



# FUTURE URBAN AREA CONCEPTUAL MASTER PLAN

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# CONCEPTUAL MASTER PLAN

## VOLUME 1: COMMUNITY STRUCTURE PLAN AND KEY POLICY DIRECTION

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## EXECUTIVE SUMMARY

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Markham's Official Plan provides for new neighbourhood and employment lands in north Markham. The identification of these lands for inclusion within the City's urban area is one of the components of Markham's strategy to accommodate assigned population and employment growth to 2031. The neighbourhood and employment lands encompass approximately 1,300 hectares (3,200 acres), north of Major Mackenzie Drive and east of the Hydro Corridor and Woodbine Avenue (see Figure 1).

The Official Plan identifies these lands as 'Future Urban Area' and outlines a comprehensive process to be undertaken prior to development occurring on the lands (see Figure 2). A key component of the planning process is the development of a Conceptual Master Plan (CMP). The Conceptual Master Plan is intended to provide a high level comprehensive Community Structure Plan for the entire FUA lands to form the basis of more detailed secondary plans for smaller areas (concession blocks).

The CMP was informed by the findings of a number of City-led concurrent background studies, including a subwatershed study, master transportation, water and wastewater studies, and planning and urban design studies. The studies were undertaken in a coordinated, integrated manner, each following a similar three-phase process. The CMP also followed a Municipal Class Environmental Assessment (EA) process with respect to the transportation, water and wastewater studies, satisfying Phases 1 and 2 of the Municipal Class EA process required for the road and servicing projects.

After intensive analysis and consultation with agencies, landowners and the public over the course of four years, the Conceptual Master Plan is now complete. This document comprises Volume 1 of the CMP documentation. The supporting subwatershed, transportation, water and wastewater studies are documented in detail in Volumes 2 and 3, available under separate cover.

### Volume 1: Community Structure Plan and Key Policy Direction

This document provides an overview of the Conceptual Master Plan background studies as well as the resulting Community Structure Plan and associated key policy direction for the next stage of the planning process for the FUA lands, which is the review and approval of secondary plans and supporting master environmental servicing plans that will the new communities in north Markham.

The vision for the new communities to be developed in the FUA reflects the vision of sustainable growth outlined in the Markham Official Plan 2014 and York Region Official Plan 2010. The Official Plan requirements were distilled into a set of guiding principles that collectively provide for the development of sustainable, healthy, compact and complete new communities. The principles, consolidated in Table 1, are organized under the broad headings of: protection and enhancement of the natural environment; building complete, compact communities; increasing travel options; maintaining a vibrant and competitive economy; and adopting 'green' infrastructure and development standards.

The Community Structure Plan (identified in Figure 12) provides a high level community structure across all of the FUA lands consistent with the guiding principles. The Plan identifies a protected

Greenway System, a transportation network, an open space network, and broad land use categories which together deliver the structural elements of the new communities and employment area to be developed in the Future Urban Area.

The Plan represents a balance between the Official Plan objectives of protecting and enhancing the natural environment and developing compact, complete new communities to accommodate growth. This balance was derived from intensive, integrated analysis which weighed the findings of the supporting subwatershed, transportation, servicing and planning studies, as well as consideration of existing land uses and public input. The key findings and strategies of each of the supporting studies are provided in this document.

The broad land use components (Residential Neighbourhood Area, Mixed Use Neighbourhood Corridor, and Mixed Use Regional Corridor) in the Community Structure Plan provide for a range of housing types (from ground oriented units to apartments), schools, parks and open space, as well as appropriate locations for retail and service uses, all at transit-supportive densities. These lands are being planned to support an overall density of 70 residents and jobs per hectare and 20 units per hectare consistent with the York Region Official Plan 2010, accommodating a population of approximately 45,000 residents.

Approximately 16,000-18,000 jobs are anticipated within the Community Structure Plan, consisting of approximately 5,000 jobs within the Residential Neighbourhood Area and Mixed Use Corridors, and 11,000-13,000 jobs being accommodated with the Employment Area north of Elgin Mills Road. The Employment Area is intended to accommodate primarily general employment uses with opportunities for business park uses and ancillary retail and service at appropriate locations. The transportation network consists of a series of arterial and collector roads that also form the basis of the active transportation and transit systems.

Building on the Community Structure Plan and the findings of each of the supporting studies, key policy direction for secondary plans, organized according to the guiding principles, is provided in Table 2.

With the completion of the Conceptual Master Plan, the next step in the detailed planning for the FUA is the submission, review and approval of secondary plans, including supporting master environmental servicing plans and community design plans. It is anticipated that components of the Community Structure Plan will be further refined as a result of additional analysis and consultation undertaken during the preparation of these plans, or through subsequent EA processes. Phasing plans will also be required for each secondary plan area. At minimum, phasing plans are expected to have regard for development occurring in an orderly progression, with regard for delivery of key infrastructure and providing for elements of a complete community in each phase.

Urban design guidelines to guide community design plans, a Community Energy Plan to identify means of reducing energy demand in the new communities, and associated financial analysis are also underway to further inform MESP's and secondary plans.

## 1.0 INTRODUCTION

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### 1.1 Purpose of the Conceptual Master Plan

Markham's Official Plan 2014<sup>1</sup> provides for new neighbourhood and employment lands in north Markham. The identification of these lands for inclusion within the City's urban area is one of the components of Markham's strategy to accommodate assigned population and employment growth to 2031. The neighbourhood and employment lands encompass approximately 1,300 hectares (3,200 acres), generally bounded by Major Mackenzie Drive to the south, the Hydro Corridor and Woodbine Avenue to the west, the northerly City limits and Elgin Mills Road to the north, and Warden Avenue and Robinson Creek to the east (see Figure 1).

The Official Plan identifies these lands as 'Future Urban Area', and outlines a comprehensive planning process to be undertaken prior to development occurring on the lands. A key component of the planning for the Future Urban Area (FUA) is the development of a Conceptual Master Plan (CMP). The CMP is intended to identify a high level Community Structure Plan along with associated policy direction to form the basis of subsequent secondary plans and development applications. The Community Structure Plan identifies structural land use categories, a high level transportation and servicing system, an open space system and major community facility requirements. The policy direction addresses the requirements for sustainable community development as identified in the York Region and Markham Official Plans, as well as provincial and regulatory agency requirements.

The CMP is intended to be endorsed by Markham Council prior to the approval of secondary plans, which will be adopted as statutory amendments to the 2014 Official Plan. Following approval of secondary plans, plans of subdivision and site plans will be submitted for review and approval prior to building permit issuance.

### 1.2 Conceptual Master Plan Process

The Conceptual Master Plan is informed by the findings of a number of concurrent City-led supporting studies including a subwatershed study, transportation study, and water and wastewater servicing studies, in addition to planning studies (see Figure 2). These supporting studies were undertaken in a coordinated manner, each following a similar three phase process. Phase 1 consisted of background, characterization and model development for each of the disciplines. In the Phase 2 impact assessment stage, preliminary land use concepts were tested against the findings and evaluation criteria established in Phase 1 to arrive at a preferred Community Structure Plan. Implementation strategies are being finalized in Phase 3.

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<sup>1</sup> Partially approved by the Ontario Municipal Board on October 30, 2015, May 26, 2016 and April 17, 2017.

Throughout the CMP exercise it was anticipated that individual secondary plans and accompanying master environmental servicing plans (MESPs) and community design plans (CDPs) would be prepared for each of the concession blocks within the FUA. For the purposes of the CMP, the individual concession blocks are referred to in this report as the 'Employment Block', 'Berczy Glen Block', 'Angus Glen Block' and 'Robinson Glen Block', as identified in Figure 3.

### **1.3 Municipal Class Environmental Assessment**

The CMP supporting studies are following a Municipal Class Environmental Assessment (EA) process under the Environmental Assessment Act. The EA Act requires that an approved EA process be undertaken prior to construction of certain municipal infrastructure projects (e.g., certain roads, water and wastewater infrastructure). The EA process involves identifying the problem or opportunity to be addressed, developing and evaluating a range of alternative solutions, providing opportunities for public input and identifying a preferred solution.

