CITY OF VAUGHAN

EXTRACT FROM COUNCIL MEETING MINUTES OF DECEMBER 11, 2012

Item 2, Report No. 51, of the Committee of the Whole (Working Session), which was adopted, as amended, by the Council of the City of Vaughan December 11, 2012, as follows:

By approving:

That a notwithstanding clause, similar to that found in Section 5.4 b) of OPA 604 amending OPA 332 (Oak Ridges Moraine Conformity OPA) be incorporated into the NHN Inventory and Improvement Plan for those areas within the jurisdiction of the municipality.

2 NATURAL HERITAGE NETWORK INVENTORY AND IMPROVEMENTS (PL-9025-11) PHASE 1 FINAL REPORT FILE NO. 25.5.4

The Committee of the Whole (Working Session) recommends:

1) That the recommendation contained in the following report of the Commissioner of Planning, dated December 4, 2012, be approved;

2) That staff report back to the Committee of the Whole meeting of January 15, 2013 on comments received from the public on the subject matter;

3) That the deputation of Ms. Gloria Marsh, York Region Environmental Alliance, Lakeland Crescent, Richmond Hill, be received; and

4) That Communication C4 from Mr. Philip J. Levine, Director, IBI Group, Richmond Street West, Toronto, dated December 3, 2012, be received.

Recommendation

The Commissioner of Planning recommends:

1. That the information contained in the report, "Phase 1 of the Natural Heritage Network Study for the City of Vaughan", November 2012, forming Attachment 1 to this report as prepared by North-South Environmental Inc., BE APPROVED as the basis for undertaking Phases 2 to 4 of the Natural Heritage Network Study.

Contribution to Sustainability

The Vaughan Official Plan (VOP 2010) was adopted by Council on September 7, 2010 and was subject to further modifications on September 27, 2011, March 20, 2012 and April 17, 2012. VOP 2010 designates a natural heritage system, the Natural Heritage Network, which is delineated on Schedule 2. Environmental policies in Chapter 3 of VOP 2010 direct that appropriate studies be undertaken to determine the precise limits of "natural heritage features and any additions to the mapped network". The Plan is consistent with York Region Official Plan policies directing local municipalities to develop local greenlands systems.

Two specific action items in Green Directions Vaughan (2009), the City's Community Sustainability and Environmental Master Plan, relate to the need to complete a natural heritage system.

> *1.3.2. Through the development of the City's new Official Plan, and in partnership with the Toronto and Region Conservation Authority, ensure protection of remaining natural features and explore opportunities for habitat restoration in headwater areas, along riparian corridors, and around wetlands.*

…/2

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 refinement of the Natural Heritage Network in Phase 1 of the Natural Heritage Network Study, and the further refinement and development of a stewardship strategy in Phases 2 through 4 of the Natural Heritage Network Study, are key components in support of Green Directions Vaughan.

Economic Impact

Funding for undertaking the Natural Heritage Network Study was included in the 2011 Capital Budget (PL-9025-11) on the basis of a two part allocation. Phase 1 was treated as a stand alone project and was funded in the amount of $52,400. In the 2012 Capital budget, the funding for Phases 2, 3, and 4 was approved at $199,700. The total budget for the preparation of the Natural Heritage Network Study is $252,100.

Communications Plan

A communication plan in respect of this report is not required. Public consultation as part of Phase 1 of the NHN Study is described below. A communications and public consultation plan will be prepared as part of the process of conducting Phases 2 to 4 of the Natural Heritage Network Study.

Purpose

The purpose of this report is to inform Council of the work completed in Phase 1 of the Natural Heritage Network Study and obtain approval of the Phase 1 final report for the purposes of proceeding with Phases 2 to 4.

Background - Analysis and Options

The Policy and Planning Context

A rigorous Provincial and Regional policy framework exists to direct the maintenance, restoration, or improvement of the diversity and connectivity of natural features and the long-term ecological function and biodiversity of natural heritage systems in the Greater Toronto Area. This policy framework is reflected in the environmental policies of VOP 2010. The following policy documents were consulted in the preparation of the environmental policies of VOP 2010 and the Terms of Reference for Phase 1 of the Natural Heritage Network Study:

- the Growth Plan for the Greater Golden Horseshoe (2006);
- the Provincial Policy Statement (2005) and the Natural Heritage Reference Manual - Second Edition (2010);
- the Greenbelt Plan (2005);
- the Oak Ridges Moraine Conservation Plan (2002);

- the Endangered Species Act (2007);
- the Ontario Biodiversity Strategy, 2011;
- the York Region Official Plan (2010); and
- Ontario Regulation 166/06 under the Conservation Authorities Act.

i) Provincial Policies

The Growth Plan for the Greater Golden Horseshoe – Places to Grow

The Province of Ontario approved the Growth Plan for the Greater Golden Horseshoe (GGH) - Places to Grow in 2006. The Growth Plan sets out a vision for growth in the GGH to the year 2031. This includes a set of long-range growth forecasts and directing how growth should be accommodated and managed effectively.

The Growth Plan supports the role of municipal policy in providing leadership and innovation in developing a culture of conservation. The Growth Plan also encourages planning authorities to identify natural heritage features and areas that complement, link, or enhance natural systems. Municipalities are encouraged to develop a system of publicly accessible parkland, open space and trails embedded in a natural heritage system as well as establish an urban open space system within built-up areas, which include rooftop gardens, communal courtyards, and public parks.

The Provincial Policy Statement

The Provincial Policy Statement (PPS) has a strong focus on the long-term prosperity and environmental health of Ontario. It states that natural features and areas shall be protected for the long-term (2.1.1). The PPS defines natural features and areas as:

> "*features and areas, including significant wetlands, significant coastal wetlands, fish habitat, significant woodlands south and east of the Canadian Shield, significant valley lands south and east of the Canadian Shield, significant habitat of endangered species and threatened species, significant wildlife habitat, and significant areas of natural and scientific interest, which are important for their environmental and social values as a legacy of the natural landscapes of an area".*

The PPS also defines natural heritage system as:

> *"A system made up of natural heritage features and areas, linked by natural corridors which are necessary to maintain biological and geological diversity, natural functions, viable populations of indigenous species and ecosystems. These systems can include lands that have been restored and areas with the potential to be restored to a natural state".*

The Greenbelt Plan

The Greenbelt Plan contains policies for providing permanent agricultural and environmental protection as well as providing for a wide range of recreation, tourism and cultural opportunities in the area. The Protected Countryside comprises an Agricultural System and a Natural System, together with a number of settlement areas and is intended to improve linkages between these areas and surrounding systems. The Natural System identifies lands that support both natural heritage and hydrologic features and functions. The Greenbelt Plan recognizes that the Natural System extends beyond the boundaries of the Greenbelt and encourages connections between the Greenbelt's Natural System and broader scale natural heritage systems of southern Ontario. Criteria have been defined to permit potential municipal requests to expand the Greenbelt.

