COMMITTEE OF THE WHOLE DECEMBER 6, 2011

NATURAL HERITAGE NETWORK (NHN) STUDY
INVENTORY AND IMPROVEMENTS
FILE #22.30

Recommendation

The Commissioner of Planning, in consultation with the Director of Purchasing Services recommends:

1. That the Toronto and Region Conservation Authority (TRCA) be retained on a sole source basis in accordance with the City's purchasing polices to undertake components of Phase 1 of the four-phase Natural Heritage Network Study in the amount of $52,400.00, including HST and disbursements; and

2. That Phase 1 be conducted in accordance with the Scope of Work, which forms Attachment 1.

Contribution to Sustainability

Green Directions Vaughan (2009) provides the following objective with respect to Natural Heritage in the City:

> *2.2.4. Develop a comprehensive Natural Heritage Strategy that examines the City's natural capital and diversity and how best to enhance and connect it. As part of this action:*
> - *Develop an inventory of Vaughan's natural heritage, and identify opportunities for habitat restoration;*
> - *Ensure that policies in the City's new Official Plan protect all ecological features and functions as per current provincial and regional policies, and also include consideration for locally significant natural features and functions;*
> - *Develop policies to create opportunities for near urban agriculture within Vaughan's rural areas, through policies described in the City's new Official Plan.*

The NHN Study continues the initial effort documented in the report, Natural Heritage in the City, prepared as a background report to the Vaughan Official Plan and which was brought forward to Council on June 1, 2010. The NHN Study will assess the role of the existing NHN in maintaining elements of biodiversity and ecological functions for the long term, and propose additional NHN areas for future securement options to meet biodiversity and ecosystem function targets consistent with Section 2.1.2 of the Provincial Policy Statement.

Economic Impact

The City's 2011 Capital Budget for Project PL-9025-11 includes $52,400 in funding for the cost required to undertake Phase 1 of the NHN Study. There is a 2012 Budget request for Phases 2 and 4. Software upgrades to allow for the use of this information, such as in a Geographic Information System, will be determined at the outcome of the Phase 1 study for consideration in the 2013 Budget.

Communications Plan

The study process includes a stakeholder consultation program in association with the public engagement process. Government agencies, landowners, development industry representatives (e.g. BILD), and community organizations will be consulted during the course of the study.

Purpose

To present an overview of the work to be undertaken for Phase 1 of the NHN Study with emphasis on the component studies requiring external contracts.

Background - Analysis and Options

Study Goals and Objectives

There are three main objectives of the overall NHN Study:

1. An assessment of the biodiversity contribution and ecological functions of the existing NHN;

2. Developing a GIS database of the NHN, its constituent parts, and relevant attribute information to provide a clear and transparent rationale for the NHN, which can be used in the development application process; and

3. Prepare a strategy to enhance the NHN to meet select ecosystem targets.

In addition, there are critical initiatives emphasizing the need for the NHN Study, including: (1) regulations under the Endangered Species Act (2007) to protect endangered redside dace habitat; (2) potential impacts of the GTA West Corridor on remaining natural habitat primarily in the Greenbelt Plan area; (3) the Official Plan requirement to complete one comprehensive and coordinated Secondary Plan for New Community Areas; and (4) the 2015 Greenbelt Plan review. The NHN Study is an objective, scientific exercise that will inform policy (e.g. for Secondary Plans for New Community Areas) and assist in meeting conformity requirements to over-arching policies and legislation.

The scope of the overall NHN study has 4 phases of work. The first phase augments the existing NHN by compiling all appropriate information into a comprehensive GIS database. Other key aspects of Phase 1 are to set ecosystem targets to complete the NHN and compare the existing NHN against the targets to understand the gaps in the system. Phase 2 of the study includes the field investigations according to existing protocols: the *Significant Wildlife Habitat Technical Guide* (MNR 2000) and; the *Evaluation, Classification and Management of Headwater Drainage Features: Interim Guidelines* (TRCA 2009). Phase 3 summarizes the work of the first two phases into a report format. Phase 4 considers a range of land securement approaches from acquisition to stewardship options.

The initial phase (Phase 1), which is the focus of this Report to Council, consists of five parts:

- documenting the NHN's constituent parts and attribute information in a GIS database to evaluate the biodiversity contribution and ecological functions of the NHN, which may result in modifications to the NHN boundaries;
- setting ecosystem targets;
- undertaking a gap assessment of the biodiversity contribution and ecological functions of the existing NHN against the ecosystem targets;
- bringing forward the revised Environmental Management Guideline (EMG) for public review and consultation; and
- providing recommendations for field investigations in subsequent phases of the study.

The purpose of this report is to recommend that the TRCA lead critical tasks comprising Phase 1 of the NHN Study. Should Council approve the budget for Phases 2 to 4 of the NHN Study, then a Request for Proposals will be prepared for bid by outside consultants to undertake the work.

Role of the TRCA in Natural Heritage System Planning

The province has delegated approval authority to the Toronto and Region Conservation Authority (TRCA) for the Natural Hazard section of the PPS. The TRCA also has a commenting role on development applications submitted to the municipality under the Planning Act for aspects of other water resource systems and natural heritage. They rely on four key instruments to guide their comments and permitting: the Terrestrial Natural Heritage System Strategy (2007); watershed plans; the Valley and Stream Corridor Management Program (1994); and Regulation 166/06 under the Conservation Authorities Act.