The Municipal Class EA process allows a proponent to address a broad range of related infrastructure projects in one document (i.e., Master Plan Approach). The CMP has been carried out in accordance with this approach, and addresses Phases 1 and 2 of the Municipal Class EA process for the transportation, water and wastewater projects that are subject to the Class EA. Phases 1 and 2 of the EA process, including the transportation, water and wastewater master plans and public consultation, are documented in Volume 2 of the Conceptual Master Plan, under separate cover. A summary of each of these studies is provided in this document.

### **1.4 Public and Stakeholder Consultation**

The development of the CMP was undertaken through a multi-disciplinary City staff and consulting team in close consultation with York Region, the Toronto and Region Conservation Authority (TRCA), the Ministry of Natural Resources and Forestry (MNR), school boards and participating landowners through a series of regular technical advisory committee and steering committee meetings over the course of four years. Non-government organizations, agencies, utilities, adjacent municipalities and First Nations and Métis communities were also consulted at key milestones in the process through workshops and one-on-one meetings.

Input from the public was solicited through reports to Council and Public Information Centres (PICs). The first PIC, held in January 2015, provided an opportunity for the public to learn about the CMP process and the nature of the individual supporting studies, and also to provide input to be considered in the development of land use concepts. A second PIC was held in November 2016 to introduce, and solicit input on, a preliminary Community Structure Plan and associated policy direction. Information regarding the CMP work was also made available on the City website during the course of the exercise.

Generally, public input related to concerns with anticipated additional traffic, the need for transit and transit-supportive land uses, and the need for parkland and a connected Greenway System in the new communities. First Nations and Metis comments also pertained to the management of archaeological resources when found and also energy sources being considered. These comments were considered in the refinement of the Community Structure Plan. Information regarding the completion of the Conceptual Master Plan was also made available to the public. A detailed summary of public and stakeholder consultation throughout the CMP exercise is provided in Volume 2 of the Conceptual Master Plan.

Further opportunities for public input on planning within the Future Urban Area will be available during the review and approval of the statutory secondary plans, and through the processing of development applications.

## **1.5 Conceptual Master Plan Documentation**

The full documentation for the CMP is organized within three separate volumes as follows:

- Volume 1: Community Structure Plan and Key Policy Direction - provides an overview of the CMP process, and a summary of the work undertaken to date, including identification of a Community Structure Plan and key policy direction for secondary plans;
- Volume 2: Transportation, Water and Wastewater Master Plans – documents the transportation, water and wastewater servicing studies;
- Volume 3: Subwatershed Study - documents all phases of the Subwatershed Study.

The contents of Volume 1 (this document) are outlined below. Volumes 2 and 3 will be available under separate cover to support the preparation of master environmental servicing plans for individual secondary plan areas, and the future detailed environmental assessment processes for specific infrastructure projects. All three volumes will be available on the Markham website once finalized.

### Volume 1: Community Structure Plan and Key Policy Direction

A 2016 Interim Report provided a summary of the Conceptual Master Plan work undertaken in Phase 1 for each of the supporting studies, and the first stage of Phase 2 impact assessment. Comments received on the Interim Report were considered in the second stage of Phase 2 impact assessment testing. Phases 1 and 2 of the supporting studies are now substantially complete and Phase 3 is nearing completion. This Volume 1 document represents an update of the Interim Report. It provides an overview of the work completed to date in all three Phases of each of the supporting studies and identifies the preferred Community Structure Plan and key policy direction for secondary plans resulting from this work. Next steps in the planning process for the Future Urban Area lands are also identified.



Remaining Phase 3 work for the supporting studies will continue to inform the development and review of master environmental servicing plans and secondary plans for each of the concession blocks within the Future Urban Area.

Volume 1: Community Structure Plan and Key Policy Directions consists of eight (8) chapters as follows:

- Chapter 1 Outlines the Conceptual Master Plan process;
- Chapter 2 Provides an overview of proposed and existing land uses in the Future Urban Area;
- Chapter 3 Provides the vision and guiding principles for the development of new communities in the Future Urban Area;
- Chapter 4 Summarizes the subwatershed study;
- Chapter 5 Summarizes the transportation, water and wastewater studies;
- Chapter 6 Describes the preferred Community Structure Plan;
- Chapter 7 Provides key policy direction for secondary plans; and
- Chapter 8 Identifies next steps in the planning for the Future Urban Area lands.

## 2.0 PROPOSED AND EXISTING LAND USE

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### 2.1 Proposed Land Use - Official Plan 2014

Of the total 1,300 hectares within the Future Urban Area, approximately 975 hectares are developable, with the remaining 325 hectares consisting primarily of natural heritage lands. These natural heritage lands are identified as part of the 'Greenway System' structural element in the Official Plan, with a corresponding 'Greenway' land use designation (see Figure 4).

Approximately 700 hectares of the developable lands are designated 'Future Neighbourhood Area' in the Official Plan. These lands, located primarily between Major Mackenzie Drive and Elgin Mills Road, were identified in Markham's growth strategy to accommodate a population of approximately 38,000.

Approximately 275 hectares of the development lands, north of Elgin Mills Road, are designated 'Future Employment Area'. The growth strategy anticipated approximately 19,000 jobs within the Future Urban Area, with the majority of jobs located within the 'Future Employment Area' lands.

### 2.2 Existing Land Use

Existing land uses within the Future Urban Area consist of a combination of primarily agricultural, rural residential and open space uses. In addition, the lands contain natural heritage features and cultural heritage resources, as described below.

#### 2.2.1 Natural Heritage Features

A number of watercourses associated with the Berczy Creek, Bruce Creek, Eckardt Creek and Robinson Creek traverse the Future Urban Area, mainly in a north-south direction. A number of small drainage features are also present on the landscape. Other natural heritage features include wetlands and woodlands not directly associated with the watercourses. The natural features provide habitat for various animals, birds, and fish, including a number of endangered species.

Most of the natural features and the broader natural heritage system of which they form a part, have been identified through the background studies that informed the identification of the 'Greenway System' in the Official Plan. The extent of the Greenway System throughout the Future Urban Area was refined through the subwatershed study, including the delineation of a proposed east-west ecological corridor between the Berczy and Bruce Creeks which is identified symbolically in the Official Plan.

### **2.2.2 Cultural Heritage and Archaeological Resources**

Markham's *Register of Property of Cultural Heritage Value or Interest* identifies 28 buildings of cultural heritage interest within the Future Urban Area lands (see Appendix A). Of the 28, seven have been designated for protection under the Ontario Heritage Act.

The remaining 21 properties of cultural value or interest have been given a preliminary evaluation rating based on examination of existing photographs and documentation contained in the *Register* and property files, as well as examination of historic maps, deed abstracts and census data. This preliminary evaluation assigned a Group '1' or Group '2' rating to most of the remaining 21 properties. A Group '1' rating, assigned to 5 properties, indicates buildings of major significance and importance to the City and worthy of designation under the Ontario Heritage Act. A Group '2' rating, assigned to 11 properties, indicates buildings of significance and worthy of preservation. A Group '3' rating, indicating buildings considered noteworthy, has been assigned to one property, and three have been assigned a combination Group '2'/'3' rating. One property has not yet been assigned a Group rating. The majority of the 21 non-designated properties will require in-depth research before a final evaluation using Markham's heritage building evaluation system can be undertaken.

Potential archaeological resources within the Future Urban Area lands were also evaluated based on mapping provided by York Region. The mapping indicates that although the majority of the FUA lands have potential for archaeological resources given their proximity to watercourses, there are no known archaeological sites within the Future Urban Area lands that need to be considered in the Conceptual Master Plan. Further archaeological assessments will be undertaken at the secondary plan or plan of subdivision stages.

### **2.2.3 Angus Glen Golf Course (Angus Glen Block)**

The Angus Glen Golf Course currently operates within a large portion of the Angus Glen Block. Twenty-nine fairways are currently configured on both tableland and Greenway System lands within the Block. An additional seven fairways are located south of Major Mackenzie Drive in the existing Angus Glen community. Long term development within the Angus Glen Block assumes the reconfiguration of the northerly fairways to allow for the ultimate continued operation of an 18-hole course (11 holes along both sides of Berczy Creek north of Major Mackenzie Drive plus the existing 7 holes south of Major Mackenzie Drive) while allowing for development of tablelands for neighbourhood uses. An interim condition of a 27-hole course incorporating the existing holes along the north side of Major Mackenzie Drive is also being contemplated. The ultimate layout of the golf course and the timing of redevelopment of the course, will have implications for infrastructure improvements (particularly the collector road network) and phasing of development.