The Oak Ridges Moraine Conservation Plan

The Oak Ridges Moraine Conservation Plan (ORMCP) is a fundamental component of the Greenbelt Plan. The Oak Ridges Moraine is an environmentally sensitive, geological landform in south central Ontario, covering 190,000 ha. It has a unique concentration of environmental, geological and hydrological features that make its ecosystem vital to south-central Ontario. The ORMCP identifies four categories of land use: Settlement; Countryside; Natural Linkage; and Natural Core. The latter two designations are the most restrictive, and provide the most aggressive goals for the protection of natural heritage.

Endangered Species Act

The new Endangered Species Act (2007) is the first in Canada to combine mandatory habitat protection with a science-based approach to listing species for protection. Species thought to be at risk are assessed by The Committee on the Status of Species at Risk in Ontario (COSSARO). COSSARO is an independent body that reviews species based on the best available science, including community knowledge, and Aboriginal Traditional Knowledge. Once species are classified "at risk", they are added to the Species at Risk in Ontario (SARO) list in one of four categories. Endangered, threatened and extirpated species on this list automatically receive legal protection under the ESA 2007. Providing legal protection to threatened species is a change from the original Act which only applied to endangered species. Under the ESA 2007, it is legally required to protect direct and indirect habitat of endangered species. Habitat regulations under the Act are available for Redside Dace (Regulation 293/11), which is relevant to the NHN Study in Vaughan.

Ontario's Biodiversity Strategy, 2011

Ontario's Biodiversity Strategy, 2011 is the guiding framework for coordinating the conservation of Ontario's variety of life and ecosystems. The success of this Strategy will be tracked through 15 specific targets representing key areas of focus for biodiversity conservation in Ontario. The progress will be monitored and assessed over a 10-year time frame to encourage people across all sectors to take actions that will ultimately lead to securing and maintaining Ontario's biodiversity. Several of the 15 targets refer directly to implementing natural heritage systems for biodiversity conservation, maintaining and enhancing ecosystem services, and reporting on the state of Ontario's biodiversity.

ii) York Region Official Plan (YROP)

The York Region Official Plan (ROP 2010), approved by the Minister of Municipal Affairs and Housing on September 7, 2010, is the upper tier planning document that provides the framework for achieving the Region's urban structure. The ROP 2010 was subject to over 50 appeals and is now in the hands of the Ontario Municipal Board. The ROP 2010 received partial approval by the Ontario Municipal Board on July 11, 2012 and September 21, 2012. Chapter 2, A Sustainable Natural Environment, was included in the partial approval. Those portions of the Plan still under appeal, largely related to employment and retail uses, will be addressed through an OMB hearing scheduled to commence on January 14, 2013.

Any amendments to the City's Official Plan must conform to the Region's Official Plan. The ROP 2010 recognizes the importance of integrating the objectives of the natural environment with those for healthy communities and economic vitality as outlined in its Sustainability Strategy (2007). The importance of maintaining and enhancing a healthy Regional Greenlands System is emphasized in the ROP 2010.

The policy framework has been brought into conformity with the Greenbelt Plan, the Oak Ridges Moraine Conservation Plan, the York Region Significant Woodlands Study (2005) among other important instruments that will affect the outcomes for the Greenlands System. The primary function of the Regional Greenlands System is:

> *"… the protection of natural heritage features in a system of cores connected by corridors and linkages. The Regional Greenlands System also provides opportunities for passive recreation in a future Regional Trails System such as hiking and nature appreciation. Urban uses and infrastructure projects should contribute ecological gains to the Regional Greenlands System through enhancement and restoration, and the strategic creation of natural habitat."*

It is the intent that the Vaughan Natural Heritage Network (NHN) and supporting policies be consistent with the objectives identified in the ROP 2010.

iii) Toronto and Region Conservation Authority Policy and Regulation

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 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.

Watershed Plans are mandated under the Oak Ridges Moraine Conservation 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.

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.

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 impacts on sensitive environmental areas such as wetlands, shorelines and watercourses.

Relation to VOP 2010 and Green Directions Vaughan

The overall Natural Heritage Network Study will assess the role of the existing Natural Heritage

Network 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 Natural Heritage Network Study, additional NHN areas may be proposed to meet ecosystem targets of the natural heritage system related to biodiversity persistence and ecological function.

At the completion of the Natural Heritage Network Study, an amendment to VOP 2010 will be prepared to implement the findings of the Natural Heritage Network Study to modify Schedule 2 and other affected schedules and relevant policies in section 3.2.3, "Components of Vaughan's Natural Heritage Network". Schedules may also be added to delineate natural features according to Section 3.3, "Features of the Natural Heritage Network".

Protection, restoration and enhancement of natural areas in the City's Natural Heritage Network is one component of achieving healthy and vibrant communities that is reflected in the City's sustainability strategy, Green Directions Vaughan. While two action items in Green Directions Vaughan specifically address the Natural Heritage Network (Action Items 1.3.2 and 2.2.4), related action items address green infrastructure (e.g. treatment train approach to stormwater management and urban forests), recreation and open space, trails and other active transportation paths, and agriculture. Looking ahead to Phases 2 through 4 of the NHN Study, it will be important to consider a more integrated approach between natural heritage protection for biodiversity, open space amenities for recreation and active lifestyles, green infrastructure and provision of local food. While the scope of the Natural Heritage Network Study has a clear focus on biodiversity persistence and sustaining key ecological functions, the benefits to residents through the provision of ecosystem services (e.g. clean air, clean water, flood protection, carbon sequestration) and the amenity value of the City's existing and restored natural areas is a critical broader context for the NHN Study.

Deliverables of Phase 1 of the Natural Heritage Network Study

i) Task 1 – Assemble a Comprehensive GIS Database

A wide range of digital data was compiled by the consultants pertaining to: provincial plan boundaries, such as the ORMCP and Greenbelt Plan areas; designations such as Areas of Natural and Scientific Interest (ANSIs) and the Regional Greenlands System; natural features such as woodlands, wetlands, valleylands, watercourses and water bodies; flora and fauna; and infrastructure such as roads and railways as well as property information. Sources of information included the Province (through Land Information Ontario), York Region, the TRCA and the City. Of the approximately 40 data layers obtained by the consulting team, the following were scrutinized in more detail:

- Oak Ridges Moraine Conservation Plan designations;
- Greenbelt Plan Natural Heritage System overlay;
- York Regional Greenlands;
- Forest/woodlands;
- Wetlands;
- Watercourses;
- Water Bodies;
- Areas of Natural and Scientific Interest; and
- Environmentally Significant Areas.

In instances where differences were observed in the GIS data provided from several sources, such as for woodlands, wetlands, watercourses and water bodies, a method of delineating final boundaries is described in the Phase 1 report. This required the data to be compared against base data such as aerial imagery, infrastructure such as roads and power lines, zoning data, and previous approvals in official plan amendments.

