



THE CORPORATION OF THE CITY OF LONDON  
**Guidelines for Management Zones &  
Trails in Environmentally Significant  
Areas**

May 2016



**London**  
CANADA

# Guidelines Revision History

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## Cover Photo – Coves ESA Boardwalk and lookout

### The Corporation of the City of London

Guidelines for Management Zones & Trails in Environmentally Significant Areas  
May 2016



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Staircase in Medway Valley Heritage Forest ESA

## 1 Introduction

Recreational trail use within parks and natural areas in urban areas is on the increase as people seek simple and inexpensive ways to meet their daily needs for physical fitness, social interaction and realization of health benefits associated with spending time in nature (Ministry of Health Promotion, 2005). With this use comes a greater appreciation of the value of green space, parks and natural areas that contribute to one's overall quality of life (Parks and Recreation Strategic Master Plan 2009). The City of London's (the "City") green space system includes many large and pre-dominantly publicly-owned Environmentally Significant Areas (ESAs) that, as of 2016, comprise approximately 680 hectares and provide close to 50 km of trails. These significant natural areas have been identified and protected for their contribution to the representation of rare species, significant habitats, geological processes, cultural heritage values and biological diversity within Canada, the province of Ontario and the City of London. In addition, they contribute to providing the City with ecosystem goods and services such as clean air and water.

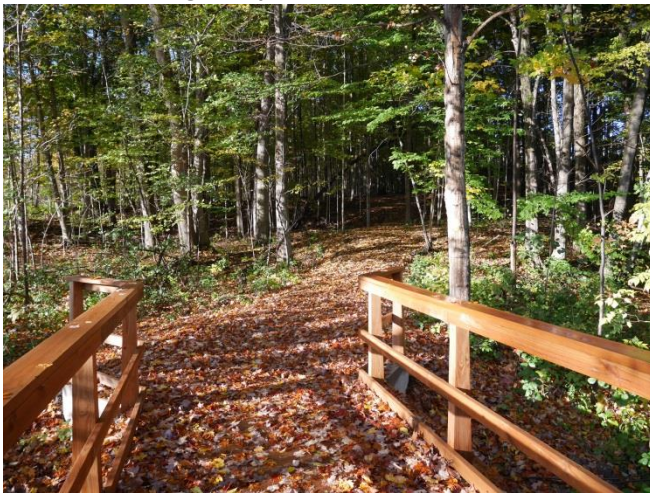
ESAs are identified in the City's Official Plan as ***"areas that contain natural features and perform ecological functions that warrant their retention in a natural state"***. Publicly-owned ESAs have a purpose and function distinct from all other publicly owned green space. Permitted uses, access, and the provision of recreational activities within ESAs are governed by the Environmental Policies of the Official Plan for significant components of the natural heritage system. These policies and practices

must be consistent with the *Provincial Policy Statement* (PPS) issued under authority of Section 3 of the *Planning Act*. The PPS is to be read in its entirety and all of the relevant policies must be considered together.

Meeting the requirements of the Official Plan is the main reason why guidelines for management zones and trails within ESAs must be based first on ecological protection through avoidance of impacts, and secondly, the application of appropriate mitigation where necessary to avoid degradation of natural features or loss of ecological functions.

The intent of this document is to establish the policy, process, and practice that must be followed when establishing management zones and reviewing the appropriateness of existing trails or planning new trails in ESAs, including:

- Establishing management zones based on Ecological Land Classification (Lee *et al.* 1998).
- Establishing and implementing a trail hierarchy according to management zones.
- Identifying areas for review where significant ecological features may occur in association with the trail system.
- Responding to unacceptable change through appropriate mitigation and adaptive management to alter practices, as required. This document is aligned with the City of London Official Plan and guidelines developed by the Ontario Ministry of Natural Resources and Forestry (*MNR 1992; MNR 2009; MNR 2014*) and Parks Canada (*Parks Canada 2008; Parks Canada 2012*) to manage protected natural areas. It is consistent with and generally exceeds the requirements for protected natural areas managed by the Government of Ontario and the Government of Canada (*Dillon 2016*).



**Boardwalk in Medway Valley Heritage Forest ESA**



Level 1 trail, photo by Steve Sauder, UTRCA

## 2 Guiding Principles for Trails in Environmentally Significant Areas

The City of London's Strategy for the Natural Heritage System was introduced during the Vision London process in 1995 and was based on ecosystem planning principles. Significant work was achieved through comprehensive Subwatershed Planning Studies to identify a natural heritage system consisting of core areas connected by the Thames River and its tributaries and an array of woodlands, wetlands, wildlife habitat and watercourses in a matrix of urban and agricultural land uses. Core areas were recognized as Environmentally Significant Areas with special policies and measures provided for their protection. Some of these policies were developed to address the access and use of publicly owned ESAs.

The first set of recommendations for the development of guidelines and principles of use and/or standards for environmentally compatible recreational trail planning applicable to all Environmentally Significant Areas were introduced in the City of London Subwatershed Studies Implementation Plan 1995. These were more fully developed during the Medway Valley Heritage Forest Site Planning Study 1996. In 1997, the Environmental and Ecological Planning Advisory Committee (EEPAC) presented a policy paper on trail planning identifying thirty (30) principles under the general areas of ecology, activities, access, design and construction, maintenance, monitoring and management. These formative principles have been largely retained with modifications to include any new information obtained during the literature review and to be consistent with all new legislative and policy requirements. The final principles are presented in five categories: Policy; Process; Trails and Permitted Activities; Design and Construction; and, Maintenance, Monitoring and Management. **Sections 2.1 to 2.5** provide more information on each category.



The basic principle for trail planning and design is to protect the natural features and ecological functions for which the ESA has been identified. The ecological integrity and ecosystem health of the ESA shall have priority in any trail use or design-related decisions. This also provides an opportunity to promote and engage a natural resource stewardship ethic among users. A stewardship ethic refers to the thoughtful care of ecological systems to preserve or enhance their natural qualities and recognizes that the values and goals of all users of natural areas are more similar than they are different. The vast majority of people value natural areas for their natural scenery and respite from the built form and do not enter a natural area with the intention of causing harm. A properly designed trail system is required to meet the needs of a wide mix of trail users in an urban setting.

Trail planning and design must address physical sustainability (trails that will retain their form over years of use and natural forces acting on them), ecological sustainability (managing the impacts of trail location and use to ensure no loss of ecological features and functions), and stewardship (fostering of individual and collective responsibility for protection of natural areas).

In London, the majority of trail planning and management efforts are focused on addressing existing use patterns on unplanned trails in existing well-used ESAs. As the City grows and new ESA lands are acquired, we may have the opportunity to plan and design new trails to protect ESAs and accommodate users.

## 2.1 Policy for Trail Planning and Design

- Natural features and ecological functions for which the ESA has been identified shall be protected.
- The ecological integrity and ecosystem health of the ESA shall have priority in any use or design-related decision.
- A properly designed and implemented trail system appropriate to specific management zones and reflecting sensitivity of the natural features will be implemented to achieve the primary objective of protection and the secondary objective of providing suitable recreational and educational opportunities.
- The community will be engaged in natural areas protection and the trail planning process to build awareness, foster education, and encourage participation in order to increase the capacity for creating a conservation culture that promotes natural areas as a common good and conservation as a collective responsibility.
- Enjoyable, safe, accessible trails for recreation appropriate in an ESA and learning environment will be permitted in accordance with recognized accessibility legislation (such as the *Accessibility for Ontarians with Disabilities Act, 2005 (AODA)*, best practices and the above principles.

## 2.2 Process for Determining Trail Locations

- Policies for trail planning and design will generally be implemented through the Conservation Master Plan (CMP) process. The CMP includes community engagement and participation and consists of various stages such as a current life science inventory, analysis and evaluation of significant ecological features, delineation of management zones, and trail planning, review and design. Below is an overview of the various components of the CMP process for reference:



- Where a CMP does not exist, or new issues with existing trails arise, trail modification will follow the process in the Guideline and shall be endorsed by consensus by the Trails Advisory Group (TAG) using best available information.
- Trail review and planning must address a variety of issues such as existing community connections, existing infrastructure, and/or the locations of trails within or adjacent to significant ecological features. These issues must be considered in the context of the ESA management zones where they are located. In all cases, an environmental planning process will be followed that evaluates if a trail is compatible with the associated significant ecological feature. If trails are not compatible, alternatives ranging from trail realignment to trail closure must be considered to arrive at a preferred solution consistent with the intent of Official Plan policies. The CMP process shall include consultation with Environmental and Ecological Planning Advisory Committee (EEPAC), public participation meetings, and a public meeting before Planning and Environment Committee of Council.
- The development of all trails and structures will be contingent upon the management zoning and the environmental sensitivity of the area.
- The number and magnitude of trails within an ESA will be minimized. Areas that contain unique and rare examples of botanical, zoological or geological phenomena shall be avoided. However, where

appropriate and following the process outlined in this document, trails should be carefully sited to allow opportunities for enhanced user experience, education and accessibility. This process includes avoiding negative impacts on significant ecological features and the ecological integrity of the ESA.

- For the creation of new trails that do not comply with this Guideline, such as those requested by the community and/or directed by Council (ex. the bicycle trail from Commissioners Road to Parliament Crescent in the Westminster Ponds ESA), the process shall include consultation with Environmental and Ecological Planning Advisory Committee (EEPAC), public participation meetings, the Trails Advisory Group (TAG) and a public meeting before the Planning and Environment Committee of Council.
- Some existing trail routes may be permanently closed and rehabilitated in conjunction with Council approval of a CMP. Access points will be limited and controlled to minimize disturbance.

### 2.3 Trails and Permitted Activities

- The primary reason for trails in ESAs is to provide appropriate recreation and promote ecological education.
- Permitted uses shall be generally restricted to low intensity, nature-based recreation, such as walking, wildlife and nature observation, with scientific study encouraged but subject to authorized permit from the City.
- Trails to permit access for persons with disabilities, consistent with these guiding principles and AODA requirements, will be provided where this can be achieved while protecting the ecological integrity and ecosystem health of the ESA.
- Activities will only be permitted when they are able to occur without negatively impacting significant ecological features and require minimal management.
- Adequate signage is required at all access points to identify the area as an ESA and to inform users of their responsibilities, code of conduct and of restrictions of use. Appropriate trail markers are also recommended throughout the ESA to further inform users.
- Off-trail use will be restricted through signage and barriers, augmented by education.
- Users have a responsibility to follow codes of conduct; trail etiquette practices to minimize user conflicts, adherence to the Parks & Recreation Area By-law and permitted activities (e.g. dogs on leash) as developed by the City of London and reinforced by informational signage. Ecologically oriented education to develop an understanding of the natural environment for a wide variety of users shall be encouraged through interpretive programs, signage, and the City's Adopt an ESA program.