### **2.2.4 Angus Glen Community Centre**

The existing Angus Glen Community Centre complex, located within the Angus Glen Block, will be integrated into the new community through new road and pedestrian connections, and will form part of the integrated parks and open space network being planned to provide connectivity throughout the entire Future Urban Area.

### **2.2.5 Utility Corridors**

A 30-40 metre wide Hydro One transmission corridor runs in a north-south direction at the west limit of the neighbourhood lands in the Future Urban Area. The Corridor is part of a hydro distribution system extending from the City of Toronto to northern York Region.

An underground pipeline for the transmission and distribution of natural gas traverses the northerly portion of the Employment Block, just south of 19<sup>th</sup> Avenue. These lands may be owned, or subject to easements, in favour of TransCanada Pipelines Limited or local distributors. The lands are intended to be incorporated in the planned land use structure (i.e., employment uses) with appropriate setbacks from the easements.

Appropriate interface conditions with these corridors will be assessed, and opportunities explored for using both corridors for secondary open space, natural heritage, trails, community gardens and agricultural use, where appropriate.

## **2.3 Surrounding Land Use**

The 'Future Neighbourhood Area' lands are north of the established Angus Glen and Berczy communities (across Major Mackenzie Drive) and the Jennings Gate/Heritage Hill residential estate communities west of Warden Avenue, and east of the Cathedral and Victoria Square communities beyond the Hydro Corridor. To the north, the employment land portion of the FUA extends to the northerly City limit, north of 19<sup>th</sup> Avenue. The 'Future Neighbourhood Area' lands are also adjacent to agricultural lands (designated 'Countryside') north of Elgin Mills Road.

The Community Structure Plan and associated policy direction acknowledge the need for appropriate interface conditions with the adjacent urban and agricultural communities. For the Berczy Glen Block, key considerations include the estate residential communities immediately to the south (Jennings Gate Estates/Heritage Hills Drive), and the Victoria Square and Cathedral communities to the west across the Hydro Corridor. Regard will be had for ensuring appropriate transition between these communities and the more compact neighbourhoods anticipated in the Berczy Glen Block. Providing connectivity and integration with these existing communities also needs careful consideration.

Primarily ground-oriented residential development characterizes the communities on the south side of Major Mackenzie Drive opposite the Angus Glen and Robinson Glen Blocks. Regard will be had for appropriate transition, given the need to plan for higher transit-supportive densities on the north side of the planned Major Mackenzie Drive rapid transit corridor.

The lands north of Elgin Mills Road, east of Warden Avenue are expected to continue in agricultural use to 2031, as reflected in the 'Countryside' designation in the Official Plan. Appropriate interface conditions between land uses within the 'Countryside' lands and the proposed urban development south of Elgin Mills Road and west of Warden Avenue need to be considered, including provincial requirements for the interface between agricultural and urban land uses.

### 3.0 THE VISION FOR NEW COMMUNITIES

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The new neighbourhoods and employment lands in the Future Urban Area are being planned in accordance with the vision of sustainable growth outlined in Markham's Official Plan 2014 and the York Region Official Plan 2010.

Consistent with this direction, the proposed vision statement for the new communities in the Future Urban Area is as follows:

*“New neighbourhood and employment lands in the north Markham Future Urban Area will be designed as healthy, compact and complete communities. These communities will reflect the City’s leadership in sustainable development, with resilience and innovation being cornerstones of community design.”*

#### 3.1 Planning for Healthy and Resilient Communities

A successful community consciously seeks to improve the health of its citizens by making public health a priority. Physical, social, and mental well-being are the necessary components of public health. To ensure these components are achieved, the built environment should be designed to create opportunities to encourage residents to be physically active and socially engaged.

There has been increasing evidence in recent years of the linkage between public health and community design. Studies have identified a number of health outcomes of low density, car dependent communities, including increasing rates of obesity and diabetes and health issues related to traffic-related air pollution. Communities built around the automobile eliminate regular physical activity from daily life, such as walking to school, to the corner store, or to a transit stop.

There is a direct link between community and neighbourhood walkability and physical activity levels. Designing neighbourhoods around pedestrian activity with a high number of destinations within walking distance can create better health outcomes, as well as a lessening of the dependence on automobiles.

A number of built environment elements are associated with active living, including:

- Availability of a range of housing types and densities that meet the needs of a diverse population;
- Proximity to a variety of land uses including shops and services, education and health facilities, and jobs and accessible by walking, cycling or transit;
- An interconnected street network that supports all forms of mobility options;
- Human scale streetscapes that encourage walking and cycling and provide a safe environment for these activities; and
- Accessible public open spaces that offer a variety of passive and active activities.

The correlation between healthy community design and resiliency to climate change is recognized with the understanding that one relies on the other to effect change. Good community design should anticipate climate change impacts and minimize the risk of disruption to the community resulting from gradual increases in temperature or extreme weather events. Subsequent to the adoption of the Official Plan 2014, the Province of Ontario released Ontario's Climate Change Strategy, and more recently a five-year Action Plan which establishes greenhouse gas reduction targets to 2020. A number of the Action Plan items will impact how the built environment is designed and how sustainable technologies are implemented. The planning of new communities needs to anticipate and incorporate policies and community design that will meet these future targets, establishing a road map for effective and responsible growth. The Future Urban Area in north Markham provides an excellent opportunity to achieve these goals and healthy community outcomes.

### **3.2 Guiding Principles**

The Official Plan 2014 identifies the underlying principles needed to ensure the development of healthy and resilient communities throughout the City including the Future Urban Area. The principles are grouped into four main themes:

- Protection and enhancement of the natural environment
- Building compact, complete communities
- Increasing travel options
- Maintaining a vibrant and competitive economy.

Protecting the natural environment means confirming a protected Greenway System through an understanding of the natural systems and their functions, including species at risk; managing groundwater and surface water resources; providing an integrated natural heritage system/open space network that respects ecological sensitivities and supports healthy and active communities; and incorporating natural topography and features as much as possible into neighbourhood design.

Building a compact, complete community means providing a range of housing types and sizes; providing a range of employment opportunities close to where people live; providing for shopping and services in a mixed use, transit-supportive built form; providing for easily accessible parks and open spaces and community facilities; designing walkable neighbourhoods; and achieving densities that support transit. It also means integrating cultural heritage in neighbourhood design; creating identity through public art and landmarks; and ensuring a high quality public realm.

Providing for sustainable travel choices means providing for increased travel options (walking, cycling, transit), and encouraging active transportation by locating jobs and services close to where people live; and also designing street networks and pedestrian connections to facilitate mobility and accessibility.

Maintaining a vibrant and competitive economy means ensuring a range of employment opportunities for local and City-wide residents over the long term, particularly within the ‘Future Employment Area’, with access to efficient transit and road systems.

A fifth over-arching principle in the Official Plan is the adoption of “green” practices at the community, infrastructure, and building levels, including the conservation of energy and water, waste reduction, and the development of resilient, sustainable stormwater management practices.

A consolidated set of principles and parameters for how the Future Urban Area should be developed, consistent with the Markham Official Plan and York Region Official Plan 2010, is provided in Table 1. Direction on how these guiding principles are to be addressed in secondary plans is provided in Chapter 7.