> The objective of the TRCA Terrestrial Natural Heritage System (TNHS) is to identify and evaluate natural heritage features and functions within the landscape, for inclusion in a Natural Heritage System. The Humber River Watershed Plan and Don River Watershed Plan describe the TNHS for the respective watersheds and include implementation recommendations regarding land use, outreach and stewardship.
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> Watershed Plans are mandated under the Oak Ridges Moraine Conservation Plan and Greenbelt Plan. The Humber River Watershed Plan: Pathways to a Healthy Humber and the Implementation Guide (2008) and the Don River Watershed Plan: Beyond 40 Steps and Implementation Guide (2009) provide guiding principles and objectives that support strategies and targets that include protecting and expanding the terrestrial natural heritage system, building sustainable communities and creating an enhanced regional open space system.
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> The TRCA's Valley and Stream Corridor Management Program outlines policies that seek to retain watercourses and valley and stream corridors as open, natural landforms, from the headwaters to the river estuary marshes. These policies guide the TRCA Planning and Development staff when reviewing applications under Ontario Regulation 166/06 and in commenting on land use planning policy documents and development applications.
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> Ontario Regulation 166/06, Development, Interference with Wetlands and Alterations to Shorelines and Watercourses, is the regulation under Section 28 of the Conservation Authorities Act that is specific to the TRCA. The main objectives of O.R. 166/06 are to ensure public safety and protect property with respect to natural hazards and to safeguard watershed health by preventing pollution and destruction of sensitive environmental areas such as wetlands, shorelines and watercourses.

Study Process and Sole Source Justification for Phase 1 of the NHN Study

Primarily through responsibilities for developing the Terrestrial Natural Heritage System and watershed plans, in addition to regulatory authority under Regulation 166/06, the TRCA maintains various databases, including in a GIS format, of biodiversity and natural areas information. The TRCA also has considerable experience regarding issues of natural heritage system design in their jurisdiction. This existing, well-developed database of natural heritage system information makes the TRCA a logical lead for Phase 1 of the NHN Study. An external consultant undertaking this Phase of the NHN Study would need to duplicate effort for data compilation. In cooperation with the TRCA, Phase 1 of the NHN Study can focus more effort to embed the intelligence regarding clear and transparent criteria for the NHN areas in the GIS database, allowing for more effort to investigate the targets and objectives of the NHN within the urbanizing municipality of the City of Vaughan.

The Policy Planning department will be responsible for convening a Steering Committee to confirm key decisions and approaches. The City, including through the role of the Steering Committee, is responsible for overall conformity of the NHN Study products to Provincial, Regional and official plan policies as well as consistency with the City's growth management strategy. The Steering Committee is to comprise City of Vaughan staff from Development Planning, IT, Parks and Forestry, Parks Development, and Policy Planning. The Policy Planning department will also seek representation on the Steering Committee from York Region and the Ministry of Natural Resources.

Roles and responsibilities between the City and the TRCA are briefly described below.

a) Comprehensive GIS Database - NHN Inventory and Attribute Information

The TRCA already maintains a GIS database of the Terrestrial Natural Heritage System and supporting feature layers. Despite this existing database, the attribute data maintained by the TRCA regarding habitat types and species/community level ranking will need to be augmented, such that this task comprises the majority (i.e. 50-60%) of the effort by the TRCA in Phase 1.

It is appropriate for the TRCA to lead the GIS database development building on the existing GIS layers and attribute data. The City will lead the external consultation with interested stakeholders (e.g. development community and/or their environmental consultants), provide a review with particular regards to policy conformity and scientific rigour, and coordinate the role of the Steering Committee review.

b) Ecosystem Targets

Given the existing research incorporated into the modelling approach for the TRCA Terrestrial Natural Heritage System, it is appropriate for the TRCA to be the lead investigator to develop the framework of ecosystem targets. Information to develop the ecosystem targets is also readily available in the scientific literature. Much of this has been summarized in the *Natural Heritage Reference Manual for Natural Heritage Policies of the Provincial Policy Statement, 2005. Second Edition* (Ontario Ministry of Natural Resources 2010), which is the Province's guide to interpreting the natural heritage policies of section 2 of the Provincial Policy Statement. Hence, the focus of the task is to identify practical and measurable targets for biodiversity and ecological functions. This will emphasize the maintenance and, where appropriate, the restoration of existing species populations and derive ecosystem targets suitable for an urbanizing municipality, such as:

- the number and size of contiguous forests to maintain interior forest species and other area-sensitive woodland species (e.g. 200 hectare functionally contiguous forest in each of the Humber River and Don River watersheds);
- maintaining amphibian and reptile species assemblages, particularly for those species that need to move among several habitats;
- habitat requirements for population viability of species listed as endangered, threatened and special concern species by the Committee on the Status of Species at Risk in Ontario (COSSARO), within their broader species ranges and regional context.

