Appendix D

Natural Heritage & Water Resources Assessment

February 2022

Regional Official Plan Review

north-south ENVIRONMENTAL

Halton REGION

Memorandum

Preferred Growth Concept – Natural Heritage System and Water Resources

1. PURPOSE

A Preferred Growth Concept (PGC) has been identified to address growth requirements for Halton Region (**Map 1**). Selection of the PGC is documented in the Preferred Growth Concept Report (Region of Halton, February 2022). This memo provides a summary of the natural heritage system (NHS) and water resource features and areas within the PGC, outlines system interactions & interdependencies and how understanding of these are addressed through the planning process.

2. PLANNING DIRECTION

The need and justification for the identification of a natural heritage system and the protection of significant features and their functions is not addressed in this memorandum, as this is not only mandated by the Province through the Provincial Policy Statement (PPS 2020) and Provincial Plans but has been part of the Regional Council's commitment to protecting Halton's natural heritage, using policies articulated in the Regional Official Plan (ROP), for over forty years. This section sets out the Region's approach to natural heritage planning and provides a brief summary of current in-force policies that have informed natural heritage considerations within the growth concept evaluation process.

2.1. Landscape Permanence

Halton's Planning Vision is provided in Part II Basic Position of the ROP. It indicates that, "Planning decisions in Halton will be made based on a proper balance among the following factors: protecting the natural environment, preserving Prime Agricultural Areas, enhancing economic competitiveness, and fostering a healthy, equitable society" (ROP s. 25). ROP s. 25 also states that, "The overall goal is to enhance the quality of life for all people of Halton today and into the future." This last sentence is noteworthy for the commitment it makes to future generations, i.e., planning decisions are not intended to benefit just the present but must consider the future as well.

The commitment to the future is re-iterated in ROP s.26: "To maintain Halton as a desirable and identifiable place for this and future generations, certain landscapes within Halton must be preserved permanently. This concept of "landscape permanence" represents Halton's fundamental value in land use planning and will guide its decisions and actions on proposed land use changes accordingly".

Two important points from this Vision statement are:

- That landscape permanence is the Region's fundamental value in land use planning; and
- That the preservation is to include consideration of the present and the future.

ROP s.27(3) states that "a natural heritage system that is integrated within settlement areas and the rural countryside, to preserve and enhance the biological diversity and ecological functions of Halton" is one of three principal categories in Halton's vision. Ensuring that the NHS is planned for and protected through the Integrated Growth Management Strategy (IGMS) process supports both this principal and the concept of landscape permanence that is clearly articulated in the ROP. Moreover, through Halton's vision, it is clear that protection of the NHS as a permanent part of Halton's landscape is required and that consideration be given not just to its current form, but also to how its form and function will be protected for future generations.

2.2. An Ecosystem Approach

The last several iterations of the ROP have adopted an ecosystem approach to protecting natural heritage. The Region embraced this approach and led the move away from a "feature-based" approach before it was entrenched in the Provincial Policy Statement in 2005. That same year, the Province introduced the Greenbelt Plan that identified a protected NHS within this Plan area. More recently, in recognition of the need to identify and protect a NHS at larger landscape-level within the Greater Golden Horseshoe, the Province identified the NHS for the Growth Plan in 2018 that extended beyond the Greenbelt NHS.

A key characteristic of the ecosystem approach is recognition that there are innumerable interactions among the many biotic and abiotic components that collectively comprise ecosystems. The interactions among landform, topography, soil, hydrology, soil fauna, vegetation and wildlife must be accounted for and included within a NHS[1] to facilitate the long-term protection of natural heritage. Furthermore, features (e.g., woodlands, wetlands) and their associated ecological functions provide important ecosystem services that support biodiversity, provide social and cultural benefits including recreation and traditional resource uses, physical and mental health benefits, climate change

[1] Natural heritage system: means a system made up of natural heritage features and areas, and linkages intended to provide connectivity (at the regional or site level) and support natural processes which are necessary to maintain biological and geological diversity, natural functions, viable populations of indigenous species, and ecosystems. These systems can include natural heritage features and areas, federal and provincial parks and conservation reserves, other natural heritage features, lands that have been restored or have the potential to be restored to a natural state, areas that support hydrologic functions, and working landscapes that enable ecological functions to continue. The Province has a recommended approach for identifying natural heritage systems, but municipal approaches that achieve or exceed the same objective may also be used (PPS, 2020).

mitigation, flood reduction, soil conservation, improved water quality, and carbon sequestration to name a few. These ecosystem services contribute to the value we place on natural heritage and support the rationale for protecting both an NHS and water resources as part of the permanent landscape of Halton Region.

Addressing the complex nature of ecological functions and services provided by a NHS and water resource features and areas is achieved across the complete land use planning process to allow for more detailed and refined information to be collected and inform decision-making. It is acknowledged and important to note that work completed in support the IGMS represents a level of detail appropriate to a screening-level exercise. More detailed levels of study as part of a subsequent area and site-specific planning are required to develop a comprehensive understanding of features and their interactions and inform refinements to and provide direction for mitigation to achieve policy compliance (e.g., no negative impact). The role of different planning stages is further discussed in **Section 5.1** of this memo.

2.3. Current Guiding Policies

Natural heritage planning is guided by provincial and regional policies applicable to the Preferred Growth Concept and to Halton Region more broadly. Focus of the IGMS process was on direction provided within these current policy and legislative documents to inform and support the concept evaluation process (Phase 1) and in informing next stages of land use planning (Phase 2). A list of key plans and policy documents, applicable to the screening assessment, is provided in **Table 1**.

Table 1. Summary of Key Statutes and Policies Applicable to the Current Study Stage

Legislation or Policy Document	Key Sections for the Natural Heritage Assessment
Provincial Policy Statement (2020) *Provides direction for the wise use of resources and requires that municipalities identify and protect a Natural Heritage System and Water Resource System.*	**Section 2.1** Natural Heritage **Section 2.2** Water
Growth Plan for the Greater Golden Horseshoe *Provides additional direction and detailed policies for municipalities within to direct and provide guidance for areas of anticipated growth within the Plan Area. This includes identification and management of natural heritage and water resource systems, and transitional considerations for the*	**Section 2.2.8.3 (d) & (e)** Settlement Area Boundary Expansions **Section 4.2.1** Water Resource Systems

Legislation or Policy Document	Key Sections for the Natural Heritage Assessment
protection of these systems through settlement area boundary expansions. Of specific note is refined direction for the identification and protection of a water resource system.	**Section 4.2.2** Natural Heritage System **Section 4.2.3** Key Hydrologic Features, Key Hydrologic Areas and Key Natural Heritage Features
Greenbelt Plan *The Greenbelt Plan identifies where development should not occur to ensure permanent protection of the agricultural land base, and the ecological and hydrological features and functions that occur in the rural landscape of the Greenbelt Plan Area.*	**Section 3.2** Natural System
Niagara Escarpment Plan *Niagara Escarpment Plan (NEP) provides direction for the protection and wise use of lands within the Niagara Escarpment. It directs development away from escarpment areas based on geology and physiography that support agriculture, hydrologic and ecological form, function and value to Ontario in addition to their aesthetic and recreational values.*	**Section 1.3** Escarpment Natural Area **Section 1.4** Escarpment Protection Area **Part 2** Development Criteria
Halton Regional Official Plan (Office Consolidation June 19, 2018) *The Regional Plan provides direction as to how physical development should take place in Halton and outlines a long-term vision for Halton's physical form and community character. This includes its vision for 'sustainable development' that is sensitive to the natural environment, heritage and culture. In form, Halton's vision includes settlement areas, rural countryside with predominantly agricultural activities, and an integrated Natural Heritage System.*	**Policies 113-114** Natural Heritage System **Policies 115-118** Regional Natural Heritage System **Policies 139.3.1-139.3.7** Greenbelt Natural Heritage System

Legislation or Policy Document	Key Sections for the Natural Heritage Assessment
Conservation Authorities Act (1990): O.Reg. 162/06 Halton Conservation Authority O.Reg. 160/06 Credit Valley Conservation *Provides authority to conservation authorities to protect wetlands, watercourses, shorelines, etc. with specific regard for hazards and management of water resources.*	Regulation of development, interference with wetlands and alterations to shorelines and watercourses.
Fisheries Act (2019) *Provides protection for fish and their habitats as well as setting out approval processes for any works that have potential to impact them.*	**Sections 34 and 35** Fish and Fish Habitat Protection and Pollution Prevention
Species at Risk Act (2002) *Federal legislation providing protection for species considered to be endangered, threatened in Canada. At project scale, primarily applicable for aquatic Species at Risk.*	**Section 32** Measures to Protect Listed Wildlife Species
Endangered Species Act (2007) *Primary legislation for protection of Species at Risk in the province of Ontario. Provides individual and habitat protection for Endangered and Threatened species in Ontario.*	**Section 10** Prohibitions on damage to habitat, etc.