<b>TABLE 1: PRINCIPLES &amp; PARAMETERS FOR PLANNING THE FUTURE URBAN AREA</b>	
	<b>PROTECTING AND ENHANCING THE NATURAL ENVIRONMENT</b>
<b>PP1</b>	Confirm and refine the Greenway System to ensure protection and enhancement of natural heritage features and functions and water resources
<b>PP2</b>	Design with regard for natural heritage and enhance the urban forest – ensure development minimizes impacts to natural features, topography and soils, and enhances tree canopy
	<b>BUILDING COMPACT, COMPLETE COMMUNITIES</b>
<b>PP3</b>	Provide for the daily needs of residents through the organization of residential neighbourhoods, mixed use centres and corridors, and an integrated open space network, all integrated with a transportation network that includes transit and active transportation
<b>PP4</b>	Identify a housing mix that provides for a range of housing types and tenure, including affordable housing
<b>PP5</b>	Identify appropriate locations for mixed use community core areas that provide a focus of retail and community services within reasonable walking distance from the majority of the population, and that are accessible by transit
<b>PP6</b>	Identify an integrated open space network as one of the main organizing elements of the community (including natural areas, parkland and other open space); and ensure the open space network is well connected to the active transportation network
<b>PP7</b>	Identify the community infrastructure (public facility and service) needs of the community through a community infrastructure plan, as well as opportunities for places of worship
<b>PP8</b>	Plan to achieve a minimum density of 70 residents and jobs per developable hectare, and 20 units per developable hectare across the ‘Future Neighbourhood Area’ lands
<b>PP9</b>	Recognize, conserve, promote and integrate cultural heritage resources in community design
<b>PP10</b>	Create community identity through establishment of a high quality public realm, placemaking and a high standard of urban design (distinctive built form, streetscapes, parks and open space, landmarks and views, public art, etc); ensure communities are designed to be accessible by all, regardless of age or physical ability
<b>PP11</b>	Ensure access to local food through opportunities for urban agriculture
	<b>MAINTAINING A VIBRANT AND COMPETITIVE ECONOMY</b>
<b>PP12</b>	Plan for the range of jobs in the ‘Future Employment Area’ lands required to achieve the City’s employment forecasts to 2031, at an overall density of 50-60 jobs per hectare; ensure employment uses are accessible by transit and active transportation networks
	<b>INCREASING TRAVEL OPTIONS (MOBILITY)</b>
<b>PP13</b>	Identify a comprehensive transportation system that emphasizes walking and cycling and transit as increasingly viable and attractive alternatives to the automobile
<b>PP14</b>	Plan for a grid pattern of streets and blocks that provides for a hierarchy of street types that provide appropriate and integrated facilities for walking and cycling; and facilitates an urban form that supports transit use and also increases opportunities for people to walk and cycle
	<b>ADOPTING GREEN INFRASTRUCTURE AND DEVELOPMENT STANDARDS</b>
<b>PP15</b>	Identify best management practices and approaches to stormwater management systems/facilities, water and wastewater systems, and the transportation network to maximize water and energy conservation and resilience at the community level
<b>PP16</b>	Identify best management practices for green buildings to reduce demands on energy, water and waste systems
	<b>IMPLEMENTATION</b>
<b>PP17</b>	Public Engagement – encourage involvement of all stakeholders
<b>PP18</b>	Phasing and Sequencing/Financial Impact – identify general phasing, sequencing and cost of development



## 4.0 SUBWATERSHED STUDY

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The Subwatershed Study is an integral component of land use planning for the Future Urban Area. The purpose of the Subwatershed Study is to describe the location, extent, sensitivity and significance of natural heritage and hydrologic features and functions within the identified study area and evaluate the factors and influences that are important to their sustainability.

The Study establishes goals and objectives for terrestrial natural heritage resources and water resources in accordance with the Provincial Policy Statement 2014, the York Region Official Plan 2010, the Markham Official Plan 2014 and the Rouge River Watershed Plan. The Study also documents existing conditions, assesses potential impacts of existing and future development and recommends management strategies to manage and mitigate the predicted impacts, including comprehensive stormwater management strategies to protect, enhance and restore hydrological functions.

In conjunction with the concurrent development of the Conceptual Master Plan, including transportation and servicing plans, the Subwatershed Study reflects and refines the City's Greenway System and identifies strategies to protect, enhance and restore ecological functions within the system.

The integrated land use planning, subwatershed, transportation and servicing (water and wastewater) studies also addresses linkages and connections between the Future Urban Area and lands outside the Future Urban Area. This relates to infrastructure linkages (roads and servicing), natural heritage linkages and corridors, confirmation/refinement of natural heritage designations outside and neighbouring the Future Urban Area, and identification of restoration and compensation areas to assist with the development of the Future Urban Area.

The Future Urban Area lies within four subwatersheds of the Rouge Watershed, as shown on Figure 5. From west to east, these include the Berczy Creek, Bruce Creek, Eckardt Creek and Robinson Creek subwatersheds.

The Subwatershed Study is being completed in a phased approach as follows:

- Phase 1: Subwatershed Characterization
- Phase 2: Subwatershed Impact Assessment
- Phase 3: Management Strategies and Implementation

A fourth phases involves long term monitoring to evaluate the effectiveness of the management and implementation strategies.

The following sections summarize the key findings in Phases 1 and 2. Phase 3 is currently underway. Once completed, all phases of the Subwatershed Study will be fully documented as Volume 3 of the Conceptual Master Plan.

The findings for Phases 1 and 2 are organized according to six disciplines: hydrogeology, hydrology and hydraulics, fluvial geomorphology, surface water quality, fisheries and terrestrial.

## 4.1 Phase 1 – Characterization

This characterization phase of the Subwatershed Study established an inventory of the existing or baseline conditions for the natural environmental system within the study area. The following are highlights of key baseline conditions for the various components of the natural system.

### 4.1.1 Hydrogeology (Groundwater)

The FUA lies just south of the Oak Ridges Moraine (ORM) in the physiographic region known as the South Slope. The ORM is a 160-kilometre long, east-west oriented ridge of sand, silt and gravel deposits that forms a divide between the Lake Ontario and Lake Simcoe watersheds.

The FUA groundwater characterization was prepared by developing a conceptual hydrogeologic model based on historical groundwater investigations incorporating both regional and local scale data and analyses. This conceptual groundwater model was then incorporated into a fully integrated three-dimensional groundwater/surface water transient numerical model (MIKE SHE) to represent existing conditions and to use in Phase 2 for assessing potential impacts and mitigation related to future land use change. The conceptual model characterization includes:

- The surficial geology of the FUA is dominated by sand and gravel deposits and sandy silt to silty sand till with local areas of glaciolacustrine silts and clay. The overburden thickness is on the order of 50 to 100 metres and is underlain by shale bedrock.
- The shallower sediments include the Halton silt clay till with inclusions of more permeable sand as well as localized areas of more permeable ORM sediments. The underlying sediments include the Newmarket Till (aquitard), the Thorncliffe Formation (aquifer), the Sunnybrook Drift (aquitard) and the Scarborough Formation (aquifer).

The major findings from the groundwater field program included:

- A refinement of the surficial geology map.
- Minimal seasonal variations of groundwater levels (less than 1.5 metres)
- Hydraulic gradients and observations indicating groundwater discharge throughout reaches of Berczy Creek (particularly in the vicinity of Elgin Mills Road), Bruce Creek north of Elgin Mills Road and in the vicinity of Warden Avenue, areas at 19th Avenue and Woodbine Avenue, south of Elgin Mills Road between Warden Avenue and Woodbine Avenue, and the Robinson Swamp.

The groundwater assessment for the baseline characterization involved building the MIKE SHE model utilizing data such as: climate data, topography, land use, streamflow, soil and hydrostratigraphic parameters, groundwater levels and groundwater discharge observations.

The model was then used to establish the following simulated baseline/current conditions:

- Average groundwater recharge – the average within the FUA was 226 mm/year. Within the more permeable sandy areas, recharge is on the order of 300-500 mm/year. Within the lower permeability soils (e.g. tills) recharge can vary and be as much as 100 mm/yr.
- Average depth to water – the depth to water within the FUA is generally less than three (3) metres and is closer to the ground surface along the majority of the stream reaches and Robinson Swamp. It is greater than 10 metres in areas coinciding with topographic highs.
- Average groundwater discharge - discharge occurs as either baseflow to streams through the streambeds or seepage to ground surface where it can evapotranspire or flow to overland to the stream. The simulated discharge locations correlated well with mapped discharge areas (described above) and measured baseflow.
- Robinson Swamp water budget:
  - The evapotranspiration is higher in the swamp than the average within the study area.
  - Groundwater discharge to the Robinson Swamp and the subsequent overland flow accounts for 60% of the average outflow of Robinson Creek.

