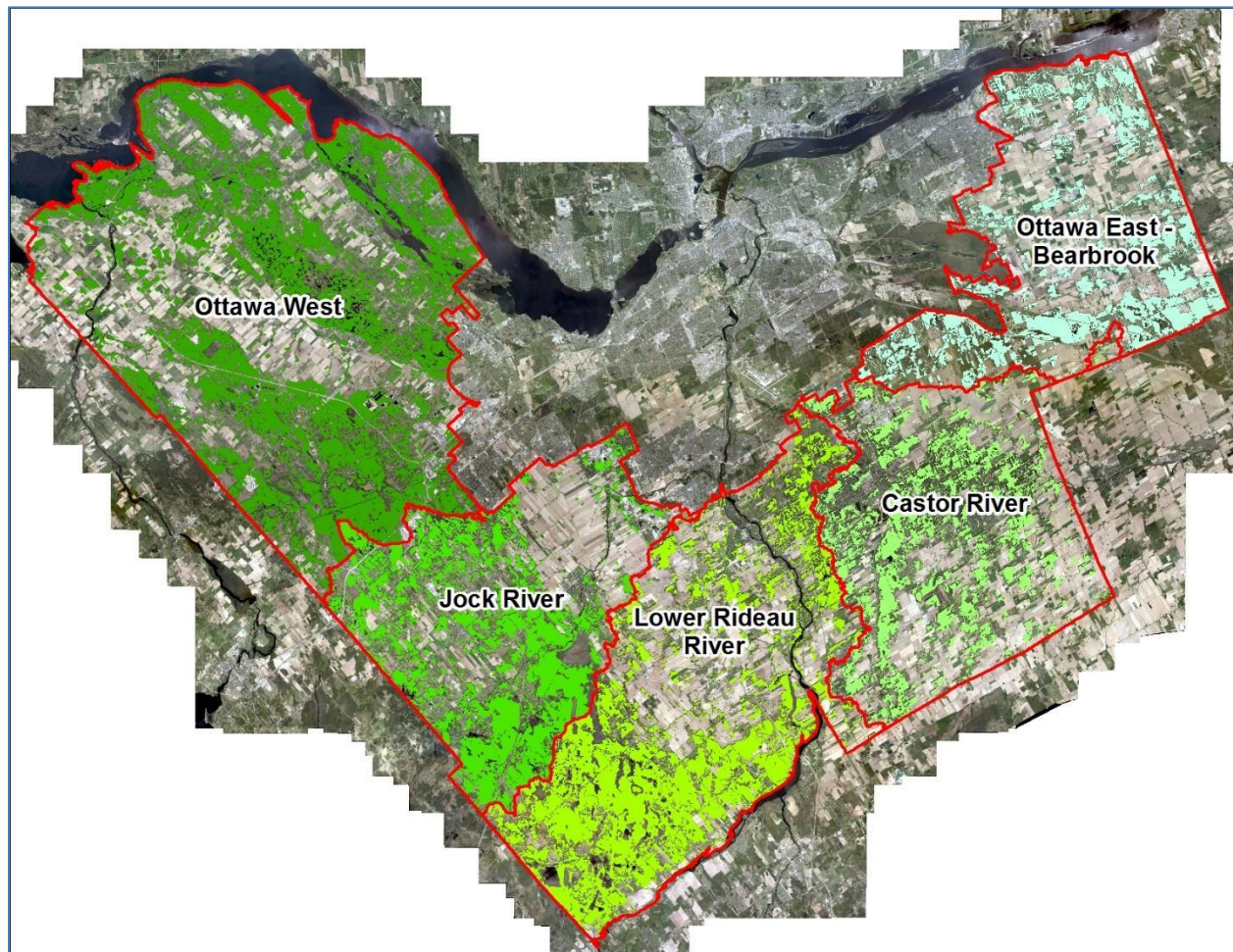
5.1.1. Planning Areas and Mapping

The PPS and the NHRM recommend a landscape approach to natural heritage system planning, with an emphasis on the integration of terrestrial ecosystems and water resource systems. The PPS identifies the watershed, “as the ecologically meaningful scale for integrated and long-term planning” (Policy 2.2.1 (a)). The Environment Canada document, How Much Habitat is Enough? (p.10), suggests that natural heritage planning should occur at a scale of 500 km² to 1000 km². The City of Ottawa has identified 5 watershed-based, rural planning areas with respect to application of the significant woodland policies, ranging in size from 322 km² to 722 km² (Table 2, Figure 1). Two of the areas, Ottawa West and Ottawa East – Bearbrook, combine smaller subwatersheds with similar land cover and land uses. Four of these areas are smaller than the recommended size range. However, they reflect better the diversity of Ottawa’s landscape and land uses than would a smaller number of larger planning units.

The headwaters of the Jock River subwatershed and the Lower Rideau River watershed extend beyond the City’s boundaries. Ideally, the calculation of forest cover would include these areas. However, the City does not have access to comparable forest cover data for areas outside its boundaries, and such areas lie beyond its regulatory jurisdiction.

The NCC Greenbelt has been identified as a sixth distinct planning area, not on the basis of watershed boundaries but rather for its unique planning context as a deliberately rural space in Federal ownership situated within and around suburban neighbourhoods of the City.

Figure 1. Rural Planning Areas with 2011 Total Forest Cover (including non-significant woodlands)



Rural Planning Area	Size (km ²)	2011 Forest Cover (km ²)	Percent Forest Cover
Ottawa West	722	278	38.4
Jock River	348	128	36.7
Lower Rideau River	469	179	38.0
Castor River	360	97	26.9
Ottawa East - Bearbrook	329	99	29.9

Table 2. Rural Planning Areas and Size

5.2. Urban Criteria

Urban woodlands differ substantially from rural woodlands in the ecosystem functions, services, and benefits that they provide. Woodlands in urban environments are typically smaller and more isolated. They are exposed to more non-native and invasive species, and a more stressful environment. They receive higher use. These pressures are inherent to the urban landscape and cannot be avoided or fully mitigated. Consequently, urban woodlands normally have lower biodiversity and ecological integrity than rural woodlands.

Conversely, urban woodlands typically have higher social and economic values than rural woodlands. They provide opportunities for outdoor recreation and relaxation, host public events and community gatherings, contribute to community identity, increase the aesthetic appearance of communities, provide educational opportunities and experiences. They absorb rainfall and decrease stormwater runoff, reduce urban heat island effects, provide shade and refuge during extreme heat events, and mitigate air pollution. A growing body of research has also shown measurable benefits of trees on physical and mental health.

Based on the multiple benefits that they provide to residents, Ottawa defines all urban woodlands meeting minimum size and age thresholds as significant under NHRM Criterion 4 – Economic and Social Functional Values. This policy does not preclude the possibility that urban woodlands may also qualify as significant under other NHRM criteria.

The NHRM provides limited guidance on how woodlands should be evaluated with respect to economic and social values. Furthermore, the guidance that it provides with respect to application of the other NHRM criteria has limited utility in an urban context. Consequently, the City has developed more comprehensive guidance, based upon an explicit *Ecosystems Services* approach.

An *Ecosystem Services* approach attempts to identify and evaluate the suite of benefits provided to humans by the natural environment. In developing its guidelines, the City used the Ecosystem Services Toolkit developed by the Federal, Provincial and Territorial Governments of Canada as part of the Value of Nature to Canadians Study. The City received assistance in this work from a multi-disciplinary, stakeholder working group with representatives from its Planning Department, the community, environmental, public health, and industry sectors. The City's working group identified a list of 19 ecosystem services for use as criteria in the evaluation of impacts on significant urban woodlands (see section 5.3.1, Table 4). The working group also identified indicators and measures for those criteria. These criteria, indicators, and measures apply in both the existing urban area and urban expansion areas, although the approach differs between them.

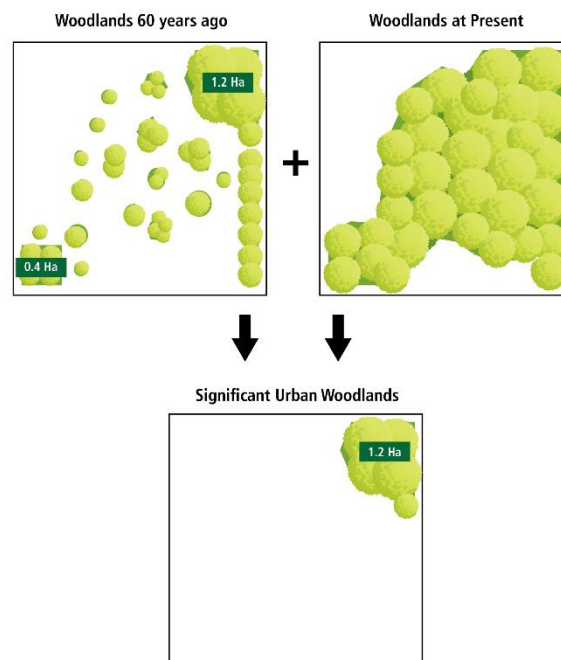
5.2.1. Size Threshold and Age Exemption

Council has established 60 years as a minimum age threshold for significant urban woodlands. Although the NHRM does not recommend a minimum age threshold for significant woodlands, the City established this threshold to exempt young, regenerating woodlands that may have grown up on brownfield sites, urban greenfield sites, or peri-urban greenfield sites held vacant in anticipation of future development or urban expansion. This approach reflects the directions in the PPS for provision of adequate land supply and promotion of efficient development patterns.

Council has also established 0.8 ha as the minimum size threshold for significant woodlands in the urban area. The 0.8 ha size threshold is consistent with the size threshold used in the City's *Urban Natural Areas Environmental Evaluation Study*. Intuitively, it also appears consistent with the general concept of what constitutes a "woodland": *i.e.*, a wooded area in which a visitor can be fully screened from the surrounding urban environment.

In application, only those areas of an urban woodland that are greater than 60 years old, as demonstrated through aerial photography or other means, will be identified as significant and counted toward the 0.8 ha size threshold (Figure 2).

Figure 2. Application of the Size Threshold and Age Exemption in the Identification of Significant Urban Woodlands



5.2.2. Exemptions for Approved Plans and Developments

When it approved the new woodland policies in 2016, Council exempted those urban areas where it had already identified the natural heritage system through secondary plans, community design plans, approved plans of subdivision, or existing conditions reports submitted and accepted by the City in support of on-going development applications. New significant woodlands were not identified in those areas. If a local plan is substantively updated in future, however, the issue of significant woodland identification within the study area could be revisited as part of that process.

6. Application

6.1. Impact Evaluation and Mitigation – General Principles

6.1.1. No Negative Impact and the Mitigation Hierarchy

Sections 3.4 and 3.5 of the City's Environmental Impact Study Guidelines discuss the principles of impact evaluation and mitigation within the context of the PPS and the Official Plan. Application of the significant woodland guidelines must take into account the general principles outlined in those sections. However, two points deserve re-emphasis. First, the “no negative impact” policy does not prohibit a project from affecting natural features or their ecological functions, although it is intended as a very high standard, particularly for natural features that are part of the Natural Heritage System. Second, where the potential exists for negative impacts, there must be explicit consideration of the “mitigation hierarchy” when preparing and implementing the environmental plan.

Significant woodlands *are not* “no touch” features. The PPS test with respect to the effect of development or site alteration on significant woodlands is “no negative impacts on the natural features or their ecological functions” (p. 24). In practice, the ecological functions to which the policy refers are those under which the feature qualifies as significant. Consequently, development or alterations that do not negatively affect those qualifying functions may occur.¹

For example, if a woodlot qualifies for significance solely based on interior forest habitat, then alterations to the woodland edge that do not reduce the area of interior forest would not affect its significant ecological function. In most cases, however, significant woodlands will have several significant ecological functions to consider.

¹ After careful review and consideration of the scientific literature, the intent of the PPS, and the need to balance the different priorities in the PPS, the City of Ottawa has concluded that the “no negative impact” standard cannot always be met with respect to the physical form of significant urban woodlands.

The City of Ottawa Environmental Impact Study (EIS) Guidelines state the basic principle:

The EIS must demonstrate how the proposed development or site alteration will satisfy the requirements of the Official Plan with respect to protection of the Natural Heritage System, natural heritage features, and their ecological functions (p. 4).