## 2.4 Design and Trail Construction

- Restoration and/or trail solutions shall rely on ecologically appropriate approaches to trail design to achieve maximum protection with a minimum of maintenance.
- The majority of trails will be natural surface hiking trails, augmented by the least intrusive measures (physical or management) to protect local conditions along a trail route. The trail surface and structures used may consist of woodchips, compacted granular materials, rock vortex weirs, culverts, boardwalks, staircases, and bridges (where/as required). Firm and stable surfaces may be permitted within specified zones to accommodate persons with disabilities or to best protect the natural features from heavy use.
- The size and number of necessary structures shall be minimized.
- The feasibility, appropriateness and cost of all structures will be based on an evaluation of site specific conditions of the trail in the context of providing the best level of protection for the overall ESA. The need for structures will be identified in the Conservation Master Plan or by the Trails Advisory Group.
- Structures required to maintain a safe trail and mitigate trail impacts on permitted trails will be subject to review by the ESA managers and professional staff. Proposals to locate and install larger structures such as observation platforms, bridges or other structures as overviewed in **Section 7.2**, where the primary purpose of such structure is to optimize the enjoyment and educational value of the ESA for permitted uses, will be reviewed through the process in **Section 2.2**.
- The location of trails adjacent to watercourses and/or steep slopes shall be minimized and subject to the determination of a suitable buffer (setback) required to control compaction, sedimentation and erosion and to enhance aquatic habitat. Through the process in **Section 2.2**, a suitable buffer distance should be provided based on the ecological features and functions. Consideration should be given to the stable top of bank, the type of soils in the area, ease of access to the aquatic feature and features that may be more sensitive to disturbances. Where appropriate, viewing areas may be provided and/or short trail segments designed to allow users access to the water's edge.
- The use of pedestrian bridges (as opposed to boardwalks and "step" bridges) should be for the purpose of protecting ecological features and functions. Where permitted, pedestrian bridges (e.g. use of span bridges, minimal wing walls, no gabion or armour stone within the channel) will be designed and constructed to create the least possible disturbance to valleys, natural creek banks and to aquatic habitats.
- Consistent with building codes and safety, structures shall be of minimum cost and require the simplest technology to achieve the desired outcome, and be visually compatible with the landscape setting.
- Installation of trails and structures will generally be timed to take place during time periods when the natural features are least sensitive to disturbance (e.g. seasonal timing windows related to *Migratory Birds Convention Act* or as dictated



by aquatic and terrestrial habitat sensitivities) and restoration should follow immediately using native species adapted to local conditions.

- Trail construction must be in compliance with the Ontario *Endangered Species Act, 2007*, Ontario Regulation 179/06 (Section 28 of the *Conservation Authorities Act* to implement and enforce the Development, Interference with Wetlands and Alterations to Shorelines and Watercourses Regulation), and may be subject to archaeological heritage investigations in areas identified as having archeological potential.

**Bobolink (*Dolichonyx oryzivorus*)**



**Eastern Meadowlark (*Sturnella magna*)**



## 2.5 Maintenance, Monitoring and Management

- Trails must be regularly monitored through both informal visual monitoring and more formal technical investigations, to detect environmental damage or user interference inconsistent with the purpose of an ESA. If this is detected, the trail must be closed and rehabilitated, relocated, or upgraded, and rules enforced.
- Areas deemed acceptable for trails shall be monitored to ensure trail route boundaries are appropriately followed and that the intensity and type of use does not result in negative impacts to the overall area where the route is located.
- A monitoring program will be developed during the Conservation Master Plan process for each ESA and implemented to provide the necessary feedback for gauging the effectiveness of management interventions in keeping conditions within acceptable limits. Monitoring periods will vary from annually to every 3-5 years, based on the intensity of trail use and sensitivity and vulnerability of the trail to impacts.
- For ESAs without a current CMP, monitoring will occur as part of the general ESA management activities and through observation reports provided by the public. This is typically done by the UTRCA on behalf of the City and through observation reports from the public which may trigger further review by a consultant, the UTRCA and/or TAG for example. At least twice annually, signs and structures are inspected and at least quarterly trails are reviewed.
- Trails in ESAs are routinely monitored.
- All structures will be regularly monitored by qualified staff and or consultants and repairs made as required, ensuring user safety.
- Restoration measures will be monitored and managed annually for the first 2-3 years to ensure successful establishment of desirable species, with the intent that a minimum of maintenance will be required in the long-term.

The City will retain management responsibility in ongoing consultation with the public whereby the community, user groups and Adopt an ESA members shall share in the responsibility of trail management through proper use of trails. These groups may assist in, providing additional monitoring of trails, advising and educating other trail users regarding codes of use where possible and safe to do so. Observation reports can be provided to the City for follow-up.



The Coves ESA (East Pond), photo by Steve Sauder, UTRCA

## 3 Policy for Trail Planning and Design

### 3.1 Unique Management Needs of Urban Environmentally Significant Areas

The primary purpose of an ESA is protection of the natural features and ecological functions that support *ecological integrity* and *ecosystem health*. Human uses should be permitted only when they can be demonstrated to be compatible with conservation of the native biota and natural processes. Management and recreation activities must be carefully planned and designed, and integrated in an *adaptive management* regime in order to achieve the primary purpose of ESAs and to enable permitted uses by the public.

Managers of urban conservation lands are often challenged by physical constraints (e.g. irregular shape, lack of ecological connectivity, microclimatic changes, hydrological changes) and ecological constraints (e.g. invasive species, altered natural disturbance processes, changes in wildlife behavior) due to the impacts of human settlement which fundamentally alters historical ecological processes that maintained healthy functioning ecosystems. For example, human settlements are often a source of exotic and/or invasive plants and animals that compete with, prey upon or displace native wildlife, resulting in the loss of native plant and animal biodiversity through biotic simplification.

Urban natural areas are often relatively small islands surrounded by diverse and heavily populated urban and suburban development. These areas are subject to the increasing demands and preferences

for recreation use, and the impacts of heavy and often incompatible uses, including encroachment, trail widening and erosion, ad hoc trail creation, dogs off leash, biking, vandalism and campfire party activities after dark. The very nature of urban natural areas assures often vigorous public involvement with an often crowded and conflicting roster of neighbours, recreationists, and environmentalists.

The key responsibility of urban conservation land managers is to find the best way to protect and restore, as much as possible, a healthy functioning ecological community in the face of fundamentally altered ecology of the urban environment and public pressure for access (Davis 2010).

The development of CMPs must outline realistic strategies, achievable objectives, and actionable items to manage the multitude of disturbances that threaten a natural area, and to identify key indicators that can be monitored to detect change over time, in order to maintain and protect irreplaceable natural habitat values, including earth and life science interests, and sensitive cultural and archaeological resources.

Protecting ESAs against damaging or excessive visitor use requires that the types of recreational activities permitted be generally restricted to passive, nature-based uses and that visitor impacts are managed through appropriate placement of trails, signs and facilities to maintain the natural features and ecological functions that characterize the area.





### 3.2 Ecosystem Approach applied to Trail Planning

In the City of London's natural areas, the footprint of trails may date back to early settlers. Archaeological evidence and the location of potential areas of human occupation are most frequently associated with sites along the Thames River Valley and its major tributaries (Wilson and Horne 1995). Within ESAs, years of use have created trail networks that may not be based on an ecosystem approach that is reflective of current policies, guidelines or best management practices. With the increase of public access and diverse user groups, many of these historic trails are now showing signs of overuse. Trails located on fall lines or on steep slopes are more susceptible to erosion, while trails crossing wet areas lead to trail widening and soil compaction. Many trails are too close to watercourses. These are key management issues to be addressed as CMPs are prepared or updated.

The City of London Official Plan promotes an ecosystem approach to environmental planning. This approach, when applied to trail planning, must recognize the dynamic nature of ecosystems and the potential for ecosystems to change over time following a trajectory determined in large part by natural and human-induced stresses that are placed on the system. The introduction of new trails of any type into a natural area where none previously existed must be recognized as a new stress on the ecosystem that will result in some unavoidable ecological effects associated with a semi-permanent to permanent trail facility and the presence of trail users. A trail system that is well planned and designed sustainably can mitigate disturbances to the environment by avoiding the most sensitive portions of natural areas, utilizing sustainable construction techniques and by providing users a defined path with education opportunities and varied user experiences. In this way, new trails should not result in any permanent loss of natural features or ecological functions.

Research on natural area trail impacts has demonstrated that a properly managed trail system will limit the areal extent and severity of recreation impacts by concentrating traffic on resistant trail surfaces and through the use of appropriate structures such as bridges, fences, and boardwalks (Leung & Marion 2000). Depending on the type of trail system developed, the visitor experience may vary from one that is primitive and intimate with nature to one that is more developed and separate from nature (Stankey and Schreyer 1987; Hendee and Dawson 2002; Lynn and Brown 2003). Within ESAs, it is the intent to continue to create trail systems that protect key ecological features and functions while permitting passive nature-based recreation appropriate to the natural setting.

### 3.3 Conservation Priorities for Environmentally Significant Areas

ESAs are recognized and designated as fully protected natural areas. In the hierarchy of the Natural Heritage System, ESAs are considered the largest, highest quality, core areas within the City. They represent areas that may have unusual geological processes, contribute important hydrological functions related to wetlands and watercourses, contain high quality vegetation communities, rare and uncommon vegetation communities and species, including Species at Risk, are of sufficiently large size to support critical wildlife habitat and linkage functions, and represent important areas of biodiversity.

Protection of important ecological areas, including the physical and ecological features and functions that sustain these areas, is therefore the primary management goal of ESAs.

In the City of London, the management of publicly owned ESAs is typically addressed through the preparation and implementation of CMP recommendations consistent with the Official Plan. Trail planning is one of the matters addressed through a CMP process.

The vast majority of documents that were reviewed for policies and best practices on natural area protection, management and the provision of public access and *sustainable* recreation, where the protection of the natural area is paramount, present an approach that must attempt to weigh the value and benefits of the human experience and balance this against the negative impacts on the ecosystem. London's Official Plan recognizes the need to provide public access to publicly owned ESAs, but limits permitted uses.

***Public access to identified ESAs within public ownership will be controlled  
so that such access will not be detrimental to the significant features of the property.***

***(Official Plan 15.4.1.4)***

As such, this and other Official Plan policies identify protection as a first priority, which places ESAs in a unique and separate classification from all other publicly owned parks and natural areas. The policies do not require or state that a balance must be achieved between protection and access. The Official Plan recognizes that in trail planning decisions, greater weight must be given to the avoidance and minimization of negative impacts through mitigation for the protection of the ecological features and functions for which an ESA has been identified.



## 4 Process for Determining Management Zones

### 4.1 ESA Management Zones and Overlays

The management objective for ESAs is to preserve and protect the ecological features and functions for which the area has been identified. This is primarily achieved through implementation of the habitat protection, restoration, and stewardship recommendations identified in the CMPs that provide direction on the management of these areas.

A management strategy often employed in national and provincial parks planning allocates management zones to various areas of the park. This has proven to be an effective protection strategy for managing the potential impacts of users, types of uses, and visitor expectations.

While it must be understood that an ESA is an integrated ecological unit in which all of the parts contribute to its ecological significance as a dynamic system, it is also important to recognize that an ESA may contain areas that have higher relative degrees of sensitivity and different ecological features and functions that warrant additional protection. These highly sensitive areas must be identified and reviewed for compatibility with trail use and/or creation.

Ecological data collected as part of the CMP process is to be used to map the ESA into a management zones. For each management zone, permitted uses are identified and allowable trail types, surfaces and uses are determined. In cases where there are existing trails, the identification of management zones and sensitive significant ecological features assists in making decisions regarding priorities for trail management, including closures, rerouting or relocation of trails, and/or where alternate trail design strategies may be required.

In keeping with the concept of the ESA as an integrated dynamic system, all zones must be managed to maintain, enhance and/or restore the ecological features and functions of the ESA, in the context of the overall protection and enhancement of the ESA and consistent with the City's Official Plan and the CMP

for the ESA (if one exists). Implementation of management zoning should result in the protection of the more sensitive ecological features by directing access and use to the areas that have been identified as having lower sensitivity to trails and are able to support more accessible trails. Any decision to close existing trails must be accompanied by clear communication of the rationale, preferably through communication, consultation, education and signage. Alternative route locations must also be clearly marked (Marion 2008). In some cases, trail rotation based on seasonal sensitivities to the natural environment may also be an option and must also rely on signage and barriers. There are three management zones that may be identified within an ESA (see **Section 5.3** for more information):

- **Nature Reserve Zone:** These areas require a higher level of protection to preserve the ecological integrity of the ESA and represent natural vegetation communities. This zone is delineated using Ecological Land Classification (Lee *et al.*, 1998) to identify vegetation communities that are the result of natural processes. The majority of an ESA is anticipated to be identified as a Nature Reserve Zone.
- **Natural Environment Zone:** Areas of cultural vegetation communities that result from, or are maintained by existing or previous cultural or anthropocentric-based disturbances. These areas often contain a large proportion of non-native species. These communities include plantations, cultural meadows, cultural thickets, cultural woodlands, and cultural savannahs, as well as manicured areas such as mowed lawn or hedgerows.
- **Cultural Heritage Zone:** These areas include identified cultural and archaeological features located within an ESA, but are distinct from the natural area (e.g. Park Farm at Meadowlily Woods ESA) and/or are large enough to warrant a separate zone.