It is important to note that the current in-force Regional Official Plan does not include a Water Resource System (WRS). Per the provincial plans identified in **Table 1** Halton is required to identify a WRS for the long-term protection of key hydrologic features and areas and their functions; this will occur through the Regional Official Plan Review process. Many hydrologic features are also captured as components (i.e., wetlands) of Halton's Natural Heritage System and as such have been indirectly considered through the assessment of natural heritage features. Additionally, for the purpose of this analysis, hydrologic areas (i.e., significant groundwater recharge areas and highly vulnerable aquifers) are also considered, where mapping is available.

Amendments to the Regional Official Plan addressing the rural and agricultural system, climate change, and natural heritage policies and mapping for these areas will be addressed in a separate amendment that follows the amendment implementing the Integrated Growth Management Strategy. Future Area-Specific Planning and natural heritage studies must meet the ROP policies that are in-force and effect at the time of submission.

3. GROWTH CONCEPTS EVALUATION – REVIEW

The Region must accommodate and plan for growth to 2051. To achieve this, several growth concepts were identified and evaluated through Phase 1 of the IGMS process. Four major themes were identified for the evaluation:

- Theme 1: Regional Urban System & Local Urban Structure
- Theme 2: Infrastructure & Financing
- Theme 3: Agriculture, Environment & Climate Change
- Theme 4: Growing the Economy & Moving People & Goods

Measures for evaluating the growth concepts were identified for each theme. Under Theme 3, Measure 3.2 addresses the NHS: "*Enhance the Natural Heritage System to strengthen Key Features and Areas and reduce the impact of new development*". A natural heritage technical memorandum (NSE 2020) was prepared to support and further explore this measure. Specifically, several sub-measures with metrics were established that could be assessed using existing mapping and informed by policy:

- How well does each concept perform at avoiding provincial plan areas, the Province's and Region's NHS, and significant water resource areas?
- How well does each concept perform at reducing / avoiding impacts of new development?
- How strongly does the concept provide opportunities to strengthen the RNHS?
- How does the concept compare with respect to the potential impacts of the proposed RNHS on further development of the potential growth areas identified?

The assessment completed provided a refined evaluation to differentiate between concepts at a finer level. For detailed outcomes of the evaluation process, please refer to the Phase 1 technical memorandum (North-South Environmental [NSE] December 2020). Key observations and outcomes of the evaluation include:

- All concepts avoid the provincial plan areas (e.g., Greenbelt Plan NHS) and as such were considered comparable in this regard.

- No concepts avoided Key Hydrologic Areas; these capture broad areas of the landscape and as such, could not be avoided under any of the concepts evaluated.
- Natural heritage features and other components of the RNHS occur across Halton's landscape. As such, avoiding the NHS in its entirety could not be reasonably achieved in any concept. Some options included greater or smaller areas of the RNHS and generally, the larger the growth concept area, the greater the amount of RNHS that occurred within it.
- Across all sub-measures, the concepts with the highest densification targets and smaller urban expansion(s) best achieved the natural heritage sub-measures identified above.
- The RNHS was included as a land use designation which precludes development. As such, no concept encroaches into the updated RNHS, and the RNHS was excluded from the proposed land budget for urban expansion areas, as areas within the RNHS cannot be developed for urban uses.

The approach used in considering natural heritage is appropriate for the IGMS as it:

- Integrates available mapping and information that is consistently available at a Regional scale.
- Protects for the permanent presence of the RNHS and water resource features and areas on the landscape.
- Provides a high-level assessment of potential impacts and opportunities to minimize them in the selection of a preferred growth concept.
- Recognizes that further study is required to refine the RNHS and provides the required flexibility in the land use planning process to permit this to occur. These refinements will occur through future planning stages as informed by detailed technical study (e.g., a subwatershed study) and may include addition, deletion or refinement of features and areas (buffers, linkages, enhancements) of the RNHS in accordance with 116.1 of the Regional Official Plan

It is recognized that additional study is required to understand the complex relationships and interdependencies of the natural environment (natural heritage and water resources) of Halton's landscape. While a detailed understanding would provide refined input to Regional land use planning, it is not feasible or appropriate for several key reasons discussed below.

A typical subwatershed study or equivalent study is a large undertaking that requires extensive planning and coordination (e.g., to contact private landowners and gain permission to access to lands), multiple years of in-field study, analyses, reporting and consultation with stakeholders and agencies to resolve technical conclusions.

The timeline of land use planning must also be considered. The IGMS is identifying lands to meet Halton's growth needs to the year 2051. Land use planning will occur for smaller areas as the need for development occurs. As such, the land use planning process will be staggered, with different areas

proceeding at different times. For the entire growth area, this is expected to occur over several decades. As planning proceeds, it is to be informed by current information, policies, and practices. All these factors have the potential to change over the course of the planning horizon and as such, it is most appropriate to complete detailed studies at a time closer to when changes in land use are being contemplated. This can include changes in the natural environment (e.g., succession of natural areas and resulting changes in function), changes to protected species (e.g., Species at Risk), criteria and approaches to assessing or evaluating significance or sensitivity (e.g., improved survey methods, or criteria such as those for Significant Wildlife Habitat). It is important that land use planning is informed by current standards and best practices.

Discussion on how IGMS process and the PGC supports and is supported by Halton's vision and policies is presented in **Section 5**.

4. THE PREFERRED GROWTH CONCEPT

Informed by the concept evaluation process across the four themes and with supporting technical studies (e.g., Agricultural Impact Assessment, natural heritage), a preferred growth concept (PGC) was identified. The PGC illustrates the recommended option to accommodate growth in Halton Region.

The PGC is a blend of areas from multiple concepts assessed and discussed through the evaluation process (NSE 2020) as well as modifications reflecting input received across the evaluation themes and informed by technical studies. Readers are referred to the PGC report (Region of Halton, February 2022) for discussion on the decision-process that arrived at the PGC and complete description of the PGC.

In this section, the PGC is briefly discussed relative to the evaluated concepts (NSE 2020) for the Natural Heritage System and water resource features & areas in the sections below. It is important to note that the PGC areas (ha) discussed in this report represent the **gross** areas and do not reflect area available for development. Gross areas are used for the purposes of the NH analysis. Net areas for settlement area boundary expansion (Community and Employment) are discussed in the Preferred Growth Concept Report (Region of Halton 2022).

4.1. Natural Heritage System Summary

The PGC will surround or abut portions of the RNHS. A summary of the RNHS within the PGC areas and a total for the PGC overall is presented in **Table 2**. This summary and a general comparison of the PGC against original concepts is also provided as context for performance of the PGC against identified criteria.

The PGC is land consumptive (~2,836ha), falling between the two options with the least densification (Concept 1 – 60% densification [~2,460 ha] and Concept 4 – 50% densification [3,280ha]), however it performs better at avoiding Key Features and reducing potential impacts to the RNHS than either of the original concepts.

In comparing the PGC against the evaluated concepts (NSE 2020), the PGC performs well with respect to avoiding Key Features. A total of 167.7ha of Key Features occur in the PGC, this is closest to Concept 3 which contained the smallest amount of Key Features (~146ha) and was the preferred option based on this metric (NSE 2020). Similarly, when considered in terms of potential impacts, the PGC performs relatively well when compared against the evaluated concepts (NSE 2020 concept mapping and **Map 1** of this memo). Risk of fragmentation is most prominent in the Halton Hills Community Area with features separated by intervening agricultural and rural lands which will lose their existing permeability to wildlife movement at the time that land development proceeds without mitigation. Throughout much of the remainder of the PGC, features are connected along linear features and linkages, reducing potential for isolation of features on the landscape, however fragmentation can still occur (e.g., linear infrastructure such as roads). Generally, risk of introducing fragmentation is moderate across most of the PGC; mechanisms to avoid, minimize and mitigate fragmentation of the system will occur through subsequent stages of land use planning.