The mitigation hierarchy is a widely accepted approach in conservation and land use planning for guiding decisions on protection of the natural environment. It categorizes and prioritizes protective measures according to their general type and effectiveness:

- Priority 1 - Avoidance: redirection of the proposed action away from the natural feature.
- Priority 2 - Minimization: reduction of the magnitude of the proposed action, either in space, time, or both.
- Priority 3 - Mitigation: protection of the feature from the proposed action, through measures such as changes in design, physical barriers, and modified operating procedures.
- Priority 4 - Compensation: off-setting of the impacts through replacement of the feature and its ecological functions elsewhere, typically at a ratio greater than 1:1 to reflect the greater risks.

Application of the Significant Woodland Guidelines must follow the mitigation hierarchy. Environmental reports must explicitly address how the mitigation hierarchy has been applied in the proposed development or site alteration. Such rationales may consider other policies and guidance in the PPS and the Official Plan, particularly with respect to the avoidance and minimization of impacts.

6.1.2. Reading the PPS, “As a Whole”.

The PPS and Ottawa’s Official Plan contain objectives, policies, and guidance on a broad range of land use planning and development matters. Tensions exist between many of these directions, which cannot always be resolved. For example, the PPS requirements for cost-effective development patterns and a 20-year land supply (Policy 1.1.1a and Policy 1.1.2) may conflict with the PPS policies for protection of natural heritage system features (Policy 2.1), especially in peri-urban areas. A similar conflict may exist between natural heritage system features and mineral aggregate resources (Policy 2.5). In such cases, decisions should focus on achieving a desirable outcome while remaining consistent with provincial policy and the Official Plan.

Where development or site alteration will have a negative impact on a natural heritage feature, that impact must be adequately justified on the basis of PPS and OP policies:

If the EIS report concludes that the project will have a residual negative impact on one or more of the values or functions of the triggering feature(s), then a recommendation to proceed with the project must be accompanied by a rationale for proceeding that is based upon the provisions of the Official Plan and the Provincial Policy Statement. Projects with residual negative impacts to significant natural features or ecological functions may not be approved (EIS Guidelines, p. 37).

6.1.3. Obligation to Acquire

Ottawa's Official Plan requires the City to acquire properties in Natural Environment Areas or Urban Natural Features, at the request of the landowner, where the property is not otherwise constrained from development. In 2012, an Ontario Municipal Board ruling extended this requirement to lands constrained by other natural heritage features, where protection of the feature would prevent all legal development permitted under the zoning (OPA #76, OMB File #PL100206, April 26, 2012). With respect to significant woodlands, this policy implies that protection of some features may only be possible if the City acquires the affected land.

However, the obligation to acquire does not apply to significant woodlands in urban expansion areas. In those designations, the OMB ruled in 2011 that natural heritage system features in these areas must be conveyed to the City, prior to development approval (OPA #76, Ministerial Modification #46, OMB File #PL1000206, September 7, 2011). For significant woodlands, conveyance would occur after the extent of the woodlands has been established through a Council-approved environmental management plan or environmental impact study.

6.2. Resolution Process

Disagreements may arise between proponents and City staff in the interpretation and application of the significant woodlands guidelines: for example, in the identification of reasonable development options or the viability of mitigation and compensation measures. Proponents and staff will seek to resolve these issues collaboratively, on the basis of consensus, through the normal planning or application review process. Where consensus cannot be reached, issues will be escalated to the responsible program manager, manager, Director, or the General Manager as required. Ultimately, the final decision on outstanding matters of disagreement will rest with the elected representatives on the responsible City standing committee and Council, subject to any right of appeal by the proponent.

6.3. Rural Significant Woodlands

In the rural area, the NHRM criteria will apply to the identification of significant woodlands and the evaluation of any development or site alteration proposed within or

adjacent to them. For any development proposed within 120 metres of a wooded area or for site alteration regulated under the Site Alteration By-law (2018-164), the City and the proponent must determine if the wooded area meets the NHRM criteria for significance. The Natural Heritage Overlay (Schedule C11) may assist in this screening, although it only illustrates those features that can be reliably identified at the scale of the mapping using available information. On-site investigation is required for the evaluation of some criteria. Features not appearing on Schedule C11 may still be significant. Conversely, features appearing on Schedule C11 may be determined not to be significant based upon on-site investigations.

Significant woodlands located within the natural heritage system are subject to greater policy protection than significant woodlands located outside of the system, or woodlands that do not meet the criteria for significance. For significant woodlands outside of the natural heritage system, staff may consider the use of compensation or off-setting to achieve no net negative impacts. Rural woodlands that do not meet the criteria for significance may still be subject to the no net loss policy in Section 4.8.1 of the Official Plan (see Section 3.4.1 of the Environmental Impact Study Guidelines).

For some low-risk projects, such as a single lot severance or a site plan application, the City's environmental planners can waive the requirement for an Environmental Impact Study. In such cases, the planner must be familiar with the site, must agree that the project has a low risk of impact on the significant woodland, and must provide a letter to file to that effect. The planner may require conditions to be registered on title as part of a Development Agreement.

Section 7 of the NHRM provides detailed guidance on the application of the criteria for significant woodlands, both in the identification of significant woodlands, and in the avoidance and evaluation of impacts. In Ottawa, the following minimum size thresholds shall apply to the NHRM criteria.

Table 3. Significant Woodland Evaluation Criteria and Size Thresholds (Rural)

	Woodland Cover in Rural Planning Area	5% or less	5 – 15%	15 – 30%	30 – 60%	Greater than 60%
Criterion 1: Size	Woodland Size	2 ha	4 ha	20 ha	50 ha	N/A
Criterion 2: Ecological Functions	Woodland Interior	Any	Any	2 ha	8 ha	20 ha
	Proximity	0.8 ha	2 ha	5 ha	10 ha	20 ha
	Linkages	0.8 ha	2 ha	5 ha	10 ha	20 ha
	Water Protection	0.8 ha	2 ha	5 ha	10 ha	20 ha
	Woodland Diversity	0.8 ha	2 ha	5 ha	10 ha	20 ha
Criterion 3: Uncommon Characteristics	Unique Species Composition	0.8 ha	0.8 ha	0.8 ha	0.8 ha	0.8 ha
	Provincially Significant Vegetation Community	0.8 ha	0.8 ha	0.8 ha	0.8 ha	0.8 ha
	Rare, Uncommon or Restricted Plant Species	0.8 ha	0.8 ha	0.8 ha	0.8 ha	0.8 ha
	Older Woodlands	0.8 ha	1 ha	2.5 ha	5 ha	10 ha
Economic and Social Values	Economic and Social Values	0.8 ha	2 ha	5 ha	10 ha	20 ha

Under Criterion 2 – Ecological Functions, the Proximity, Linkages, and Water Protection criteria also require a specified distance between natural heritage system features. The following distances shall apply.

- Proximity and Water Protection: 30 metres. This distance is consistent with Conservation Authority regulations and the City of Ottawa minimum setback policies for surface water features.
- Linkages: no minimum distance. Any woodland meeting the minimum size criterion in Table 3 shall be considered significant if it falls within a core natural area or natural landscape linkage area shown on Schedule C11, or has been identified as a natural linkage in another Council-approved planning study.

In accordance with the general principles discussed above, the evaluation of impacts on significant woodlands must consider all of the ecological functions for which the woodland is considered significant. This includes functions that are discovered during on-site investigations, which may not have been previously known.

6.3.1. Aggregate Resources

The Provincial Policy Statement acknowledges the importance of aggregate resources to the provincial economy and establishes policies for their identification and protection (PPS Policy 2.5). Natural heritage features, such as significant woodlands, frequently overlap with mineral aggregate resources. The NHRM reflects the PPS and the need for balance by stating:

Rehabilitation of mineral aggregate operations, implemented under the Aggregate Resources Act, may be taken into consideration for the demonstration of no negative impacts (see PPS policies 2.1.4 and 2.1.6)² where rehabilitation of ecological functions is scientifically feasible and is conducted consistent with policy 2.5.3.1 and other government standards.

A decision to consider rehabilitation in the demonstration of no negative impacts... would have to be made on a case-by-case basis in consultation with the local MNR [MNRF] district office. If approved, final rehabilitation would need to be planned to occur as soon as possible and be suited to the local natural environment (p. 11).

In practice, this means that environmental impact studies in support of development applications for aggregate operations may contemplate the removal of significant woodlands, provided that rehabilitation as outlined on the rehabilitation plan is planned to occur as soon as possible and that rehabilitation is suited to the local natural environment.

² The NHRM references the 2005 PPS policy numbers; see policies 2.1.5 and 2.1.8 in the 2020 PPS.

Significant woodlands have not been identified within an aggregate extraction area approved under a licence issued under the *Aggregate Resources Act*.

6.4. Urban Significant Woodlands

In the urban area, any woodland that is at least 60 years old and 0.8 ha in size qualifies as significant, except for the exemptions noted above in Section 5.2.2.

6.4.1. Urban Criteria for Impact Evaluation

Significant woodlands identified in the urban area and urban expansion areas may be subject to impacts from development, either within the woodland or adjacent to it. An EIS is required to evaluate those impacts, in accordance with the policies of the PPS and the Official Plan.

The criteria for urban significant woodlands fall into two types: screening criteria, and comparative criteria.

Screening criteria represent important ecosystem functions and services that cannot be replaced or substituted, or for which impacts cannot be adequately mitigated. Areas of significant woodland providing these services should be conserved and protected from negative impact.

Comparative criteria represent those ecosystem services that can be replaced, substituted, or adequately mitigated through urban design or engineering. Inherent in the identification of comparative criteria is the principle that negative impacts may be permitted on the size, shape, or nature of a significant urban woodland, if the ecosystem services provided by the woodland can be maintained or improved. It also acknowledges that negative impacts on the functions and services of a significant urban woodland may be necessary in order to achieve other policies and objectives of the Official Plan and the PPS. Under such circumstances, the comparative criteria will be used to evaluate the nature and magnitude of those impacts and to evaluate development options.

Table 4 summarizes the criteria for urban significant woodlands and identifies the measures and indicators used to represent them. The measures and indicators have been classified as representing screening criteria or comparative criteria. Although the application of the criteria will differ between the existing urban area and urban expansion areas, the basic sequence remains the same. Screening criteria will apply first, in order to identify those woodlands or portions of woodlands that should be retained for their long-term ecosystem values and services. Comparative criteria will then apply to the remainder of the woodlands, in order to maximize the overall benefit to the community.

Appendix B provides more detailed guidance on the application of these criteria.

Table 4. Representation of Urban Criteria by Measures and Indicators
(Green shading indicates which urban criteria are represented by which measure(s) or indicator(s))

Urban Criteria	Category of Services	Hazard Lands	Habitat and Landscape Connectivity		Social Values				iTree Eco Analysis (or equivalent)						Accessibility and Equity				LID
		Constrained Areas	Adjacency and Connectivity	Uncommon Characteristics (NHRM)	Unusual Recreational, Educational, Cultural Opportunities	Qualifying Cultural, Heritage or Historical Features	Indigenous Values Established Through Consultation	Existing Public Use	Total Canopy Cover at maturity	Pollutants Removed	Run-off Averted	Carbon Storage	Carbon Sequestration	Structural Value	Residents Within 250m, by Housing Type	Residents Within 250m by Quality of Access	Total Accessible Greenspace	Sensitive Populations within 250 m	Run-off Captured
		Screening Criteria							Comparative Criteria										
Air pollution	Air, Water Cycle, Climate																		
Air temperature																			
Climate regulation - energy																			
Carbon storage																			
Water-flow regulation: cumulative																			
Water-flow regulation: green infrastructure	Green Infrastructure																		
Erosion regulation																			
Water purification and waste treatment																			
Disease regulation (exposure)	Disease Regulation																		
Pollination	Pollination																		
Cultural identity, social relations, cohesion	Socio-cultural																		
Spirituality/religion																			
Knowledge systems and education																			
Cognitive, physical, psychological benefits																			
Aesthetic experience																			
Inspiration - creative	Recreation, heritage, tourism																		
Recreation and tourism																			
Sense of place and heritage	Habitat																		
Habitat																			

The process for the evaluation of urban woodlands differs for the existing urban area and urban expansion areas or developing communities, as shown in Table 5 and described below.