In addition, there are “overlay” zones that are applied to the underlying management zones if applicable. These include:

- **Restoration Overlay:** This overlay highlights areas within the ESA that require active ecological restoration or special management to restore or improve ecological conditions.
- **Utility Overlay:** This overlay is introduced where an existing condition such as a utility site or corridor (e.g. hydro transmission lines, gas or water pipeline, railroad lines, sanitary sewer) or other servicing infrastructure or facilities (e.g., sanitary sewer pumping station or stormwater management facility), is present within the ESA and preclude restoration to the original ecological condition.
- **Trail Review Overlay:** This overlay is to be used as part of trail planning and review. The overlay is to be applied to areas where existing trails are located within a significant ecological feature and further review is required to determine the appropriate resolution if the existing trail is determined to be incompatible with a certain species and/or habitat.

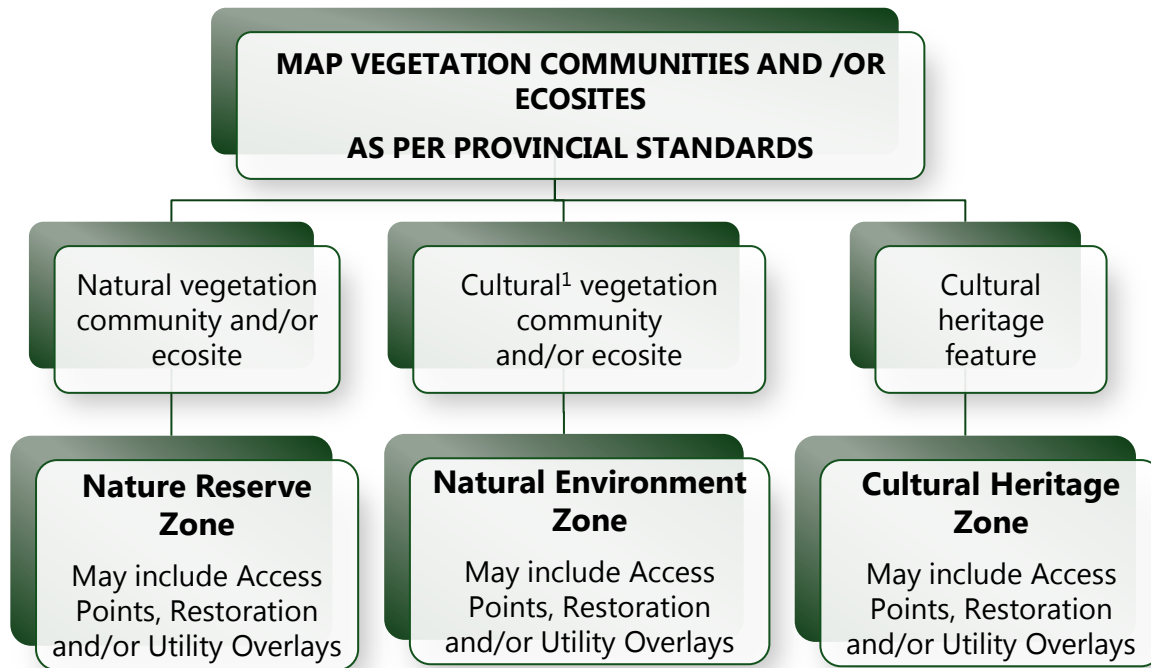
For a more complete description of each overlay, please refer to **Section 5.5**.

#### 4.1.1 Process for Identifying and Delineating Management Zones

Nature Reserve and Natural Environment Zones are to be mapped following the completion of field studies to delineate the boundaries of vegetation communities. As outlined in the City’s most recent

*Data Collection Standards for Ecological Inventory*, a vegetation community survey should be based on the Ecological Land Classification for Southern Ontario – First Approximation and its Application (Lee et al., 1998). Those communities/ecosites identified under the community series of plantation (CUP), cultural meadow (CUM), cultural thicket (CUT), cultural savannah (CUS) and cultural woodland (CUW), as well as manicured areas such as mowed lawn or hedgerows, are to be zoned as Natural Environment. All other natural communities/ecosites are to be zoned as Nature Reserve. This process is overviewed in **Chart 1**.

**Chart 1: Identify and Delineate Management Zones**



*1 = Vegetation community designated as "cultural" under Ecological Land Classification for Southern Ontario – First Approximation and Its Application (Lee et al., 1998); include the ecosites and vegetation communities listed under the community series of Plantation (CUP), Cultural Meadow (CUM), Cultural Thicket (CUT), Cultural Savannah (CUS), and Cultural Woodland (CUW). Cultural vegetation communities would also include manicured areas such as mowed lawn or hedgerows.*



Coves ESA (East Pond) boardwalk and look out. Photo by Steve Sauder, UTRCA

## 5 Process for Assessing Trail Locations

Following the identification and delineation of management zones to guide the types of trails and use permitted in each zone, existing trails and proposed trails within an ESA will require review for compatibility with the surrounding significant ecological features. Following the completion of the life science inventory of the ESA, significant ecological features are required to be identified and evaluated. These significant ecological features are mapped as part of the life science inventory and evaluation phase of the CMP for the ESA. To supplement the guidance provided in the City's most recent version of the *Environmental Management Guidelines*, we have included additional notes for delineating significant ecological features in ESAs in **Section 5.1**.

### 5.1 Process for Identifying and Delineating Significant Ecological Features

As part of the Conservation Master Plan process and overall management of ESAs, significant ecological features are to be identified and delineated based on provincially accepted standards. Where wildlife habitat has been identified and evaluated as significant using the most recent version of the MNRF's Significant Wildlife Habitat Ecoregion 7E Criteria Schedule, these are to be mapped to identify their location(s) in an ESA. For provincially listed Species at Risk (as per Ontario Regulation 230/08 – the Species at Risk in Ontario List), habitat for each species listed as *Threatened* or *Endangered* is to be mapped based on the following (in order of priority):

1. The regulated habitat description defined in Ontario Regulation 242/08 under the Ontario *Endangered Species Act, 2007*; or,
2. The general habitat description issued by the MNRF. This includes the delineation of a species' habitat into habitat categories; or,
3. The type of habitat known to support the species and as described according to an accepted Government of Canada or Government of Ontario reference source. This may be delineated based on a vegetation community/ecosite identified during the vegetation community survey.

It should be noted that some wildlife and/or Species at Risk/rare species habitat may not be mapped for public viewing to protect features with increased sensitivity consistent with the data sensitivity requirements of Ontario's Natural Heritage Information Centre.

## 5.2 Determining General Compatibility of Significant Ecological Features and Trails

Using **Table 1** as a guide, there are significant ecological features that may occur within a City ESA that should be reviewed to determine compatibility with new or existing trails within or adjacent to them.

The question asked for each significant ecological feature in **Table 1** is:

***"Is there potential for the trail or its use to impact or eliminate the significant ecological feature and/or its ecological function?"***

For the question above, it is important to also consider the following:

- Would a trail designed to be compatible with the underlying landform and/or significant ecological feature(s) harm the feature or its ecological function?
- Would responsible trail use harm the feature or its function?

The majority of the review to date involves existing trails that have been formed in the green space area prior to its designation as an ESA or prior to coming into City ownership. However, **Table 1** is also to be used when considering the location for a new trail in an ESA.

Significant ecological features that are generally compatible with trails and/or trail use are identified with a "No" in **Table 1**. This means that these types of wildlife habitat in Ecoregion 7E have been pre-determined as either not applicable to the City of London or generally compatible with trails. However, all trails in an ESA are subject to review to ensure they are designed appropriately (eg. trail surface, width, elevation, etc.) and are able to withstand use by the public (see **Section 2.5** and **Section 8** for more information on trail management and monitoring). Rerouting or relocation of existing trails, as well as creation of new trails in an ESA is subject to ground-level micro-siting through the process described in **Section 2.2**.

Significant ecological features that may be more susceptible to impacts caused by trails and/or trail use are indicated with a "Yes" in **Table 1**. For each of these features, rationale is to be provided during the

review of a trail as to why the trail and/or trail use is compatible with the specific circumstance presented.

Included in **Table 1** is a brief rationale to provide context to the “Yes/No” answer to the question “Does this feature require review for compatibility with trails?”

For Species at Risk listed as *Threatened* or *Endangered* under the Ontario *Endangered Species Act, 2007*, habitat related to these species shall be considered individually and not included as part of an applicable wildlife habitat. This is further reinforced by the MNR as Species at Risk are not included as indicator wildlife species in their Significant Wildlife Habitat Ecoregion 7E Criteria Schedule (2015). For example, if Eastern Spiny Softshell turtles (*Apalone spinifera spinifera*) were identified within an ESA, this Species at Risk would require further review to determine if trails and/or trail use is compatible with its general habitat. If turtle wintering areas or turtle nesting areas have also been identified in the ESA and are being reviewed for their compatibility with trails, these types of wildlife habitat would not include Spiny Softshell turtles as an indicator species as they would be reviewed separately. Where Species of Conservation Concern are included as indicator species in the Significant Wildlife Habitat Ecoregion 7E Criteria Schedule (2015), these species are to be assessed individually based on their unique habitat needs and a review completed to determine if that habitat is compatible with trails.

For species and features that are considered to be regionally rare in the City of London, consideration should be given to these during the ground-level micro-siting of a trail. These species and features have not been included in **Table 1** as they are not subject to the periodic reviews for status updates by any one government agency or group. Regionally rare species and features would be identified and mapped as part of the CMP process and consideration provided when reviewing and locating trails in an ESA.



**Table 1: Significant Ecological Features and General Compatibility with Trails**

Significant Ecological Feature	Does this feature require review for compatibility with trails?	Rationale <sup>1</sup>
<i>Significant Wildlife Habitat<sup>2</sup></i>		
<b>Seasonal Wildlife Concentration Areas</b>		
Waterfowl Stopover and Staging Areas (Terrestrial)	Yes	Fields flooded with sheet water during the Spring may provide short-term habitat for migrating waterfowl. Depending on the location of the trail within the habitat, trails may require temporary closure in the Spring due to flooding and/or to prevent disturbance to waterfowl.
Waterfowl Stopover and Staging Areas (Aquatic)	No	Trails would not occur in open water where this wildlife habitat would occur.
Shorebird Migratory Stopover Area	No	Significant shorebird migratory stopover habitat typically occurs along the southern Great Lake shorelines. The large numbers of shorebirds required to evaluate this type of wildlife habitat would generally not be found in the City's ESAs.
Raptor Wintering Area	No	In general, trails do not cause changes (reductions) to vegetation communities or alterations that may reduce prey populations. Raptors roosting within City limits would not likely be sensitive to the limited disturbance that occurs in ESAs in the winter months.
Bat Hibernacula	No	This type of significant wildlife habitat is not found within the City of London.
Bat Maternity Colonies	No	Bat maternity colonies can be found in human structures, suggesting bat species are not particularly sensitive to human disturbance. Wildlife trees are retained in ESAs and trees along hiking trails are not routinely inspected. In the unlikely event that a large tree would need to be proactively managed for risk to public safety, a cavity search is completed in advance by qualified personnel to avoid impacts to the species. As bats do not generally exhibit site fidelity to any one wildlife tree, trails would not impact bat or this type of wildlife habitat.
Turtle Wintering Areas	No	Trails would not occur or impact the deeper open water and wetland areas where this wildlife habitat would occur.
Reptile Hibernaculum	Yes	Well-designed trails that limit disturbance to accumulated rock or woody debris would not likely impact the reptile hibernacula. However, this feature warrants review as snakes, especially in large numbers, are susceptible to persecution or collection.