The PGC offers good opportunities (104.5ha) for system improvement through the implementation of linkages and enhancement areas. When compared against the evaluated Concepts, the PGC offers greater opportunity for system enhancement than Concepts 2, 3 and 4; only Concept 1 contained a greater area (~117ha).

Conclusion: Based on the factors discussed above, while the PGC is land consumptive, overall it performs well at avoiding features, reducing potential impacts, and provides opportunities for enhancement compared to Concepts evaluated.

Features within the PGC will require detailed assessment through subsequent planning stages to evaluate, confirm or refine understanding of feature significance, interactions, and functions. Similarly, further work is required to establish final linkages, buffers, and enhancements of the RNHS. Outcomes of this work have potential to add or remove areas from the RNHS as informed by detailed study and assessment. Further discussion on how natural heritage is addressed in the land planning process can be found in **Section 5**.

Table 2. Summary of the RNHS within the PGC.

PGC Areas	PGC Land Area* (ha)	Total NHS Area in PGC (ha)	NHS Key Features (ha)	Linkages & Enhancement (ha)	Watercourse Length (Key Feature) (km)
PGC Halton Hills Community	516.2	104.2	42.6	5.2	6.2
PGC Halton Hills Employment	565.6	143.2	56.1	4.8	9.5
PGC Milton Community	827.2	117.8	12.4	25.8	9.5
PGC Milton Employment	926.8	254.1	56.7	68.7	7.0
PGC Totals	2,835.8	619.3	167.7	104.5	32.2

* Gross PGC areas (ha). Please refer to Preferred Growth Concept Report (Region of Halton 2022) for net areas which exclude the NHS and other 'take-outs'.

4.2. Water Resource Features & Areas Summary

As noted through preceding section(s), many water resource features (e.g., wetlands, watercourses) are also Key Features of the NHS and are therefore also represented in Section 4.1 NHS. They are considered here with regard to their role in maintaining water quality and quantity and broadly, their relationship to ecological form and function.

A summary of the water resource features and areas within each area of the PGC areas is presented in **Table 3** with PGC Scenario Totals also provided. Water resource features and areas are shown on **Map 1**.

Water resource features represent physical features with defined edges (e.g., wetlands) and are generally identified as constraints to development; watercourses are linear features and as such are calculated based on length of the features present. Within the PGC, there are 87.4ha of water resource features and 32.2 km of watercourse present. The presence and distribution of watercourses can be easily observed in mapping (**Map 1**). Water resource features are captured within the RNHS and as such, are represented within the mapped areas of the RNHS (**Map 1**).

Key Hydrologic Areas (KHA) include areas of the landscape that serve important hydrologic function(s) (e.g., significant areas of groundwater recharge). The PGC includes 348.9ha of KHA. Relative to the evaluated concepts, the PGC performs substantially better than Concept 1 (512 ha) and 4 (669ha), but not as well as Concept 2 (250 ha) or 3 (227ha). In consideration of the fact that the PGC is quite land consumptive, it performs well at avoiding KHAs.

It is recognized that the PGC continues to have potential to negatively impact the hydrologic interactions with the ecological form and function of the RNHS, however detailed assessment is required to refine understanding of how and where these occur on the landscape (see **Section 5**).

Table 3. Summary of water resource features and areas in the PGC.

PGC Area	PGC Land Area* (ha)	Water Resource Features (ha)	Watercourse Length (km)	Key Hydrologic Areas (ha)
PGC Halton Hills Community	516.2	22.7	6.2	90.4
PGC Halton Hills Employment	565.6	27.2	9.5	83.0
PGC Milton Community	827.2	3.4	9.5	34.8
PGC Milton Employment	926.8	34.2	7.0	140.7
PGC Totals	2,835.8	87.5	32.2	348.9

* Gross PGC areas (ha). Please refer to Preferred Growth Concept Report (Region of Halton 2022) for net areas which exclude the NHS and other 'take-outs'.

4.3. Preliminary Constraints

Key Natural Heritage Features, Linkages and Enhancement Areas of the RNHS, and Key Hydrologic Features, as defined under the Growth Plan are constraints to development. Constraint categories (i.e., level to which they are a constraint to development) have been assigned based on policy requirements and available secondary source information (See **Attachment 1**). Mapping for some natural heritage features and areas is not available at a regional scale or requires detailed field surveys to be conducted to collect information (e.g., Species at Risk or Significant Wildlife Habitat) as such, these are not captured in this preliminary constraints assessment. Preliminary constraint categories are as follows:

- **High Constraint**: Includes natural environment features and areas (NHS and WRS), and Regulatory Floodplain with existing designations or *significance* that afford them protection under current provincial or municipal plans / policies. High Constraint areas represent features and areas that prohibit development.

- **Medium Constraint**: Includes natural environment features and areas (NHS and WRS) that may, through future assessment represent constraints to development or are indicators of potentially significant functions. Linkages and restoration / enhancement areas are captured under this category as their final position is not fixed to existing features on the current landscape. It is recognized that they will become high constraint through future planning stages as they are confirmed and/or refined. Determinations regarding level of constraint for

features and areas in this category are to be informed by future studies that are undertaken to support Area-Specific Plans or Secondary Plans with appropriate levels of assessment / information.

- **Low Constraint**: Includes natural environment areas (NHS and WRS) that, based on current knowledge, do not represent constraints to development (i.e., do not preclude development), but may influence some aspects of land use planning decisions (e.g., densities, type of development) or may present additional study requirements, enhanced management requirements, etc. that could increase development complexity, management needs, or otherwise affect the planning and / or development processes. Areas and functions captured in this constraint category may also interact with / contribute to the form and/or function of natural heritage features and therefore have important influence on the ecological functions they provide.

Map 2 illustrates the outcomes of assigning these constraint categories to mapped feature and areas within the PGC; the amount (area) represented by each constraint level is presented in **Table 4**. assessment was also completed in support the evaluation of concepts and was presented in the concept evaluation memo (NSE 2020).

When compared to the evaluated concepts, the PGC performs very well with respect constraints. Across all constraint categories (High Constraint, Medium Constraint and Low Constraint), the PGC performs better than all evaluated concepts. Under the evaluated concepts, the lowest proportions were 27% (Concept 3) for High Constraint, 11% for Medium Constraint (Concept 4) and 14% for Low Constraint (Concept 2). The PGC is comprised of 17% High Constraint, 4% Medium Constraint and 12% Low Constraint.

Table 4. Summary of preliminary natural heritage and water resource features and areas constraints in the PGC.

PGC Area	PGC Land Area* (ha)	High Constraint (ha)	Medium Constraint (ha)	Low Constraint (ha)
PGC Halton Hills Community	516.2	98.3	5.2	90.4
PGC Halton Hills Employment	565.6	138.0	4.8	83.0
PGC Milton Community	827.2	88.8	25.8	34.8
PGC Milton Employment	926.8	145.3	68.7	140.7
PGC Totals	2,835.8	470.4 (17%)	104.5 (4%)	348.9 (12%)

* Gross PGC areas (ha). Please refer to Preferred Growth Concept Report (Region of Halton 2022) for net areas which exclude the NHS and other 'take-outs'.

4.4. Supporting Halton's Natural Heritage Vision

The IGMS forms the first stage of land use planning and as such, must demonstrate that, at a level appropriate for broad land-use planning, it supports and is supported by Halton's Official Plan Planning Vision and Policies (**Section 2**).

At the scale of the IGMS, this is achieved by ensuring that the RNHS is preserved and planned for to establish permanence on the landscape, that a systems-based approach has been and will continue to be used, and through these measures ensure that flexibility and opportunity exists at this broadest scale to ensure the test of no negative impact can be met through future stages of land use planning.

Through the selection of the PGC this was specifically addressed by:

- Incorporating the RNHS as an existing 'land use' designation within the settlement area, thus ensuring that the system can be preserved, connected and enhanced on the landscape in the long-term;
- Through the concept evaluation process (NSE 2020) and Sections 4.1-4.3 of this memo:
    - Refining the evaluation of concepts to assess the potential for impacts and ability to avoid the RNHS to the extent possible, recognizing that avoidance and minimization (in order of preference) are the best ways in which to potential impacts to the RNHS.
    - Recognizing that opportunity to strengthen and enhance the system exist through the implementation of linkages and enhancement areas.
- Acknowledging and expressly identifying the need for further study to refine understanding of conditions to refine the RNHS and ensure that the system and its functions can be preserved.
- Continue to require that demonstration of no negative impact through future planning stages and reaffirming the Region's role in reviewing studies to ensure ROP policy compliance.