Table 5. Planning Context for the Evaluation of Significant Urban Woodlands

Area	Process	Scope
Future Neighbourhood Overlay (Urban expansion area)	<ul style="list-style-type: none"> • Secondary plan (or equivalent) as per Official Plan policies for these areas 	Environmental management plan (or equivalent) <ul style="list-style-type: none"> • Confirmation of status and extent of significant woodlands. • Evaluation of impacts to significant woodlands under alternative development concepts. • Determination of preferred development concept through the planning process. • Assessment of preferred concept's impacts to significant woodlands, in accordance with these guidelines. • Determination of significant woodland areas for protection and conveyance to the City.
Existing Urban Area	<ul style="list-style-type: none"> • New secondary plan, or substantive revisions to an existing plan • New area-specific policy • Draft plan of subdivision • Site plan 	Environmental management plan or EIS, as appropriate <ul style="list-style-type: none"> • Individual Terms of Reference to be determined at pre-consultation. • EIS can be combined with Tree Conservation Report where both are required.

Under the Site Alteration By-law, environmental impact studies may also be required for site alteration proposed in or adjacent to significant woodlands shown on Schedule C11. Preparation of these EIS documents will also require an individual Terms of Reference.

6.4.2. Official Plan Tree Canopy and Greenspace Targets

Official Plan policies in Section 4.8 set targets for rural and urban forest cover and access to urban greenspace. These targets are:

- No net loss of rural forest cover (outside of villages).
- Urban forest canopy cover target of 40%.
- All urban residents to be within a safe 5 minute walk (400 meters) of a public greenspace (passive or active), within a 10 minute walk of two public greenspaces, and within a 15 minute transit ride of a publicly-owned natural area.

In the evaluation of project impacts on urban significant woodlands, proponents must report on the effect of those impacts on urban canopy cover and access to greenspace within the community relative to the targets (see Appendix C and D). Proponents may also refer to the targets when addressing the mitigation hierarchy or preparing a rationale for modification or removal of significant woodlands.

6.4.3. Future Neighbourhood Overlays (Urban Expansion Areas)

The Official Plan requires that natural heritage features and the natural heritage system in urban expansion areas be identified and conveyed to the City.

However, some woodlands may have limited public value in their existing state (e.g., unmanaged plantations) or may pose potential risks to public health and safety through natural hazards such as animal disease vectors (e.g., black-legged ticks) or nuisance plants (e.g., poison ivy). In some of these cases, modification of the woodlot, or even removal of the woodlot with compensation, might provide greater public benefit.

Therefore, the City is prepared to consider options for development affecting significant woodlands in specific cases. Any proposed modification or removal of the woodland must, however, be evaluated using these guidelines and demonstrate public benefits that would justify the impact to the natural heritage system.

Significant urban woodlands differ from rural significant woodlands in that the benefits and value provided to surrounding communities by their potential social and economic services usually outweigh the benefits and values provided by their biological services. Urbanization of the surrounding landscape has several predictable effects on the ecological functions of woodlands, leading to an inevitable loss of native biodiversity:

- Isolation and loss of ecological connectivity;
- Reduced size and heterogeneity;
- Increased edge effect and exposure to invasive species;
- Increased environmental stress (temperature, air quality);
- Increased public use and pressure;
- Changes in hydrology (wetter or drier);
- Removal of hazard trees providing nest or den sites.

Conversely, urbanization of the surrounding landscape increases the social and economic functions of woodlands, through increased access to the public and provision of green infrastructure. For example, accessible urban woodlands provide opportunities for:

- Community events;
- Learning, education, and cognitive development;
- Recreation, physical activity, and physical development;
- Improved mental health;
- Relief from extreme heat events;
- Relief from the urban environment and urban stress;
- Creative and artistic inspiration;
- Spiritual contemplation and reflection.

Prior to final identification of the natural heritage system in urban expansion areas, the proponent will conduct an evaluation of any significant woodlands to the satisfaction of the City, using the criteria, measures, and indicators provided in Section 6.4.1 of these guidelines. In conducting the evaluation, the proponent may use a comparative approach that assesses the impact of alternative development concepts on the significant woodlands against a baseline scenario of full woodland retention. In developing the alternative development concepts, the proponent will consider:

- Both screening criteria and comparative criteria;
- The mitigation hierarchy;
- Other urban planning and design requirements.

The proponent's report on the evaluation of significant woodlands will include a summary for each of the alternative development concepts and the baseline scenario (i.e., preservation and conveyance of the woodland in its existing form). It will also include a rationale for the selection of the preferred development concept in the context of the PPS and OP policies. These summaries and rationale should be presented in an environmental management plan or an integrated environmental review (see Appendix C).

The City is not obligated to accept a proposed removal or modification of a significant woodland. In the absence of City agreement to an alternative plan, the provisions of Section 12.2 will still require the proponent to convey significant woodlands to the City at no cost. The City's agreement to removal or modification of a significant woodland will require demonstration of equal or greater benefit to the future community.

6.4.3.1. Modification or Removal of Significant Urban Woodlands

Modification or removal of a significant urban woodland should be considered only where it can be demonstrated that the woodland has limited public value in its natural state or poses a potential risk to public health and safety that cannot be mitigated. In

some cases, the location or nature of a significant urban woodland might create difficulties or obstacles for good urban design. Conversely, significant urban woodlands may create opportunities for improved urban design or increased land use efficiency.

Any proposed modification or removal of an urban woodlot should provide a net environmental and socio-economic benefit to the community. When proposing such trade-offs, the City will require proponents to consider:

- Opportunities for more efficient design of stormwater management systems, especially low impact development (LID) in combination with tree retention and tree planting;
- Opportunities for more efficient design of park and pathway systems;
- Opportunities for increased community access to wooded greenspace through strategic compensation, improved or expanded pathways, or greenspace enhancement;
- Opportunities for enhanced tree planting, especially in combination with active transportation, transit, public spaces, and privately-owned public spaces.

For example, portions of a woodlot may be suitable for incorporation into the major stormwater management system as a conveyance or storage feature. Upland portions may be suitable for retention and redevelopment as wooded parks (and counted toward parkland dedication). The resulting increase in land-use efficiency could have financial benefits, which might then apply toward improving access to other significant woodlands or urban natural areas through expanded or improved pathways, or to the creation of other accessible urban greenspace (in addition to parkland dedication). The types of trade-offs and the level of detail provided in an evaluation will depend upon the type and scale of the planning study. Appendix C provides a detailed example of how such an approach might be implemented in an urban expansion area.

6.4.3.2. Secondary Plans or Area-specific Policies

Under the policies of Section 12 of the Official Plan, these local plans require the preparation and approval of either an Environmental Management Plan (EMP) or a Landscape Concept Plan (LCP). Any significant woodlands present in the study area must be addressed as part of those plans.

Application of the urban criteria, measures, and indicators in Table 4 requires information on the street pattern, residential densities, soils, hazard lands, drainage patterns, existing vegetation communities and habitats, other natural heritage features and linkages to the natural heritage system, heritage and historical features, and indigenous values. Much of this information will come from the preparation of existing conditions reports. However, some information will require assumptions based on professional experience, comparison to other projects, and professional opinion.

For example, the calculation of future canopy cover in a community at maturity requires a list of proposed tree species at planting numbers. However, this information normally comes from a landscaping plan, which typically accompanies a more detailed plan of subdivision. Therefore, at the stage of an EMP or LCP, canopy cover calculations will need to rely upon a preliminary estimate of tree numbers and species, based on proposed land uses, linear road frontage or area, soil mapping, and typical planting densities. Similarly, calculations of greenspace access rely on projected household and resident densities. Again, finalization of these numbers does not normally occur until plan of subdivision. However, estimates of resident densities can be obtained from proposed residential form or zoning (e.g., low-density residential, mid-density residential, high-density residential). So long as the same assumptions apply to the evaluation of development concepts, they will provide a sound basis for comparison.

These information requirements align well with the existing study and design requirements for local plans and should require minimal additional work (see Appendix C).

6.4.3.3. Plans of Subdivision

At this stage, the location and extent of any significant urban woodlands should have been explicitly identified in the EMP or LCP, along with any permitted or agreed modifications. In that case, the focus of the EIS with respect to significant woodlands will be on the implementation of the EMP or LCP requirements. In some cases, additional fieldwork may be necessary to update existing conditions reports or surveys for species at risk. However, such additional investigations should not compromise the original conclusions regarding significant woodlands, except under exceptional circumstances (e.g., a new species at risk is designated or discovered on site).

6.4.3.4. Examples

Appendix C provides an example of a significant woodland evaluation for a hypothetical urban expansion area. The example, which could be used as a template, includes three scenarios, including a baseline and preferred scenario. It incorporates some simplified assumptions regarding street tree species and planting densities, which are for illustrative purposes only.

6.4.4. Established Urban Area

The established urban area includes all the area within the urban boundary of the City, excluding the National Capital Greenbelt and areas identified in the Official Plan as Future Neighbourhoods. Within this area, any woodland that is 60 years old at the time of evaluation and 0.8 ha in size or larger qualifies as significant. The City evaluated many of these woodlands in the 2005 Urban Natural Areas Environmental Evaluation Study (UNAEEES). Most of the highly rated features are publicly owned or otherwise

protected from development, or are in areas constrained by natural hazards such as floodplains, valleylands, or unstable slopes. Only a small number of significant urban woodlands remain in private ownership and at risk of future development.

Where development is proposed in the established urban area that would affect a significant woodland, then the City will require the proponent to submit an EIS with their application.

6.4.4.1. Exemptions

As discussed above in Section 5.2.2, new significant woodlands shall not be identified in those urban areas where the natural heritage system has already been identified in a secondary plan, community design plan, plan of subdivision, or an existing conditions report submitted to and accepted by the City. If a local plan is undergoing a substantive update, however, the issue of significant woodland identification within the study area could be revisited as part of that process.

6.4.4.2. Context and Constraints

Within the established urban area, the Official Plan does not require the conveyance of privately owned, natural heritage features to the City (except as required under other policies of the Plan, for example dedication of parkland, pathways, and stormwater facilities). In fact, as discussed above in 5.1.3, the Official Plan requires the City to acquire at the request of the owner any portions of properties within the established urban area that are constrained from all legal development by natural heritage protections. Consequently, in many cases, protection of a privately owned significant urban woodland may not be possible without acquisition by the City.

The evaluation of development impacts on significant woodlands in the established urban area must also consider the land use context. In setting out land uses and zoning within the established urban area, Council has considered and balanced all of the priorities and directions of the *Planning Act*, the PPS, and the Official Plan. These priorities and directions may include such things as residential and commercial land requirements, intensification targets, infrastructure requirements, complete streets, active transportation, family-friendly neighbourhood design, transit, and transit-oriented development. Protection of significant woodlands cannot automatically override these considerations. Furthermore, as the intensity and complexity of land uses increases from the edge to the center of the urban area, the functions and benefits of urban woodlots change. They derive less value from their inherent, natural state and ecological processes, and more value from their support of the surrounding urban fabric and urban life. This does not imply that woodlands do not belong in urban centres. However, in the established urban area, an explicit focus on ecosystem services may lead logically to consideration of modified forms, trade-offs, or even substitutions for the functions of urban woodlands.

6.4.4.3. Compensation for Ecosystem Services

Woodlot and tree retention always has priority. However, where cost or past planning decisions make full or even partial retention of an urban woodlot impractical, it will be necessary to mitigate or compensate for the lost benefits through enhanced, on-site, green design and technology. For example, replacement of urban heat island benefits and energy benefits may require the use of green roofs, reflective roof materials, strategic tree plantings, and the provision of shaded public space. Replacement of rainwater interception and evapotranspiration may require enhanced use of permeable surfaces, use of bioswales, and incorporation of tree rooting space into stormwater management. In particular, any proposal for the replacement of urban woodland will require enhanced tree planting, including the use of suspended pavement to provide adequate soil volumes, especially in restrictive, hard surface, locations.

These techniques and technologies complement other directions in green urban design. Consideration of shade facilitates a more conscious approach to the design of public space, placemaking, and the promotion of active transportation. The provision of adequate root space for mature trees creates opportunities for stormwater storage and infiltration. In these ways, requiring compensation for lost ecosystem services positions the discussion of urban design within the framework of liveable communities.

Within the context of the significant woodlands policies, compensation will focus on the replacement of ecosystem services within the development site and surrounding community. Monetary or compensation outside the study area will not be sought nor considered by the City. Notwithstanding this policy, however, compensation for tree removal or loss may still be required under other City policies and by-laws.