Significant Ecological Feature	Does this feature require review for compatibility with trails?	Rationale <sup>1</sup>
Colonially -Nesting Bird Breeding Habitat	Yes	This type of habitat includes tree/shrub, bank/cliff and ground nesting colonial birds. Further review should occur if trails occur or are proposed within or adjacent to this habitat to minimize disturbance effects. Seasonal restrictions on trails may be required.
Deer Winter Congregation Areas	No	There is generally insufficient habitat to support deer winter congregation areas in the City of London's ESAs.
<b>Specialised Habitat Areas</b>		
Waterfowl Nesting Area	No	Trails would not cause extensive loss of grassland or forest habitat where nesting occurs or cause barriers for waterfowl movement back to water bodies and wetlands by the hens and ducklings. Signage should be provided where this type of wildlife habitat occurs to discourage off-leash dogs.
Bald Eagle and Osprey Nesting, Foraging and Perching Habitat	Yes	It is anticipated that if these species are using an ESA as habitat, they would be habituated to human disturbance but this should be confirmed during the review of a trail within or adjacent to this habitat.
Turtle Nesting Areas	No	Trails and appropriate use of trails would not be a barrier or cause of mortality for turtles travelling between habitats. If new trails are being constructed, this should be completed outside of the nesting season to avoid placement of a compacted trail over a nest. Signage (respecting NHIC data sensitivity) should be provided where this type of wildlife habitat occurs to discourage off-leash dogs.
Seeps and Springs	Yes	Development of new trails should be avoided near seeps and springs unless alternative trail solutions such as boardwalks can be sited to protect the features and functions. Trails and boardwalks should be located and designed to avoid redirection of surface water and shallow groundwater in the area of the seep/spring.
Amphibian Breeding Habitat	No	Amphibians breeding in water are not anticipated to be impacted by trails and/or trail use. Given that the majority of amphibian breeding occurs when public access to ESAs is prohibited, impacts to this type of wildlife habitat due to trail use are not anticipated.
Woodland Area-Sensitive Bird Breeding Habitat	Yes	If an existing or proposed trail is 200 m or more from a woodland edge (measure inward from the edge), species that rely on this interior habitat may be sensitive to disturbance.

Significant Ecological Feature	Does this feature require review for compatibility with trails?	Rationale <sup>1</sup>
Woodland Raptor Nesting Habitat	Yes	Woodland raptors vary in their tolerance of human activities. Review should be based on the species observed.
<b>Animal Movement Corridors and Linkages</b>		
Amphibian Movement Corridors	No	Trails are not a barrier to connectivity for amphibian species. Most non-salamander species' movement between amphibian habitats is typically random dispersal rather than following a distinct corridor. For salamander species that depend on micro-climate conditions, the supply of downed woody debris, forest floor structure and tree cover should be maintained in the ESA through appropriate trail design.
<b>Rare Vegetation Communities</b>		
Cliffs and Talus Slopes, Sand Barrens, Alvars, Old Growth Forests, Savannahs and Tallgrass Prairies	No	These types of rare vegetation are generally not found in the City of London. Further, a well-designed trail would not significantly impact these communities or threaten their continued persistence in the ESA.
Other Rare Vegetation Communities (Provincially Rare S1 to S3 Communities)	No	A well-designed trail would not impact these communities or threaten their continued persistence in the ESA. Specific rare species within these communities are reviewed as part of Habitat for Species of Conservation Concern.
<b>Habitat for Species of Conservation Concern</b>		
Shrub/Early Successional Bird Breeding Habitat	No	Trails located in or adjacent to this habitat would not result in habitat loss.
Marsh Bird Breeding Habitat	Yes	Though trails in marsh habitats will be limited due to the requirement for boardwalks, the diverse assemblage of species that use this habitat have specific habitat requirements that should be considered.
Open Country Bird Breeding Habitat	Yes	Species that depend on this type of habitat may have specific habitat requirements. Species that rely on this interior grassland habitat may be more sensitive to disturbance.
Terrestrial Crayfish	Yes	If evidence of terrestrial crayfish is found, the use of the habitat by the species should be reviewed as colonies can be as small as a few square meters, making trail placement or use of boardwalks important to avoid impacting the habitat.

Significant Ecological Feature	Does this feature require review for compatibility with trails?	Rationale <sup>1</sup>
Other Species of Conservation Concern <sup>3</sup>	Yes	Species included in this type of wildlife habitat have a diverse range of requirements and tolerance to disturbance.
<b>Species at Risk<sup>4</sup></b>		
<b>Threatened or Endangered Species</b>		
Species at Risk (General/Regulated Habitat <sup>5</sup> )	Yes	Species and/or habitat included in this type of wildlife habitat have a diverse range of requirements and tolerance to disturbance.

1 = From the Significant Wildlife Habitat Mitigation Support Tool (MNR Version 2014)

2 = As per the most recent version of the MNR's Ecoregion 7E Criteria Schedules for Significant Wildlife Habitat. At the time of writing this version of the guideline, the latest version was January 2015

3 = Species of Conservation Concern include species designated by the NHIC as SRank S1-S3, provincially designated Special Concern under the Endangered Species Act, 2007 or designated Threatened or Endangered under Schedule 1 of the Species at Risk Act, 2002

4 = Species at Risk are those legally protected as Threatened or Endangered Species under the Ontario Endangered Species Act, 2007

5 = Derived from a General Habitat or Regulated Habitat description or summary. The general habitat is based on the area currently depended on by the species for critical life processes. Regulated habitat is as described in Ontario Regulation 242/08

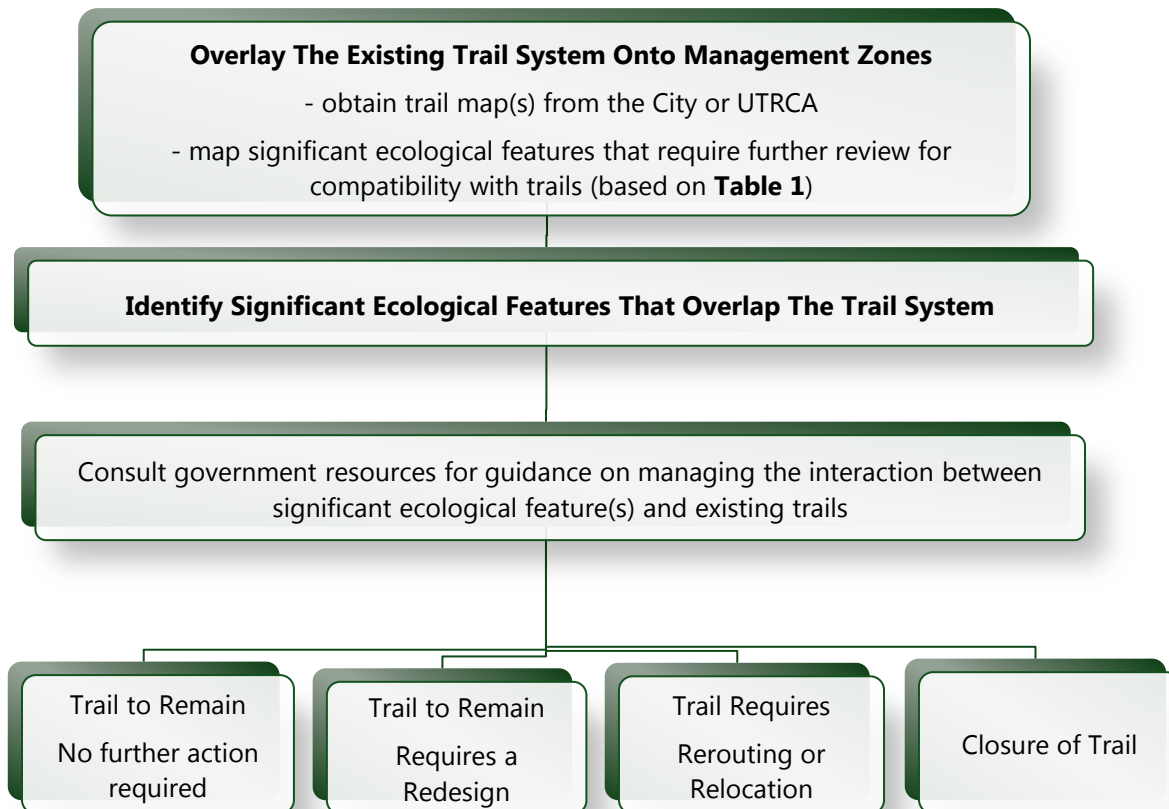
### 5.2.1 Existing Trails

For the trails that require further review to determine compatibility with significant ecological features, these are then mapped in association with the underlying management zone to determine where overlap occurs. The sections of trail are then identified by applying a Trail Review Overlay. Appropriate, relevant accepted Government of Canada or Government of Ontario publications and resources should then be reviewed to provide guidance on how trails and/or trail use may impact the significant ecological feature under review. Reputable resources include technical reports published by government agencies. Where the preferred resources are not available for a significant ecological feature that requires further review, alternate sources of information may be considered. Based on the results of this review, the following options are:

- Keep the existing trail, as is;
- Keep the existing trail and include design features to preserve ecological integrity;
- Realign the trail to avoid the significant ecological feature; or,
- Close the trail.

This process is overviewed in **Chart 2** below.

**Chart 2: Review of Significant Ecological Features and Trail Recommendation for Existing Trails**



As noted in **Section 5.2**, rerouting or relocation of existing trails, as well as the redesign of a trail in an ESA is subject to ground-level micro-siting through the process described in **Section 2.2**.

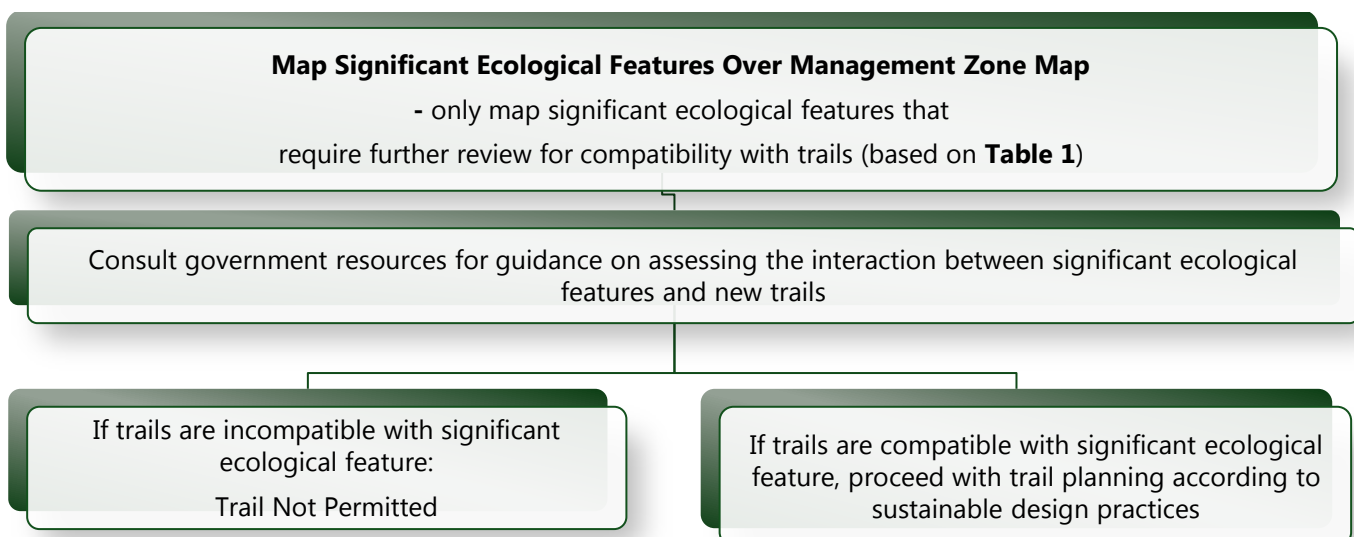
Natural features or land ownership issues may not permit a continuous, connected trail through an ESA, particularly where trails were not planned as part of a CMP. Connectivity of the Thames Valley Trail (TVT) should continue to be maintained in City owned ESAs, subject to the process in **Section 2.2**. The TVT is about 110 km long and follows the Thames River for most of its route. The TVT travels through the City of London over multi-use pathways, private lands such as the University of Western Ontario (UWO), and in City owned natural areas including Killaly Meadows, Kains Woods and Warbler Woods ESAs. London's Mayor officially opened the City section of the trail on June 16, 1973 at Gibbons Park. The TVT also travels through the Fanshawe Conservation Area and Komoka Provincial Park. The TVT links to a broad network of footpaths in Southwestern Ontario (TVTA 2008).