A more detailed breakdown is provided in **Table 5** below.

Table 5. Supporting Halton's Natural Heritage Vision through the IGMS

Policy Direction	How Supported through the IGMS
Landscape Permanence (**ROP s.26**)	The RNHS is treated as an existing 'land use' designation within settlement areas that is not available to accommodate growth. This recognizes and supports the RNHS as a permanent feature on Halton Region's landscape.

Policy Direction	How Supported through the IGMS
'The goal of Halton's Natural Heritage System is to increase the certainty that the biological diversity and ecological functions within Halton will be preserved and enhanced for future generations' (**ROP s. 114**).	The approach used to include the RNHS in the IGMS process provides certainty that the RNHS will be preserved today and through future land use planning. Consideration has been given to its presence and influence on land needs; specifically, this ensures that sufficient area is available to maintain the NHS and meet growth needs in the Region
The objectives of the NHS (**ROP s. 114.1**) include direction for maintaining, protecting, and preserving features and functions (e.g., biodiversity, Key Features, quality, and quantity of surface water, etc.), recognizing the complementary nature of agriculture and natural heritage and supporting agricultural uses outside of Key Features.	Protecting for the presence of the RNHS and considering hydrologic features and Key Hydrologic Areas within the concepts supports the objectives of the Region's NHS at this initial planning stage. Further work is required to confirm and / or refine understanding of the features and their functions to establish the RNHS (features, buffers, linkages and enhancements) that will ultimately be implemented through land use planning and development. The interactions and interdependencies between rural and agricultural lands and the RNHS and between features of the RNHS and hydrologic features, areas and functions and the potential impacts to these associated with development have been considered at a broad-scale appropriate to the IGMS. Further work is required to understand these and other interactions; this is further discussion in **Section 5**.
It is the policy of the Region to apply a systems-based approach to implementing the Regional Natural Heritage System (**ROP s. 118**) by not permitting the alteration of any components of the Regional Natural Heritage System unless it has been demonstrated that there will be no *negative impacts* on the *natural features*	The approach used considers the future implementation of linkages and buffers in addition to protection of features and areas by integrating the RNHS in its entirety (mapped features, linkages, enhancements, buffers). This ensures that a connected system with opportunities for enhancement are captured in this first stage of land use planning.

Policy Direction	How Supported through the IGMS
and areas or their *ecological functions* (**ROP s. 118.2**).	Through the IGMS it was recognized that development adjacent to the NHS can result in negative impacts and that avoiding where possible, and minimizing the RNHS within the Concepts is the first step in supporting the policy requirement for no negative impact. Several factors were used to consider these risks, at a scale suitable to the IGMS, within the evaluation of concepts: • Presence of key features. The greater the area of NHS, the greater potential system impacts • Edge effects. The more 'feature edge' vs. 'feature interior' the greater the effect of edge impacts (light, noise, pets, invasive species, etc.) • Fragmentation risk. A qualitative assessment of risk for the system to become fragmented, such as through feature isolation or creation of barriers on the landscape (e.g., roads). Further work will be required to refine understanding of features, their functions and interactions on the landscape to ensure that a systems-based approach is used and that the test of no negative impact is met throughout the land use planning process.
Enhancements to the Key Features [of the RNHS] including Centres for Biodiversity (**ROP s. 115.3 (2)**) are considered components of the RNHS. The ROP also recognizes that early introduction of the RNHS in the land planning process in the broadest available context will provide greater flexibility to enhance the ecological functions of all components of the system and hence improve the long-term	Through the IGMS process, the RNHS in its entirety, including enhancement areas and linkages, has been integrated. Linkages provide critical connections for the RNHS. They provide the pathways through which plants and animals move between features and across the landscape. Landscape connectivity is also important for genetic diversity and for supporting resilience to climate change through species mobility. Linkages may follow existing features (e.g., watercourses) or may be identified across the landscape (e.g., across existing rural or agricultural

Policy Direction	How Supported through the IGMS
sustainability of the system as a whole (**ROP s. 118.2 (d)**	landscapes). Linkages are identified to ensure that in the event of landscape change (e.g., development) connectivity and its functions are identified and preserved. Enhancement areas identify lands that can provide a benefit to the RNHS through returning them to a natural condition. This can include opportunities to improve feature shape or size, widen narrow features etc. Under existing conditions, these areas are generally not vegetated or not natural in condition (e.g., rural landscapes, agricultural lands). As land is proposed to be developed, detailed planning for enhancement opportunities (e.g., wetland creation, meadow habitat, forest habitats, etc.) are established. In planning for these areas through the IGMS, it ensures that there is sufficient flexibility and opportunity to achieve the objectives and policies of the ROP as land use planning proceeds to more detailed stages.

The IGMS supports Halton's Planning Vision and is aligned with the NHS policies at the broad, landscape scale of the current process. It is important to recognize and acknowledge that the selection of the PGC represents the first step in the land use planning process. Applying a systems-based approach and ensuring that the NHS is planned as part of Halton's landscape from this early stage will support the achievement of the Region's goal and objectives for the NHS as Halton's supports its future growth.

Further studies are required to develop a comprehensive understanding of the natural environment within the growth area(s) to ensure that Halton's Planning Vision and NHS policies continue to be supported and that policies compliance is achieved. ROP s. 115 of the ROP provides direction on the components of the RNHS; these have been reflected in the IGMS through the mapped NHS and the acknowledgment that detailed study will provide opportunities to inform and screen for other features and functions to be considered part of the NHS that are not, at this time, mapped (e.g., significant wildlife habitat).

The Provincial Policy Statement, 2020, Growth Plan, 2019, Greenbelt Plan, 2017, and ROP contain policies that are supportive of watershed/subwatershed planning and acknowledge its importance as

part of land use and infrastructure planning. As per Halton ROP s. 145(9), local municipalities are required to prepare Area-Specific Plans for major growth areas. SWS must be completed as part of Area-Specific Plans (i.e., Secondary Plan) approval. Direction provided through this memo regarding confirmation or refinement of the NHS is reflective of ROP s. 116.1 of the ROP which permits additions, deletions, and/or boundary adjustments, through detailed study (e.g., subwatershed study as part of an area-specific plan).

5. GUIDANCE FOR FUTURE STUDIES & LAND USE PLANNING

5.1. Natural Environment in the Land Planning Process

Halton Region recognizes the complex interactions and interdependencies of natural heritage and water resource features and areas. This is reflected in Halton's goal for the NHS and ROP Policies (e.g., ROP s. 114.1).

Developing a comprehensive understanding of the complex interactions and interdependencies requires detailed study not suitable or feasible at the scale of the IGMS. The process of detailed characterization, confirmation and / or refinement of the system and implementation of measures to achieve the vision, goals and policies of the ROP is met through the complete land planning process.

Table 6 below provides a high-level overview of natural heritage in the land planning process. This basic process overview is generally applicable to greenfield development and settlement area boundary expansions. Study names will vary from one municipality to another (e.g., additional stages / steps, slight variation in when certain aspects are addressed), however the basic structure and process of refinement will be generally consistent with what is presented below. Minor variations such as advancing more detailed work to earlier stages of planning may occur to accommodate specific needs or issues.

Refinements or boundary adjustments for the RNHS may be proposed through a Subwatershed Study or Environmental Impact Assessment and must be accepted by the Region through a planning approval process as per 116.1 of the ROP. Similarly, the Region will retain a role in ensuring compliance with Regional policies through the development process (e.g., achieving no negative impact).