6.4.4.4. Individual Terms of Reference

Within the established urban area, every urban woodlot has its own unique planning context, planning history, and environmental constraints. These circumstances vary so widely that a standard approach to an evaluation will not suffice. Similarly, engineering, servicing, and construction standards and practices evolve over time. Consequently, any evaluation of impacts on a woodland in the urban area will require preparation of an individual Terms of Reference by the proponent, subject to the agreement of the assigned City planner. The Terms of Reference will draw upon the criteria, measures, and indicators provided in Table 4.

Depending upon the proposal and the context, the Terms of Reference may require a comparative assessment of development options where feasible, rather than a simple, absolute assessment of impacts. In many cases, it will require a qualitative assessment of mitigation and compensation measures, given that quantitative methods and tools may not exist for determining equivalency in the provision of ecosystem services. The EIS and/or integrated environmental review must include an explanation, as well as an

explicit rationale and justification under the PPS and the Official Plan for any negative impact that cannot be avoided, adequately minimised or mitigated.

6.4.4.5. *Examples*

Appendix D provides three examples of Terms of Reference for the assessment of development impacts on woodlands in the established urban area. The three examples are not exhaustive, but cover a set of typical conditions and concerns. The features used in the examples lie within another municipality, and the proposed developments are hypothetical.

7. Tools

Many systems and tools exist for evaluating the suite of ecosystem services provided by woodlands. Over time, these tools have improved in both sophistication and in ease of use. Some of them, such as the U.S. Forest Service's iTree tools, are available online and can be used effectively by people with little or no prior training.

As existing tools improve and new tools become available, practitioners will presumably want to adopt the most useful ones. Practitioners may employ any tools that they wish in the assessment of woodland ecosystem services, so long as they produce the required information in a transparent and comprehensible manner.

7.1. iTree

At present, the City of Ottawa recommends the iTree suite of tools for the assessment of ecosystem services by urban woodlands. The toolkit is available online at: <http://www.itreetools.org/>. The website includes full training and technical resources.

The U.S. Forest Service developed the iTree tools for the assessment of ecosystem services by trees at scales ranging from a single tree to a forested region. The tools incorporate models and methods that have been extensively peer-reviewed and published in academic, scientific journals. In the context of these guidelines, the key analysis tools are:

- **iTree Eco:** as described on the iTree website, "iTree Eco provides a broad picture of the entire urban or rural forest. It is designed to use field data from complete inventories or randomly located plots throughout a community or study area, along with local hourly air pollution and meteorological data to quantify forest structure, environmental effects, and values."
- **iTree Design:** "a simple online tool that provides a platform for assessments of individual or multiple trees at the parcel level. This tool links to Google Maps and allows you to see how tree selection, tree size, and placement around your home affects energy use and other benefits."

- **iTree Canopy:** “a quick and easy way to produce a statistically valid estimate of land cover types (e.g., tree cover) using aerial images available in Google Maps. The latest version of Canopy also estimates values for air pollution reduction and capturing atmospheric carbon. Canopy can be used by urban forest managers to estimate tree canopy cover, set canopy goals and monitor canopy change over time. Canopy can also be used to estimate inputs for use in i-Tree Hydro and elsewhere where land cover data are needed.”

These tools have limitations. In particular, for Canada, they rely upon a limited set of atmospheric data. Consequently, one must regard absolute estimates of benefits with caution, as they may have a large error or bias. However, when used comparatively, the estimates provide a valid basis for evaluation of the relative benefits of different development options.

7.2. Modelling Gaps

Despite widespread work and research on modelling of the ecosystem benefits of urban trees and forests, some gaps remain at the local or site-specific scale. Tools such as iTree predict tree and forest benefits based upon models that employ large data sets and statistical relationships between form (e.g., size, leaf area, species) and functions (e.g., removal of fine particulates from the air). However, their accuracy declines quickly at more local scales, as other site-specific factors become more important. For example, the value of a woodland for removing air pollutants will depend greatly upon the spatial relationship of the woodland to the benefiting population, or the proximity of the woodland to sources of pollutants. An urban woodland lying immediately downwind of a busy road will provide more air quality benefit than a woodland lying upwind of the road. Similarly, the value of a woodland for avoidance of stormwater runoff will depend upon the local topography, the local soil and bedrock conditions, the length of the growing season, *etc....*

Two areas in particular may soon see progress in the development of more local tools: air quality modelling, and urban heat island modelling.

7.2.1. Urban Air Quality

Broadly speaking, two types of urban air quality models exist: dispersion models and photochemical models (U.S. EPA: <https://www.epa.gov/scram>, last verified 14 June 2018). Dispersion models are more common and simple. They analyze the movement and spread of pollutants under a set of environmental conditions. However, they do not account for interactions and chemical changes in pollutants under the influence of solar radiation, which can substantially affect their concentrations and harmfulness. Photochemical models incorporate chemical interactions and changes. Photochemical models typically produce more accurate results.

In order to produce accurate results at a local level (i.e., at a resolution of less than 1 km²), both dispersion models and photochemical models require local ambient air quality monitoring, local micro-climate data, high resolution topographic data, and three dimensional building data. They also require data on area, linear, and point sources of pollutants. Typically, development applications do not include this kind of detailed environmental information, unless they happen to concern land uses associated with unusual sources of air pollutants.

At this time, therefore, these guidelines recommend the use of total canopy cover as surrogate measure for the air quality benefits of urban woodlands, with iTree Eco providing the most practical tool for estimating that function (Table 4).

7.2.2. Urban Heat Island

The urban heat island effect occurs when urban surfaces – pavement, buildings – absorb and re-emit solar energy, thereby raising ground-level air temperatures. Typically, temperatures in large urban areas exceed those of the surrounding landscape by several degrees. The effect can have significant, negative health impacts, especially during extreme heat events. Urban trees and woodlands can reduce and mitigate urban heat island effects by reflecting solar energy, dissipating it through evapotranspiration, and shading more absorbent surfaces.

Typically, the contribution of an urban area or feature to the urban heat island effect is estimated by direct measurement of *surface temperature* using infrared imagery from drones, aircraft, or satellites. However, differences in surface temperature do not always correlate closely with differences in *apparent air temperature* – i.e., the temperature as actually experienced by people. Apparent air temperature may be more dependent upon upwind land uses, ambient humidity, and mixing of atmospheric layers.

As with air quality modelling, the information necessary to model apparent heat island effects at a local level generally does not exist. Again, these guidelines recommend the use of total tree canopy cover as a surrogate measure for urban heat island benefits of urban woodlands. Where reflective surfaces or engineered shade structures are proposed as compensation for loss of tree canopy cover, then surface temperature measurements of similar features could be used estimate their relative benefits.

8. Integration with other Policies and Processes

The Significant Woodland Guidelines have been written to complement the City's other policies and processes. In particular, they reflect the City's planning and development application processes, the Urban Forest Management Plan, evolving practices in low impact development, Ottawa Public Health's *Health and the Built Environment* campaign, and guidelines for urban and suburban design. Implementation of the Significant Woodland Guidelines should facilitate implementation of these other policies.

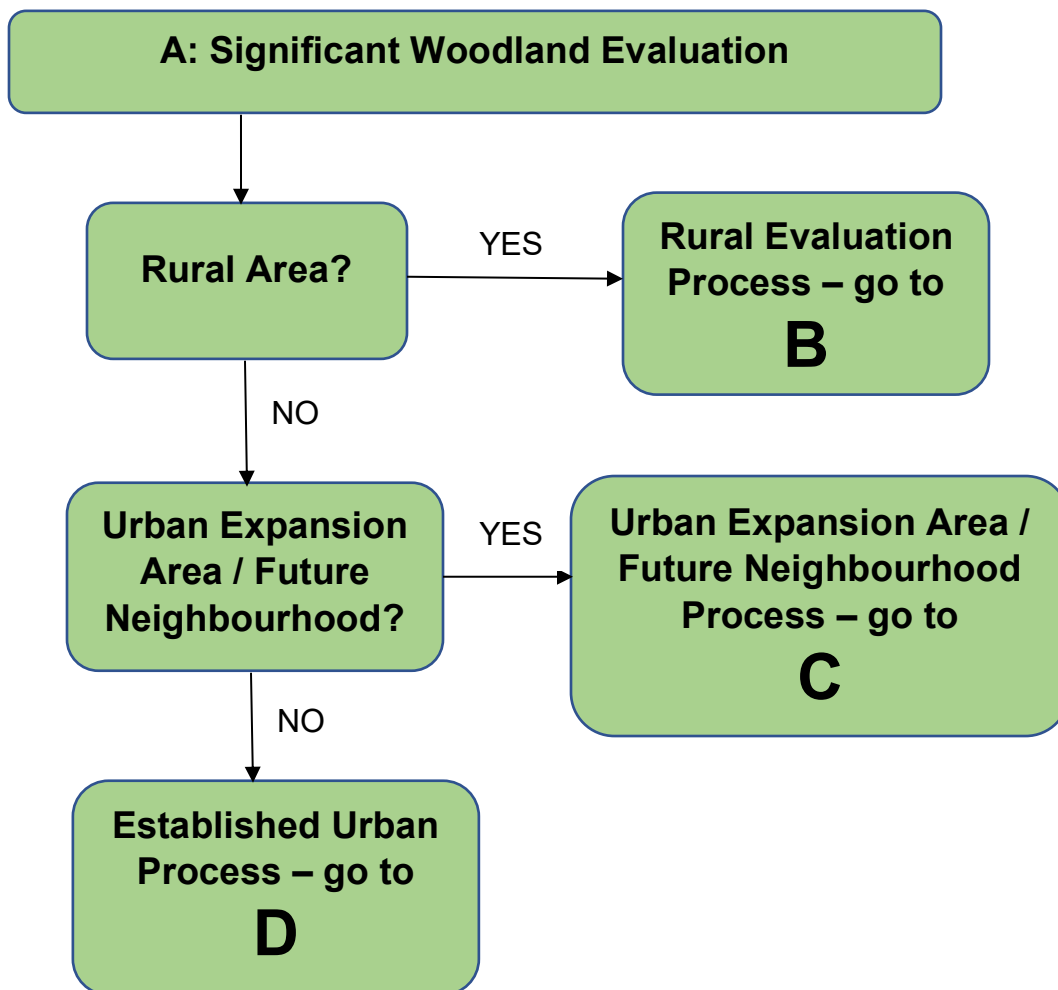
The Significant Woodland Guidelines also have application to many other policies of Ottawa's Official Plan. Consideration of the Guidelines should be given during implementation of the following sections:

Official Plan Section	Policy
2.1	The Big Policy Moves
2.2.1	Regeneration
2.2.3	Energy and Climate Change
2.2.4	Healthy and Inclusive Communities
3.1	Designate Sufficient Land for Growth
3.4	Focus Rural Growth in Villages
4.4	Parks and Recreation Facilities
4.7	Drinking Water, Wastewater and Stormwater Infrastructure
4.8	Natural Heritage, Greenspace and the Urban Forest
4.9	Water Resources
4.10.3	Make trees an important component of a school's outdoor space
4.11	Generally Permitted Uses
5	Transects
5.4.4	Provide direction for new development in the Suburban Transect
5.5.1	Recognize a rural pattern of built form and site design
5.6.3	Natural Heritage Overlays
5.6.4	Future Neighbourhood Overlay
6.6.5	Ottawa International Airport Economic District
6.6.8	Kanata North
7	Greenspace Designation
8	Greenbelt Designations

Official Plan Section	Policy
9	Rural Designations
10.1	Prevent injury, loss of life and property damage (see particularly 10.1.5 on Wildland fire hazards, but also other subsections)
10.3	Build resiliency to the impacts of extreme heat
10.4	Enhance personal security through design
11	Implementation
12	Local Plans