The water budget analysis indicates that the majority of recharge supporting the discharge locations occurs within the FUA and medium recharge areas contribute the largest volume to the discharge areas. High recharge areas provide the second largest portion of recharge to the groundwater discharge areas in Bruce Creek and Upper Berczy Creek within the FUA. Low recharge areas provide the second largest portion of recharge to the groundwater discharge areas in Lower Berczy Creek.

#### **4.1.2 Hydrology and Hydraulics**

The FUA lies within the middle section of the Rouge River Watershed. Its climatic conditions are characteristic elsewhere in southern Ontario, exhibiting mild winters and hot summers, with precipitation patterns exhibiting a seasonal variation.

The soils and land use conditions within the FUA contribute toward moderate infiltration rates and low runoff potential during storm events. Soils within the area are generally sand, with some areas of silt particularly within areas of the Berczy Creek Subwatershed.

Hydrologic analyses for the Subwatershed Study were completed using the TRCA-approved PCSWMM hydrologic model for the Rouge River Watershed. The model was refined within the limits of the FUA based on the refined watercourses and LiDAR mapping provided as part of the Subwatershed Study. Hydraulic characterization of the regulated watercourses within the FUA was completed using the HEC-RAS hydraulic model.

The reaches of the Bruce and Berczy Creeks which traverse the FUA are regulated watercourses within well-defined riverine systems and regulatory floodplains. The Robinson

Creek at the east boundary of the FUA is also a regulated watercourse within a regulated floodplain. The portion of the FUA within the Eckardt Creek Subwatershed discharges to an urban minor system south of Major MacKenzie Drive, and has no defined or regulated watercourses within the contributing drainage area.

The Regional Storm floodplain was delineated for all watercourses with contributing drainage areas greater than 50 ha. The floodline mapping indicates that the Regional Storm Floodplain is largely contained within the currently defined Greenway, with the exception of portions of the northwest tributary within the FUA and the Berczy Creek Subwatershed.

#### **4.1.3 Fluvial Geomorphology**

The three watercourses within the FUA (Berczy Creek, Bruce Creek and Robinson Creek) and their associated tributaries were assessed using both desktop and field-based methods. The desktop assessment reviewed local geology, physiography and watershed conditions to determine and verify reach delineation for the watercourses. The field program employed both rapid and detailed assessments to characterize the watercourses. A monitoring program was also completed which overlapped with previously established TRCA Regional Watershed Monitoring Network (RWMN) sites. Based on the field program, erosion thresholds were established for the FUA.

The following describes existing geomorphology conditions for the three main watercourses within the study area:

Berczy Creek: based on historical data collected by the TRCA combined with recent monitoring data, results suggest that Berczy Creek is susceptible to development impacts and that downstream sections are already responding to these impacts. The channel is relatively active through channel process of erosion and deposition under existing land use conditions resulting in variable channel characteristics throughout the FUA. It was important to consider this active nature as part of the impact assessment, particularly the potential for downstream impacts.

Bruce Creek: similar to Berczy Creek, this creek is also active but characterized by different dominant processes. The western tributary was adjusting through degradation and planform alterations. The main branch has been historically active through planform adjustment; meander cutoffs were noted both at the upstream and downstream end of the FUA. There is also potential for future cut-offs, specifically within a series of meanders where adjustment was noted on historic aerial photographs. The Bruce Creek's history of meander cut-offs was an important consideration for the impact assessment particularly with respect to proposed crossing locations.

Robinson Creek: this creek is highly variable through the study area due to a number of wetland complexes, online ponds, and channel alteration. The majority of the eastern branch is either poorly-defined or non-existent. Due to a lack of gradient, the area is dominated by wetlands and marshes. There are isolated sections where flow and gradient are sufficient to establish a defined channel over a short distance. In these sections, the substrates are very fine consisting primarily of clay and organic material with a small percentage of fine sand. Robinson Creek is a relatively stable system which is frequently undefined due to various

natural features (wetlands, ponds). The sensitivity due to this lack of definition was a consideration for the impact assessment, particularly in terms of any stormwater that is to be directed to the area.

#### **4.1.4 Surface Water Quality**

Surface water quality monitoring indicates that the existing surface water quality within the FUA is generally of higher quality, with lower concentrations of nutrients, microorganisms, TSS, and most metals compared to literature and reported values for similar land use conditions. Similarly, with the exception of E. Coli, the existing surface water quality demonstrated few Provincial Water Quality Objective (PWQO) exceedances during wet weather conditions. Very few PWQO exceedances were noted for all parameters monitored under dry weather conditions.

Monitoring results indicated that the instream water temperature is generally below the 24 C objective for stormwater discharge in Redside Dace supporting habitat. The dissolved oxygen levels were frequently below the 7 mg/L objective for stormwater discharge.

#### **4.1.5 Fisheries**

The Berczy, Bruce and Robinson Creeks each support diverse communities of resident fishes which is an indication of high water quality in this area. Berczy and Bruce Creeks support several coolwater fish species. Brook Trout, a coldwater species, occurs in Bruce Creek upstream from the FUA, and Mottled Sculpin, another coldwater species, occurs within and upstream from the FUA. Neither of these coldwater species have been reported from Berczy Creek. The Robinson Creek fish community has fewer coolwater species than Berczy or Bruce and is dominated by common warmwater species within the FUA. Berczy, Bruce and Robinson Creeks also provide spawning and nursery habitat for Rainbow Trout, which migrate upstream from Lake Ontario to spawn.

The main branches of the Berczy, Bruce and Robinson Creeks support Redside Dace, an endangered fish species in Ontario and Canada. Protection or enhancement of Redside Dace and their habitat in the Rouge River watershed is considered to be of paramount importance by MNRF and TRCA, although the protection of other species and their habitats are also priorities.

Water temperature monitoring indicated that the main branches of Bruce and Berczy Creeks are in the cool-warmwater thermal regime, which is consistent with the fish communities. Groundwater discharge contributes to this thermal regime.

Field investigations identified areas of groundwater discharge along Berczy Creek immediately downstream from 19<sup>th</sup> Avenue, immediately upstream and downstream of Elgin Mills Road, and approximately mid-way between Elgin Mills Road and the downstream boundary of the FUA. A spring is located on a tributary near to the main branch of Berczy Creek.

Along Bruce Creek, areas of groundwater discharge have been identified just downstream from Elgin Mills Road, and at two locations between Elgin Mills Road and Major MacKenzie Drive. Small ice-free areas were observed at the outlets from two ponds on the golf course

downstream from Warden Avenue, and an area of groundwater discharge was observed along the west branch of Robinson Creek.

Fish sampling at a number of locations along tributaries to Berczy Creek and Bruce Creek have captured common warmwater species including Brook Stickleback, Creek Chub, Blacknose Dace and Bluegill. The latter is presumed to have originated from golf course ponds. The few locations where Brook Stickleback have been captured are in close proximity to the main branches of the creeks or their major tributaries.

Most of the headwater drainage features have been classified in accordance with the TRCA guidelines. Due to the high infiltration rates on the table lands, the majority of the headwater drainage features are ephemeral.

#### **4.1.6 Terrestrial**

The FUA is located in the middle of the Rouge Watershed. The areas of the Berczy, Bruce, Eckardt, and Robinson Creek subwatersheds that make up the FUA Subwatershed study area are located within the Middle Tributaries of the Rouge Watershed. Natural features within the Middle Tributaries are generally considered as being in poor condition, primarily resulting from low amounts of natural cover, urbanization within the southern sections of the subwatersheds, and the agricultural matrix influences throughout the north sections.

Despite the overall poor condition of the Middle Tributaries area, key natural features and locally rare/sensitive flora and fauna species are found within this area, including forest patches within the Robinson Creek headwater complex, occurrence of locally rare/sensitive flora species, and locally rare/sensitive fauna species in the Robinson Creek headwater complex.

The following is a summary of key terrestrial features within the FUA including vegetation communities, plant species, amphibians, breeding birds, and other wildlife observations.

##### *Vegetation Communities*

Natural features represent approximately 253 ha or 19% of the total area within the FUA. Cultural vegetation community types, including meadows, plantations, savannahs, thickets, woodlands, and hedgerows, were the most abundant by area. This is followed by wetland communities and aquatic, swamp community types, and upland forests.