The GIS database related to the Natural Heritage Network forms a critical resource tool for staff in Planning and other City departments. The City has confidence in the natural feature layers as a solid foundation for moving forward in Phases 2 to 4 of the NHN Study and as a resource for planners to use immediately. Together with information collected regarding zoning, designations in previous official plan amendment approvals, ownership, and infrastructure, further refinement of the NHN can be undertaken to establish an appropriate benchmark condition of the biodiversity contribution of the NHN.

It is intended that the GIS resource be a living database that can be periodically updated as the various layers and new layers are added. This will ensure that the initial investment in system development serves as a continuing resource to the City.

ii) Task 2 – Identify Natural Heritage Network Targets – Habitats, Species and Linkages

Identifying NHN Targets based on policy and regulation (e.g. Endangered Species Act, Provincial Policy Statement, Oak Ridges Moraine Conservation Plan, Greenbelt Plan, York Region Official Plan, Regulation 166/06 of the Conservation Authorities Act) places an emphasis on delineating the remaining natural areas. This is the information that was collected and scrutinized in Task 1. It is a critical first step in understanding the opportunity available to develop a natural heritage system that maintains "*biological and geological diversity, natural functions, viable populations of indigenous species and ecosystems*" (PPS 2005) given the history of settlement and urban development in a particular municipality.

Identifying NHN targets based on a systems approach meets the intent of the PPS, but also the Oak Ridges Moraine Conservation Plan, the Greenbelt Plan and the Growth Plan, to maintain "elements of biodiversity and ecological function for the long-term" (PPS 2.1.2). The identified NHN targets based on a systems approach are surrogates for more explicit population viability analysis for those species known to occur and likely to persist in a NHN in Vaughan. These species groups include:

- woodland interior species (e.g. Ovenbird, Veery, Scarlet Tanager);
- amphibian species that use aquatic and upland woodland habitats in their life cycles (e.g. Wood Frog, Salamander species);
- open habitat species (e.g. Bobolink, Eastern Meadowlark); and
- fish assemblages (particularly cool- and cold-water fish species).

Ecological linkages are also identified as NHN targets based on a systems approach. Linkages are critical to ensure meta-population viability by ensuring species movement and dispersal in the event that recolonization is required of a local population. Linkages are also an important aspect of planning for climate change impacts by providing for movement and population dispersal in response to shifting climatic regions.

Further analysis is required to quantify NHN targets based on a systems approach. This can be accomplished through scenario modelling in Phases 2 and 3 of the NHN Study to test various enhancement area options to improve the NHN performance relating to biodiversity and ecological function. Furthermore, the scenario modelling must consider those parts of the NHN expected to remain within an agricultural matrix and NHN areas within an urban land use matrix. As noted in section 4.2.1 of the Phase 1 report, negative impacts on the NHN from surrounding urban land uses are greater than from an agricultural land use matrix and this must be a consideration to model enhancement areas to ensure viability and ecological integrity of the NHN.

iii) Task 3 – Undertake a Gap Analysis

The intent of the gap analysis as described in the Request for Proposals was to test the NHN

refined in Task 1 against quantitative ecosystem targets. As described above, the NHN targets based on a systems approach requires modelling and scenario-testing to quantify the targets as performance metrics. As a result, the gap analysis was modified to test select metrics based on guidelines in the Environment Canada report (2004), "How Much Habitat is Enough? (Second Edition)". Guidelines for forest, wetland and riparian habitat were selected that relate to the NHN targets identified on the basis of a systems approach, particularly with respect to interior woodland habitat, habitat clusters or mosaics, and riparian linkages.

The selected guidelines for forest habitat and wetland habitat are particularly useful. First, forest cover in general has diminished slightly based on a comparison with results from other studies. The most recent background report, Natural Heritage in the City (AECOM 2010) identified 16% forest cover while the York Region Significant Woodlands Study (North-South Environmental 2005) identifies 12% forest cover for all woodlands (11.6% forest cover using criterion for significant woodlands only). The 1992 subwatershed study, prepared to evaluate existing conditions for the urban areas of Vellore, Carrville, and the Woodbridge Expansion Area, identified 12% woodland cover for the City. Despite the general lack of woodland cover, there is an opportunity to improve the larger contiguous forest patches, likely associated with valleylands, in the Humber River and Don River watershed. Strikingly, however, there is very little woodland that can be considered to be interior forest habitat, such that interior forest conditions are an obvious area for improvement and restoration as a long-term goal of the NHN.

Although 30 metres is often applied as a minimum buffer to wetlands, the analysis demonstrates that a 100 metre "Critical Function Zone" is effectively protected in many situations when considering the landscape context of wetlands. This suggests that a very targeted approach can be taken to develop criteria to identify wetlands for which a minimum vegetation protection zone greater than 30 metres can provide the most ecological gain. Criteria for wetland restoration and/or protection of the "Critical Function Zone" include: headwater areas to protect the sources of streams; groundwater recharge areas for maintaining stream flow and temperature; and floodplains for flood attenuation and water storage.

Although expressing the results of the gap analysis in quantitative metrics is useful, it is clear that a spatial analysis is required to identify priority restoration opportunities to meet the NHN targets. As noted above in the discussion regarding NHN targets, scenario modelling is required to test enhancement area options to improve NHN performance in relation to select targets, such as targets based on the guidelines outlined in the report, "How Much Habitat is Enough? (Second Edition)" (Environment Canada 2004). Hence, the tasks of setting NHN targets and gap analysis are iterative steps best undertaken through scenario modelling.

iv) Recommendations to Revise the Environmental Management Guideline

The Environmental Management Guideline (EMG) was originally prepared in 1994 in support of Official Plan Amendment 400 and addressed the preparation of an Environmental Impact Study, or other environmental reports, at the scales of the Block Plan and Plan of Subdivision/Site Plan. The EMG was revised in 2010 by City staff following adoption of VOP 2010 in order to reflect the designation of a Natural Heritage Network in VOP 2010 and policy changes to bring VOP 2010 in conformity with the PPS (2005) and the revised Natural Heritage Reference Manual (2010).

The consulting team of North-South Environmental reviewed the revised EMG and have provided recommendations to improve the clarity and effectiveness of the EMG for the submission of environmental reports, such as an Environmental Impact Study (EIS) or Master Environment and Servicing Plan (MESP). The main recommendations are summarized in section 6 of the Phase 1 report (Attachment 1), but some of the highlights include:

- clear outline for Terms of Reference and a work plan to undertake an EIS and/or MESP;

- attention to transfer of data, particularly GIS data, through the development application process for ongoing revision of the NHN;
- more emphasis on monitoring requirements and assessment of cumulative effects; and
- significant additions to methods and protocols to address assessments of significant wildlife habitat.