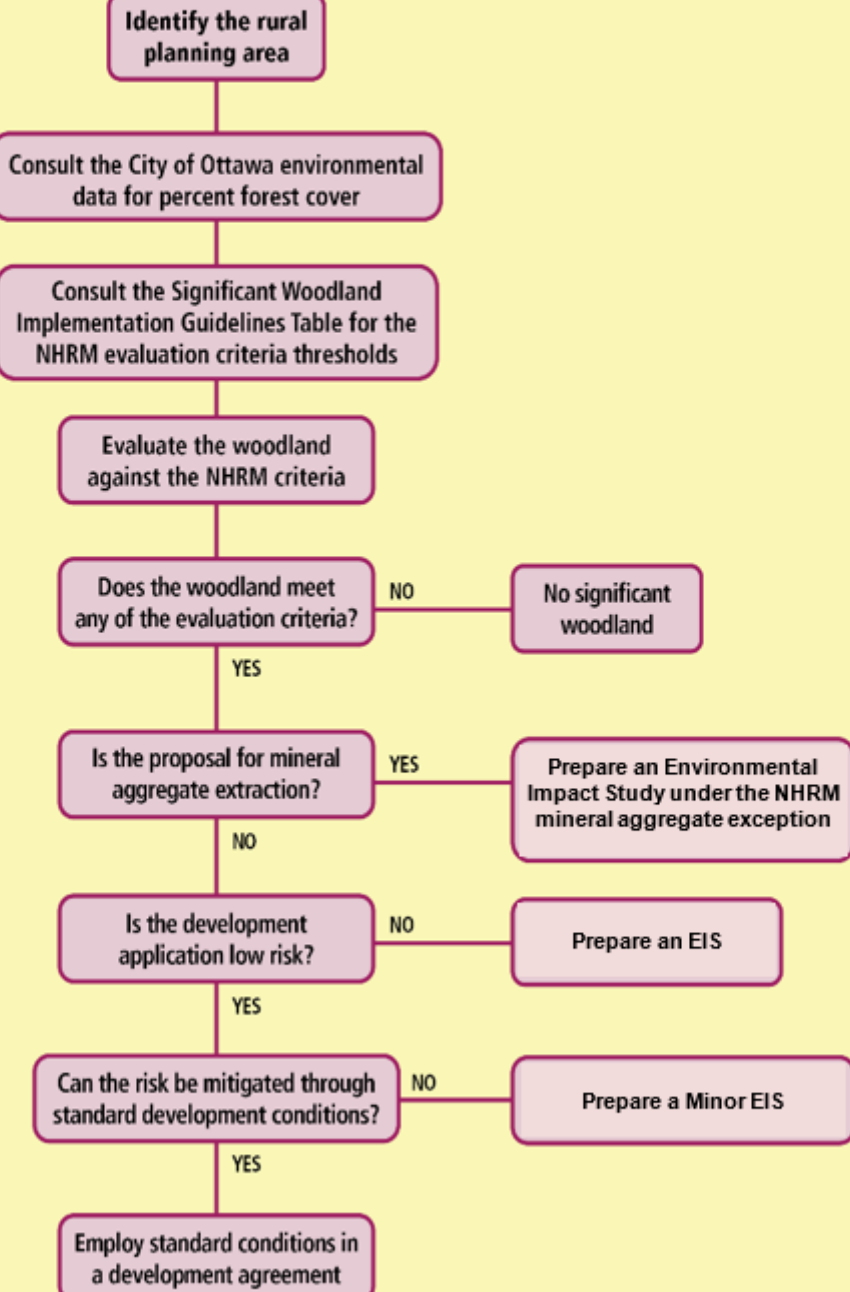
APPENDIX A. A Key and Flowchart for the Evaluation of Potentially Significant Woodlands

The following key and flowchart will assist in determining which evaluation process applies to a particular, potentially significant woodland, and the steps in that process.



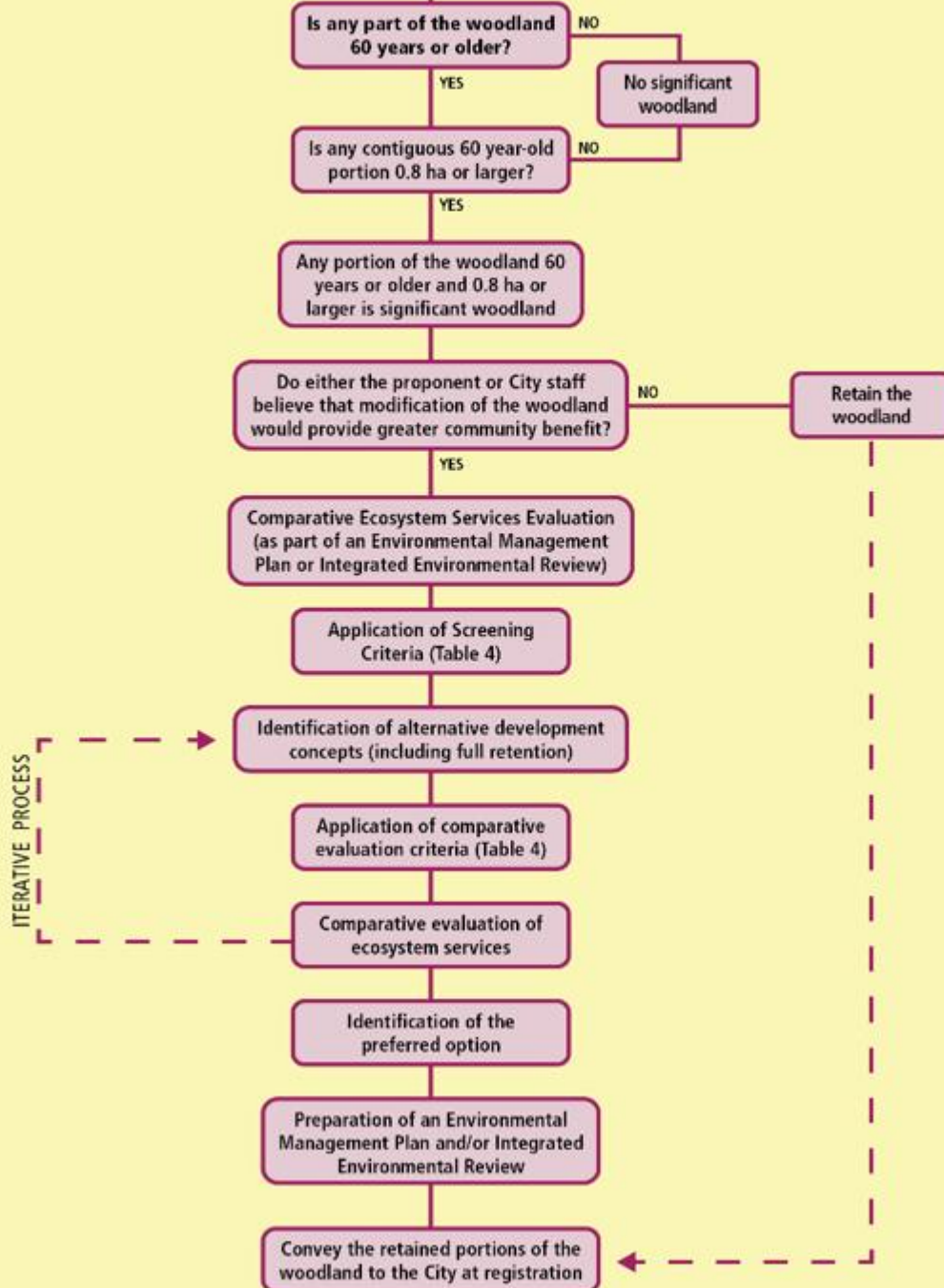
B

Rural Evaluation Process



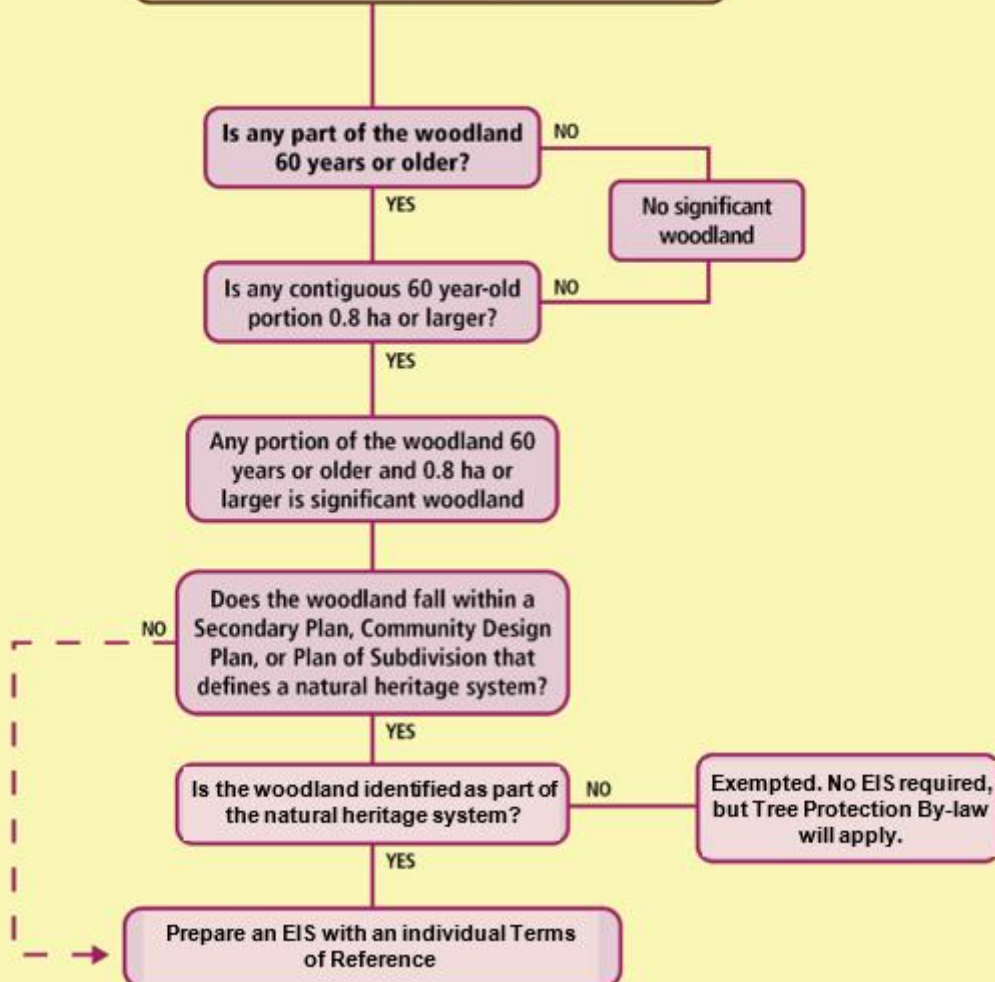
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Urban Expansion Area / Future Neighbourhood Process



D

Established Urban Area Process



APPENDIX B. Additional Guidance on the Application of Table 4. Representation of Urban Criteria by Measures and Indicators

Screening Criteria

Areas of woodlands that meet any of the following criteria should be screened out from development or negative impact.

Social Values

Unusual Recreational, Educational, or Cultural Opportunities

This evaluation identifies unusual or unique recreational, educational, or cultural opportunities that draw or could draw residents and visitors from outside the immediate neighbourhood. It does not include recreational or multi-purpose trails that simply traverse the woodland (those would be addressed under adjacency and connectivity). Examples include the sugar bush in Richelieu Park, the outdoor classroom at Macoun Marsh in the Beechwood Cemetery, the “swimming hole” near McKay Lake in Rockcliffe Park (Caldwell-Carver Conservation Area), the boardwalks and observation platforms in the Mud Lake Conservation Area at Britannia, and the mountain-biking trails in Trillium Woods, the urban portion of the South March Highlands Conservation Forest.

Qualifying Cultural, Heritage, or Historical Features

This evaluation identifies any cultural, heritage, or historical features or characteristics that have received official recognition or designation, or which would qualify for official recognition or designation. It would include any archaeological sites that might be deemed “sensitive” according to Federal or Provincial criteria. Examples include the maple stand in Richelieu Park (which has formal heritage designation in addition to its use as a sugar bush), the woodland surrounding the Briarcliffe Heritage Conservation District, or pre-contact indigenous archaeological sites on the Rideau and Ottawa Rivers.

Indigenous Values Established through Consultation

This evaluation would typically take place at the stage of a Secondary Plan, although it could take place during a subdivision application or site plan. The evaluation refers specifically to values identified through consultation with representatives of the Anishinabe Algonquin Nation, typically as designated by the Pikwakanagan and Kitigan-Zibi First Nations. Indigenous values could include such things as the presence of ceremonial or medicinal plants, cultural significance in oral history, or contemporary gathering spaces. Contact information can be obtained from City of Ottawa planning staff.

Hazard Lands

Constrained Areas

Urban woodlands sometimes occupy areas that are constrained from development by natural hazards such as floodplains, watercourse meander belts, steep or unstable slopes, restrictive soils, or karstic terrain. In some cases, proponents may seek to reduce these development constraints through engineered means, such as grade raises, channel redesign, or slope drainage. Where urban woodlands occupy such constraint lands, the constrained areas should be screened out from development or negative impact, except as required to reduce or eliminate existing risks to public safety.