The emphasis of this task of Phase 1 is to compile the existing scientific information in an appropriate framework of ecosystem targets such that this comprises about 15-20% of the TRCA effort for Phase 1. The Policy Planning department will work closely with the TRCA to involve other City departments, York Region staff and feedback from external consultation to arrive at final ecosystem targets appropriate for an urban municipality to balance economic, social and ecological considerations. This will consider the role of the

NHN in overall growth management objectives of the City and York Region. Credibility of the framework of ecosystem targets can be enhanced by ensuring a peer review by contracting a review or through an expert panel, which will be considered in subsequent phases of the NHN Study.

c) Gap Assessment

Conducting the gap assessment will require spatial analysis in a GIS environment to compare the habitat availability in the existing NHN against the ecosystem targets. The required spatial analysis is typical for natural heritage system design and consists of determining, for example: amounts of contiguous habitat based on connected habitat patches; amounts of interior habitat using buffering approaches; and areas of functional connectivity using scores for natural, semi-natural and agricultural areas.

The City and the TRCA should jointly develop the methodology for the gap assessment, particularly where a straightforward accounting of habitat amount is not suitable to determine the biodiversity contribution of the NHN. The City will ensure that the Steering Committee, as described above, reviews the methodological approach.

The TRCA will lead the GIS analysis for the gap assessment, identify the gaps and document the results in a report format. This requires about 15-20% of the TRCA effort for Phase 1. The City will lead the external consultation with interested stakeholders (e.g. development community and/or their environmental consultants), provide a review with particular regards to policy conformity and scientific rigour, and coordinate the role of the Steering Committee review.

d) Environmental Management Guideline (EMG)

The City will lead the review and revision of the EMG and seek stakeholder comments. The TRCA will review and provide comments on the revised EMG.

e) Preliminary Methodology for Field Investigations

The TRCA will provide recommendations for aspects of the methodology for field investigations to be conducted in Phase 2 of the NHN Study. Recommendations may be related to information gaps (a) in comparing the function of the existing NHN to ecosystem targets or (b) for specific geographic areas. Recommendations regarding the methodology for field investigations can be used by the City as a basis for seeking cost recovery, such as through a proposal to the Species at Risk Stewardship Program under the Endangered Species Act (2007).

The TRCA may recommend next steps to prepare for field investigations, such as further refinement of the NHN attribute data, to improve the subsequent evaluation of significant wildlife habitat and headwaters areas. This task requires less than 10% of the TRCA effort for Phase 1 as it is integrated with the reporting responsibilities for other tasks.

Budget

This contract has an upset limit of $52,400.00, including HST and disbursements.

Timing

The targeted completion of Phase 1 of the NHN study is the end of the second quarter of 2012, or 6 months from the date of approving the Scope of Work.

Relationship to Vaughan Vision 2020/Strategic Plan

The Natural Heritage Network Study is consistent with the Vaughan Vision 2020 Strategic plan, through the following initiatives, specifically:

Service Excellence:

- Lead & Promote Environmental Sustainability

Management Excellence:

- Plan and Manage Growth & Economic Vitality
- Demonstrate Leadership & Promote Effective Governance

This report is consistent with the priorities previously set by Council.

Regional Implications

Policies in the York Region Official Plan support the effort of local municipalities to identify local greenlands systems.

Conclusion

Given that the TRCA is the primary source of biodiversity and natural areas information and research in their jurisdiction, a sole source contract to the TRCA for Phase 1 of the NHN Study will ensure timely completion of the study and consistency with York Region policies regarding the Greenlands System and goals and objectives of the Humber River and Don River watershed plans. Any external consultant undertaking this work would need to obtain much of the available information from the TRCA through data sharing agreements and include review by the TRCA of key decisions and deliverables. The City, including through the role of the Steering Committee, is responsible for overall conformity of the NHN Study products to Provincial, Regional and official plan policies as well as consistency with the City's growth management strategy. Should Council concur, the recommendation should be approved.

Attachments

1. Scope of Work to Undertake Phase 1 of the Natural Heritage Network Study

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Respectfully submitted,

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1. INTRODUCTION

The City of Vaughan Official Plan 2010 designates a natural heritage system, the Natural Heritage Network (NHN), in Vaughan. The overall NHN Study will assess the role of the existing NHN in maintaining elements of biodiversity and ecological functions for the long term, consistent with Provincial Policy Statement (PPS) 2.1.2. At the completion of all phases of the NHN Study, additional NHN areas may be proposed to meet ecosystem targets of the natural heritage system related to biodiversity persistence and ecological function.

There are three main objectives of the overall NHN Study:

1. An assessment of the biodiversity contribution and ecological functions of the existing NHN;

2. Developing a GIS database of the NHN, its constituent parts, and relevant attribute information to provide a clear and transparent rationale for the NHN, which can be used in the development application process; and

3. Prepare a strategy to enhance the NHN to meet select ecosystem targets.

The scope of the overall NHN Study has 4 phases of work. The first phase augments the existing NHN by compiling all appropriate information into a comprehensive GIS database. Other key aspects of Phase 1 are to set ecosystem targets to complete the NHN and compare the existing NHN against the targets to understand the gaps in the system. Phase 2 of the study includes field investigations according to existing protocols: the *Significant Wildlife Habitat Technical Guide* (MNR 2000) and; the *Evaluation, Classification and Management of Headwater Drainage Features: Interim Guidelines* (TRCA 2009). Phase 3 summarizes the work of the first two phases into a report format. Furthermore, in reconciling the results of Phase 1 and the findings from the field investigations in Phase 2, it may be necessary in Phase 3 to refine ecosystem targets as well as re-evaluating the natural heritage gaps in the NHN. Phase 4 considers different land securement approaches and, hence, will provide a checklist of actions to enhance the NHN.