### 5.2.2 New Trails

For new trails proposed in ESAs, the review of significant ecological features will focus on determining if the planned trail would be compatible with the feature. Where trails are generally known to be incompatible with the significant ecological feature, trails should be further reviewed using accepted Government of Canada or Government of Ontario publications and resources. If a trail is required to minimize impacts from informal use of an area, or for controlled viewing of a special feature, sustainable and accessible trail design practices shall be considered. The process outlined in **Section 2.2** is to be followed so that ecological integrity can be protected to the greatest extent possible.

This process is overviewed in **Chart 3** below.

**Chart 3: Review of Significant Ecological Features and Trail Recommendations for New Trails**



As noted in **Section 5.2**, the siting of trails in ESAs is subject to ground-level micro-siting through the process in **Section 2.2**.

### 5.3 Public Access and Trails Based on Management Zones

The following sections provide a description of each management zone and recommendations for public access and trails for ESAs based on the identified management zone. Information about what types of trail is permitted in each management zone is provided in **Section 6.0**.

#### 5.3.1 Nature Reserve Zone

The majority of an ESA is anticipated to be identified as a Nature Reserve Zone as this describes areas that are the result of natural processes and represent natural vegetation communities that sustain important ecological features and functions (see **Section 4.1**).

Where it is determined that ecological integrity can be preserved, and specific natural features and their ecological functions can be protected, public access and trails are permitted in this zone in support of appropriate low-intensity, nature-based recreation. Structures (e.g. boardwalks, bridges, stairways) may be permitted to reduce impacts to significant ecological features and increase the sustainability of the trail system in the ESA.



Bald Eagle viewed from Kains Woods ESA.  
Photo credit: Gary Irwin



Vegetation monitoring  
in Sifton Bog ESA  
Scientific study with  
access through permit  
issued by the  
City/UTRCA.

#### 5.3.2 Natural Environment Zone

Areas that are defined as cultural vegetation communities (see **Section 4.1**), are generally expected to have lower sensitivity to trails and trail use than Nature Reserve Zones. However, these areas still have the potential to support significant natural features and trails are to be reviewed to determine compatibility with the surrounding natural features and their ecological functions. These areas may

provide an opportunity for accessible trails that permit use by persons with mobility disabilities, especially when directly adjacent to an Access Point.

Trails may be located in Natural Environment Zones where it can be demonstrated that the trail will not result in negative impact to the adjacent ecological features and functions of the ESA. Temporary facilities for research, education and management may be permitted in less sensitive supporting areas to allow human activities designed to improve values such as biodiversity, wildlife habitat and aesthetics. These will be considered on a case-by-case basis.

### 5.3.3 Cultural Heritage Zone

The protection of cultural heritage landscapes within natural settings is important to safeguard the human-nature interaction. These may include farm complexes which contain important cultural heritage landscapes (e.g. Park Farm at Meadowlily Woods ESA), historically significant buildings or structures, archaeological sites, mill sites, aboriginal sites, views and vistas. As outlined in **Section 4.1**, Cultural Heritage Zone applies where a cultural heritage feature is located inside an ESA, but is distinct from the natural area and/or large enough to warrant a separate zone. Small, isolated cultural heritage features would be recognized and managed within other zones.

Trails are permitted in Cultural Heritage Zones where it can be demonstrated that the trail will not result in negative impact to the ecological features and functions of the ESA and/or cultural heritage resource.



Cultural Heritage zone adjacent to the Westminster Ponds-Pond Mills ESA. Demolition of some of the Veteran's buildings previously used for school education programs was required for safety. Chimneys were retained to maintain potential nesting habitat for the listed Species at Risk Chimney Swift known to use other nearby chimneys.



### 5.3.4 Access Points

Access Points will be limited and controlled to minimize disturbance in an ESA. These are controlled access locations and staging areas for visitors to an ESA from outside the community where access by motorized vehicle or bicycle is required. Primary access locations will include designated parking areas and bike racks with information kiosks to direct users. Secondary access locations will have nearby on-street parking and smaller information signs and structures at the trailheads. Access Points will ideally be located outside of the ESA boundary wherever possible on adjacent parkland. Where an Access Point must be located within the ESA, every effort will be undertaken to avoid locating it in a significant ecological feature to minimize the impact on ecosystem features and functions.

Access Points should include control structures to facilitate the staging of a variety of user types prior to entrance into the ESA. Enhancements may include paved trails, visitor control structures, and signage for orientation, interpretation and education.



Main entrance off Oxford Street parking lot to Sifton Bog ESA. Access Zone includes a restoration area, inset photo of an interpretive sign. Level 2 trail to a boardwalk leading to a viewing platform for observation.



Main entrance off Pond Mills Road parking lot to South Pond in Westminster Ponds-Pond Mills ESA Level 2 trail and information kiosk.

## 5.4 Changes to ESA Management Zone Designations or Boundaries

Healthy ecosystems are dynamic and subject to change over time. Disturbance processes such as windstorms, ice storms, fire, flood, and disease can result in significant change critical to natural renewal and succession processes that contribute to a greater diversity of habitats and species. In instances where detectable and obvious change to an area results from natural disturbance processes, the management zone and boundary will remain unchanged to allow for natural disturbance and successional processes to continue.

Change can also be brought on by human-caused disturbances such as indirect impacts that may occur due to urban development adjacent to natural areas, or direct impacts that may occur due to the installation of infrastructure into natural areas. Where detectable and obvious change occurs due to human-created disturbance processes, the designation and/or boundary of a management zone should not be modified to reflect a new, lesser ecological condition. Semi-permanent or temporary changes to an area may be identified with a restoration overlay on the original management zone to restore areas impacted by human-caused disturbances.

## 5.5 Overlays

### 5.5.1 Restoration Overlays

Restoration overlays are applied to identify areas where active management intervention is required to restore ecological integrity. Restoration may take the form of habitat creation, enhancement or restoration, control of nuisance wildlife, control of invasive species, prescribed burns and/or the creation or enhancement of habitat structures (nest boxes or platforms, amphibian breeding habitat, snake hibernacula, etc.). This objective is supported by the City's Official Plan.

The primary goal of a restoration overlay is to maintain or restore the indicator feature(s) of the underlying management zone, while providing opportunities for community-based stewardship activities and education. The secondary goal is to offer an opportunity to study the recovery of natural ecosystems that have been modified by human disturbances from the past and present and, to facilitate public education, appreciation and stewardship.

Where restoration overlays are applied, temporary trails may be required to access existing and future restoration areas. Depending upon the ultimate goal of the restoration project, these trails may be removed or formalized following completion of the restoration project.

### 5.5.2 Utility Overlay

In some instances, ESA managers must deal with an existing condition such as a utility site or corridor, or other similar infrastructure or facility, inside an ESA. In a case where ongoing access requirements associated with the utility preclude restoration to the original ecological condition, a Utility Overlay is established. Where restoration to the original ecological condition is possible, a Utility Overlay is not used; instead, the management zone is applied based on the targeted vegetation community (i.e., ELC) and overlaid with a Restoration Overlay.

The primary goal for a Utility Overlay is to protect the overall integrity of the ESA, and minimize impact of the utility site, corridor, infrastructure or facility while maintaining the ability for the City to access the utility for operational maintenance, as required by other approvals. The secondary goal depends on the circumstances of the specific ESA. Where maintenance access is required, trails should be located along the same route to minimize impacts to the surrounding ESA while achieving a social benefit by designing the trails to accommodate persons with disabilities wherever possible.

### 5.5.3 Trail Review Overlay

As indicated in **Section 4.1**, this overlay is to be used as part of a trail planning and/or review process as described in **Section 2.2**. The overlay is applied to areas where existing trails are located within or immediately adjacent to a significant ecological feature and further review is required as per **Table 1**.

Isolated peninsula in the Medway Valley Heritage Forest ESA, undergoing restoration following installation of a sanitary sewer.



Old field in Killaly Meadows ESA with prairie and savannah habitat features, undergoing controlled burn for restoration.





## 6 Trails and Permitted Activities

The use of trails for permitted activities should follow the four standards for ESAs in the City:

1. To promote protection of the natural heritage system through proper management zoning and trail design
2. To generally locate trails and ancillary trail facilities/amenities outside of significant ecological features
3. To restrict trail uses to low-impact nature-based activities
4. To create a safe, enjoyable and accessible trail system for public use, education and overall nature appreciation

### 6.1 City-Wide Trail Hierarchy

There are three tiers, or levels of trails and pathways that may be applied to publicly-owned natural and built form areas across the City. Generally, Level 1 and Level 2 trails are the standard approach within publicly owned ESAs. This guideline document addresses the planning and design of these trails to permit appropriate access and use while protecting the features and functions of an ESA. The type of trail is determined through the process identified in **Section 2.2**.

The types of trails, users and general trail characteristics permitted in ESAs are outlined in **Table 2** based on each of the management zones described in the sections above. The various types of trails and the types of activities permitted on them are further described in the subsections below. Specific design and construction details are outlined in **Section 7**.

**Table 2: Summary of Management Zones, Trail Hierarchy and Specifications, and Overlays for ESAs**

Management Zone	Trail Type	Users <sup>1</sup>	Trail Width	Trail Surface	Trail Structure <sup>2</sup>
Nature Reserve Zone	Level 1	Hikers	1.0 – 1.5 m	<ul style="list-style-type: none"> <li>Natural earth surface</li> <li>Wood chips</li> <li>Boardwalk</li> <li>Corduroy logs</li> <li>Stepping stones</li> </ul>	<ul style="list-style-type: none"> <li>Boardwalk</li> <li>Viewing platform</li> <li>Bridge</li> <li>Control structures</li> <li>Stairways (wood, metal or stone)</li> <li>Directional signs</li> <li>Interpretive signs</li> <li>Warning signs</li> </ul>
Natural Environment Zone <sup>3</sup>	Level 1	Hikers	1.0 – 1.5 m	<ul style="list-style-type: none"> <li>Natural earth surface</li> <li>Wood chips</li> <li>Boardwalk</li> <li>Corduroy logs</li> <li>Stepping stones</li> </ul>	<ul style="list-style-type: none"> <li>Boardwalk</li> <li>Viewing platform</li> <li>Bridge</li> <li>Control structures</li> <li>Stairways (wood, metal or stone)</li> <li>Directional signs</li> <li>Interpretive signs</li> <li>Warning signs</li> </ul>
	Level 2	Hikers Pedestrians, strollers, children on bicycles accompanied by pedestrian adults, wheelchairs	1.5 – 2.0 m	<ul style="list-style-type: none"> <li>Non-erodible material (e.g., asphalt<sup>4</sup> or granular) to create a firm and stable surface</li> </ul>	
Cultural Heritage Zone	Level 1	Hikers	1.0 – 1.5 m	<ul style="list-style-type: none"> <li>Natural earth surface</li> <li>Wood chips</li> <li>Boardwalk</li> <li>Corduroy logs</li> <li>Stepping stones</li> </ul>	Depends on type of feature and relationship to adjacent or underlying zones
	Level 2	Hikers Pedestrians, strollers, children on bicycles accompanied by pedestrian adults, wheelchairs	1.5 – 2.0 m	<ul style="list-style-type: none"> <li>Boardwalk</li> <li>Non-erodible material (e.g., asphalt<sup>4</sup> or granular) to create a firm and stable surface</li> </ul>	