Habitat and Landscape Connectivity

Adjacency and Connectivity

Urban woodlands that form an existing or potential component of the City's natural heritage system or greenspace network should be screened out from development that would negatively affect their potential, long-term contribution to those systems. Specifically, urban woodlands should be screened out from development under the following circumstances:

- They lie adjacent to another terrestrial natural heritage system feature in the urban area, the National Capital Greenbelt, or the rural area: *i.e.*, another significant woodland, a provincially significant wetland, an urban natural feature, a natural environment area, a significant valley land, a Life Science Area of Natural and Scientific Interest, an Earth Science Area of Natural and Scientific Interest. Woodlands lying within 20 metres of another feature will be considered adjacent, provided that the intervening area is currently in natural or agricultural landcover or greenspace (may include a pathway or multi-use trail up to 3 metres wide). Hedgerows and other narrow woodlands of less than 30 metres in width will not qualify for adjacency, but may be considered for landscape connectivity.
- They lie within the potential development setback of a surface water feature as set in the Official Plan, a subwatershed study, an environmental management plan, other Council-approved City guidance documents, or Conservation Authority regulations.
- They provide an existing or potential natural or recreational linkage identified in the City of Ottawa's natural heritage system, the City of Ottawa Greenspace Network, or the National Capital Commission's Capital green space network.

Modifications may be considered to such woodlands where they do not impair the contribution of the woodland to the natural heritage system or greenspace network.

Specialized Habitat

Urban woodlands that provide specialized habitat should be screened from development. Specifically, woodlands should be retained for environmental protection if they meet any of the “Uncommon Characteristics Criteria” in Section 3 of Table 7.2 in the Natural Heritage Reference Manual 2010. In addition, woodlands should be protected if they provide habitat for an endangered or threatened species identified under the *Endangered Species Act, 2007*, unless the proponent can demonstrate a reasonable expectation of receiving a permit for damage to or destruction of that habitat.

Comparative Criteria

A. iTree Eco Analysis (or equivalent)

The iTree Eco Analysis will estimate the long-term impacts of the proposed development of the woodland on the overall ecosystem services provided by the urban forest in the planning area. The following definitions apply during this analysis:

- The **urban forest** consists of the significant woodland under evaluation, other public and private treed areas, street trees, and individual trees on private property. It will also include trees proposed as compensation on a landscaping plan or Tree Conservation Report, provided that the plan or report demonstrates **adequate soil rooting volume** for the healthy growth of the tree.

The following table of soil rooting volumes was originally prepared for the City of Ottawa’s Street Tree Manual and is consistent with urban forest literature and the recommendations of other Canadian municipalities.

Recommended Soil Volumes (un-compacted native soil)					
Tree Type/Size	Recommended Soil Volume (m ³)	Shared Soil Volume (m ³)	Soil Volume: Champlain Sea clays (m ³)	Shared Soil Volume: Champlain Sea Clays (m ³)	Maximum Soil Depth (m)
Ornamental	15	9	20	12	1
Columnar	15	9	20	12	1
Small	20	12	25	15	1
Medium	25	15	30	18	1.2
Large	30	18	35	20	1.3
Evergreen	25	15	30		1.2

- The **planning area** will be:
 - for a woodland within the established urban area: the neighbourhood as defined in the Ottawa Neighbourhood Study;
 - for a woodland within a Future Neighbourhood Overlay (urban expansion area): the boundary of the planning studies (e.g., the EMP).
- The **time horizon** for the evaluation will be forty years.

B. Accessibility and Equity

Total Accessible Greenspace

Total accessible greenspace will be measured as the total area of greenspace or natural land that lies in public ownership and is generally accessible to the public. It will include:

- parks;
- open spaces in public ownership, with the exception of green transportation and utility corridors where further development is intended;
- Urban Natural Features and other natural areas in public ownership;
- accessible floodplain and hazard lands (e.g., valleylands).

It will include open water areas within the above land uses.

It will not include school grounds, golf courses, graveyards, *etc.*... with restricted access, nor temporary greenspace reserved for other purposes, such as major transportation corridors and infrastructure.

The planning area will be the same as for the iTree Eco Analysis (see above).

Residents within 250 metres of greenspace by housing type and quality of access

This geographic information system (GIS) analysis will estimate the proportion of residents within walking distance of urban greenspace, broken down by housing type and quality of greenspace access. The analysis may include greenspace outside the planning area (see iTree Eco Analysis for the definition of the planning area).

Walking distance is defined as the 250 metre direct linear distance to any greenspace boundary, approximating a 400 metre walking distance or 5-minute walking time along an orthogonal grid street system. If a complete pedestrian geospatial network is available for GIS analysis, then physical accessibility may be calculated using a 5-minute walking time and a walking speed of 5 km/hour.

Housing type is defined as:

- Street-oriented residential: detached dwellings, doubles, and townhomes on individual lots.

- Multi-unit residential: townhomes on shared lots, low-rise apartments, mid- to high-rise apartments, residences in mixed-use developments.

Access categories are:

- High access: landscaped parks, wooded parks, urban natural features or open spaces with internal, accessible paths or facilities.
- Moderate access: stormwater facilities, urban natural features or open spaces with peripheral, accessible paths or facilities.
- Low access: urban natural features or open spaces with no accessible paths or facilities.

Maximizing Human Health Benefits within 250 metres

This GIS analysis will identify any sensitive land users within a 250 metre or five-minute walk of accessible greenspace, where such information is available. Accessible greenspace, in this context, refers to any greenspace with high or moderate access, as defined above. Promoting positive health and well being is important for the whole population; however, some people experience health differences that are unfair or avoidable, which are known as health inequities (i.e., through the social, economic, mental and physical conditions in which people live, learn, work and play).

Occupants of the following land uses could experience health benefits and/or a reduction of health inequities through access to woodlots:

- Hospitals
- Schools
- Daycares
- Retirement residences
- Long-term care facilities
- Social housing.

Low Impact Development (LID)

This analysis will estimate the existing or potential benefits of the woodland in providing compatible stormwater control for the planning area. It is measured as the total area of stormwater management facilities (both quantity and quality control, including flow channels) replaced by the woodland. Information for this measure would come from a master drainage study or stormwater management plan.

Social Values – Existing Public Use

This evaluation identifies existing, authorized uses of the woodland by the surrounding community. It can include private lands where public access is permitted. The evaluation may be qualitative (*i.e.*, simply descriptive) or semi-quantitative (*i.e.*, survey-based). Examples of public uses would be dog-walking, mountain-biking, or bird-watching on formal or informal trail networks.

APPENDIX C. Urban Expansion Area: An Example Evaluation of Alternative Concept Plans

Description

The three concept plans represent different approaches to the treatment of a significant woodland in an urban expansion area. The woodland consists of a core area of mature cedar swamp in a local groundwater discharge area at the foot of a slope. The groundwater level remains high year-round, although groundwater discharge diminishes in the summer, with little or no drainage off site. A younger, regenerating moist forest of ash, small cedar, poplar and birch surrounds the core woodlot.

Under the Official Plan definition, the core area of the woodland meets the definition of “significant woodland” in the urban area. The remainder of the woodland is less than 60 years old and does not qualify as significant.

The woodlot lies on private land and does not currently support public use. It has no known historical or cultural significance. It does not provide a natural heritage system linkage. It does not overlap with any other known development constraints.

In its current state, the significant core woodlot has limited potential for public access or use, due to its wet nature and its dense undergrowth. Potential does exist to improve access to the woodlot through improved drainage, pathway construction, and careful placement of fill.

SUMMARY TABLE AND ASSUMPTIONS

Summary Table

Statistic	Plan 1	Plan 2	Plan 3 (preferred)
Accessible Greenspace	21.6%	20.5%	20.6%
Multi-unit Residential with Greenspace Access (high, mod, low)	99.4% (55.5%, 42%, 2.1%)	99.4% (55.5%, 42.0%, 2.1%)	99.6% (71.8%, 27.2%, 0.6%)

Statistic	Plan 1	Plan 2	Plan 3 (preferred)
Street-oriented Residential with Greenspace Access (total/high)	88.3% (61.5%, 14.5%, 12.2%)	85.2% (65.7%, 11.3%, 8.0%)	94.1% (91.9%, 1.3%, 0.9%)
Public Canopy Cover	25.5%	25.2%	25.3%
Pollution Removal	1,208 tonnes/yr	iTree not run	1,145 tonnes/yr
Carbon Storage	2,406 tonnes	iTree not run	2,282 tonnes/yr
Avoided Run-off	4,951 m3/yr	iTree not run	4,694 m3/yr

Conclusion and Rationale

Overall, Concept Plan 3 provides the most benefit to the community, while balancing other development principles and objectives.

- Concept Plan 1, retention of the significant woodland, provides minimal benefit to the community due to the inaccessible nature of the woodlot. There is no obligation for the property owner to improve access and no financial incentive to do so.
- Concept Plan 2 improves land use efficiency by reducing the size of the woodlot and providing approximately 2.3 ha of additional residential area. The conversion of the woodlot to a wooded park (as part of the normal parkland dedication) increases its accessibility to the surrounding community. However, the additional benefit is minimal and does not justify the overall loss of greenspace and canopy cover.
- Concept Plan 3 improves land use efficiency by reducing the size of the woodlot and providing approximately 2 ha of additional residential area. The addition of small 0.25 ha wooded parkette (in addition to the normal parkland dedication) provides greenspace access to an underserved area of the community. Improved access for much of the remaining community is provided by the provision of additional nature trails within the creek corridor setback and in the eastern woodlot. Overall, this concept plan provides substantially increased community benefit, which compensates for the small, overall loss of greenspace and canopy cover.

Assumptions

Multi-unit Residential: 20 large trees/ha, 3 small trees/ha

Street-oriented Residential: 18 large trees/ha, 1 small tree/ha

Urban Natural Features: 190 large trees/ha

Wooded Parks and Creek Corridors: 100 large trees/ha

Parks and Stormwater Facilities: 10 large trees/ha

Schools and Institutions: 5 large trees/ha

Large Tree = 115 m² canopy, Small Tree = 78 m² canopy

Access Categories

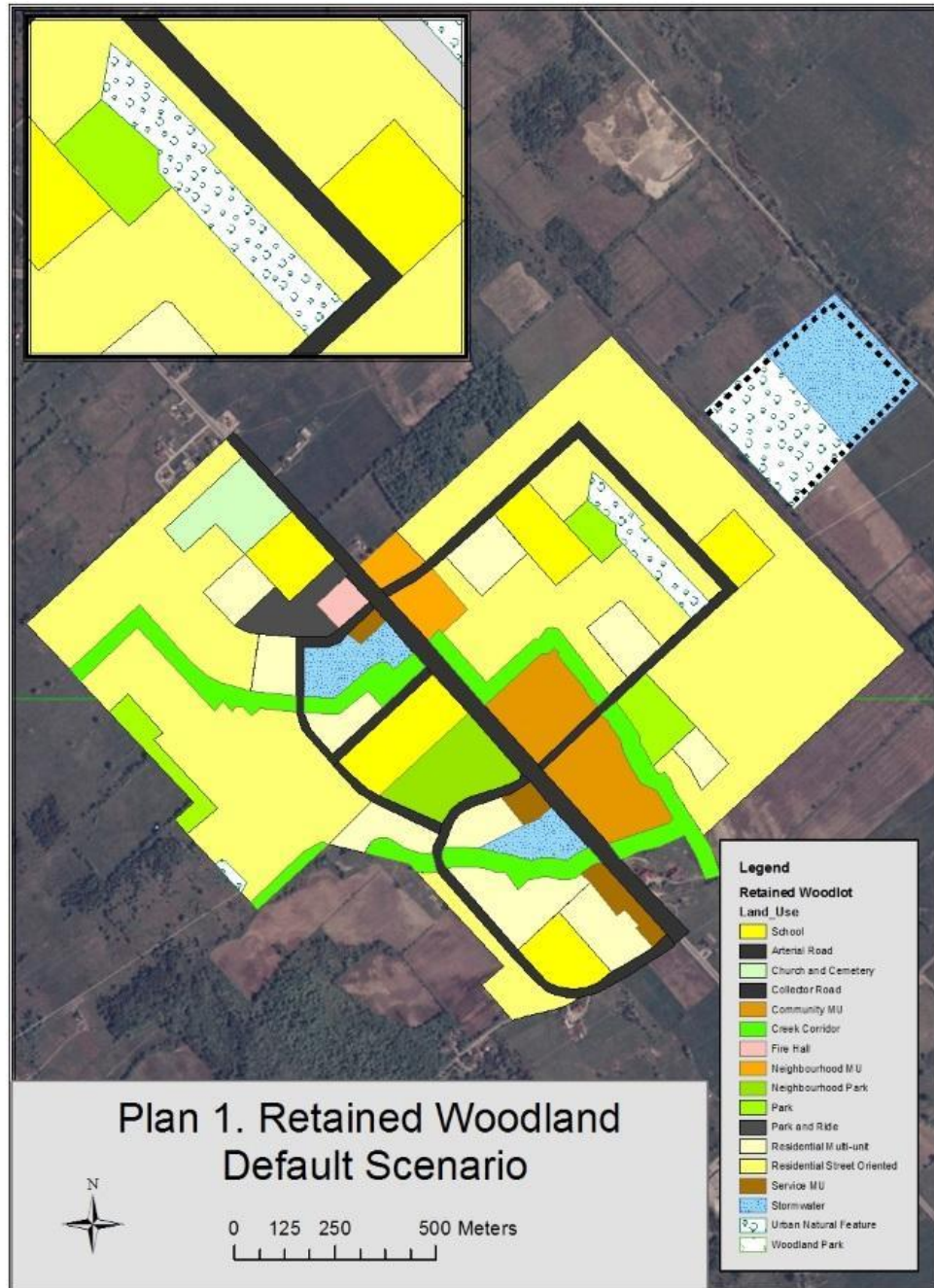
High: programmed parks, wooded parks, urban natural areas or open space with internal, accessible paths or facilities.