The revised Environmental Management Guideline will be brought to Council in the near future as a separate item while Phases 2 through 4 of the NHN Study are underway. This will allow for public comment on the EMG, which will be integrated with the public consultation program for Phases 2 through 4 of the NHN Study.

v) Priorities for Field Work

The consulting team of North-South Environmental focused the discussion of the field work anticipated in subsequent phases of the NHN Study on headwater drainage features and significant wildlife habitat. This is recognized in the Terms of Reference for Phases 2-4 of the NHN Study as the most significant data gaps thereby hampering the natural heritage system design. It is also recognized in the Terms of Reference for Phases 2 to 4 of the NHN Study that other priority sites may be identified in addition to sites related to the priority themes of headwater drainage features and significant wildlife habitat.

Criteria are suggested to select priority headwater drainage features for investigation. This also needs to be balanced against the need for representative sampling and the opportunity for a cumulative assessment approach to the investigation of headwater drainage features given that the NHN Study is a City-wide study.

A comprehensive review of potential types of significant wildlife habitat in Vaughan is presented in Appendix 3 of the Phase 1 report. This preliminary analysis will assist not only in identifying priority sites for field investigations, but also in any modification of field survey protocols to identify candidate or confirmed significant wildlife habitat.

Public Consultation

City staff and the consulting team held two Public Consultation Meetings on June 28, 2012 and October 4, 2012 at the Vaughan City Hall. The two Public Consultation Meetings were each attended by 40 to 50 people and presentations made by the consultants and City staff are available on the City of Vaughan web site. City staff also coordinated additional consultation sessions on September 19, 2012 and September 20, 2012. The session on September 19, 2012 was attended by about 40 people and the session on September 20, 2012 as attended by approximately 10 people. All comments have been recorded. City staff and the consulting team met with select landowner groups representing Block 27, Block 40/47, Block 41, Block 55, and Block 59 in September 2012.

One important response was the request that the City consider making the NHN information and/or GIS data available for public viewing. Staff recommend that this feedback be addressed in the public consultation strategy for Phases 2-4 of the NHN Study.

Another aspect of the feedback from the consultation was to place the NHN Study within the broader context of healthy and resilient communities. This approach also considers integrated natural heritage system design with planning for open space (i.e. passive and active recreation) and green infrastructure (e.g. low impact development measures such as rain gardens, bioswales and other treatment train approaches to manage stormwater).

Conclusions and Next Steps

The expectations set out in the Terms of Reference for Phase 1 of the NHN Study have been addressed. A comprehensive GIS database has been developed and delivered to the City, recommendations to revise the EMG have been provided, and recommendations for field investigations will assist not only to identify sample sites, but also to finalize survey protocols.

The development of NHN targets and an assessment of the NHN against the targets to understand the biodiversity contribution of existing natural areas requires further work in Phases 2 and 3. The key lesson learned in Phase 1 is the need to undertake spatial modelling of enhancement area options to identify and test NHN targets in an iterative analysis.

The scenario modelling is necessary to test restoration options against targets, such as those interpreted from the Environment Canada report, "How Much Habitat is Enough? (Second Edition)". The gap assessment undertaken in Phase 1 of the NHN study demonstrates that a framework of indicators and targets, such as forest cover, interior woodland, or riparian cover, can be developed to understand the current baseline condition and the desired future condition. This will assist in monitoring progress toward achieving the desired future condition. This finding will be incorporated into the work plan for subsequent phases of the NHN Study.

A sample set of indicators and targets derived from existing research is provided in the table below. The targets are identified as precedents and should be interpreted as examples of thresholds proposed in various studies. The framework identified below can be used to evaluate NHN options in order to establish appropriate local targets. For example, the York Region Urban Forest Study (Draft 2012) estimates 19.5% canopy cover and a Leaf Area Index (LAI) of 1.22 for Vaughan, including all tree cover (i.e. not just in natural areas). This information can be utilized in the City's Urban Forest Strategic Plan to set an appropriate local target for the urban forest. Considering agricultural areas as an indicator requires further discussion of matrix lands in the Countryside designation as well as urban agriculture opportunities. Riparian habitat metrics can be tested, for example, by considering that 100% of all targeted headwater drainage features are naturally vegetated. This requires input from the field investigations in Phase 2 to determine the headwater drainage features to maintain in the Natural Heritage Network.

Sample Indicators and Targets

Indicator	**Metric**	**Precedent (Parentheses denote the source of various precedents)**
Urban Forest	Leaf Area Index (LAI) or canopy cover	40% canopy cover target (American Forests)
Greenspace	Hectares per 1000 people	15 hectares of greenspace per 1000 people by 2050 (TRCA Living City Report Card)
Agriculture		
Fish Communities	Rank stream reach as unimpaired, likely impaired or impaired.	Identify restoration target for "likely impaired" stream reaches. (Stanfield, L. 2012. Reporting on the condition of stream fish communities in the Canadian tributaries of Lake Ontario, at various spatial scales. Journal of Great Lakes Research, 38: 196 – 205)
Forest Habitat	Forest cover	25% (York Region): 30% forest cover in a watershed (Environment Canada)
Forest Habitat	Size of largest forest patch	Greater than 200 hectares in a watershed (Environment Canada)
Forest Habitat	Interior forest	10% of a watershed with forests greater than 100 metres from the forest edge (Environment Canada)

Wetland Habitat	Wetland cover	10% wetland cover (Environment Canada)
Wetland Habitat	Protection of Critical Function Zone 100 metres from wetland edge	Protection of the Critical Function Zone 100 metres from the wetland edge (Environment Canada)
Riparian Habitat	Vegetated stream length	75% of stream length vegetated (Environment Canada)
Riparian Habitat	Width of stream buffers	30 metre wide buffers on each side of streams (Environment Canada)

Another key consideration emerging from the public consultation are approaches to make the results of the NHN Study available more quickly to residents and stakeholders using appropriate internet portals. This could be in the form of static maps available on the City web site allowing residents and stakeholders an opportunity to view the materials in advance of attending public meetings.

Natural heritage system connections to adjacent municipalities will also be explored in subsequent phases of the NHN Study.

Status of Phases 2 to 4 of the Natural Heritage Network Study

The Request for Proposals for Phases 2 through 4 of the Natural Heritage Network Study (RFP12-466) was advertised on November 8, 2012 and has a closing date of Thursday November 29, 2012. Staff anticipate a report to Council in January 2013 on the results of the consultant selection process.

Relationship to Vaughan Vision 2020/Strategic Plan

The Natural Heritage in the City report 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 ROP 2010 support the efforts of local municipalities to identify and implement local greenlands systems.

Conclusion

Phase 1 of the Natural Heritage Network Study is complete. Recommendations are set out in this Report to Council to augment the work program in subsequent phases of the NHN Study. Therefore, it is recommended that the Phase 1 report be approved as the basis for undertaking Phases 2 to 4 of the Natural Heritage Network Study.