Management Zone	Trail Type	Users <sup>1</sup>	Trail Width	Trail Surface	Trail Structure <sup>2</sup>
	Level 3	All of the above plus bicycles	2.0 - 3.0 m	<ul style="list-style-type: none"> <li>• Boardwalk</li> <li>• Non-erodible material (e.g., asphalt<sup>4</sup> or granular) to create a firm and stable surface</li> </ul>	
Access Point	Same as Cultural Heritage Zone	Same as Cultural Heritage Zone	Same as Cultural Heritage Zone	<ul style="list-style-type: none"> <li>• Boardwalk</li> <li>• Non-erodible material (e.g., asphalt<sup>4</sup> or granular) to create a firm and stable surface</li> </ul>	<ul style="list-style-type: none"> <li>• Bike rack</li> <li>• Parking –car</li> <li>• Kiosk</li> <li>• Control structures</li> <li>• Viewing Platform</li> <li>• Interpretive signs</li> </ul>
Restoration Overlay	<ul style="list-style-type: none"> <li>• Consistent with the underlying and/or adjacent management zone</li> </ul>				
Utility Overlay	<ul style="list-style-type: none"> <li>• Consistent with the underlying and/or adjacent management zone</li> </ul>				

<sup>1</sup>Users refer to human users. Dogs on-leash are permitted in City ESAs; <sup>2</sup>Trail Structures – all structures will require regular (annual) inspection. For some types of structures, inspection by a qualified structural engineer may be required; <sup>3</sup>A Level 3 trail may be permitted within a Natural Environment Zone to upgrade an existing connection between neighbourhoods subject to the 'Process' outlined in **Section 2.2**. <sup>4</sup>Use of asphalt in an ESA is subject to the process in **Section 2.2** and may be used to provide some form of environmental protection to the surrounding area

# 7 Design and Construction

## 7.1 Trails

In the sections below, the types of trails are overviewed and details provided on their design and maintenance standards. Information about which types of trails are permitted in each management zone is outlined in **Table 2**.

As of January 1, 2016 the construction and re-development of public spaces requires the City to meet the Accessibility for Ontarians with Disabilities Act regulations for the installation of new recreational trails.

### 7.1.1 Level 1 Trail

Level 1 trails are to be designed and managed for maximum protection of the natural setting and minimum maintenance to create and maintain the feeling of being away from the City and “in nature”. They will be designed to accommodate single or restricted nature-based uses such as hiking, walking and nature observation.

Typically, these trails are not “constructed” but follow the existing topography of the natural area. As such, trails may contain natural challenges such as uneven surfacing, large inclines, or partial trail obstructions. Trail users are expected to voluntarily assume a greater burden of risk and uncertainty of the potential “hazards inherent” as indicated on signage at all entrance points. *The Design of Public Spaces Standard* (Ontario Reg. 191/11) (“the Standard”) recognizes that there can be exceptional conditions where the need to provide accessible trails may need to be balanced with other legitimate concerns. In such instances, the City is expected to meet the requirements of the Standard to the greatest extent possible.

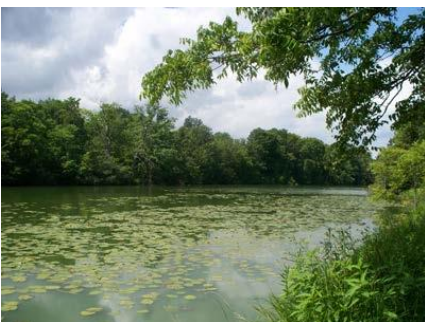
Narrow-based, natural surface hiking trails for passive nature-based recreation



Kains Woods ESA Level 1 trail – natural surface through a terrestrial landscape



The Coves ESA West Pond aquatic landscape



### Design and Maintenance Standards:

- Trail typically consists of natural earth, but can include woodchips, wooden logs (corduroy), or stepping stones to a variable width of 1.0 – 1.5 m with the objective to minimize the footprint of the trail.
- Trail typically uses low-tech design standards that are appropriate (sustainable) for the location and volume of use. Trail junctions will minimize the use of Y-shaped design.
- No requirement for additional clearance for shoulders; however,

overhanging vegetation will be kept clear of the trail as required for safety.

- Poorly drained and permanently wet soils generally do not make for good trail surfaces. Where re-routing is not feasible, alternative trail surfacing such as boardwalks or granular materials should be used to prevent environmental impacts associated with compaction, trail widening and alteration of drainage.
- Trail obstructions such as deadfall trees and rocks will be removed only where deemed necessary for safety or to prevent users from creating new trails.
- The Council-approved Tree Risk Management Policy and Procedures for ESAs (2013) will be followed in order to minimize tree inspections and tree mitigation.
- Permitted structures include boardwalks, pedestrian bridges of appropriate size to span the ravine or watercourse, stepping stones, and water diversions.

#### Access and Linkages:

- Includes minor nodes at junctions with Level 3 trails or at access points that typically include bicycle parking, and information signage to inform users of permitted and restricted uses.
- Components may include closed loops or solitary trail segments.
- Hikers will orient following directional signage.

### 7.1.2 Level 2 Trail

Level 2 trails are “improved” trails that provide access to natural or cultural features. Level 2 trails are not permitted within Nature Reserve Zones. Exceptions to this may be considered to provide access to a unique viewing point or feature to control and direct use in sensitive ecological areas, provided the process outlined in **Section 2.2** is followed.

These types of trails may be installed to include surfacing with appropriate trail hardeners or asphalt to provide for environmental protection (e.g. steep slopes >8%) and accommodate pedestrian uses for accessibility, such as wheelchairs, strollers (**Table 2**). Use of trail hardeners or asphalt may only be used within a Natural Environment Zone where it can be demonstrated it will not result in negative impact to the ecological features and functions of the surrounding area in the ESA.



Two types of Level 2 Trails. On the far left is a limestone screening trail through an old field / savannah habitat in Killaly Meadows ESA. On the right is a paved trail overlying a sanitary sewer maintenance access in Westminster Ponds ESA.

#### **Design and Maintenance Standards:**

- Trail typically consists of natural earth, granular or asphalt surface (or other suitable non-erodible material) to a variable width of 1.5 – 2.0m. Where the trail is deemed accessible, the trail in its

entirety shall meet AODA recreational trail surface requirements for both firmness and stability. Trail surface for access to special-feature areas may require the installation of structures such as boardwalks or viewing platforms.

- Trail may consist of shorter closed loop trail segments that pass by features of interest.
- Trail obstructions such as deadfall trees and rocks will be removed for safety.
- The Council-approved Tree Risk Management Policy and Procedures for ESAs (2013) will be followed in order to minimize tree inspections and tree mitigation.

### **Access and Linkages:**

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- May include a major kiosk at the main access entrance with interpretive signs to inform users of permitted and restricted uses, to highlight the natural features of the ESA, and may provide bicycle parking.
- May include minor nodes with bicycle parking at junctions with Level 3 trails where car parking and other facilities are not provided.
- Typically will offer trailside amenities such as benches, viewing platforms, interpretive signs and other signage at access points.

### **7.1.3 Level 3 Trail**

These trails provide visitor access and are to be designed and implemented to protect environmental features and to accommodate areas of increased visitor use. Level 3 trails and structural amenities may require appropriate setbacks from adjacent natural features and functions. In exceptional situations, a Level 3 trail may be permitted within a Natural Environment Zone to upgrade an existing connection between neighbourhoods subject to the 'Process' outlined in **Section 2.2**. Level 3 trails are not permitted within Nature Reserve Zones.

## **7.2 Trail Structures**

Where the health and sustainability of ESAs is threatened by high use, mitigation efforts often include trail hardening, posting signs, installing stairs, boardwalks or bridges and erecting rail fencing or other barricades to preclude off-trail hiking. Other measures include educational programs and visitation by uniformed personnel, or limiting parking and other structures that encourage access. The following section includes general guidelines for the design and location of various trail structures. Structures and their location will be guided by the management plans within the CMP for the ESA.

Some built structures will be required for user passage over some of the physical trail barriers throughout the City (rivers, streams, steep slopes, roads, railroads) and to protect sensitive areas from user impacts. In ESAs, the use of trail structures will be minimized and used to either provide a higher level of protection to a significant ecological feature from the permitted trail use or to increase user safety and trail accessibility. In ESAs, structures will be permitted and built to accommodate the



anticipated volume of visitors in a controlled manner and the anticipated use by persons with mobility disabilities.

For some larger structures such as bridges and stairways, etc., technical design must include onsite investigations and the preparation of design drawings completed by qualified structural and geotechnical engineers.

During the technical design stage for trail structures, archaeological and soils investigations should be undertaken where necessary. In addition, consideration should be given to the need for securing a permit from the UTRCA for trails and trail crossings planned within UTRCA Regulated Areas. Finally, technical design should provide restrictions on the timing of trail structure construction to meet MNRF and/or Environment Canada timing windows that protect significant species and fish habitat.

### 7.2.1 Bridges

Where a bridge is deemed necessary for a river, stream or ravine crossing, the size, span and engineering design requirements and materials will vary for every crossing type. Bridges should be used minimally in ESAs and only as justified through the CMP. Where a bridge is being built, it must be done in a manner that will protect the ecological features and functions of the ESA and should be designed to blend in with the surrounding natural environment.

Bridges that must span a watercourse will generally require engineering design and construction mainly on site using wood and often steel reinforcement. For some locations a small wooden structure or “step-bridge” constructed on site may be appropriate to span a small swale within a woodland.

Prefabricated steel truss bridges are a practical, cost effective solution for many situations. This type of structure may have less impact than a conventional bridge on the sensitive valley, ravine or creek it is meant to protect and reduces the likelihood of people “shortcutting” a trail segment, resulting in trampling and erosion.

In cases where a steel span bridge may be required, the bridge design and location is to also serve as a compelling landscape anchor with the purpose to draw people away from shortcutting through significant or sensitive areas.

If a bridge is to be constructed in an ESA, construction impacts shall be considered during the CMP process to determine appropriate mitigation measures to reduce impacts.

Wood and steel pedestrian bridge in Medway Valley Heritage Forest ESA



Steel span bridge in Meadowlily Woods ESA



## 7.2.2 Stairways

For very steeply sloped areas where there is inadequate room to develop switchbacks or other access solutions, it may be necessary to construct a stairway.

The site characteristics will determine the type and design of the structure required. Where feasible, a stepped trail using natural materials may be sufficient to provide access on a steep slope.

Wooden stairway in the Medway Valley Heritage Forest ESA.



## 7.2.3 Boardwalks

Where trails must pass through wetland vegetation communities, such as swamps or marshes, or through areas with a proliferation of large roots that are exposed to the surface, or through a very damp, clayey area (e.g. Westminster Ponds), a boardwalk structure may be required to maintain the integrity of the trail and to minimize environmental damage.

If trails are not appropriately surfaced, users will walk around wet areas, creating wider trails through the surrounding vegetation. Trampled vegetation and soil disturbance can also alter surface water flow, causing increased erosion. In some cases, various types of small culverts or geotextile products may be sufficient to overcome the wet soil conditions.

In wetter areas, low profile boardwalks are relatively easy to construct and install. Where the trail is in a high-profile location, and it is necessary to provide a fully accessible trail, or where the trail surface must be above standing water or greater than 60 cm above the surrounding grade, a more sophisticated design and installation is necessary. This may include engineered footings or abutments, structural elements and railings.

Low profile boardwalk installed through a Silver Maple swamp forest in Forestview Heritage Woodland.



Boardwalk section through the lagg and swamp forest zones of the Sifton Bog ESA.