This initial phase (Phase 1), which is the focus of this Scope of Work, consists of five parts:

- taking inventory of the NHN's constituent parts based on available information and documenting attributes in a GIS database to evaluate the biodiversity contribution and ecological functions of the NHN, which may result in modifications to the NHN boundaries;
- setting ecosystem targets;
- undertaking a gap assessment of the biodiversity contribution and ecological functions of the existing NHN against the ecosystem targets;
- bringing forward the revised Environmental Management Guideline (EMG) for public review and consultation; and
- providing recommendations for field investigations in subsequent phases of the study.

Toronto and Region Conservation Authority

The province has delegated approval authority to the Toronto and Region Conservation Authority (TRCA) for the Natural Hazard section of the PPS. The TRCA also has a commenting

role on development applications submitted to the municipality under the Planning Act for aspects of other water resource systems and natural heritage. They rely on four key instruments to guide their comments and permitting: the Terrestrial Natural Heritage System; watershed plans; the Valley and Stream Corridor Management Program (1994); and Regulation 166/06 under the Conservation Authorities Act.

> The objective of the TRCA Terrestrial Natural Heritage System (TNHS) is to identify and evaluate natural heritage features and functions within the landscape, for inclusion in a Natural Heritage System. The Humber River Watershed Plan and draft Don River Watershed Plan describe the TNHS for the respective watersheds and include implementation recommendations regarding land use, outreach and stewardship. The target for natural cover in the Vaughan portion of the two watersheds combined is 22% (TRCA, Sept. 2009).
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> Watershed Plans are mandated under the Oak Ridges Moraine Conservation Plan and Greenbelt Plan. The Humber River Watershed Plan: Pathways to a Healthy Humber and the Implementation Guide (2008) and the Don River Watershed Plan: Beyond 40 Steps and Implementation Guide (2009) provide guiding principles and objectives that support strategies and targets that include protecting and expanding the terrestrial natural heritage system, building sustainable communities and creating an enhanced regional open space system.
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2. SCOPE OF WORK (PHASE 1)

2.1 Tasks

2.1.1 Comprehensive GIS Database - NHN Inventory and Attribute Information

The main product of this task of the study is to complete a GIS database of the NHN with sufficient attribute information to meet the objectives of the study. Additional open space areas that contribute to the maintenance of biodiversity and/or the provision of ecological functions will be included in the database inventory, as required. The structure of the GIS database in terms of component layers and attributes is to be determined in consultation with the Steering Committee.

The existing NHN was developed as part of the natural heritage background study, Natural Heritage in the City (AECOM 2010), and is based on a compilation of available information. The

GIS database developed in this phase of the study (Phase 1) will take the next step of documenting various components of the NHN and include information such as listed below, and as determined in consultation with the Steering Committee:

- ownership and/or security of the site (e.g. zoning, private or public property, conservation easements or other covenants);
- level of protection in policy (e.g. Greenbelt NHS overlay, ORMCP Natural Core or Natural Linkage, etc.);
- habitat type;
- significance of natural features according to the PPS and criteria in the Natural Heritage Reference Manual; and
- habitat quality or condition, as the quality of the habitat will factor into the ability of the site to provide for biodiversity habitat and species persistence.

Comparison of the Core Features of the NHN to known information sources, such as wetland evaluations conducted by the Province and criteria established by York Region for Regionally Significant Forests, can identify Core Features in relation to tests for significance in the PPS. Attribute information for such areas should allow for a refinement of criteria to determine significance and inclusion within the Core Features of the NHN. This comparison can include, for example:

- identified and evaluated wetlands using sources from York Region (e.g. Map 4 of the York Region Official Plan) and the Province;
- woodlands and Regionally Significant Woodlands; and
- significant valleylands, valley and stream corridors as defined in the Valley and Stream Corridor Management Program (TRCA 1994), and other watercourses.

The TRCA will provide the rationale for the attribute type and methodology for populating the database in conjunction with the City and other agency partners (e.g. MNR, York Region, and TRCA). For example, habitat types can be determined from sources including:

- existing City-sponsored studies such as the Focus Rural Area Woodland Ecosystem Assessment (AMEC 2002);
- submission materials for Block Plans;
- TRCA Terrestrial Natural Heritage System data;
- and via air photo interpretation to ELC Community Series level.

As a result, the inventory must be of sufficient detail to document clear decision rules providing the rationale for the NHN boundaries. The result of this review of NHN criteria and decision rules may be to remove select areas from the NHN and include new areas that meet the revised criteria.

The attribute information must include appropriate content to compare the ecological function of the existing NHN against the ecosystem targets, which are also to be developed as part of this phase (see subsection 2.2.2 below) of the NHN Study. All relevant data will be made available to appropriate staff in a comprehensive GIS format.

The TRCA will work with partner agencies, such as the Ministry of Natural Resources and York Region, to share natural areas information. Responsibility for identifying and managing fish habitat has been delegated to the TRCA. The Province is responsible for identification of wetlands, endangered and threatened species, and Areas of Natural and Scientific Interest (ANSIs). Valleylands have been previously documented in background studies for previous official plan amendments, namely for OPA 400 and OPA 600, and are addressed in the TRCA's

Valley and Stream Corridor Management Program. York Region has conducted a review of Regionally Significant Woodlands. As a result, the natural features outlined in the PPS that have not been evaluated in detail include:

- significant wildlife habitat as described in the PPS, the Natural Heritage Reference Manual (OMNR 2010), and *Significant Wildlife Habitat Technical Guide* (OMNR 2000); and
- headwater areas as noted in the Natural Heritage Reference Manual (OMNR 2010) and as described in the *Evaluation, Classification and Management of Headwater Drainage Features: Interim Guidelines* (TRCA 2009).