##### *Botanical Species*

A total of 686 vascular plant species were initially recorded in the study area. Of the species reported within the FUA, 16 are provincially rare and 141 are locally significant.

An additional list of vascular plant species for two properties within the Bruce Creek system north and south of Elgin Mills Road, and a third property north of Elgin Mills Road in the Berczy Creek system, included observations for a total of 334 vascular plant species, including 211 native species, 122 non-native species, and one unknown Hawthorn species.

### *Amphibian Species*

Within the FUA and neighbouring lands in the Robinson Creek subwatershed, seven anuran species were documented, including the American Toad, Gray Treefrog, Spring Peeper, American Bullfrog, Green Frog, Northern Leopard Frog and Wood Frog. With the exception of the American Toad, all are considered significant within the jurisdiction of the TRCA.

Based on background information and surveys within the FUA, the overall distribution and abundance of calling frogs and toads within the FUA and adjacent lands appeared to be low. Wetland habitats occupy only 14% of the entire FUA land base, and only a few of these had pond habitat suitable for breeding amphibians. Preferred breeding habitats (i.e., shallow marsh and aquatic vegetation communities) only account for 2% of the FUA, or 7% if shallow marsh communities are included. The latter are seasonal in formation, and tend to be ephemeral; therefore, they may not always result in suitable breeding habitat.

### *Bird Species*

Based on the background information and field studies conducted within the FUA and neighbouring Robinson Creek subwatershed, 117 species of breeding birds were documented; of these, 90 could be confirmed specifically from the FUA. Woodland habitats supported the highest diversity of birds, followed by early successional/agricultural habitats, wetland habitats, and urbanized/residential areas.

### *Other Key Wildlife Species Observations*

Reptile observations were generally based on incidental records within the FUA and adjacent lands. Species that have been observed within the FUA and adjacent lands include Eastern Gartersnake, Eastern Milksnake (listed as 'Special Concern' federally), Midland Painted Turtle, Snapping Turtle (listed as 'Special Concern' federally and provincially), and Pond Slider (introduced turtle species).

Significant wildlife habitat may be present within the FUA and adjacent lands and targeted searches should continue to be undertaken where appropriate habitat is present. Targeted studies would be required to understand the full extent of suitable turtle habitat within the FUA and adjacent lands.

### *Significant Features*

#### *Wetlands*

Nearly a third of the natural area within the FUA is composed of wetland features, the majority of which occur within the floodplains of the watercourse systems and/or are associated with groundwater discharge areas/shallow water tables. From a policy perspective, the majority of wetland features were identified as Provincially Significant Wetlands within the Bruce Creek or Berczy Creek wetland complex. Some isolated wetland features on the tablelands are still under review.

#### *Woodlands*

The woodland and forest feature areas within the FUA are represented by cultural woodlands, plantations, coniferous forest, and deciduous forest types. The range of naturally occurring

and cultural woodland types within and adjacent to the FUA is relatively high including a cross-section of deciduous and coniferous woodland and forest types. Almost all of the woodland and forest features exist within the Greenway system (e.g., of the woodland and forest community series, approximately 94% are within the Greenway). Of particular importance are the forests and woodlands that are relatively rare on the landscape (e.g., the coniferous forests) and those that contain 100 metre interior forested areas.

#### *Significant Wildlife Habitat (SWH)*

A range of potential SWH types exist within the FUA and neighbouring areas of the Robinson Creek subwatershed. Based on the vegetation community types present and the occurrence of key wildlife species, 25 SWH types were flagged as potentially occurring. These include, amongst others, deer winter congregation areas; breeding habitat for a variety of birds; amphibian breeding habitat; bull frog concentration areas; bat maternity colonies; turtle nesting and wintering areas; and animal movement corridors.

The range of candidate SWH identified occurs mostly within the Greenway System; therefore, the form and function of the areas that have been flagged should be protected. Management recommendations to be developed as part of Phase 3 of the Subwatershed Study will be used to direct potential enhancements that reinforce SWH that is within the Greenway System, and/or identify opportunities to create areas that are consistent with SWH criteria.

#### *Endangered and Threatened Species*

Sixteen Species at Risk (SAR) were recorded in background studies and field investigations in the FUA and neighbouring lands. Of these, 12 are designated as Endangered or Threatened within Ontario, including Little Brown Bat, Butternut, Barn Swallow, Eastern Meadowlark and Bobolink, amongst others. Four (Eastern Wood-Pewee, Wood Thrush, Grasshopper Sparrow, and Snapping Turtle) are designated as Special Concern in Ontario.

Of the SAR documented, occurrences of species that prefer woodland habitats such as Wood Thrush and Eastern Wood-Pewee were found primarily within the Greenway System. Those that prefer open country habitat, such as Bobolink, Eastern Meadowlark, and Barn Swallow were found outside of the Greenway System and within the tableland areas. Some occurrences of these species within the Greenway System indicate that there is currently suitable habitat that is protected. Their presence in these areas, however, will be intimately linked to the quality of habitat, the openness of adjacent areas outside of the Greenway System, and the large amount of open habitat occurrence at the landscape scale.

## **4.2 Phase 2: Impact Assessment**

The Phase 2 impact analysis generally involved assessing the potential impact of planned land use changes on the area's natural resources both with and without contemporary management practices in place. The impact assessment analysis was completed in two iterations. The first iteration tested and analyzed impacts of an initial land use concept, which was then revised and retested in the second iteration (documented in Volume 2 and 3 of the Conceptual Master Plan). The land use concepts assumed a distribution of urban land uses



that would achieve the population and employment and minimum density targets identified for the Future Urban Area, and the road and servicing networks required to support the land uses.

The following summarizes the findings of the Phase 2 impact assessment by discipline.

#### **4.2.1 Hydrogeology (Groundwater)**

The proposed future land use conditions were tested using the MIKE SHE model to evaluate impacts to the groundwater system with traditional end of pipe stormwater management and with different levels of infiltration management options, that is, Low Impact Development Best Management Practices (LID BMPs). These management strategy simulations provided a preliminary understanding of the level of impact and mitigation provided by different capture volumes (e.g., 2-10 mm per impervious area) for different land use types and physiographic conditions (e.g., topography and surficial materials) within the FUA.

Impacts and effectiveness of infiltration mitigation using LID BMPs were evaluated for areas within the FUA by comparing existing and future simulation conditions for groundwater recharge, discharge to streams and wetlands, discharge contribution areas to streams, and water budgets for the FUA subwatersheds and Robinson Swamp.

Modeling results have generally shown that urbanization of the FUA lands will reduce infiltration and lower the groundwater table which will cause reduction in clean and cool baseflow discharge to the creeks. As indicated previously, most of the creeks within the FUA are occupied by Redside Dace which depend on a supply of cool and clean baseflow. To mitigate these impacts, LID BMPs to hold and infiltrate water back into the ground were modeled and tested. The results of the modeling have shown that 2mm - 10mm of infiltration back into the ground using LID BMPs will adequately mitigate the impacts of the proposed development on the groundwater system. Berczy Creek is more sensitive than Bruce Creek and Robinson Creek and therefore requires higher infiltration levels (up to 10 mm).

According to the York Region Source Water Protection Plan, the northern half of the FUA lies within the York Region Local Area for its municipal groundwater supply. The changes in infiltration and recharge results identified in the Phase 2 analysis were found to have a negligible impact on the York Region Local Area and sustainability of well supplies.

The depths and design of infrastructure related to roads, road crossings, sanitary and storm sewers and municipal water have the ability to intercept the shallow and intermediate groundwater flow associated with groundwater discharge to stream reaches and wetlands. Site specific studies should be carried out throughout the FUA to refine the groundwater conditions and potential linkages where roads, water and wastewater infrastructure are being considered. Any long-term dewatering especially for infrastructure construction adds another factor for potential impacts to the groundwater flow system. Due consideration for the potential for localized strong upward hydraulic gradients should be included in the design of future site specific groundwater studies.

#### **4.2.2 Hydrology and Hydraulics**

Hydrologic analyses were completed to determine the potential impacts of proposed future development within the FUA relative to flooding and erosion.