Table 6. Natural Heritage in the Planning Process for Greenfield Development and Settlement Area Boundary Expansions– An Overview

Land Planning Stage(s) or Studies	Natural Heritage Characterization & Planning
Settlement Area Boundary Expansion(s)	• Growth planning must account for the presence of NHS(s) and landscape permanence of the system(s). • Recognize that the complex functions and system. interactions cannot be fully known at this stage of land use planning and ensure refinements to the NHS are planned for and can be accommodated, including potential increases to the system, as more detailed characterization is completed. • Consider potential broad-level impacts and potential opportunities to enhance the NHS that may exist or be triggered by land use change(s) to inform decision-making.
Subwatershed Study (or equivalent)	• Detailed studies are conducted to comprehensively assess features, functions and interactions within and between natural heritage features and areas, with water resources features and areas and with the surrounding landscape. • Feature limits may be field confirmed by regulating agencies at this study stage or may be addressed at a later planning stage. • Study outcomes include confirmation of, or recommendations to refine the NHS informed by findings and analyses (e.g., Significant Wildlife Habitat Assessment), identify or provide direction for linkages and enhancement areas to create a resilient and connected system. • At this planning stage, land uses are broadly defined (e.g., Employment, Community). As such, consideration of potential impacts and recommended mitigation is provided to guide the next stages of planning. Studies at this stage of planning will generally include guidance for mitigation (e.g., buffers, locations for wildlife crossing structures).
Area-Specific Plan / Block-Plan / Secondary Plan (or equivalent)	• Direction and guidance of a Subwatershed Study (or equivalent) are implemented through this planning stage. Generally, this will include confirming and finalizing enhancement areas, linkages, minimum buffers and refining other mitigation measures (e.g., refined direction for wildlife crossing structures). • If required (e.g., as a recommendation of a Subwatershed Study), some further detailed study may occur and refinements to the NHS can occur. • Feature limits are generally confirmed at this planning stage if they were not addressed through preceding stages.

Land Planning Stage(s) or Studies	Natural Heritage Characterization & Planning
	• At this planning stage, land uses are being refined. As such, a refined impact assessment may be completed to inform mitigation planning and recommendations. • The requirements identified through this stage may be presented as policies applicable to the specific planning area.
Site Planning & Detailed Design	• All major decisions with respect to the NHS are complete. This planning stage represents the final implementation of recommendations, direction and / or policies for the planning area developed through preceding studies. • Final design specifications for implementation are addressed such as landscaping and/or buffer or enhancement planting plans, detailed wildlife crossing drawings, etc.

5.2. Functions, Interactions & Interdependencies

Natural environment interactions and interdependencies are evident when viewed at different scales – from highly localized site scales (e.g., catchment and water balance for a small discrete wetland) to the landscape scale (e.g., broad, landscape permeability). The interactions and interdependencies of the natural environment are complex, influenced by factors such as bedrock geology (e.g., aquifers), surficial geology (e.g., infiltration), climate, existing land uses, biological and hydrologic functions. These complex interactions are what have shaped and created the natural systems present within the Region. Through its vision of landscape permanence, a systems-based approach to natural heritage planning and the forthcoming introduction of a water resource system, the Region recognizes and plans for these considerations to ensure a healthy environment for present and future generations.

This will be critically informed and affected by developing an understanding of the interactions on the landscape through the planning process (per **Section 5.1**) and ensuring that consideration is given to cumulative impacts, adaptive management, and striving towards decision-making and activities which establish or strengthen connectivity and support known interactions and interdependencies.

Through developing this understanding and assessment of the features (delineation, functions) and interactions, refinements to the RNHS may occur in accordance with ROP s. 116.1.

As a means of capturing potential system interactions and interdependencies in the IGMS, broad-scale functions and their interactions are summarized in **Table 7**. It is expected that most, if not all, of the interactions summarized in this report exist within the PGC. Further exploration of the location, magnitude and potential influence of these interactions is required through more detailed levels of

study to inform specific targets, management, and other guidance for land use planning at refined scales.

Table 7. Potential interactions & interdependencies – natural environment

Interaction / Interdependencies	Description
Groundwater Recharge	Groundwater recharge is a key input to the water balance. It is influenced by conditions at the site scale and the broader landscape scale. Groundwater recharge should be assessed at multiple scales to ensure information is available to support the management of sub-surface functions and how they contribute to surface features and functions (e.g., wetlands, seeps & springs). Natural cover (e.g., within the NHS) supports recharge by providing permeable surfaces, slowing flows to permit infiltration, etc. Natural features occurring in areas where surficial geology supports increased infiltration rates may have a greater impact on overall recharge within a given system or area.
Groundwater Discharge	Groundwater discharge areas are places where groundwater is expressed (i.e., comes out at) the surface, bringing cooled, filtered water that can support both aquatic and terrestrial functions. Groundwater discharge plays an important role in supporting some wetlands, seeps and springs, and providing baseflow to watercourses and other drainage features; this is particularly important in maintaining and supporting coldwater streams which are dependent on this groundwater function.
Flow Attenuation	At the ground surface, flow attenuation is affected by land cover and topography. At-surface attenuation affects how quickly water reaches receiving bodies (watercourses, wetlands, lakes) by slowing its progress across the land (e.g., through vegetated areas vs. paved areas) or by permitting increased rates of infiltration. Below the ground surface, flow attenuation is through infiltration and the ability to attenuate flows 'at source' or where the water first comes into contact with the landscape. Flow attenuation supports water quantity by slowing its movement through the hydrologic system. Benefits of this can be observed across the watershed (e.g., baseflow conditions, thermal regimes, etc.) but are most acutely observed moving downstream in the system (e.g., reducing 'flashy' flow characteristics). Addressing flows holistically (surface and ground water)

Interaction / Interdependencies	Description
	can directly influence issues such as flooding, erosion, and groundwater quantity. Water quality can also be influenced by flow attenuation which in turn has substantial influence on biological functions. At surface, water moving through vegetated areas is slowed, reducing its erosive power, thus reducing potential downstream sedimentation, allows material to move out of suspension, reducing suspended solids in receiving watercourses, and providing opportunities for vegetation to 'filter' or 'take-up' nutrients present in the water – again supporting potential downstream water quality by mitigating for some excess nutrients. Pooling of water in natural topographic lows – such as vernal pools and wetlands, is critical to their ecological functions, by sustaining hydric soils and hydroperiods for pools which support amphibian breeding, and other species (e.g., invertebrates). Sedimentation (increased tubidity) can impact light penetration (affecting in-water vegetation), visibility for foraging fish species, altering substrates (infilling interstitial spaces), smothering eggs (e.g., spawning fish), etc. in receiving watercourses. Sediment also often carries other deleterious substances (e.g., heavy metals, contaminants) which can have direct and indirect impacts on aquatic communities (vegetation, invertebrates, fish, etc.). By supporting infiltration, water quality can be improved through the above actions and also by providing opportunities for water to cool as it moves through the system and ultimately to supporting groundwater supported features and functions (e.g., coldwater streams).
Thermal Effects	Water temperature is influenced through both surface features and subsurface functions. At the surface, vegetation along watercourses (i.e., riparian vegetation) and flow attenuation within vegetated areas (e.g., wetlands) provide shading, cooling water / mitigating warming effects. Conversely areas with limited natural cover (including riparian cover) can result in increased water temperatures / warming effects. Infiltration also influences water temperature, cooling it as it moves through the subsurface and reducing the temperature of water entering receiving systems. Water temperature is major driver of ecological processes in aquatic habitats. Thermal regime in watercourses influences the overall health of aquatic ecosystems, including aquatic species biodiversity and water quality.

Interaction / Interdependencies	Description
	Thermal regime influences the growth rate, movement and emergence of aquatic organisms, and their distribution as most aquatic species require a specific range of temperatures. A change in water temperature can occur naturally or as a result of anthropogenic disturbances (e.g., pollution, deforestation, and climate change). Extreme temperature changes can affect early-stage growth and development which can influence breeding success and limit population recruitment. Some species have limited environmental ranges in which they can survive, requiring cold water (e.g., Brook Trout) to support them and their life cycle. Supporting or mitigating to mimic natural groundwater / surface water interactions is required to maintain these species.
Vegetation Communities	**Wetlands** can act as points of groundwater recharge, groundwater discharge, provide flow attenuation (moderate downstream flow conditions), and support watercourse baseflow – particularly in smaller order / headwater features. These functions are important throughout a catchment or watershed. Similarly, a healthy and functional hydrologic system is important for the maintenance and function of wetlands. Wetland water balances are dependent on inputs from adjacent lands via overland flow and/or groundwater in addition to precipitation. Wetland hydrologic conditions are critical to supporting wetland plants (wetland obligate species) and the fauna that depend on them as well as the presence and duration of available water. **Woodlands** interact with hydrologic functions through infiltration, attenuation (e.g., sloughs, vernal pools), evapotranspiration, and shading. Woodlands in turn are influenced by soil moisture influencing forest composition and history. Tree species are adapted to certain moisture ranges and fauna have adapted to use certain habitats to meet their critical life cycle needs. **Open country habitats** such as grasslands, meadows, thickets and savannahs maintain permeable cover on the landscape for infiltration and slow the flow of water overland. Many of these habitat types occur in drier conditions, potentially increasing soil capacity to store water (unsaturated zone) where suitable soil conditions exist. Where well drained soils occur, they may act as important recharge areas.