Moderate: stormwater facilities, urban natural areas or open space with peripheral, accessible paths or facilities.

Low: urban natural areas and open space with no access.

WOODLOT SCENARIO 1

Retained Woodlot



Description

This design retains the unmodified woodlot, but with a reduced boundary to allow a more practical, grid road pattern. The woodlot has low accessibility due to its swampy nature. Overall, the community greenspace consists of the woodlot, an eastern woodlot associated with a SWM facility, the creek corridors, other stormwater facilities, and parks.

Mitigation

None.

Compensation

None

Statistics

Plan Area: 206.3 ha

Total Accessible Greenspace: 44.6 ha (21.6%)

High accessibility: 12.9 ha

Moderate accessibility: 18.9 ha

Low accessibility: 12.8 ha

Residential Greenspace Access

Multi-unit

Total Multi-unit Residential Area: 18.3 ha

Total Area with Greenspace Access: 18.2 ha (99.4%)

Residential area with high access	10.2 ha	55.5%
Residential area with moderate access	7.7 ha	42.0%
Residential area with low access	0.4 ha	2.1%

Street-oriented

Total Street-oriented Residential Area: 90.6 ha

Total Area with Greenspace Access: 80.0 ha (88.3%)

Residential area with high access	55.8 ha	61.5%
Residential area with moderate access	13.2 ha	14.5%
Residential area with low access	11.0 ha	12.2%

Canopy Cover

Total Woodland Area: 9.5 ha

Large Tree Crowns: 42.1 ha

Small Tree Crowns: 1.1 ha

Total Public Urban Canopy Cover: 52.7 ha (25.5%)

iTree Eco 6 Analysis

Number of Trees: 5,602

Dominant Species: N/A

Pollution Removal: 1,208 tonnes/year

Carbon Storage: 2,406 tonnes

Carbon Sequestration: 52.64 tonnes/year

Avoided Run-off: 4,951 m³/year

Structural Value: \$21.4 million

Habitat Values

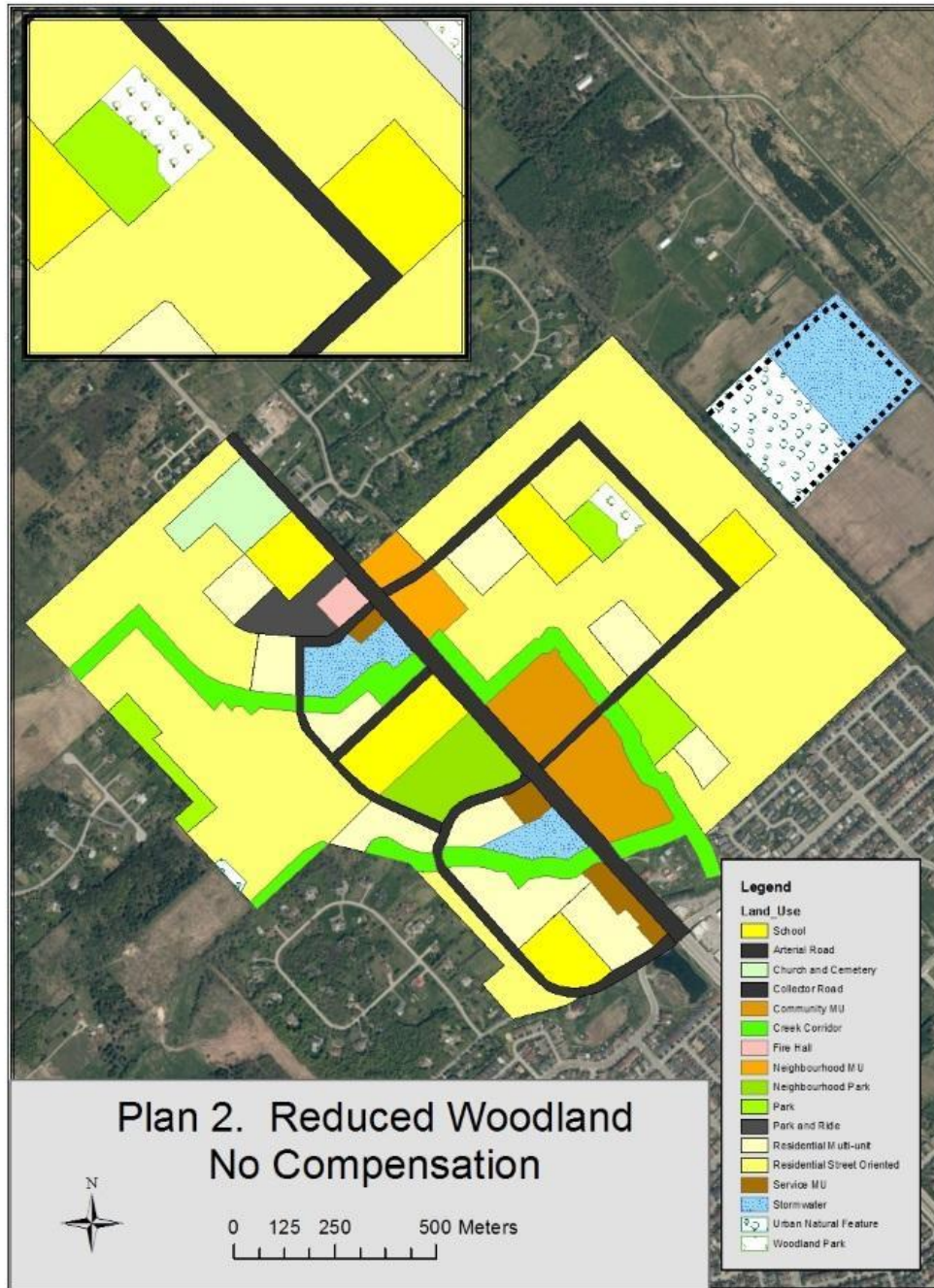
High density of large cedar trees in the central area of the woodlot. No other unusual or specialized habitat.

Historical and Cultural Values

None identified.

WOODLOT SCENARIO 2

Woodlot Removal – No Compensation



Description

This design removes the woodlot, but retains most of the mature cedar trees in a wooded park. The overall availability of accessible greenspace declines, although the new wooded park increases the quality of accessible greenspace in its immediate vicinity.

Mitigation

Retention of large cedar trees in a wooded park.

Compensation

None

Statistics

Plan Area: 206.3 ha

Total Accessible Greenspace: 42.3 ha (20.5%)

High accessibility: 13.4 ha

Moderate accessibility: 18.5 ha

Low accessibility: 10.4 ha

Residential Greenspace Access

Multi-unit

Total Multi-unit Residential Area: 18.3 ha

Total Area with Greenspace Access: 18.2 ha (99.4%)

Residential area with high access	10.2 ha	55.5%
Residential area with moderate access	7.7 ha	42.0%
Residential area with low access	0.4 ha	2.1%

Street-oriented

Total Street-oriented Residential Area: 93.1 ha

Total Area with Greenspace Access: 79.3 ha (85.2%)

Residential area with high access	61.2 ha	65.7%
Residential area with moderate access	10.6 ha	11.3%
Residential area with low access	7.5 ha	8.0%

Canopy Cover

Total Woodland Area: 7.1 ha

Large Tree Crowns: 43.6 ha

Small Tree Crowns: 1.2 ha

Total Public Urban Canopy Cover: 51.9 ha (25.2%)

iTree Eco 6 Analysis [Not run]

Number of Trees:

Dominant Species:

Pollution Removal:

Carbon Storage:

Carbon Sequestration:

Avoided Run-off:

Structural Value:

Habitat Values

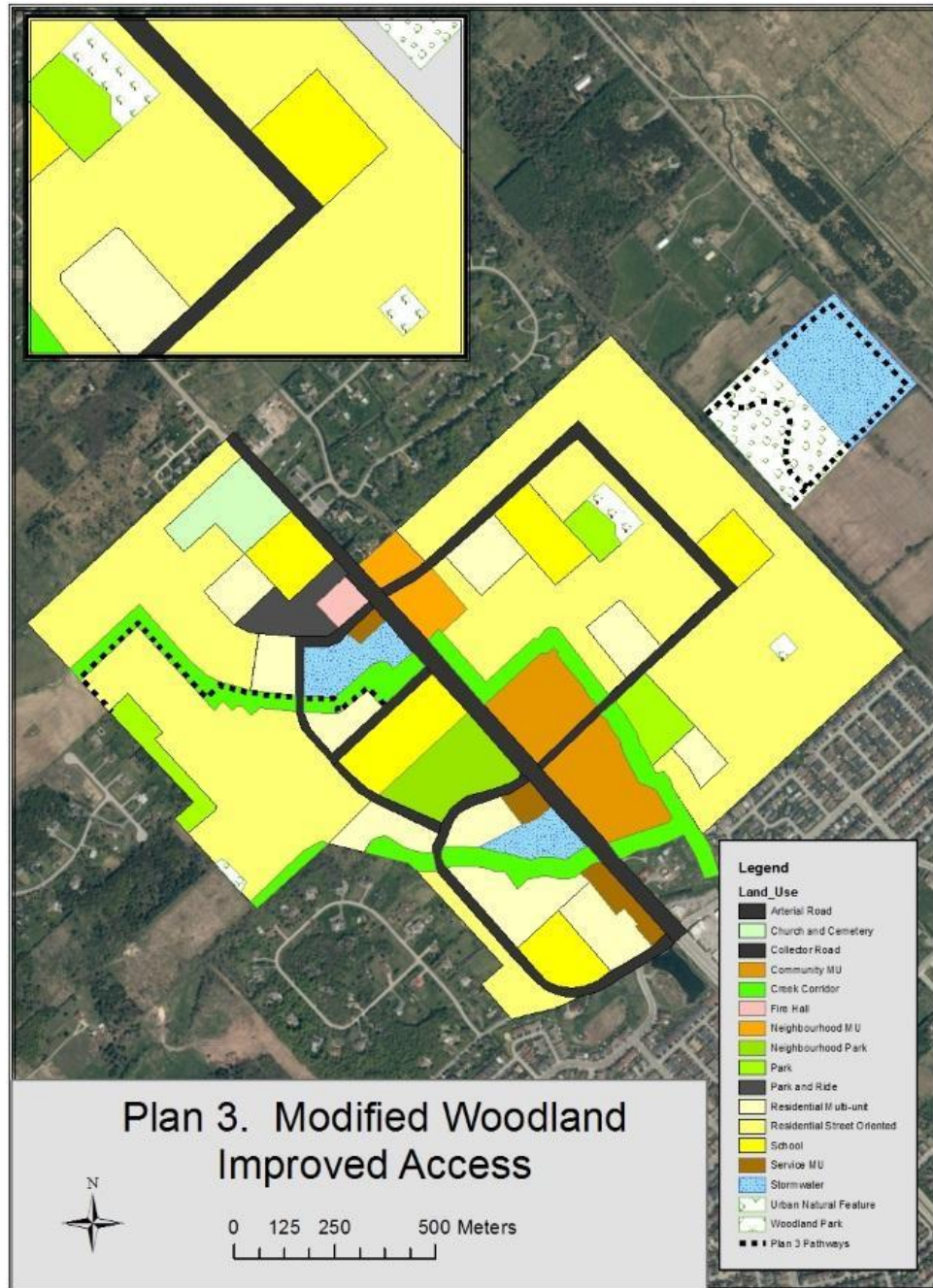
The large cedar trees from the original woodlot have been retained in a wooded park.