The results of the hydrologic analyses demonstrated that, in the absence of stormwater quantity controls, the increased peak flow and runoff volume generated by the future urban land use would increase the erosion potential along the Berczy, Bruce, and Robinson Creeks. Peak flows would be anticipated to increase along all watercourses for the more frequent events (i.e., 20 year frequency or less), due to the additional volume of runoff generated by the future land use, with reductions in peak flows at various locations along the Berczy and Bruce Creeks, as well as along the Robinson Creek and through the Unionville Special Policy Area (SPA) for the less frequent events (i.e., 50 year and 100 year). Peak flows for the Regional Storm event would increase along Robinson Creek and along Berczy Creek, with increased flows through the Unionville SPA, representing potentially higher floodwaters in these areas during the Regional Storm event under future uncontrolled land use conditions.

Reliance on end-of-pipe facilities for erosion protection with drawdown times of approximately five days would largely mitigate increased erosion potential along the receiving watercourses, although residual increases above acceptable levels (i.e., 5% greater than existing) would be anticipated along the Bruce and Berczy Creeks, based on the erosion criteria and thresholds developed through the fluvial geomorphologic assessment. Strategic quantity controls to the 100 year level within the Bruce, Eckardt and Robinson Creeks, without 100 year controls within the Berczy Creek, would largely mitigate increased flood potential downstream, including most areas within the Unionville SPA.

The provision of LID infiltration-based BMPs, in combination with the end-of-pipe strategy, would mitigate the erosion potential along the receiving watercourses to within acceptable tolerances, and would also provide flood protection to the 100 year flow condition at key locations downstream.

The future development within the FUA would also result in increased peak flows during the Regional Storm event, particularly within the limits of the Unionville SPA. Regional Storm impacts through the Unionville SPA can be mitigated through the provision of local strategically-sited Regional Storm control facilities within the portions of the FUA and the Robinson Creek Subwatershed, as well as the employment lands in the Berczy Creek Subwatershed. These opportunities will be further explored and refined as part of subsequent studies (i.e., secondary plan and master environmental servicing plan).

#### **4.2.3 Fluvial Geomorphology**

The primary impact to watercourses from urbanization include changes to the hydrologic regime as a result of increased impervious cover. Increased surface runoff can be largely mitigated through integrated stormwater management. However, it is difficult to fully mitigate the fundamental changes to the landscape and therefore various targets are employed to ensure key elements of the fluvial system are maintained and protected to help absorb any potential impacts which may arise. For the impact assessment, three critical elements were

assessed: the meander belt width corridor; potential loss of stream length and realignment; and proposed road crossing locations.

An additional consideration for the FUA is the presence of Redside Dace in the main branches of the Berczy, Bruce, and Robinson Creeks. Under Ontario Regulation 176/13 of the Endangered Species Act (2007), the occupied or recovery Redside Dace habitat requires the application of a 30 metre setback to development from the meander belt width. This is applied to both sides, thereby increasing the meander constraint by an additional 60 metres.

Implementation of the meander belt width corridor can reduce and control negative impacts which may occur as a result of urbanization. It is also used to evaluate risk for potential road crossings. Within the meander belt width, development should be strictly limited to specific low impact and localized uses, such as trails or properly planned road crossings. This management strategy also limits disturbance to riparian vegetation which ensures resiliency of the fluvial system by reducing bank erosion and creek widening.

Changes in land use may result in realignments of existing watercourses to optimize developable area. This is particularly common with low-order streams which may be potentially combined to reduce fragmentation of the land parcels. Modifications may be large-scale realignments or small-scale removal of a bend or reduction of sinuosity. These types of changes are more common in areas which are already partially or fully developed and land use changes are less significant. Realignment of watercourses in most cases is not supported. It may be acceptable if the existing channel is degraded or has already been heavily modified as part of the existing land use. In these cases, the channel presents a restoration opportunity and realignment would be supported. Should realignments be proposed, it is critical to ensure that stream lengths are maintained, to the extent possible. Loss of stream length reduces aquatic habitat and reduces the fluvial system's ability to effectively convey water and sediment. Depending on the conditions, loss of stream length may increase channel slope increasing available potential energy which could lead to increased erosion.

Road crossings are an integral part of urbanization and an important consideration in terms of impacts to watercourses. A poorly sited road crossing can result in negative impacts to the channel and higher risk to the structure itself. There are a number of factors which should be considered when identifying the most appropriate location for a road crossing. For a large development area, such as the FUA, it is important to minimize the number of times the proposed road network crosses the watercourse valley. This will reduce impacts to the watercourse as well as the surrounding natural heritage features. Road crossings should not be located within close succession. Providing an adequate distance between crossings allows for an area of potential adjustment, if there are negative impacts to the watercourse as a result of the crossing structure. This will minimize the risk of compromising any additional structures located downstream.

#### **4.2.4 Surface Water Quality**

The future development within the FUA is anticipated to result in an increase in water quality contaminants, including heavy metals, nutrients, and thermal enrichment. The stormwater management system within the FUA is required to address provincial standards for stormwater

quality control to an enhanced standard of treatment, as well as requirements for protection of Redside Dace habitat as per the guidelines issued by the MNRF.

The stormwater management system within the employment lands is required to incorporate source controls for all individual sites, which is anticipated to preclude the possibility of providing stormwater quality control within wet end-of-pipe facilities. By contrast, the balance of the FUA offers the opportunity to implement more centralized end-of-pipe stormwater management facilities to provide stormwater quality, erosion, and quantity control for multiple landownerships.

LID BMPs are anticipated to form part of the stormwater management system, to satisfy requirements for erosion protection, maintaining baseflow in the receiving watercourses, and enhancing aquatic habitat within the receiving systems. These facilities are also recognized to provide enhancements to stormwater quality, particularly with respect to removal of pollutants and mitigating thermal enrichment of storm runoff within urban development areas. These facilities should form part of a treatment train approach toward stormwater management, and would thus be integrated into the future development at source. The City is preparing guidelines for the implementation of LID BMPs in the next stages of development.

#### **4.2.5 Terrestrial**

The bulk of natural heritage features and functions are contained within the proposed Greenway System and will be protected. Where direct impacts associated with removal of features occurs, best management practices will be required to reduce impacts to natural features and functions in the surrounding areas.

Where features are proposed for removal outside of the Greenway System (e.g., woodland areas, wetlands, and/or individual trees) to accommodate development, restoration and/or compensation will be required to ensure associated features and functions can be replicated within protected features, buffers, and/or enhancement areas within the Greenway System. Specific recommendations regarding mitigation and implementation strategies will be provided as part of the Phase 3 of the Subwatershed Study.

To facilitate the integration and impact assessment of the land characteristics with underlying physical processes present within the FUA, a series of landscape patches was delineated within the FUA and adjacent the Robinson Creek subwatershed. The objective of delineating patches was to create spatial units that were composed of land use types and/or natural heritage features that are similar in composition, structure, and function. This resulted in four characteristics patch types: anthropogenic, meadow/early successional, shrub/mid-successional, and/or wooded/late successional.

A detailed summary of key terrestrial characteristics, supporting hydrologic functions (e.g., shallow ground water, association with floodplains, and association with headwater drainage features), key species, and potential policy implications were outlined for each patch within the FUA and neighbouring Robinson Creek subwatershed. The proposed land use concepts were then used to identify potential impacts (direct and indirect) for each patch, and recommendations were provided for impact avoidance and/or management strategies to

mitigate impacts. Specific management recommendations will be developed as part of Phase 3.

Additionally, a detailed assessment was completed to evaluate the impacts associated with locations where roads are proposed to cross the Greenway System. Generally, all roads crossings will result in some degree of impact to natural heritage features within the FUA. Recommendations to avoid impacts to key areas have been provided, and where unavoidable, management recommendations to mitigate potential impacts have been provided. Detailed mitigation strategies to address Greenway System road crossings will be developed during Phase 3 of the Subwatershed Study.

Broad scale opportunities for ecosystem enhancement have been identified within the FUA to direct ecological management strategies to specific patches. The goal is to create new habitat areas that will reinforce ecological functions that are currently present within the Greenway System (e.g., open habitats to support meadow and early successional species; woodland restoration to create larger woodland and forested patches), and/or create complementary habitat functions that may provide habitat for species that have more complex life histories and depend on a range of habitat types (e.g., woodland restoration near pond areas to create amphibian foraging habitat). The broad-scale recommendations provided in the Phase 2 impact assessment will be refined during Phase 3 of the Subwatershed Study to provide specific management recommendations.