Interaction / Interdependencies	Description
Wildlife Habitat: Terrestrial	Many species use multiple habitat types to complete their life cycle, seasonally or to support their biological requirements. Understanding these complex relationships is important in informing refinements to the NHS. For example: pool breeding amphibians (e.g., spring peeper) that utilize ponds and pools for breeding, but require access to nearby upland habitat (e.g., woodlands) to support foraging and summering habitat. Where land development is expected to occur, maintaining these connections may require the implementation of linkages / corridors and/or enhancements.
Wildlife Habitat: Aquatic	Aquatic habitat is affected by water quantity through overland and groundwater contributions. The means of water transport and the landscape over or through which it moves will affect the speed at which it reaches aquatic habitats and the quality of the water being received (e.g., introduction of deleterious substances, sedimentation, etc.). The mode of transport can also influence thermal regime (warm through cold) and as such affects a feature's ability to support a range of aquatic biota (e.g., invertebrates, crustaceans, bi-valves, fish, etc.). Benthic invertebrates are significantly affected by their environment including water quality, sediment composition and quality, and other hydrological factors. Sampling of benthic invertebrates is commonly used in monitoring programs as a biological indicator of water condition and determining the overall health of a waterbody, including monitoring the impact of pollution and human disturbance. The composition and quality of the physical environment including habitat, vegetation and fluvial landscape also influences the composition of benthic community. Fish species are similarly influenced by water quality and quantity. Species have thermal requirements or preferences, influences the community composition (e.g., brook trout); others are sensitive to water quality (e.g., Redside Dace) and others still are impacted by water quality issues such as lowered oxygen levels (e.g., through excessive algae growth).
Specialized Wildlife Habitat	Several specialized habitat types are highly dependent on sufficient water quality and quantity including amphibian breeding habitat (wetlands, vernal pools, ponds), turtle overwintering habitat, temporary ponding (e.g., waterfowl migratory stopover habitat), and seeps & springs. Hydrology is an important factor in the presence and function of these specialized habitats. Water quality may also influence the functional success

Interaction / Interdependencies	Description
	of some (e.g., amphibian egg development). Alterations to the conditions which support and maintain these habitats can directly and indirectly affect their continued function and presence on the landscape. Specialized terrestrial habitats are also important system elements. These can include hibernacula (e.g., for snakes), mature woodlands which can support cavity trees (bat maternity roosting), interior habitat, etc. Providing for these specialized habitats is critical to the protection of biodiversity and habitat functions.
Terrestrial and Aquatic Biodiversity	The presence of diverse of habitat types directly influences terrestrial and aquatic biodiversity. Loss of biodiversity leads to the loss of ecosystem functions affecting water resources and the NHS. Specialist species are more sensitive to changing habitat conditions and are typically more susceptible to climate change and other changes causes by human activities. A loss of native species biodiversity provides an opportunity for invasive species to either out-compete weak native populations or invade unoccupied territory in both terrestrial and aquatic habitats.
Agricultural Practice and the Natural Environment	Agricultural land uses have a direct and important relationship to the water resource system. Water quality and quantity in the local water resource system are critical to the agricultural community for both agricultural production and as rural residents (e.g., wells). The agricultural community are also land stewards living on and with lands that support natural heritage and water resource features and areas. The role and relationship between Halton's agricultural community and the natural environment systems should be further explored to ensure that agricultural lands and the natural environment can continue to support one another.

5.2.1. A Climate Change Lens

Climate change is influencing our natural environment and will affect both the NHS and water resources in Halton. To name but a few impacts: climate change can create larger, more frequent storm events, longer and more severe periods of drought, is increasing temperatures which is changing species distribution, including the spread and impact of invasive species, etc. The effects of climate change on our natural systems are difficult to capture and reflect into land use planning. What we do know is that robust, connected systems are our best way of supporting resilience in the face of

a changing climate. Further, it is important that characterization of system functions and interactions, and any resulting refinements to the system through the land use planning process continue to apply a climate change lens to inform decision-making.

Climate change is additionally being integrated into the IGMS process through a separate technical study being prepared by Sustainability Solutions Group. This study models energy use and greenhouse gas emissions produced over the next 30 years to determine the energy and emissions production of the PGC. It will also model, compare and contrast the PGC with the "business-as-usual" scenario represented by Growth Concept 4 and the "no urban expansion" Growth Concept 3B. This technical study builds upon a previous comparative analysis that evaluated the emissions of four different Growth Concepts (SSG 2021). The climate change technical study will be available as a technical appendix to the Preferred Growth Concept Report (Region of Halton, 2022). Readers are directed to these technical studies for additional consideration of climate change and its influence on the land planning process.

5.3. Impacts: Assessment, Avoidance, Mitigation

A comprehensive assessment of impacts will be developed as more detailed studies are conducted and as planned land uses are refined (e.g., from 'community lands' to block plan and finally plan of subdivision). The assessment of impacts is to be informed by knowledge and understanding of the features, functions and interactions present on the landscape and the nature of the proposed work(s).

An impact assessment is to discuss direct, indirect (including induced impacts such as occupancy-related impacts [e.g., domestic animals]), and cumulative impacts at both the feature and system-scale. Impacts are to be assessed in terms of their likelihood of occurrence, the magnitude of the impact on the feature(s), function(s) and system, geographic extent, timing (e.g., during sensitive biological periods) and duration.

The following sequential approach to addressing potential impacts should be applied:

- **Avoid** creating the impact(s). This can be achieved through a range of actions including protecting features and functions, siting, management techniques and design.
- **Minimize** the Impact(s). Where impacts cannot be avoided, effort should be placed on opportunities to minimize impacts to the extent possible (e.g., selecting a road alignment that crosses at the narrowest point of a valley)
- **Mitigate** remaining impact(s). After effort has been demonstrate for avoiding and minimizing impacts, all remaining impacts are to be mitigated.

A mitigation strategy may include a broad range of measures but will typically involve tools or interventions that act at the spatial and/or functional scale(s) suitable to address the identified impact (e.g., landscape-level vs. feature-specific). Some common measures include:

- **Linkages.** As the PGC urbanizes, landscape permeability will decline, and fragmentation of the system and isolation of its component features can occur. Identification and implementation of linkages forms a critical component of the NHS to maintain connectivity within and avoid or minimize fragmentation of the system. The RNHS includes linkages; additional linkages may be identified as understanding of the functions, interactions and interdependencies between features and areas is developed (e.g., site-scale linkage to connect wetland and upland habitat for amphibians).

- **Buffers.** Buffers are an important component of a mitigation strategy where development is proposed adjacent to the NHS and are components of the RNHS. At the system-scale, buffers represent a primary mitigation tool, however in planning and implementing mitigation, they are to be considered as one part of a mitigation strategy. Buffers are to be informed by both existing conditions and sensitivities, and the anticipated impacts that a buffer is being used to mitigate. Guidance for the planning and design of buffers at future planning stages is provided below.

  Buffers may be prescribed in policy (e.g., Greenbelt Plan NHS, Vegetation Protection Zones) or informed by guidance documents (e.g., Sustainable Halton 3.02 Natural Heritage Definition and Implementation and Halton's Environmental Impact Assessment Guideline 2020) as may be prepared or updated from time to time.

- **Low Impact Design.** Most commonly applied to stormwater management, the principle(s) of Low Impact Design (LID) can be applied to a broad range of development activities (e.g., bird friendly design / windows, shielded lighting, etc.).

Mitigation strategies are to be developed at future stages of the land use planning process to support the ROP policy requirement of 'no negative impacts on the natural features and areas or their ecological functions' of the NHS (ROP s. 118.2 (b)).

5.4. Enhance & Restore

Enhancements to key features provide opportunities to increase natural cover within the NHS. Through this, several benefits are achieved:

- **Form**. Under-represented habitats can be added into the system, feature shape(s) can be improved to reduce edge effects, etc.

- **Function**. Adding to habitat diversity or increasing the size of a specific habitat type can support or increase biodiversity, protect sensitive species, or add specific specialized functions (e.g., construction of hibernacula).
- **Resilience**. A robust and connected system is more resilient to pressures and change. Implementation of system enhancements will support system resilience, including to the effects and impacts of climate change.