CITY OF VAUGHAN

EXTRACT FROM COUNCIL MEETING MINUTES OF DECEMBER 11, 2012

Item 2, CW(WS) Report No. 51 – Page 12

Attachments

1. Phase 1 of the Natural Heritage Network for the City Of Vaughan, Prepared by North-South Environmental Inc., November 2012 (Mayor and Members of Council ONLY)

Report prepared by:

Tony Iacobelli, Senior Environmental Planner ext. 8630

(A copy of the attachments referred to in the foregoing have been forwarded to each Member of Council and a copy thereof is also on file in the office of the City Clerk.)

NATURAL HERITAGE NETWORK INVENTORY AND IMPROVEMENTS (PL-9025-11) PHASE 1 FINAL REPORT
FILE NO. 25.5.4

Recommendation

The Commissioner of Planning recommends:

1. That the information contained in the report, "Phase 1 of the Natural Heritage Network Study for the City of Vaughan", November 2012, forming Attachment 1 to this report as prepared by North-South Environmental Inc., BE APPROVED as the basis for undertaking Phases 2 to 4 of the Natural Heritage Network Study.

Contribution to Sustainability

The Vaughan Official Plan (VOP 2010) was adopted by Council on September 7, 2010 and was subject to further modifications on September 27, 2011, March 20, 2012 and April 17, 2012. VOP 2010 designates a natural heritage system, the Natural Heritage Network, which is delineated on Schedule 2. Environmental policies in Chapter 3 of VOP 2010 direct that appropriate studies be undertaken to determine the precise limits of "natural heritage features and any additions to the mapped network". The Plan is consistent with York Region Official Plan policies directing local municipalities to develop local greenlands systems.

Two specific action items in Green Directions Vaughan (2009), the City's Community Sustainability and Environmental Master Plan, relate to the need to complete a natural heritage system.

> *1.3.2. Through the development of the City's new Official Plan, and in partnership with the Toronto and Region Conservation Authority, ensure protection of remaining natural features and explore opportunities for habitat restoration in headwater areas, along riparian corridors, and around wetlands.*
>
> *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 refinement of the Natural Heritage Network in Phase 1 of the Natural Heritage Network Study, and the further refinement and development of a stewardship strategy in Phases 2 through 4 of the Natural Heritage Network Study, are key components in support of Green Directions Vaughan.

Economic Impact

Funding for undertaking the Natural Heritage Network Study was included in the 2011 Capital Budget (PL-9025-11) on the basis of a two part allocation. Phase 1 was treated as a stand alone project and was funded in the amount of $52,400. In the 2012 Capital budget, the funding for

Phases 2, 3, and 4 was approved at $199,700. The total budget for the preparation of the Natural Heritage Network Study is $252,100.

Communications Plan

A communication plan in respect of this report is not required. Public consultation as part of Phase 1 of the NHN Study is described below. A communications and public consultation plan will be prepared as part of the process of conducting Phases 2 to 4 of the Natural Heritage Network Study.

Purpose

The purpose of this report is to inform Council of the work completed in Phase 1 of the Natural Heritage Network Study and obtain approval of the Phase 1 final report for the purposes of proceeding with Phases 2 to 4.

Background - Analysis and Options

The Policy and Planning Context

A rigorous Provincial and Regional policy framework exists to direct the maintenance, restoration, or improvement of the diversity and connectivity of natural features and the long-term ecological function and biodiversity of natural heritage systems in the Greater Toronto Area. This policy framework is reflected in the environmental policies of VOP 2010. The following policy documents were consulted in the preparation of the environmental policies of VOP 2010 and the Terms of Reference for Phase 1 of the Natural Heritage Network Study:

- the Growth Plan for the Greater Golden Horseshoe (2006);
- the Provincial Policy Statement (2005) and the Natural Heritage Reference Manual - Second Edition (2010);
- the Greenbelt Plan (2005);
- the Oak Ridges Moraine Conservation Plan (2002);
- the Endangered Species Act (2007);
- the Ontario Biodiversity Strategy, 2011;
- the York Region Official Plan (2010); and
- Ontario Regulation 166/06 under the Conservation Authorities Act.

i) Provincial Policies

The Growth Plan for the Greater Golden Horseshoe – Places to Grow

The Province of Ontario approved the Growth Plan for the Greater Golden Horseshoe (GGH) - Places to Grow in 2006. The Growth Plan sets out a vision for growth in the GGH to the year 2031. This includes a set of long-range growth forecasts and directing how growth should be accommodated and managed effectively.

The Growth Plan supports the role of municipal policy in providing leadership and innovation in developing a culture of conservation. The Growth Plan also encourages planning authorities to identify natural heritage features and areas that complement, link, or enhance natural systems. Municipalities are encouraged to develop a system of publicly accessible parkland, open space and trails embedded in a natural heritage system as well as establish an urban open space system within built-up areas, which include rooftop gardens, communal courtyards, and public parks.

The Provincial Policy Statement

The Provincial Policy Statement (PPS) has a strong focus on the long-term prosperity and environmental health of Ontario. It states that natural features and areas shall be protected for the long-term (2.1.1). The PPS defines natural features and areas as:

> *"features and areas, including significant wetlands, significant coastal wetlands, fish habitat, significant woodlands south and east of the Canadian Shield, significant valley lands south and east of the Canadian Shield, significant habitat of endangered species and threatened species, significant wildlife habitat, and significant areas of natural and scientific interest, which are important for their environmental and social values as a legacy of the natural landscapes of an area".*

The PPS also defines natural heritage system as:

> *"A system made up of natural heritage features and areas, linked by natural corridors which are necessary to maintain biological and geological diversity, natural functions, viable populations of indigenous species and ecosystems. These systems can include lands that have been restored and areas with the potential to be restored to a natural state".*

The Greenbelt Plan

The Greenbelt Plan contains policies for providing permanent agricultural and environmental protection as well as providing for a wide range of recreation, tourism and cultural opportunities in the area. The Protected Countryside comprises an Agricultural System and a Natural System, together with a number of settlement areas and is intended to improve linkages between these areas and surrounding systems. The Natural System identifies lands that support both natural heritage and hydrologic features and functions. The Greenbelt Plan recognizes that the Natural System extends beyond the boundaries of the Greenbelt and encourages connections between the Greenbelt's Natural System and broader scale natural heritage systems of southern Ontario. Criteria have been defined to permit potential municipal requests to expand the Greenbelt.

The Oak Ridges Moraine Conservation Plan

The Oak Ridges Moraine Conservation Plan (ORMCP) is a fundamental component of the Greenbelt Plan. The Oak Ridges Moraine is an environmentally sensitive, geological landform in south central Ontario, covering 190,000 ha. It has a unique concentration of environmental, geological and hydrological features that make its ecosystem vital to south-central Ontario. The ORMCP identifies four categories of land use: Settlement; Countryside; Natural Linkage; and Natural Core. The latter two designations are the most restrictive, and provide the most aggressive goals for the protection of natural heritage.