#### 7.2.4 Barricades

Barrier structures are used in locations where control of access is required, such as a corral barrier to indicate change in trail type from an easier, improved Level 2 pedestrian trail to a more difficult Level 1 hiking trail. In this case a corral may be required to prevent bicycle passage.

Wood rail entrance corrals are often placed at the entrance to an ESA to reinforce the no-bike rule and to indicate that there are no improved trails.

Where the trail is deemed accessible, barricade structures for the control of bicycle access would not be included as the barriers would impede accessibility.

Bicycle barricade to permit only persons on foot at the entrance to Warbler Woods ESA.



#### 7.2.5 Viewing Platforms and Lookouts

Locations for viewing platforms and lookouts or viewpoints may be identified through the CMP for the ESA. Vegetation removal shall be avoided or minimized during the construction of any structures, with the site location directed to areas of disturbance that would benefit from some rehabilitation and removal of non-native and invasive species. Viewing platforms and lookouts may be recommended for installation where there is a natural desire by trail users to view or access certain areas of an ESA, such as a scenic vista, to visit a large tree or other unusual feature, to access the water's edge, to view or photograph a display of spring flowers, or to climb a steep slope, etc.

These compelling features may also be sensitive to disturbance. Viewing platforms and lookouts can be appropriate means to allow visitors to view sensitive areas and special features in a way that maintains suitable separation distances that protect the feature.

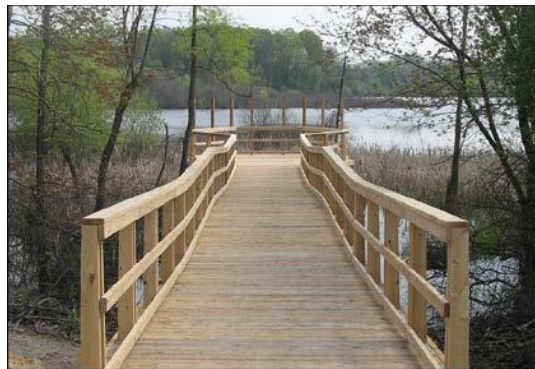


Sifton Bog ESA viewing platform at Redmond's Pond accessible from a boardwalk through the sensitive floating bog mat. Picture taken from off boardwalk during a vegetation monitoring study

Lookout from a barricade along the edge of a steep slipface in the Medway Valley Heritage Forest ESA



Accessible boardwalk and viewing platform to observe seasonal concentrations of waterfowl on Saunders Pond at Westminster Ponds ESA.



A small bench for a rest and a quiet view of South Pond in Westminster Ponds-Pond Mills ESA



Location of a possible lookout platform along the Kains Woods ESA hiking trail providing a view of the steep north facing slopes of the Thames River with White Pine and Eastern Hemlock



## 7.2.6 Trail Closures

As part of the effort to minimize the number of trails, and to optimize the location of trails, it may be necessary to close portions of the existing trail network. Closure of the existing trail can be an essential part of the overall process of trail planning and management. This may include permanent closure of a trail, but more commonly it will include closure of a portion of a trail where rerouting or relocation has been identified as part of the CMP process. If the former trail is not properly decommissioned and its location sufficiently disguised, it will continue to attract users.

The location of a new trail (including portions of trail rerouted or relocated) will be determined by following the planning principles and processes discussed throughout this document.

A study by Winter (2006) revealed that the most common motivators for off-trail activities were the desire to take or pose for photographs, or to take close-up photographs of flowers or insects, etc., or to touch natural features such as a large tree. Evidence of off-trail use, e.g. the presence of trampled vegetation, footprints leading off-trail, or the observation of other hikers off-trail, increased the likelihood that hikers would also leave the trail.

When an existing trail or a section of trail is to be closed, the following steps should be taken if feasible:

1. Construct new trail, reserving any plant material, topsoil, leaf litter, etc. that may be useful for restoration of closed trail.
2. Post "trail closed" sign at entrance to closed section of trail, in a location where it is easily seen by users.
3. Install temporary barrier fence, to protect work area on closed trail.
4. Break up or scarify soil on the closed section of trail to facilitate restoration planting, encourage natural regeneration, and make closed trail uninviting to users.
5. Restore closed trail with plant material, including plants moved from new trail as well as those from reliable native-plant nurseries. Choose plant species that are appropriate for the area in the ESA. In selecting plants, try to include some faster-growing species. Select tallest and fastest-growing shrubs for planting on the closed trail near the junction(s) with the new trail. This will help to hide the location of the former trail, and discourage ongoing use. In addition to plants and/or cuttings, sow native seeds as appropriate.



Cedar post and rail barricade and logs placed on the closed trail segment at Forest View Heritage Woodland Park.



Trail closed sign

6. Rake leaves onto former trail.
7. When new plants are well established, remove temporary barrier fence.
8. As required, construct a barrier to reinforce the message that this trail is closed.
9. Install signage that redirects trail users.

### 7.3 Trail Signage

The use of trail signs and markers that establish a code of behaviour/conduct is an important tool to manage user behaviour by increasing user awareness, modifying expectations and communicating rules of use. Signage should be aesthetically pleasing, with messages that are clear and easy to read and understand. The effectiveness of signs varies on the placement, length of message, importance to the visitor, topic being addressed, and the normative message content and presentation (Winter 2006; Cialdini et al. 2006). There are several different types of signs presented below that can be organized according to their function.

A defined set of standardized signs shall be available for ESAs. The City will use current research and signage standards and designs, including but not limited to AODA to create and install signs at all access points and in areas where inappropriate uses are occurring as determined through the monitoring program. For all new ESAs taken into City ownership, signage will be installed upon completion of the CMP and preferably prior to the development of a nearby site.

#### 7.3.1 Designation/directional signs

Rectangular blazes of coloured paint applied at regular intervals to trees along managed trails are used to indicate the trail type and direction. In Ontario, most of the major trails, including the Thames Valley Trail, use the Bruce Trail and Appalachian Trail standard of white blazes for the main trail and blue blazes for side trails. This standard creates consistency so that everyone understands their meaning when hiking on unfamiliar trails. The Thames Valley Trail Association (TVTA) established their main heritage trail network through London in 1971 following this Provincial standard. Managed trails in City-owned ESAs are marked with yellow blazes.

#### 7.3.2 Regulatory signs

These are used to list uses or activities that are restricted and legally

Example of an Informational Sign



Example of a Directional Sign



enforceable by a City by-law. In addition to these required regulatory signs, simpler signs with pictographs focused on rules and regulations with Quick Response (QR) code links to trail maps and contact numbers are installed at most access points, offering a succinct message about doing or not doing a particular action. Regulatory signs must be posted at all access entrances to ESAs. The UTRCA ESA Management Provincial Offences Officers can only enforce the City of London Parks and Recreation Area By-laws throughout the ESAs, and the *Conservation Authorities Act* where the UTRCA owns portions of an ESA. The City of London By-law Officers can enforce the relevant Parks and Recreation Area Bylaws in ESAs.

### 7.3.3 Warning signs

These are used to highlight trail conditions that may pose safety concerns or inconvenience to trail users. They may be temporary to mark a section of trail closed due to high water, or permanent to mark a steep section of the trail. The access points to all yellow-blazed trails will require signage to warn the user of potential inherent risks associated with use (e.g. "This area is managed in a natural condition for the protection of significant wildlife habitat. Natural hazards such as overhanging tree branches, fallen trees, steep slopes, or flooding may be present or arise. Please proceed with caution and don't go off the trail.")



### 7.3.4 Information signs

These provide general information about the ESA and trails. They range from large format entrance signs and/or information kiosks located at major trailheads with a range of information, including maps and interpretive information, to smaller signs posted at particular features of interest, such as a sign to identify a wildlife tree.

#### Example of an Information Sign



### 7.3.5 Interpretive signs

These provide specific educational information about points of interest (e.g. ecological, geological, historical, and cultural) along the trail. They can represent a large range of sign formats and application, depending on the interpretive program and complexity of information to be communicated.

The use and placement of interpretive signs is an important consideration for trail planning. Signs are often targets of vandalism, especially those placed along the trail routes. There are new technologies available that use smart phones to read QR codes placed on simple trail markers along the route. This technology can be used to facilitate self-guided walks for leisure or structured educational programs. It reduces the cost involved to create, install and replace signs. Informational signage should be aesthetically pleasing (for example, existing signs in the Coves ESA).

## 8 Maintenance, Monitoring and Management

### 8.1 Adaptive Management Approach

Establishment of baseline conditions through a CMP process or other environmental planning process is essential to implementing an adaptive management approach. Baseline data provides a benchmark against which objectives related to ecosystem protection, environmental policies and management can be measured to ensure activities are sustainable and effective. The key to effective adaptive management is to implement rigorous monitoring and evaluation to ensure ecological objectives are being maintained while achieving community and social objectives.

### 8.2 Monitoring Framework

Managing change in natural ecosystems involves evaluating trails and their use through a decision framework such as the Limit of Acceptable Change (LAC) (Cole and Stankey 1998) or the Stress-Response-Intervention-Outcome (SRIO) adaptive management framework (Bergsma and De Young 2007). This framework is used to guide decisions about the acceptability and management of impacts and visitor use. Identification of an acceptable limit or targeted outcome establishes thresholds for permitted uses (e.g. trails) such that recreation use does not compromise protection of the resource beyond a minimally acceptable condition (Cole and Stankey 1998) that will contribute to ecosystem decay.

Monitoring begins by understanding the current conditions of an area to establish a baseline. Degraded areas will require management plans for restoration and trail system improvements that can be monitored to track the success of management in achieving acceptable baseline conditions. The baseline of healthy natural areas will be monitored to ensure use of the trail system does not result in environmental impacts over time. The objective of monitoring is to provide a quantifiable assessment of trail conditions and will typically include such measurements as trail width and depth, trail condition class score, soil and vegetation plot data, and other environmental factors. Indicator variables are regularly monitored and can be summarized to report on trail conditions and their impact on the surrounding environment over time (Marion 2008). Monitoring frequency will vary based on the intensity of trail use and sensitivity and vulnerability of the natural area to impacts. A well-designed monitoring program will provide the necessary feedback for gauging the effectiveness of management interventions in keeping conditions within acceptable limits and within the targeted outcome. A documented failure of an intervention can be used to justify the use of a more obtrusive [intrusive] or expensive intervention (Marion 2008), trail closure, or more innovative management. The CMP process will establish the details and protocols for the monitoring framework and implementation approach to be undertaken as part of required management activities within each publicly owned ESA. As outlined in **Section 2.5**, for ESAs that do not have a current CMP, monitoring will occur as part of the general ESA management activities.



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# Appendix A

## *Glossary*

Medway Valley Heritage Forest ESA, Boardwalk

# Acronyms, Abbreviations, Definitions

## - A -

**Adaptive Management** - is a structured, iterative process of optimal decision making in the face of uncertainty regarding the effectiveness of our actions in achieving desired objectives – due to either gaps in our understanding or changes in the ecosystems we are trying to manage. Adaptive management provides a way to systematically reduce uncertainty over time via system monitoring and management intervention (Holling 1978; Murray and Marmorek 2004).

**Anthropogenic** - of, relating to, or resulting from the influence of human beings on nature.

## - B -

## - C -

**Cultural** - as defined under Ecological Land Classification for Southern Ontario – First Approximation and Its Application (Lee et al., 1998), vegetation community resulting from, or maintained by, cultural or anthropogenic-based disturbances. Includes the ecosites and vegetation communities listed under the community series of Plantation (CUP), Cultural Meadow (CUM), Cultural Thicket (CUT), Cultural Savannah (CUS), and Cultural Woodland (CUW). Manicured areas, such as mowed lawn or hedgerows, are also considered to be cultural.