Enhancements to key features are components of the RNHS and are identified at the system scale. These enhancement areas are to be assessed & recommendations are made as more detailed information is obtained through further study (e.g., a subwatershed study). As part of the study, an enhancement framework (or similar) should be prepared to confirm and refine recommendations for system enhancement and provide direction on the best approach(es) to enhancing the system informed by detailed characterization and meet the goal and objectives of the natural heritage policies of the ROP. For example, creation of amphibian breeding habitat in proximity to upland forest to address under-representation of this habitat type on the landscape; or creation of meadow habitat to support habitat diversity in the local landscape.

In addition to enhancements, detailed studies should identify opportunities to restore features within the NHS. This may include actions such as invasive species management, fill or removal of dumped materials, or feature restoration(s).

As summarized in **Section 4.1**, mapped enhancement opportunities occur within the PGC and will be confirmed, refined and implemented through future stages of land use planning. Enhancement to Key Features are considered part of the RNHS. Refinements to system enhancements may be considered in accordance with ROP s. 116.1 as informed by detailed study and a refined understanding of features, their functions and opportunities that can best support the system.

5.5. Monitor

Monitoring is the process of observing and tracking the progress or state of something over time. With respect to the RNHS in land use planning, monitoring can be used to track changes in conditions over time or observe how well something if functioning, including:

- **Function of Mitigation Measures**. Mitigation measures are intended to address potential for impacts to the RNHS. Monitoring can be used to assess how effective they are at performing for their intended use. For example how effective wildlife crossing structures and exclusion measures are at preventing or minimizing animal road mortality.
- **Assessing 'No Negative Impact': Biodiversity & Impacts**. Developments will include a plan to address potential impacts to the RNHS to achieve 'no negative impact'. Monitoring is an important tool to assess the successes or issues with these plans. This can be achieved through

monitoring biodiversity and species assemblage over time as indicators of ecological change, successful implementation of enhancements (e.g., achieves function target(s)), or identifying where and what types of impacts are occurring (e.g., informal trails, invasive species, etc.)

Monitoring is an important tool to identify successes and issues; however, the purpose of monitoring is to support good decision making. As such, it is equally important that monitoring outcomes be used to refine approaches and require adaptation of land planning practices to further Halton in achieving its vision, goal and support policies for the RNHS.

6. SUMMARY

A Preferred Growth Concept (PGC) has been identified to address growth requirements for Halton Region. This memo:

- Reaffirms Halton's vision and goal for the NHS and how the PGC and IGMS process support them;
- Summarizes current policy direction informing land use planning, including the IGMS process;
- Summarizes the natural heritage system (NHS) and water resource features and areas within the PGC;
- Considers the PGC in comparison to the evaluated concepts and its performance at avoiding and minimizing potential impacts to the NHA and water resource features and areas; and
- Provides preliminary guidance for future studies and land use planning:
    - Outlines how the natural heritage is addressed through the planning process to support the Region's vision and policies for the NHS;
    - Recognizes and provides an overview of system interactions & interdependencies to be considered through future study;
    - Reaffirms a hierarchy for land use planning and the NHS (avoid, minimize, mitigate) and the assessment of impacts;
    - Recognition of the importance of system enhancement and restoration to achieve Halton's vision and goal for the NHS, and in considering natural heritage planning through a climate change lens.

The information and content provided in this memo reflect Halton's existing process and ROP natural heritage policies and vision and is informational. Specific guidance may be developed to inform studies (e.g., development of a subwatershed study guideline) and will supersede any information presented herein.

As discussed through this memo, the IGMS process supported a systems-based approach to natural heritage planning by including the RNHS as a 'take out' to the growth concepts. This was carried

forward to the selection of the PGC, ensuring that a connected RNHS can be maintained as the Region grows. Similarly, by using the RNHS as an existing land use designation it is treated as a permanent component of the Region's landscape, thus supporting Halton's planning vision.

The goal for the RNHS and policies pertaining to the RNHS are supported at this early stage of land use planning through ensuring that land planning has regard for the RNHS. Further work to characterize and develop a comprehensive understanding of the system will be completed through detailed studies to support the next stages of the land use planning process. This may include refinements to the RNHS in accordance with ROP s. 116.1 and continuing to support early and thoughtful integration of the RNHS and the protection of water quality and quantity in land planning processes (ROP s. 118, 145(9)).

This characterization is to include a comprehensive evaluation and consideration of the interactions and interdependencies between the NHS and water resource and assess and address potential impacts associated with the transition of lands from rural to urban through avoidance, minimization and mitigation, enhancement and restoration to ensure that the form, function and biodiversity of the system is protected for current and future generations.

As noted through the Phase 1 memo (NSE 2020) and briefly above, the current in-force Official Plan does not include a Water Resource System (WRS). The Region is committed to identifying a WRS in accordance with provincial guidance through the Regional Official Plan review. Once developed, more detailed consideration of the system, its composite elements and its interaction and influence on other systems (e.g., agricultural, natural heritage) are to be considered at future planning stages. Of specific note, concerns have been raised through consultation with the Halton Natural Heritage Advisory and Halton Agricultural Advisory Committees regarding potential impacts to water quality and quantity for rural settlements and agricultural landowners / operators. These have been addressed at the landscape scale through the IGMS process and in the selection of the PGC. As discussed in **Section 3**, detailed study could not be completed at this broad scale; detailed study through next stages of work will be required to develop a refined understanding of interactions and address these concerns in additional detail. Water quality, quantity and function will be further addressed and recognized through the preparation of the WRS for Halton with additional policy-based considerations in the new Official Plan.

Finally, planning for and consideration of climate change and its effect on our water resource and natural heritage systems must continue. While some consideration of climate change has been integrated into the current IGMS process, a more fulsome consideration of its influence on land development planning and how implementation might strive to mitigate for and build resilience to climate change should be further explored through future planning processes.

REFERENCES

North-South Environmental (NSE) 2020. Technical Memorandum: Growth Concept Evaluation – Natural Heritage System and Water Resources. North-South Environmental Inc. (NSE). December 2020.

Region of Halton 2020. Environmental Impact Study Guideline.

Region of Halton 2022. Preferred Growth Concept Report. February 2022.

Sustainability Solutions Group (SSG) 2021. Halton Region Integrated Growth Management Strategy: Growth Concepts – Comparative Greenhouse Gas Emissions Assessment. June 2021.

ATTACHMENT 1 | CONSTRAINTS ASSESSMENT – POLICY CONSTRAINT ASSESSMENT

Halton Growth Concepts Natural Heritage System and Water Resources Impact and Constraints Assessment Framework

Prepared by Halton Region Policy Planning and North-South Environmental Inc., Growth Concepts Technical Memo Appendix – December 2, 2020

(NH = Natural Heritage System Features and Areas; WR = Water Resource / Hydrologic Features or Areas)