Endangered Species Act

The new Endangered Species Act (2007) is the first in Canada to combine mandatory habitat protection with a science-based approach to listing species for protection. Species thought to be at risk are assessed by The Committee on the Status of Species at Risk in Ontario (COSSARO). COSSARO is an independent body that reviews species based on the best available science, including community knowledge, and Aboriginal Traditional Knowledge. Once species are classified "at risk", they are added to the Species at Risk in Ontario (SARO) list in one of four categories. Endangered, threatened and extirpated species on this list automatically receive legal protection under the ESA 2007. Providing legal protection to threatened species is a change from the original Act which only applied to endangered species. Under the ESA 2007, it is legally required to protect direct and indirect habitat of

endangered species. Habitat regulations under the Act are available for Redside Dace (Regulation 293/11), which is relevant to the NHN Study in Vaughan.

Ontario's Biodiversity Strategy, 2011

Ontario's Biodiversity Strategy, 2011 is the guiding framework for coordinating the conservation of Ontario's variety of life and ecosystems. The success of this Strategy will be tracked through 15 specific targets representing key areas of focus for biodiversity conservation in Ontario. The progress will be monitored and assessed over a 10-year time frame to encourage people across all sectors to take actions that will ultimately lead to securing and maintaining Ontario's biodiversity. Several of the 15 targets refer directly to implementing natural heritage systems for biodiversity conservation, maintaining and enhancing ecosystem services, and reporting on the state of Ontario's biodiversity.

ii) York Region Official Plan (YROP)

The York Region Official Plan (ROP 2010), approved by the Minister of Municipal Affairs and Housing on September 7, 2010, is the upper tier planning document that provides the framework for achieving the Region's urban structure. The ROP 2010 was subject to over 50 appeals and is now in the hands of the Ontario Municipal Board. The ROP 2010 received partial approval by the Ontario Municipal Board on July 11, 2012 and September 21, 2012. Chapter 2, A Sustainable Natural Environment, was included in the partial approval. Those portions of the Plan still under appeal, largely related to employment and retail uses, will be addressed through an OMB hearing scheduled to commence on January 14, 2013.

Any amendments to the City's Official Plan must conform to the Region's Official Plan. The ROP 2010 recognizes the importance of integrating the objectives of the natural environment with those for healthy communities and economic vitality as outlined in its Sustainability Strategy (2007). The importance of maintaining and enhancing a healthy Regional Greenlands System is emphasized in the ROP 2010.

The policy framework has been brought into conformity with the Greenbelt Plan, the Oak Ridges Moraine Conservation Plan, the York Region Significant Woodlands Study (2005) among other important instruments that will affect the outcomes for the Greenlands System. The primary function of the Regional Greenlands System is:

> *"... the protection of natural heritage features in a system of cores connected by corridors and linkages. The Regional Greenlands System also provides opportunities for passive recreation in a future Regional Trails System such as hiking and nature appreciation. Urban uses and infrastructure projects should contribute ecological gains to the Regional Greenlands System through enhancement and restoration, and the strategic creation of natural habitat."*

It is the intent that the Vaughan Natural Heritage Network (NHN) and supporting policies be consistent with the objectives identified in the ROP 2010.

iii) Toronto and Region Conservation Authority Policy and Regulation

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 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.

Watershed Plans are mandated under the Oak Ridges Moraine Conservation 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.

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.

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 impacts on sensitive environmental areas such as wetlands, shorelines and watercourses.

Relation to VOP 2010 and Green Directions Vaughan

The overall Natural Heritage Network Study will assess the role of the existing Natural Heritage Network 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 Natural Heritage Network Study, additional NHN areas may be proposed to meet ecosystem targets of the natural heritage system related to biodiversity persistence and ecological function.

At the completion of the Natural Heritage Network Study, an amendment to VOP 2010 will be prepared to implement the findings of the Natural Heritage Network Study to modify Schedule 2 and other affected schedules and relevant policies in section 3.2.3, "Components of Vaughan's Natural Heritage Network". Schedules may also be added to delineate natural features according to Section 3.3, "Features of the Natural Heritage Network".

Protection, restoration and enhancement of natural areas in the City's Natural Heritage Network is one component of achieving healthy and vibrant communities that is reflected in the City's sustainability strategy, Green Directions Vaughan. While two action items in Green Directions Vaughan specifically address the Natural Heritage Network (Action Items 1.3.2 and 2.2.4), related action items address green infrastructure (e.g. treatment train approach to stormwater management and urban forests), recreation and open space, trails and other active transportation paths, and agriculture. Looking ahead to Phases 2 through 4 of the NHN Study, it will be important to consider a more integrated approach between natural heritage protection for biodiversity, open space amenities for recreation and active lifestyles, green infrastructure and provision of local food. While the scope of the Natural Heritage Network Study has a clear focus on biodiversity persistence and sustaining key ecological functions, the benefits to residents through the provision of ecosystem services (e.g. clean air, clean water, flood protection, carbon sequestration) and the amenity value of the City's existing and restored natural areas is a critical broader context for the NHN Study.

Deliverables of Phase 1 of the Natural Heritage Network Study

i) Task 1 – Assemble a Comprehensive GIS Database

A wide range of digital data was compiled by the consultants pertaining to: provincial plan boundaries, such as the ORMCP and Greenbelt Plan areas; designations such as Areas of Natural and Scientific Interest (ANSIs) and the Regional Greenlands System; natural features such as woodlands, wetlands, valleylands, watercourses and water bodies; flora and fauna; and infrastructure such as roads and railways as well as property information. Sources of information included the Province (through Land Information Ontario), York Region, the TRCA and the City. Of the approximately 40 data layers obtained by the consulting team, the following were scrutinized in more detail:

- Oak Ridges Moraine Conservation Plan designations;
- Greenbelt Plan Natural Heritage System overlay;
- York Regional Greenlands;
- Forest/woodlands;
- Wetlands;
- Watercourses;
- Water Bodies;
- Areas of Natural and Scientific Interest; and
- Environmentally Significant Areas.

In instances where differences were observed in the GIS data provided from several sources, such as for woodlands, wetlands, watercourses and water bodies, a method of delineating final boundaries is described in the Phase 1 report. This required the data to be compared against base data such as aerial imagery, infrastructure such as roads and power lines, zoning data, and previous approvals in official plan amendments.

The GIS database related to the Natural Heritage Network forms a critical resource tool for staff in Planning and other City departments. The City has confidence in the natural feature layers as a solid foundation for moving forward in Phases 2 to 4 of the NHN Study and as a resource for planners to use immediately. Together with information collected regarding zoning, designations in previous official plan amendment approvals, ownership, and infrastructure, further refinement of the NHN can be undertaken to establish an appropriate benchmark condition of the biodiversity contribution of the NHN.