The structure of the attribute information should also consider criteria for determining significant wildlife habitat and headwaters evaluation so as to anticipate the type of information developed during the field investigations in Phase 2. Note also that the expectation in the Natural Heritage Reference Manual and the Endangered Species Act is that species of special concern are to be addressed through a review of significant wildlife habitat.

2.1.2 Ecosystem Targets

The TRCA will identify appropriate ecosystem targets for an urban municipality with reference to criteria in accordance with the PPS regarding elements of biodiversity (e.g. species persistence), ecological functions, and natural heritage systems. Ecosystem targets should also reflect the *Significant Wildlife Habitat Technical Guide* (MNR 2000) and the *Evaluation, Classification and Management of Headwater Drainage Features: Interim Guidelines* (TRCA 2009).

In addition to guidance provided in the scientific literature, ecosystem targets should interpret, among other agency documents, Ontario's Biodiversity Strategy 2011, the PPS (Section 2), the Natural Heritage Reference Manual, the Endangered Species Act, the York Region Official Plan and related background documents, the Humber River and Don River watershed plans, and the TRCA Terrestrial Natural Heritage System. The ecosystem targets should also be consistent with MNR's 'coarse-filter/fine-filter' approach to determining biodiversity targets (e.g. OMNR 2011). 'Coarse-filter' refers to ecological representation of broad habitat types, such as main vegetation communities or underlying geomorphology and topography to determine the geographic units of representation. 'Fine-filter' generally refers to the use of indicator species or identifying unique features (e.g. karst topography, habitat requirements for species at risk, habitat requirements for viable populations of focal species or functional groups of species, wildlife concentration areas, etc.).

2.1.3 Gap Assessment

The TRCA will undertake the required analysis to compare the ecosystem targets against the biodiversity contribution (i.e. habitat amount and quality and habitat connectivity) and ecological functions of the existing NHN. Where the existing NHN falls short of meeting the ecosystem targets (i.e. a gap), then preliminary opportunities for habitat enhancement or additions to Core Features can be identified. This information can then be used when determining priority sites for field investigations in later phases of the NHN study.

The results of the natural heritage system gap assessment will be documented in a report format. The report should describe the methodology used to compare the biodiversity contribution of the existing NHN against the ecosystem targets. For example, an accounting of

habitat amount (i.e. in hectares) against the habitat preferences for indicator species to determine the likelihood of species persistence may require qualifying the habitat amounts by considering aspects of habitat quality (e.g. natural, semi-natural, disturbed).

Where ecosystem targets are not met in the existing NHN, the extent of the gap should be described in quantitative terms as much as possible. While candidate areas to fill the gaps in the NHN are not an expected deliverable of Phase 1, the quantitative description of the gap will help to set priorities for field investigations that may result in additions to the Core Features and/or Enhancement Areas components of the NHN.

2.1.4 Environmental Management Guideline

The Environmental Management Guideline (EMG) was revised by City staff in November 2010 following Council adoption of the Vaughan Official Plan (VOP) in September 2010. While staff at the City and York Region have reviewed and commented on the EMG, it has not been made available for public comment.

The revised EMG is structured in two parts with the first part including guidance to scope an environmental impact study (EIS) in relation to development applications in proximity to the NHN and the second part considering objectives for the protection and/or enhancement of natural features and the Natural Heritage Network. As is the case now with the current version of the EMG, staff in Development Planning and proponents of development applications use the EMG to scope the required EIS in support of a development application.

The TRCA is expected to review the EMG and provide recommendations in relation to key deliverables of this study, namely:

- ecosystem targets and gaps in the NHN; and
- the attribute information developed to describe the NHN.

It is the responsibility of the City to revise the EMG, which will be based on recommendations from the TRCA. The City is also responsible for ensuring public comment on the EMG and revising the EMG accordingly.

2.1.5 Preliminary Methodology for Field Investigations

Results of Phase 1 of the NHN study, particularly the development of attribute information and the NHN gap assessment, will provide information to identify priority geographic areas for field investigations.

Research conducted for the purposes of developing the ecosystem targets must consider habitat requirements for species at risk. As such, available information regarding the maintenance and/or recovery of redside dace populations will need to be reviewed. Information gaps shall be brought forward as possible recommendations for the field investigation phase (Phase 2) of the NHN study.

Evaluating headwaters is related both to the ‘fine-filter’ consideration of maintaining species at risk as well as the ‘coarse-filter’ consideration of overall watershed health. By researching appropriate ecosystem targets related to watershed health and cumulative effects, information and research gaps may be identified and brought forward as possible recommendations for the field investigation phase (Phase 2) of the NHN study.

2.2 Deliverables

2.2.1 GIS Database of the Natural Heritage Network

- Complete a GIS database of NHN layers, compatible with IT Department standards, that can be made available to planners in the Development and Policy Planning departments, as well as other appropriate City staff. The structure of the GIS database in terms of component layers and attributes is to be determined in consultation with the Steering Committee.

- Provide appropriate level of detail of attribute information in the GIS database related to tests and/or criteria to determine significance of natural features and corresponding level of protection.