Historical and Cultural Values

None identified.

WOODLOT SCENARIO 3

Woodlot Removal – With Compensation



Description

This design removes the woodlot, but retains many of the mature trees in a wooded park. It adds a treed parkette in the eastern corner of the development to provide greenspace access in that quadrant. It also provides new, internal, pathways in the eastern urban natural feature and the creek corridor to increase the accessibility of those features to the surrounding community.

Mitigation

Retention of large cedar trees in a wooded park.

Compensation

A new treed parkette of 0.25 ha and new pathways in the eastern urban natural feature and creek corridor.

Statistics

Plan Area: 206.3 ha

Total Accessible Greenspace: 42.5 ha (20.6%)

High accessibility: 22.2 ha

Moderate accessibility: 11.7 ha

Low accessibility: 8.6 ha

Residential Greenspace Access

Multi-unit

Total Multi-unit Residential Area: 18.3 ha

Total Area with Greenspace Access: 18.2 ha (99.6%)

Residential area with high access	13.1 ha	71.8%
Residential area with moderate access	5.0 ha	27.2%
Residential area with low access	0.1 ha	0.6%

Street-oriented

Total Street-oriented Residential Area: 92.8 ha

Total Area with Greenspace Access: 87.3 ha (94.1%)

Residential area with high access	85.3 ha	91.9%
Residential area with moderate access	1.2 ha	1.3%
Residential area with low access	0.8 ha	0.9%

Canopy Cover

Total Woodland Area: 7.1 ha

Large Tree Crowns: 43.8 ha

Small Tree Crowns: 1.2 ha

Total Public Urban Canopy Cover: 52.1 ha (25.3%)

iTree Eco 6 Analysis

Number of Trees: 5301

Dominant Species: N/A

Pollution Removal: 1,145 tonnes/year

Carbon Storage: 2,282 tonnes

Carbon Sequestration: 49.9 tonnes/year

Avoided Run-off: 4,694 m³/year

Structural Value: \$20.3 million

Habitat Values

Several of the large cedar trees from the original woodlot have been retained in a wooded park.

Historical and Cultural Values

None identified.

APPENDIX D. Established Urban Area: Example Terms of Reference for Environmental Impact Studies

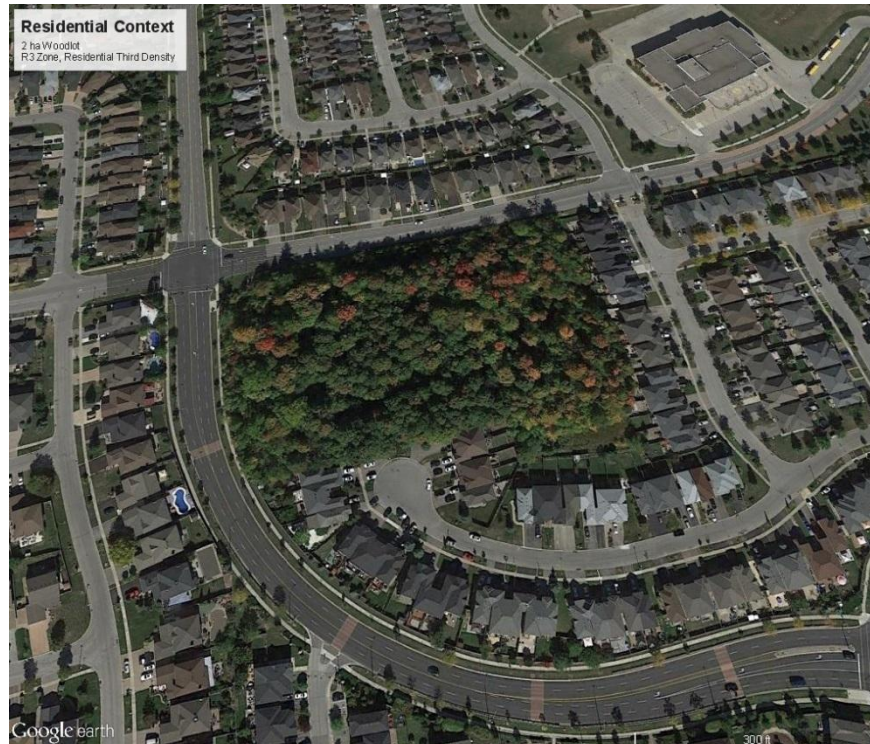
The following three examples illustrate possible Terms of Reference for the assessment of development impacts on significant woodlands in the established urban area.

The three examples are not exhaustive, but cover a set of typical conditions and concerns. The features used in the examples lie within another municipality, and the proposed developments are hypothetical.

EXISTING URBAN AREA – EXAMPLE 1

Infill Residential Subdivision

Zone R3, Residential Third Density Zone



The Property

A 2 ha property, covered in mature hardwood forest. No record of species at risk, but the potential exists for SAR birds and bats. The previous owner allowed public access. The neighbours use the property informally for dog walking, and the neighbourhood children have constructed a mountain bike track in the woodlot.

The Proposed Application

The property owner has come for a pre-consultation on a proposed plan of subdivision for 70 to 85 units, consisting of semi-detached homes and townhomes.

Options for Purchase

The owner has no desire to sell. The municipality does not have sufficient funds in its acquisition budget to purchase the property at fair market value.

ENVIRONMENTAL IMPACT STUDY AND INTEGRATED ENVIRONMENTAL REVIEW: TERMS OF REFERENCE

Pre-consultation Summary

- Development in accordance with the approved land use and Official Plan policies cannot proceed while retaining the significant woodland as such.
- The City will not pursue acquisition of the property.
- The City will consider use of parkland dedication (estimated at 0.25 ha) for retention of part of the woodland as a wooded park.

Required Studies

- A woodlot inventory, including an assessment under the uncommon characteristics criteria, as per the NHRM.
- A species at risk survey, with an emphasis on birds and bats.
- An iTree Eco evaluation of the existing woodlot.
- A detailed landscaping plan and urban canopy analysis, with demonstration of adequate soil volumes for retained and planted trees.
- An assessment of the change in accessible greenspace for residential units within a 250 metre straight-line distance of the woodlot, broken down by housing type.
- An assessment of the benefits of retained and planted trees at 40 years of maturity, using iTree Design.
- An assessment of the change in tree canopy cover within the neighbourhood, as defined in GeoOttawa, at 40 years of maturity.

Expected Mitigation and Compensation for Woodlot Removal

- Enhanced tree retention and/or planting:
 - Integration with on-site stormwater management, including low-impact development;
 - Use of soil cells and suspended pavement, especially in conjunction with on-site stormwater management.
- Strategic tree planting to maximize environmental benefits (as per the iTree Design analysis)
- A centrally located, treed parkette of 0.25 ha.
- Retention of areas demonstrating uncommon characteristics (where the extent of retention does not contradict the approved land use).
- Any required mitigation and compensation under the *Endangered Species Act 2007*.

Existing Urban Area – Example 2

Infill Light Industrial Development

Zone IL, Light Industrial Zone



The Woodlot

A 1.8 ha woodlot, covered in mature, second growth forest. The woodlot straddles portions of 8 properties. There is no public access. The central portion of the woodlot contains a swampy swale draining southwest to a stormwater sewer inlet on the street. The woodlot has a number of butternut in varying conditions of health along the northeast edge. No other species at risk are known from the site.

The Proposed Application

The property owner has come for a pre-consultation on a site plan application for a proposed warehouse and office facility on the vacant, northeast lot.

Options for Purchase

The owner has no desire to sell. The municipality does not have sufficient funds in its acquisition budget to purchase the property at fair market value.

ENVIRONMENTAL IMPACT STUDY AND INTEGRATED ENVIRONMENTAL REVIEW: TERMS OF REFERENCE

Pre-consultation Summary

- It appears possible to develop the site in accordance with the approved land use while minimizing impacts on the woodlot.
- The City will not pursue acquisition of the property.

Required Studies

- A woodlot inventory, including an assessment under the uncommon characteristics criteria, as per the NHRM.
- A species at risk survey, with an emphasis on birds and bats.
- A butternut health assessment.
- An iTree Eco evaluation of the existing woodlot.
- A detailed landscaping plan with demonstration of adequate soil volumes for retained and planted trees.
- An assessment of the benefits of retained and planted trees at 40 years of maturity, using iTree Design.
- An iTree Eco evaluation of the woodlot and landscape trees at maturity (40 years).

Expected Mitigation and Compensation for Woodlot Modification

- Locating the building envelope and parking to minimize impacts on the woodlot.
- Retention of areas demonstrating uncommon characteristics (where the extent of retention does not contradict the approved land use).
- Integration of the woodlot and the swale into the stormwater management system.
- Strategic tree planting to maximize environmental benefits (as per the iTree Design analysis).
- Explicit consideration of a green roof or a reflective roof.
- Any required mitigation and compensation under the *Endangered Species Act 2007*. Off-site compensation for butternut removal is acceptable.

Existing Urban Area – Example 3

Mainstreet Redevelopment

Zone AM, Arterial Mainstreet



The Woodlot

A 0.8 ha woodlot, approximately 60 years old. The woodlot currently straddles portions of four rectangular parcels stretching back from the main street. There is no current public access. The woodlot contains a small, thicket swamp. It may also contain butternut. No other species at risk are known from the site. The cleared, open space behind the woodlot is approved for mid-density residential development.

The Proposed Application

The applicant has consolidated ownership of the four lots and proposes to redevelop it as a six story mixed-use building containing office and retail uses with associated parking.

Options for Purchase

The owner has no desire to sell. The municipality does not have sufficient funds in its acquisition budget to purchase the property at fair market value. Some cash-in-lieu of parkland funds may be available from the adjacent residential development.

ENVIRONMENTAL IMPACT STUDY AND INTEGRATED ENVIRONMENTAL REVIEW: TERMS OF REFERENCE

Pre-consultation Summary

- It appears possible to develop the site in accordance with the approved land use, while retaining some or all of the woodlot.
- The City will not pursue acquisition of the property.
- The City will consider use of parkland dedication (estimated at 0.15 ha) for retention of part of the woodland as a wooded park.
- Under Section 37 of the *Planning Act*, there may be potential to allow increased height and density on the site in return for preservation or enhancement of the woodlot as privately-owned public space.

Required Studies

- A woodlot inventory, including an assessment under the uncommon characteristics criteria, as per the NHRM.
- A species at risk survey, with an emphasis on birds and bats.
- A butternut health assessment, if applicable.
- A significant wildlife habitat evaluation of the swamp, as per the MNRF significant wildlife habitat guidance.
- An iTree Eco evaluation of the existing woodlot.
- A detailed landscaping plan, with demonstration of adequate soil volumes for retained and planted trees.
- An assessment of the change in accessible greenspace for residential units within a 250 metre straight-line distance of the woodlot, broken down by housing type.
- An assessment of the benefits of retained and planted trees at 40 years of maturity, using iTree Design.
- An iTree Eco evaluation of the woodlot and landscape trees at maturity (40 years).

Expected Mitigation and Compensation for Woodlot Modification or Removal.

- Locating the building envelope and parking to minimize impacts on the woodlot.
- Retention of areas demonstrating uncommon characteristics (where the extent of retention does not contradict the approved land use).
- Retention of areas providing sustainable significant wildlife habitat
- Enhanced tree retention and/or planting:
 - Integration with on-site stormwater management, including low-impact development;

- Use of soil cells and suspended pavement, especially in conjunction with on-site stormwater management.
- Strategic tree planting to maximize environmental benefits (as per the iTree Design analysis)
- Any required mitigation and compensation under the *Endangered Species Act 2007*.
- Explicit consideration of a green roof or a reflective roof.
- Any required mitigation and compensation under the *Endangered Species Act 2007*. Off-site compensation for butternut removal is acceptable.
- Explicit consideration of providing privately-owned public space in the woodlot in return for increased height and density.