## - D -

## - E -

**Ecological Integrity** - Ecological integrity refers to a condition in which biotic and abiotic components of ecosystems and the composition and abundance of native species and biological communities are characteristic of their natural regions and rates of change and ecosystem processes are unimpeded (note, this definition has been taken from the Ontario Provincial Parks and Conservation Reserves Act, 2006)

**Ecoregion** - a relatively large unit of land or sea that contains a geographically distinct assemblage of natural communities with boundaries that approximate the original extent of the natural environment prior to major land use change

**Ecosystem** - defined as the community of living co-existing organisms (including humans) and the non-living physical and chemical environment in which that community lives. There is a constant interaction and interdependence among all components of the ecosystem resulting in a dynamic variability. This variability means that ecosystems are constantly changing

**Ecosystem Health** - Ecosystem health refers to the biological condition of an ecosystem and may be indicated by its ability to maintain natural diversity and primary productivity, perform ecosystem services (such as nutrient cycling) and to rebound from stress. The field of ecosystem health often examines relationships between ecosystem health and human health. Knowledge of the measures of ecosystem health may help to diagnose causes of degradation and assist in aspects of ecosystem management.

Indicators of poor ecosystem health tend to be specific to the ecosystem, but symptoms of poor health often include:

- a) A loss of biodiversity accompanied by the proliferation of simpler life forms;
- b) The loss of keystone species, leading to stresses on other species;
- c) An increased rate of species mortality due to disease;
- d) Changes in the historic patterns of species movement; and
- e) The proliferation of non-native invasive species.

**Environmentally Significant Areas (ESAs)** - are identified in the City's Official Plan as areas that contain natural features and perform ecological functions that warrant their retention in a natural state. Publicly-owned ESAs have a purpose and function distinct from all other publicly owned green space. Permitted uses, access, and the provision of recreational activities within ESAs are governed by the Environmental Policies of the Official Plan for significant components of the natural heritage system.

- F -

- G -

**General Habitat** - an area on which a species depends, directly or indirectly, to carry out its life processes. This includes places that are used by the species as dens, nests, hibernacula or other residences. It doesn't include areas where the species once lived or where it may be reintroduced in the future. As soon as a species is listed as Threatened or Endangered on Ontario Regulation 230/08 (the Species at Risk in Ontario list) under the Ontario Endangered Species Act, 2007, that species' general habitat is legally protected as well.

**General Habitat Description** - general habitat descriptions are technical, science-based documents that provide greater clarity on the area of general habitat protected for a species. They have been developed for some of the provincially listed Species at Risk that are most likely to be affected by human activity (see also Habitat Categories).

**Government Resources** - technical reports published by government agencies.

**Groundwater** - water found in the tiny spaces between soil particles and in cracks in bedrock. Aquifers are the underground areas of soil or rock where substantial quantities of groundwater can be found. These are the source for water wells and springs. Groundwater discharges when it leaves the ground wherever the water table meets the ground's surface. This discharge is essential for maintaining surface waters (see Seeps and Springs).

- H -

**Habitat Categories** - when the Ministry of Natural Resources and Forestry issues a General Habitat Description for a Species at Risk, the habitat is categorized to help identify areas within the species' habitat that may be able to tolerate more or fewer changes. Habitat is categorized by considering how a species uses its habitat and taking into account any unique characteristics of that habitat. Habitat categories can vary among species and generally help determine when an activity may damage or destroy habitat and what conditions may be required for an authorization.

- **Category 1:** *These are areas of habitat where a species will probably be least tolerant to changes (e.g., nesting and hibernation sites). Activities that could alter category 1 habitat areas will likely damage and destroy them, so they usually require authorization to continue.*
- **Category 2:** *These are areas of habitat where a species is believed to be moderately tolerant to changes (e.g., areas used daily to find food). Relatively high-impact or large-scale activities that could alter category 2 habitat areas could damage and destroy them, so they usually require authorization to continue.*
- **Category 3:** *These are areas of habitat where a species is believed to be the most tolerant to changes (e.g., areas used occasionally to find food). Some high-impact or large-scale activities that could alter category 3 habitat areas could damage and destroy them, so they usually require authorization to continue.*

**High water mark** - *the highest that the water gets under normal conditions during the course of a year, but not the highest it gets during extreme flooding. In the case of watercourse features, such a line would be the line below which the vegetation and soil show the effects of submersion under water.*

- 1 -

**Interior Habitat** - *interior habitats are those that provide area-sensitive species a refuge from edge effects. These habitats are typically measured from the edge of the feature (e.g. woodland or grassland) in an inward direction. For area-sensitive species that use woodland areas as habitat, this area is typically more than 200 m (inward) from the edge of the woodland. For clarity, this differs from woodland interior, which is more than 100 m (inward) from the edge of the woodland.*



– L –

**Linkage/corridor** - a linear area intended to provide connectivity (at the regional or site level) supporting a complete range of community and ecosystem processes, enabling plants and smaller animals to move between core areas and other larger areas of habitat over a period of generations. The terms are used interchangeably for planning purposes but may need to be distinguished for ecological or biological reasons (Adapted from the Natural Heritage Reference Manual 2011).

**Limit of Acceptable Change (LAC)** - is a framework to guide decisions about the compatibility, acceptability and management of trail impacts and visitor use within designated management zones based on an inventory and evaluation of existing (baseline) conditions. The evaluation of existing trail conditions is generally based on objective and quantifiable measurements of abiotic (e.g. soils, slopes, exposure, elevation, trail width and depth, trail condition class score), biotic (e.g. vegetation and wildlife) and cultural elements (e.g. archaeological and cultural heritage features). Indicator variables are identified for various trail segments that will be used to monitor and detect changes in trail conditions and user impacts on the surrounding environment. Trail maintenance activities will focus on resolving impacts through appropriate interventions. Any documented failure of an intervention over time may be used to justify either increasing the level of intervention or a trail closure.

– N –

**NHIC; Natural Heritage Information Centre** - part of the MNRF that conducts research and surveys in the field for priority species and areas across Ontario. The centre collects, reviews, manages and distributes information for: species of conservation concern, rare and exemplary plant communities, wildlife concentration areas, and natural areas.

– M –

**MNRF; Ministry of Natural Resources and Forestry** - a government ministry of the province of Ontario that is responsible for Ontario's provincial parks, forests, fisheries, wildlife, mineral aggregates and the Crown lands and waters. It should be noted that this ministry was previously referred to as the Ministry of Natural Resources (MNR).

**Micro-siting** - this refers to reviewing the location for a trail through a site visit, which may include a Conservation Master Plan Local Implementation Committee or the Trails Advisory Group (TAG). The intention of micro-siting is to further ensure the avoidance of impacts to ecological features such as regionally rare flora, and seasonal habitats such as vernal pools for example.

– P –

**PPS; Provincial Policy Statement** - The Provincial Policy Statement is issued under section 3 of the Planning Act. The Provincial Policy Statement applies province-wide and should be read in its entirety. Its policies set out the government's land use vision for how we settle our landscape, create our built environment, and manage our land and resources over the long term to achieve livable and resilient communities.

**PSW; Provincially Significant Wetland** - wetlands are ranked to determine whether they should receive special protection as "provincially significant". Significance is determined by the Ontario Wetland Evaluation System. Completed wetland evaluations are submitted to the MNRF for approval prior to a wetland being identified as a PSW.

– O –

**OWES; Ontario Wetland Evaluation System** - created to inform Ontario's land use planning process. The Ministry of Natural Resources and Forestry evaluates wetlands to help municipalities, conservation authorities and others with land use planning. The ministry provides manuals describing how wetlands are to be delineated and evaluated and offers annual training for professionals wishing to become qualified wetland evaluators.

– R –

**Rare Vegetation Community** - The MNRF defines rare vegetation communities as a type of wildlife habitat. This includes vegetation communities with a sub-national (SRank) ranking of S1, S2 or S3 as designated by the NHIC and/or listed in Appendix M of the Significant Wildlife Habitat Technical Guide (MNR 2000). This also includes cliffs and talus slopes, sand barrens, alvars, old growth forests, savannahs, and tallgrass prairies. Many of these types of rare vegetation communities are not applicable to the City of London.

**Regulated Habitat** - this habitat area is prescribed in Ontario Regulation 242/08 under the Ontario Endangered Species Act, 2007 as the protected habitat for species listed as Threatened or Endangered in Ontario. Once a habitat regulation has been defined for a listed species, this replaces the general habitat protection.

**Riparian Zone** - areas where the terrestrial landscape transitions to the aquatic environment of a flowing watercourse.

– S –

**Seep** - a moist or wet place where water, usually groundwater, reaches the earth's surface from an underground aquifer.

**Significant Wildlife Habitat** - wildlife habitat is identified as "areas where plants, animals, and other organisms live, and find adequate amounts of food, water, shelter, and space needed to sustain their populations." It is considered significant where it is ecologically important in terms of features, functions, representation or amount, and contributing to the quality and diversity of an identifiable geographic area or Natural Heritage System. The MNRF is the authoritative source for defining the types of wildlife habitat relevant to the various ecoregions in Ontario.

Broadly defined, wildlife habitat includes seasonal concentration areas of animals, rare vegetation communities, specialized habitat for wildlife, habitat for species of conservation concern, and animal movement corridors. Criteria for determining significance have been developed by the MNRF for the various ecoregions in Ontario. The City of London falls within ecoregion 7E.

**Species at Risk** - This includes Species at Risk that would be legally protected by provincial or federal legislation. In Ontario, flora and/or fauna listed as Endangered or Threatened under the provincial Endangered Species Act, 2007, as well as their habitat, are protected. Aquatic Species at Risk and Migratory Birds listed on Schedule 1 of the federal Species at Risk Act, 2002 are also protected. Other species listed on Schedule 1 of the federal Species at Risk Act, 2002 would not be protected on City-owned lands as Species at Risk (see Species of Conservation Concern). The federal Species at Risk Act applies mostly to federal lands.

**Species of Conservation Concern** - flora and/or fauna listed as Special Concern under the provincial Endangered Species Act, 2007; Endangered or Threatened under Schedule 1 of the federal Species at Risk Act, 2002; and species designated a SRank of S1, S2 or S3 by the NHIC.

**Spring** - a water resource formed when the side of a hill, a valley bottom or other excavation intersects a flowing body of groundwater at or below the local water table, below which the subsurface material is saturated with water. A spring is the result of an aquifer being filled to the point that the water overflows onto the land surface.

**SRank; Subnational Rank** - the conservation status of a species or plant community within a particular province, territory or state. NHIC assigns subnational ranks (SRanks) for species and plant communities in Ontario using the best available information and considering factors such as abundance, distribution, population trends and threats. Conservation status ranks do not have any legal standing in Ontario. They are independent of status designated under Canada's Species at Risk Act and Ontario's Endangered Species Act.

**Sustainability** – refers to the capacity to endure. A holistic concept that, for natural ecosystems, requires all their components to be sustained, with human uses included only when they are compatible with conservation of the native biota and natural processes (Noss 1995). Sustainable systems are maintained without exhausting natural resources or losing ecological integrity. For humans, sustainability is the potential for long-term maintenance of well-being, and includes environmental, economic, and social components.

**Sustainable Design Practices** - those that can be maintained over the long-term from environmental, economic and social perspectives. (Adapted from Trails for All Ontarians, 2006)

**- T -**

**TAG; Trails Advisory Group** - representing ESA user groups to comment on any trail related issues in ESAs that were not addressed or contemplated in the most current Conservation Master Plans (CMP) or where a current CMP does not exist. The detailed terms of reference for TAG is outlined under separate cover as approved by Council.

**- U -**

**Unevaluated Wetland** - a wetland that has not been evaluated using the Ontario Wetland Evaluation System.

**Utility Corridor** - generally a linear anthropogenic feature that contains infrastructure (e.g. hydro transmission lines, gas or water pipeline, railroad lines, sanitary sewer)

**- W -**

**Watercourse** - An identifiable depression in the ground in which a flow of water occurs regularly or continuously

**Wildlife Habitat** - see Significant Wildlife Habitat