- Provide appropriate level of detail of attribute information in the GIS database to test the biodiversity contribution and ecological functions of the existing NHN against ecosystem targets. Attribute information may include, but not be limited to: the main types of habitat (e.g. according to ELC types and/or TRCA site types); habitat quality (e.g. disturbed, semi-natural, natural); and information related to level of protection or site securement (e.g. ownership, policy protection).

- Complete a report documenting the decision rules and criteria for determining the NHN boundaries and documenting changes to the NHN from the April 2010 Natural Heritage in the City background report (AECOM 2010).

2.2.2 Ecosystem Targets and NHN Gaps

- Description of ecosystem targets based on criteria in accordance with the PPS regarding elements of biodiversity (e.g. species persistence), ecological functions, and natural heritage system design.

2.2.3 Gap Assessment Results

- The results of the gap assessment are to be documented in a report format. The report should describe the methodology used to compare the biodiversity contribution of the existing NHN against the ecosystem targets. For example, an accounting of habitat amount (i.e. in hectares) against the habitat preferences for indicator species to determine the likelihood of species persistence may require qualifying the habitat amounts by considering habitat quality.

- Where ecosystem targets are not met in the existing NHN, the extent of the gap should be described in quantitative terms as much as possible. While candidate areas to fill the gaps in the NHN are not an expected deliverable of Phase 1, the quantitative description of the gap will help to set priorities for field investigations that may result in additions to the Core Features and/or Enhancement Areas components of the NHN.

2.2.4 Preparation for Field Investigations in Phase 2

- Identify recommendations for aspects of the methodology for field investigations to be conducted in Phase 2 of the NHN Study. Recommendations may be related to information gaps (a) in comparing the function of the existing NHN to ecosystem targets or (b) for specific geographic areas. Recommendations regarding the methodology for field investigations can be used by the City as a basis for seeking cost recovery, such as through a proposal to the Species at Risk Stewardship Program under the Endangered Species Act (2007).

- Recommend next steps to prepare for field investigations, such as further refinement of the NHN attribute data, to improve the subsequent evaluation of significant wildlife habitat and headwaters areas.

2.2.4 Review of the Environmental Management Guideline (EMG)

- Provide recommendations to modify the EMG to better align with the components of the NHN. This shall consider (a) the attribute information developed as part of the GIS database, (b) the tests and criteria used to determine the NHN boundaries, and (c) strengthening the NHN as a connected system in relation to the identified ecosystem targets.

2.3 Methodology

2.3.1 Steering Committee

The Policy Planning department will be responsible for convening a Steering Committee on two or three occasions during the process to confirm key decisions and approaches. The Steering Committee is to comprise City of Vaughan staff from Development Planning, IT, Parks and Forestry, Parks Development, and Policy Planning. The Policy Planning department will also seek representation on the Steering Committee from York Region and the Ministry of Natural Resources.

The role of the Steering Committee will be to provide a review and advice regarding:

- the draft ecosystem targets;
- the draft attribute table(s) for assembling and documenting the NHN data layers;
- the decision rules to confirm areas as Core Features, Enhancement Areas, Built-up Valley Lands and countryside components of the Greenbelt Plan area and Oak Ridges Moraine Conservation Plan area;
- the comparison of the biodiversity contribution and ecological functions of the existing NHN against the ecosystem targets;
- the final report documenting the process, decisions and results of the study with particular emphasis on conformity review to appropriate policies and/or standards.

2.3.2 Public Review and Consultation

The City of Vaughan will be responsible for making available key deliverables for public consultation and stakeholder review. The City and the TRCA will determine an appropriate public consultation strategy including stakeholder meetings (e.g. with the development

community), reports to Committee of the Whole, and making documents publicly available for review and comment.

2.3.3 Research

The main research effort is in the development of a framework of ecosystem targets. A brief report will provide the scientific basis for the ecosystem targets and incorporate feedback from external consultation.

2.3.4 Data Assembly

Data from the Province (e.g. Land Information Ontario, Natural Heritage Information Centre), the Ministry of Natural Resources Aurora office, York Region, the TRCA and the City's IT spatial data warehouse will need to be compiled and structured into an appropriate GIS database for use by City staff.

2.3.5 GIS Analysis

There are two main aspects of the GIS analysis:

- Assembly of data and developing appropriate attribute information to ensure transparent criteria for determining the boundaries of the NHN; and
- The gap assessment to compare the biodiversity contribution and ecological functions of the existing NHN against ecosystem targets.

One of the main results of the GIS analysis will be possible changes to the NHN boundaries and documenting changes to the NHN from the April 2010 Natural Heritage in the City background report (AECOM 2010).

Conducting the gap assessment will require spatial analysis in a GIS environment to compare the existing habitat availability in the existing NHN against the ecosystem targets. The required spatial analysis is typical for natural heritage system design and consists of determining, for example: (a) amounts of contiguous habitat based on connected habitat patches, (b) amounts of interior habitat using buffering approaches, and (c) areas of functional connectivity using scores for natural, semi-natural and agricultural areas. Where the existing NHN falls short of meeting the ecosystem targets (i.e. a gap), then preliminary opportunities for habitat enhancement or additions to Core Features can be identified. This information can then be used when determining priority sites for field investigations.