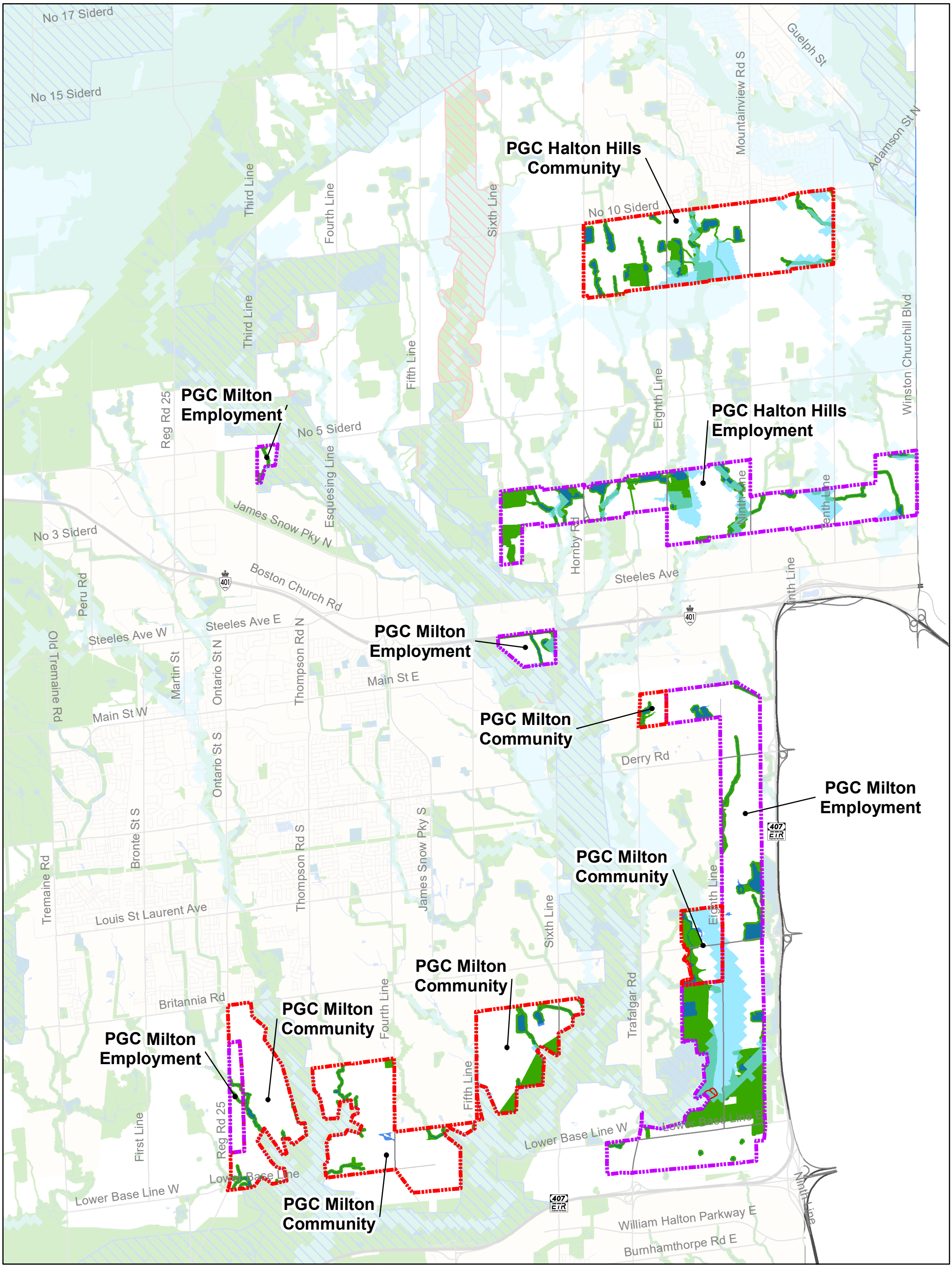
Feature / Area	NHS	WR	Halton Regional Official Plan NHS Component	Constraint High/Medium/Low
Significant Wetlands *As defined under s.276.5 of the Regional Official Plan (ROP)*	X	X	x	High
Wetlands *All features meeting the definition of a wetland in accordance with the definition provided in the PPS and meeting the 50/50 rule for delineation under OWES*	X	X	X	High
Significant Woodlands *As identified using provincial and/or municipal guidelines (where they meet or exceed provincial guidance).*	X		X	High
Life Science Areas of Natural and Scientific Interest (ANSI)	X		X	High
Earth Science Areas of Natural and Scientific Interest (ANSI)	X		X	High
Fish Habitat	X		X	High
Highly Vulnerable Aquifers		X		Low
Significant Groundwater Recharge Areas		X		Low
Permanent and Intermittent Streams / Watercourses	X	X	X	High
Inland Lakes / Inland Lakes and their Littoral Areas	X	X	X	High
Regulated Flood Plains as determined, mapped and refined from time to time by the appropriate Conservation Authority			X	High

Feature / Area	NHS	WR	Halton Regional Official Plan NHS Component	Constraint High/Medium/Low
Sand Barrens, Savannahs, Tallgrass Prairies	X		X	High
Linkages	X	X	X	Medium
Buffers	X	X	X	High

FIGURES | PREFERRED GROWTH CONCEPT

Natural Heritage System & Water Resource Features and Areas
Preferred Growth Concept

January 7, 2022



IGMS PGC - Employment
IGMS PGC - Communtiy
Minor
Highway
Major
Urban Boundary

Water Resource Areas
Water Resource Features
Draft Regional Natural Heritage System

Provincial Growth & Green Belt Plan Natural Heritage System

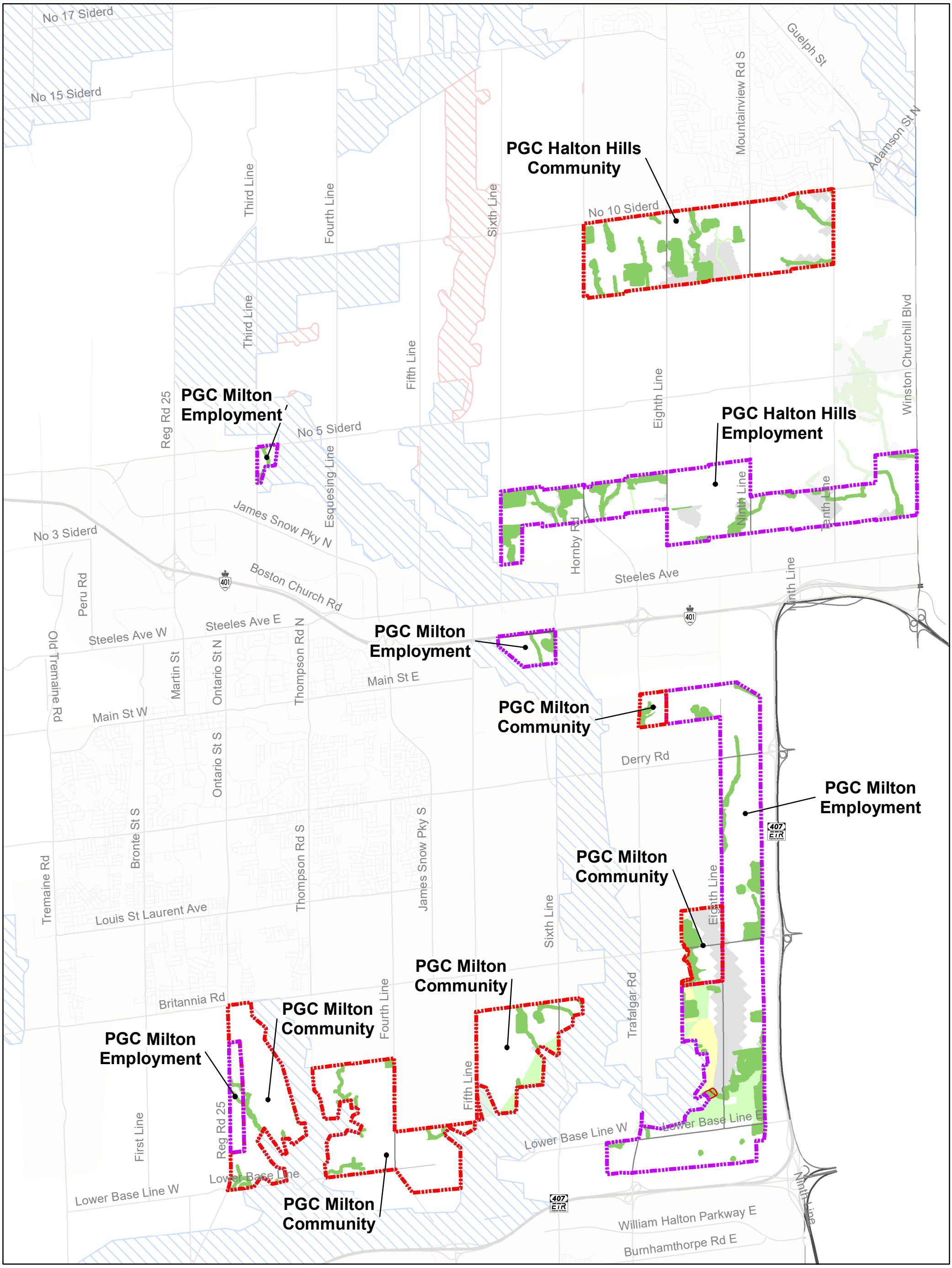
Greenbelt Plan
Growth Plan for the Greater Golden Horseshoe

0 0.5 1 2 3 4 Kilometers

Halton REGION

Constraints
Preferred Growth Concept

January 7, 2022



IGMS PGC - Employment
IGMS PGC - Communtiy
Minor
Highway
Major
Urban Boundary

IGMS NHS Evaluation Constraints
High
Medium
Low
Other

Provincial Growth & Green Belt Plan Natural Heritage System
Greenbelt Plan
Growth Plan for the Greater Golden Horseshoe

0 0.5 1 2 3 4 Kilometers

Halton REGION