It is intended that the GIS resource be a living database that can be periodically updated as the various layers and new layers are added. This will ensure that the initial investment in system development serves as a continuing resource to the City.

ii) Task 2 – Identify Natural Heritage Network Targets – Habitats, Species and Linkages

Identifying NHN Targets based on policy and regulation (e.g. Endangered Species Act, Provincial Policy Statement, Oak Ridges Moraine Conservation Plan, Greenbelt Plan, York Region Official Plan, Regulation 166/06 of the Conservation Authorities Act) places an emphasis on delineating the remaining natural areas. This is the information that was collected and scrutinized in Task 1. It is a critical first step in understanding the opportunity available to develop a natural heritage system that maintains "*biological and geological diversity, natural functions, viable populations of indigenous species and ecosystems*" (PPS 2005) given the history of settlement and urban development in a particular municipality.

Identifying NHN targets based on a systems approach meets the intent of the PPS, but also the Oak Ridges Moraine Conservation Plan, the Greenbelt Plan and the Growth Plan, to maintain "elements of biodiversity and ecological function for the long-term" (PPS 2.1.2). The identified

NHN targets based on a systems approach are surrogates for more explicit population viability analysis for those species known to occur and likely to persist in a NHN in Vaughan. These species groups include:

- woodland interior species (e.g. Ovenbird, Veery, Scarlet Tanager);
- amphibian species that use aquatic and upland woodland habitats in their life cycles (e.g. Wood Frog, Salamander species);
- open habitat species (e.g. Bobolink, Eastern Meadowlark); and
- fish assemblages (particularly cool- and cold-water fish species).

Ecological linkages are also identified as NHN targets based on a systems approach. Linkages are critical to ensure meta-population viability by ensuring species movement and dispersal in the event that recolonization is required of a local population. Linkages are also an important aspect of planning for climate change impacts by providing for movement and population dispersal in response to shifting climatic regions.

Further analysis is required to quantify NHN targets based on a systems approach. This can be accomplished through scenario modelling in Phases 2 and 3 of the NHN Study to test various enhancement area options to improve the NHN performance relating to biodiversity and ecological function. Furthermore, the scenario modelling must consider those parts of the NHN expected to remain within an agricultural matrix and NHN areas within an urban land use matrix. As noted in section 4.2.1 of the Phase 1 report, negative impacts on the NHN from surrounding urban land uses are greater than from an agricultural land use matrix and this must be a consideration to model enhancement areas to ensure viability and ecological integrity of the NHN.

iii) Task 3 – Undertake a Gap Analysis

The intent of the gap analysis as described in the Request for Proposals was to test the NHN refined in Task 1 against quantitative ecosystem targets. As described above, the NHN targets based on a systems approach requires modelling and scenario-testing to quantify the targets as performance metrics. As a result, the gap analysis was modified to test select metrics based on guidelines in the Environment Canada report (2004), "How Much Habitat is Enough? (Second Edition)". Guidelines for forest, wetland and riparian habitat were selected that relate to the NHN targets identified on the basis of a systems approach, particularly with respect to interior woodland habitat, habitat clusters or mosaics, and riparian linkages.

The selected guidelines for forest habitat and wetland habitat are particularly useful. First, forest cover in general has diminished slightly based on a comparison with results from other studies. The most recent background report, Natural Heritage in the City (AECOM 2010) identified 16% forest cover while the York Region Significant Woodlands Study (North-South Environmental 2005) identifies 12% forest cover for all woodlands (11.6% forest cover using criterion for significant woodlands only). The 1992 subwatershed study, prepared to evaluate existing conditions for the urban areas of Vellore, Carrville, and the Woodbridge Expansion Area, identified 12% woodland cover for the City. Despite the general lack of woodland cover, there is an opportunity to improve the larger contiguous forest patches, likely associated with valleylands, in the Humber River and Don River watershed. Strikingly, however, there is very little woodland that can be considered to be interior forest habitat, such that interior forest conditions are an obvious area for improvement and restoration as a long-term goal of the NHN.

Although 30 metres is often applied as a minimum buffer to wetlands, the analysis demonstrates that a 100 metre "Critical Function Zone" is effectively protected in many situations when considering the landscape context of wetlands. This suggests that a very targeted approach can be taken to develop criteria to identify wetlands for which a minimum vegetation protection zone greater than 30 metres can provide the most ecological gain. Criteria for wetland restoration and/or protection of the "Critical Function Zone" include: headwater areas to protect the sources

of streams; groundwater recharge areas for maintaining stream flow and temperature; and floodplains for flood attenuation and water storage.

Although expressing the results of the gap analysis in quantitative metrics is useful, it is clear that a spatial analysis is required to identify priority restoration opportunities to meet the NHN targets. As noted above in the discussion regarding NHN targets, scenario modelling is required to test enhancement area options to improve NHN performance in relation to select targets, such as targets based on the guidelines outlined in the report, "How Much Habitat is Enough? (Second Edition)" (Environment Canada 2004). Hence, the tasks of setting NHN targets and gap analysis are iterative steps best undertaken through scenario modelling.

iv) Recommendations to Revise the Environmental Management Guideline

The Environmental Management Guideline (EMG) was originally prepared in 1994 in support of Official Plan Amendment 400 and addressed the preparation of an Environmental Impact Study, or other environmental reports, at the scales of the Block Plan and Plan of Subdivision/Site Plan. The EMG was revised in 2010 by City staff following adoption of VOP 2010 in order to reflect the designation of a Natural Heritage Network in VOP 2010 and policy changes to bring VOP 2010 in conformity with the PPS (2005) and the revised Natural Heritage Reference Manual (2010).

The consulting team of North-South Environmental reviewed the revised EMG and have provided recommendations to improve the clarity and effectiveness of the EMG for the submission of environmental reports, such as an Environmental Impact Study (EIS) or Master Environment and Servicing Plan (MESP). The main recommendations are summarized in section 6 of the Phase 1 report (Attachment 1), but some of the highlights include:

- clear outline for Terms of Reference and a work plan to undertake an EIS and/or MESP;
- attention to transfer of data, particularly GIS data, through the development application process for ongoing revision of the NHN;
- more emphasis on monitoring requirements and assessment of cumulative effects; and
- significant additions to methods and protocols to address assessments of significant wildlife habitat.

The revised Environmental Management Guideline will be brought to Council in the near future as a separate item while Phases 2 through 4 of the NHN Study are underway. This will allow for public comment on the EMG, which will be integrated with the public consultation program for Phases 2 through 4 of the NHN Study.

v) Priorities for Field Work

The consulting team of North-South Environmental focused the discussion of the field work anticipated in subsequent phases of the NHN Study on headwater drainage features and significant wildlife habitat. This is recognized in the Terms of Reference for Phases 2-4 of the NHN Study as the most significant data gaps thereby hampering the natural heritage system design. It is also recognized in the Terms of Reference for Phases 2 to 4 of the NHN Study that other priority sites may be identified in addition to sites related to the priority themes of headwater drainage features and significant wildlife habitat.