2.3.6 Report Writing

The TRCA is responsible for draft and final versions of all reports, or one comprehensive report, documenting the methodology and results of Phase 1 of the NHN study. Emphasis in the reports is on transparent documentation of methods, decision rules, process and results. Phase 3 of the NHN Study addresses final reports with more emphasis on layout and design. Revising the Environmental Management Guideline is the responsibility of the City. At a minimum, the reports or one comprehensive report shall including the following components.

Ecosystem targets. A brief report will provide the scientific basis for the ecosystem targets and incorporate feedback from the Steering Committee and external consultation.

NHN data layers and attributes. A report is required to document the data layers and sources of information compiled in the GIS database. Decision rules used to determine the appropriate attribute information shall be documented. Decision rules and/or criteria for determining the NHN boundaries and documenting changes to the NHN from the April 2010 Natural Heritage in the City background report (AECOM 2010) shall be documented.

Gap assessment. The results of the gap assessment will be documented in a report format. The report should describe the methodology used to compare the biodiversity contribution of the existing NHN against the ecosystem targets. Where ecosystem targets are not met in the existing NHN, the extent of the gap should be described in quantitative terms as much as possible. While candidate areas to fill the gaps in the NHN are not an expected deliverable of Phase 1, the quantitative description of the gap will help to set priorities for field investigations that may result in additions to the Core Features and/or Enhancement Areas components of the NHN.

3. PROJECT ADMINISTRATION, ROLES AND RESPONSIBILITIES

3.1 Project Administration

The study will be administered by a Project Coordinator from the Policy Planning department of the City of Vaughan and a Steering Committee which will be made up of staff representatives from various City of Vaughan departments (e.g. Development Planning, Parks Development, ITM, Parks and Forestry). The Project Coordinator will be responsible for day-to-day contacts and operations. The Project Coordinator and the Steering Committee will perform the following functions:

- Project oversight;
- Provision of departmental information and support to the TRCA as it respects their individual mandates;
- Attending meetings with the TRCA to hear status updates and to provide input on policy development; and
- Review and comment on draft versions of the required study reports.

The City of Vaughan will seek representation on the Steering Committee from governmental organizations, such as the Region of York and the Ontario Ministry of Natural Resources. The membership of the Steering Committee will be established after consultation with the TRCA.

The means of engaging other interested parties and organizations (e.g. NGO's) will be established in collaboration with the Steering Committee and the TRCA and will be the responsibility of the City of Vaughan.

3.2 Roles and Responsibilities

3.2.1 Comprehensive GIS Database - NHN Inventory and Attribute Information

The TRCA already maintains a GIS database of the TNHS and supporting feature layers. The existing attribute data maintained by the TRCA regarding habitat types and species/community level ranking will need to be augmented. It is appropriate for the TRCA to lead the GIS

database development building on the existing GIS layers and attribute data. The City will lead the external consultation with interested stakeholders (e.g. development community and/or their environmental consultants), provide a review with particular regards to policy conformity and scientific rigour, and coordinate the role of the Steering Committee review.

3.2.2 Ecosystem Targets

Given the existing research incorporated into the modelling approach for the TRCA TNHS, it is appropriate for the TRCA to be the lead investigator and/or researcher to develop the framework of ecosystem targets. The City's Project Coordinator will work closely with the TRCA to involve other City departments, York Region staff and feedback from external consultation to arrive at final ecosystem targets appropriate for an urban municipality to balance economic, social and ecological considerations. This will consider the role of the NHN in overall growth management objectives of the City and York Region. The City shall lead the external consultation with interested stakeholders (e.g. development community and/or their environmental consultants). Credibility of the framework of ecosystem targets can be enhanced by ensuring a peer review by contracting a review or through an expert panel, which will be considered in later phases of the NHN Study.

3.2.3 Gap Assessment

The City and the TRCA will jointly develop the methodology for the gap assessment where a straightforward accounting of habitat amount is not suitable to determine the biodiversity contribution of the NHN. The City will ensure that the Steering Committee reviews the methodological approach.

The TRCA will lead the GIS analysis for the gap assessment, identify the gaps and document the results in a report format. The City will lead the external consultation with interested stakeholders (e.g. development community and/or their environmental consultants), provide a review with particular regards to policy conformity and scientific rigour, and coordinate the role of the Steering Committee review.

3.2.4 Environmental Management Guideline

The City will lead the review and revision of the EMG. The TRCA will review and provide comments on the revised EMG.

3.2.5 Preliminary Methodology for Field Investigations

The TRCA will provide recommendations for aspects of the methodology for field investigations to be conducted in Phase 2 of the NHN Study. Recommendations may be related to information gaps (a) in comparing the function of the existing NHN to ecosystem targets or (b) for specific geographic areas. Recommendations regarding the methodology for field investigations can be used by the City as a basis for seeking cost recovery, such as through a proposal to the Species at Risk Stewardship Program under the Endangered Species Act (2007).

The TRCA may recommend next steps to prepare for field investigations, such as further refinement of the NHN attribute data, to improve the subsequent evaluation of significant wildlife habitat and headwaters areas.

Table 1 Summary of roles and responsibilities for the TRCA and the City of Vaughan during Phase 1 of the Natural Heritage Network Study.

Task	TRCA Responsibility	Vaughan Responsibility
1. GIS Database and Attributes of the NHN	- Feature and NHN attributes in a GIS database; - Boundary modifications and rationale/documentation; - Feature data layers in a GIS database - Documentation (report)	- Lead external consultation; - Conformity review, including confirmation of criteria/decision-rules for boundary modifications; - Project management (including liaison with Steering Committee)
2. Ecosystem Targets	- Research lead; - Develop framework of ecosystem targets - Documentation (report)	- Lead external consultation; - Conformity review; - Lead integration with City and Region objectives regarding growth management and overall role of the NHN
3. Gap assessment	- Jointly develop methodology for gap assessment with City staff (e.g. determining role of habitat quality to factor as a weighting together with habitat amount); - Lead spatial analysis in GIS environment; - Identify gaps; - Identify potential geographic areas to fill gaps (i.e. Enhancement Areas for further study or Core Features to be recommended for protection); - Lead report writing	- Jointly develop methodology for gap assessment with City staff (e.g. determining role of habitat quality to factor as a weighting together with habitat amount); - Lead external consultation; - Conformity review; - Project management (including liaison with Steering Committee)
4. Environmental Management Guideline	- Review and comment	- Lead role in revisions; - Lead role in external consultation
5. Recommendations for Field Investigations	- Jointly with the City, provide recommendations that may result from Tasks 1, 2 and 3.	- Jointly with the TRCA, provide recommendations that may result from Tasks 1, 2 and 3.
6. Overall Project Management		- Coordinate Steering Committee of City staff, Region, MNR and the TRCA representatives; - Lead public consultation; - Ensure conformity reviews by City and Region staff

4. TIMING

The targeted completion of Phase 1 of the NHN study is the end of the second quarter of 2012, or 6 months from the date of approving the Scope of Work.

Prior to commencing work on the project, the contractor will submit for the approval of the Steering Committee a finalized work plan, which will assign dates to the completion of various milestone tasks on the timeline. No chargeable work shall commence prior to the approval of the finalized work plan and the City of Vaughan shall not be responsible for any costs associated with its finalization.

5. BUDGET AND PAYMENT SCHEDULE

The budget for this study has an upside limit of $50,900.00.

The TRCA shall not exceed the budget or undertake any work that would cause the budget to be exceeded without written permission from the City of Vaughan. Such permission shall be required for any phase or component of the study, as set out in the approved work plan.

The payment schedule is based on 3 milestones:

GIS database assembly

Milestone	Expected Completion Date	Budget Amount
1.Preliminary GIS database assembly and draft ecosystem targets	March 2012 (or 3 months from approval of Scope of Work)	$20,000
2. Gap assessment	May 2012 (or 2 months after submitting Milestone 1 products)	$20,000
3. Final Products	June 2012 (or 2 months after completing Milestone 2)	$10,000

Invoices will be required to contain the following minimum information:

- Description and explanation of work undertaken in each invoice time period;
- Personnel employed and hours expended by the hourly rate;
- Disbursements (not an extra cost to the project budget);
- Total Fee for each invoice;
- Budget expended to-date and remaining budget.
- 10% hold back applicable to all invoices.

The 10% hold back shall be reimbursed on the final approval of the Phase 1 deliverables, either as one comprehensive report and a comprehensive GIS database or a series of reports and a comprehensive GIS database, by Vaughan Council.

6. CONTEXTUAL AND BACKGROUND INFORMATION

The following documents are available on the City of Vaughan web site and are considered to be background to assist in developing an understanding of the origin of the project and the context within which the City of Vaughan is currently working. The information cited below is not considered to be comprehensive in respect of the issues the City will be facing and the background to the project.

- Natural Heritage in the City – Background Report. AECOM. April 2010. (http://www.vaughantomorrow.ca/OPR/background.html)
- Natural Heritage Review Background Study – Natural Heritage in the City. File 25.5.4. Committee of the Whole. June 1, 2010. Item 32. (http://www.city.vaughan.on.ca/vaughan/council/minutes_agendas/committee_2010/a20100601.cfm);
- City of Vaughan Official Plan. September 2010. (http://vaughantomorrow.ca/OPR/index.html);
- Green Directions Vaughan – Community Sustainability and Environmental Master Plan. (http://vaughantomorrow.ca/EMP/index.html);
- York Region Official Plan. Minister's Modified Copy. As approved by the Ministry of Municipal Affairs and Housing. 2010.

(http://www.york.ca/Departments/Planning+and+Development/Growth+Management/2010+Reports+and+Background+Papers.htm).

7. REFERENCES

Ontario Biodiversity Council. 2011. Ontario's Biodiversity Strategy, 2011: Renewing Our Commitment to Protecting What Sustains Us. Ontario Biodiversity Council, Peterborough, ON.

Ontario Ministry of Natural Resources. 2011. A land manager's guide to conserving habitat for forest birds in southern Ontario. Science and Information Resources Division and Trent University. Queen's Printer for Ontario.

Ontario Ministry of Natural Resources. 2010. Natural Heritage Reference Manual for Natural Heritage Policies of the Provincial Policy Statement, 2005. Second Edition. Toronto: Queen's Printer for Ontario. 248 pp.

Ontario Ministry of Natural Resources. 2000. Significant Wildlife Habitat Technical Guide. 151 pp.

Credit Valley Conservation and Toronto and Region Conservation Authority. 2009. Evaluation, Classification and Management of Headwater Drainage Features: Interim Guidelines. 22 pp.

Toronto and Region Conservation Authority. 1994. Valley and Stream Corridor Management Program.