Criteria are suggested to select priority headwater drainage features for investigation. This also needs to be balanced against the need for representative sampling and the opportunity for a cumulative assessment approach to the investigation of headwater drainage features given that the NHN Study is a City-wide study.

A comprehensive review of potential types of significant wildlife habitat in Vaughan is presented in Appendix 3 of the Phase 1 report. This preliminary analysis will assist not only in identifying

priority sites for field investigations, but also in any modification of field survey protocols to identify candidate or confirmed significant wildlife habitat.

Public Consultation

City staff and the consulting team held two Public Consultation Meetings on June 28, 2012 and October 4, 2012 at the Vaughan City Hall. The two Public Consultation Meetings were each attended by 40 to 50 people and presentations made by the consultants and City staff are available on the City of Vaughan web site. City staff also coordinated additional consultation sessions on September 19, 2012 and September 20, 2012. The session on September 19, 2012 was attended by about 40 people and the session on September 20, 2012 as attended by approximately 10 people. All comments have been recorded. City staff and the consulting team met with select landowner groups representing Block 27, Block 40/47, Block 41, Block 55, and Block 59 in September 2012.

One important response was the request that the City consider making the NHN information and/or GIS data available for public viewing. Staff recommend that this feedback be addressed in the public consultation strategy for Phases 2-4 of the NHN Study.

Another aspect of the feedback from the consultation was to place the NHN Study within the broader context of healthy and resilient communities. This approach also considers integrated natural heritage system design with planning for open space (i.e. passive and active recreation) and green infrastructure (e.g. low impact development measures such as rain gardens, bioswales and other treatment train approaches to manage stormwater).

Conclusions and Next Steps

The expectations set out in the Terms of Reference for Phase 1 of the NHN Study have been addressed. A comprehensive GIS database has been developed and delivered to the City, recommendations to revise the EMG have been provided, and recommendations for field investigations will assist not only to identify sample sites, but also to finalize survey protocols.

The development of NHN targets and an assessment of the NHN against the targets to understand the biodiversity contribution of existing natural areas requires further work in Phases 2 and 3. The key lesson learned in Phase 1 is the need to undertake spatial modelling of enhancement area options to identify and test NHN targets in an iterative analysis.

The scenario modelling is necessary to test restoration options against targets, such as those interpreted from the Environment Canada report, "How Much Habitat is Enough? (Second Edition)". The gap assessment undertaken in Phase 1 of the NHN study demonstrates that a framework of indicators and targets, such as forest cover, interior woodland, or riparian cover, can be developed to understand the current baseline condition and the desired future condition. This will assist in monitoring progress toward achieving the desired future condition. This finding will be incorporated into the work plan for subsequent phases of the NHN Study.

A sample set of indicators and targets derived from existing research is provided in the table below. The targets are identified as precedents and should be interpreted as examples of thresholds proposed in various studies. The framework identified below can be used to evaluate NHN options in order to establish appropriate local targets. For example, the York Region Urban Forest Study (Draft 2012) estimates 19.5% canopy cover and a Leaf Area Index (LAI) of 1.22 for Vaughan, including all tree cover (i.e. not just in natural areas). This information can be utilized in the City's Urban Forest Strategic Plan to set an appropriate local target for the urban forest. Considering agricultural areas as an indicator requires further discussion of matrix lands in the Countryside designation as well as urban agriculture opportunities. Riparian habitat metrics can be tested, for example, by considering that 100% of all targeted headwater drainage features are

naturally vegetated. This requires input from the field investigations in Phase 2 to determine the headwater drainage features to maintain in the Natural Heritage Network.

Sample Indicators and Targets

Indicator	**Metric**	**Precedent (Parentheses denote the source of various precedents)**
Urban Forest	Leaf Area Index (LAI) or canopy cover	40% canopy cover target (American Forests)
Greenspace	Hectares per 1000 people	15 hectares of greenspace per 1000 people by 2050 (TRCA Living City Report Card)
Agriculture		
Fish Communities	Rank stream reach as unimpaired, likely impaired or impaired.	Identify restoration target for "likely impaired" stream reaches. (Stanfield, L. 2012. Reporting on the condition of stream fish communities in the Canadian tributaries of Lake Ontario, at various spatial scales. Journal of Great Lakes Research, 38: 196 – 205)
Forest Habitat	Forest cover	25% (York Region): 30% forest cover in a watershed (Environment Canada)
Forest Habitat	Size of largest forest patch	Greater than 200 hectares in a watershed (Environment Canada)
Forest Habitat	Interior forest	10% of a watershed with forests greater than 100 metres from the forest edge (Environment Canada)
Wetland Habitat	Wetland cover	10% wetland cover (Environment Canada)
Wetland Habitat	Protection of Critical Function Zone 100 metres from wetland edge	Protection of the Critical Function Zone 100 metres from the wetland edge (Environment Canada)
Riparian Habitat	Vegetated stream length	75% of stream length vegetated (Environment Canada)
Riparian Habitat	Width of stream buffers	30 metre wide buffers on each side of streams (Environment Canada)

Another key consideration emerging from the public consultation are approaches to make the results of the NHN Study available more quickly to residents and stakeholders using appropriate internet portals. This could be in the form of static maps available on the City web site allowing residents and stakeholders an opportunity to view the materials in advance of attending public meetings.

Natural heritage system connections to adjacent municipalities will also be explored in subsequent phases of the NHN Study.

Status of Phases 2 to 4 of the Natural Heritage Network Study

The Request for Proposals for Phases 2 through 4 of the Natural Heritage Network Study (RFP12-466) was advertised on November 8, 2012 and has a closing date of Thursday November 29, 2012. Staff anticipate a report to Council in January 2013 on the results of the consultant selection process.

Relationship to Vaughan Vision 2020/Strategic Plan

The Natural Heritage in the City report 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 ROP 2010 support the efforts of local municipalities to identify and implement local greenlands systems.

Conclusion

Phase 1 of the Natural Heritage Network Study is complete. Recommendations are set out in this Report to Council to augment the work program in subsequent phases of the NHN Study. Therefore, it is recommended that the Phase 1 report be approved as the basis for undertaking Phases 2 to 4 of the Natural Heritage Network Study.

Attachments

1. Phase 1 of the Natural Heritage Network for the City Of Vaughan, Prepared by North-South Environmental Inc., November 2012 (Mayor and Members of Council ONLY)

Report prepared by:

Tony Iacobelli, Senior Environmental Planner ext. 8630

Respectfully submitted,

John MacKenzie
Commissioner of Planning

Diana Birchall
Director of Policy Planning

/lm