### **4.3 Next Steps**

The Community Structure Plan for the FUA identified in Figure 12 is the result of the extensive analysis undertaken through the CMP process at a master planning level, taking into account the competing objectives of protecting the natural environment and accommodating a pre-determined level of new community growth, along with the associated infrastructure needed to support the new communities. The findings of Phases 1 and 2 of the Subwatershed Study were instrumental in arriving at the preferred Community Structure Plan.

The Community Structure Plan will be further refined in secondary plans and accompanying master environmental servicing plans. The management strategies to be developed in Phase 3 of the Subwatershed Study will inform these plans, and identify further means of avoiding or mitigating impacts on natural features and functions. Recommendations are expected to address the key areas identified in the Phase 2 impact assessment, including among other matters, refinement of road crossings of streams, the use of LID BMPs in stormwater management strategies, and addressing endangered species.

## 5.0 MASTER TRANSPORTATION, WATER AND WASTEWATER STUDIES

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### 5.1 Overview

The CMP process is intended to satisfy the requirements of Phases 1 and 2 of the Municipal Class EA process for the transportation, water and wastewater projects that are subject to the Class EA undertakings. The details of this Class EA Master Plan can be found in Volume 2: Transportation, Water and Wastewater Master Plan. An overview of each of these studies is provided below.

### 5.2 Transportation Study

The purpose of the Transportation Study is to identify the transportation infrastructure, programs and policies required to support the new neighbourhood and employment areas in the Future Urban Area. A transportation plan is to be developed for the FUA that provides the basic road network on which to develop transit service and future pedestrian and cycling connections, while respecting environmental considerations related to watercourse crossings and impacts on other natural heritage features. A key consideration is the provision of more travel choices, and to facilitate the interconnection between the various networks of roads, transit lines, sidewalks, bicycle facilities, and pathways and trails, as well as seeking to reduce auto-dependency by requiring appropriate transportation demand management (TDM) strategies.

The main components of the transportation study include:

- Development of a multi-modal transportation demand forecast framework
- Forecasting impacts on the Regional arterial road network
- Identifying a new collector road network
- Coordinating transit with land use patterns and ensuring the early integration of transit service into new communities
- Establish the basic road pattern upon which pedestrian and bicycle facilities can be designed and implemented through the secondary plans and development applications
- Having regard for transportation demand management strategies and parking management strategies for use during later development application stages.

The Transportation Study was undertaken in phases, in parallel with the Subwatershed Study. The following provides an overview of the analysis and findings of the study.

#### 5.2.1 Phase 1 - Background

Phase 1 of the Study focused on a review of the existing transportation system within the study area. The existing transportation system assessment provided a baseline for comparison against future conditions, illustrated the need for potential improvements, and also informed the initial screening assessment of transportation solutions.

## 5.2.2 Phase 2 – Impact Assessment

The Phase 2 impact assessment was undertaken in two iterations of testing. In the first iteration, a land use option based on the road network shown in a preliminary Community Structure Plan (documented in Volume 2 of the Conceptual Master Plan) was tested. The analysis in the first iteration was focused on the traffic demand aspects of the FUA, aimed at identifying constraints and opportunities with regard to the arterial road access points and the collector crossings and number of lanes.

In the second iteration of testing, the first iteration analysis was rerun using updated information including the York Region Travel Demand Model based on the completed York Region Transportation Master Plan and refined land use information for the FUA. The findings outlined below are based on this updated information.

The FUA collector road network was further defined in terms of the number of lanes, the anticipated intersection traffic control, and potential need for turn lanes. Also, a comprehensive active transportation network was established.

### Study Approach

In June 2016, Regional Council endorsed the York Region 2016 Transportation Master Plan (TMP) which reflects Region-wide transportation needs to the year 2041. As the Conceptual Master Plan is based upon a target horizon year of 2031, the transportation network assumptions through and around the FUA and in the broader study area have been scaled back from the Region's 2041 horizon year to the FUA horizon year of 2031. The general study approach for the analysis of the FUA transportation network built directly upon travel demand and transportation network assumptions from the Region's TMP.

### Travel Demand Overview

Travel demand was extracted from the Region of York Travel Demand Model for the horizon year 2031 AM peak period (3 hours) and the AM peak hour.

It is expected that approximately 210,000 total person trips will originate from Markham and 200,000 will be destined to Markham during the AM peak period by the year 2031. Approximately 47% of trips originating in Markham end in Markham, which is a strong indication of the maturation of land use and travel patterns in the City as more people are expected to choose to live and work in the City (self-containment) by 2031.

For the FUA in particular, it is expected that 20,880 trips will originate from the area and 13,360 trips will be destined to it in the morning peak period. A high level of self-containment is expected with approximately 42% of all trips originating from the FUA remaining in the City of Markham and 42% of all trips destined to the FUA originating from the City of Markham. Other major areas of attraction for FUA trips are the City of Toronto with a share of 35% (including 12% to downtown Toronto) and the remainder of York Region (excluding the City of Markham) accounting for 15%. York Region is the main generator for trips destined to the

FUA, with a share of 27% of total AM peak period trips, excluding the City of Markham. This points to a south-southwesterly trip pattern for travel generated by the FUA, which is consistent with existing trends in travel demand patterns and the type and density of land uses in the respective areas.

### Transit Modal Share

Information about transit usage in York Region, in Markham and in the FUA in particular was also extracted from the Region of York Travel Demand Model. It is expected that 14% of all travel in York Region by the year 2031 will be served by transit. The corresponding transit share for Markham is 17%. For the FUA specifically, the Region's travel demand forecasts suggest that 18% of the trips generated from the newly developed area and 3% of the trips attracted to the area in the AM peak period will be using transit as the mode of travel.

These shares translate into approximately 4,200 trips to/from the FUA using some form of transit. This is a substantial amount of travel by transit that can only be realized through the proper combination of land use and transit service initiatives. Specifically, this level of transit usage will require transit supportive development with an appropriate allocation of land use mixes and densities along corridors with efficient transit service and high levels of convenience and accessibility throughout the area. Proposed new GO Rail stations, an expanded High Occupancy Vehicle (HOV) network that would also facilitate faster transit service by bus, and Regional Express Rail (RER) are expected to contribute to accommodating the anticipated transit travel demand. GO trips are expected to utilize mainly the Unionville, Gormley, Mount Joy and Richmond Hill stations.

The base assumptions for major transit infrastructure and service in the area for the 2031 horizon year, are based on the Region's TMP. It is anticipated that, as part of future works (i.e., secondary plans), further discussions among the Region, the City, and the development proponents will yield a feasible strategy for phasing in land development and transit initiatives (infrastructure, service and technologies) that would allow the realization of the anticipated levels of transit usage.

### Transportation Network

To accommodate the future travel demand, several improvements in the transportation network need to take place by the 2031 horizon year. As previously noted, while the Region's TMP update reflects transportation needs to the year 2041, the FUA Conceptual Master Plan is based upon a target horizon year of 2031. Accordingly, the transportation network assumptions through and around the FUA and in the broader study area have been scaled back from the Region's 2041 horizon year to the FUA horizon year of 2031 as depicted on Figure 6 and Figure 7 for the transit and arterial road networks respectively, and were determined in consultation with York Region for the purposes of the Phase 2 impact assessment.

According to the Region's TMP, rapid transit in the vicinity of the FUA is expected to be in place by 2041 on Woodbine Avenue south of Major Mackenzie Drive, and on Major Mackenzie Drive from Jane Street to the Donald Cousens Parkway. Beyond that, Regional Express Rail is



considered to serve transit demands by the year 2041 with additional GO Rail stations on the Richmond Hill and Stouffville GO Rail Lines.

While the Region's long term transportation network calls for rapid transit service along Major Mackenzie Drive and also along Woodbine Avenue, south of Major Mackenzie Drive (subject to further study) by 2041, the level of transit infrastructure and service anticipated by 2031 will consist primarily of frequent transit service along almost all arterial road corridors. The Frequent Transit Network (FTN) will ultimately offer service frequencies of 15 minutes or less. The FTN will be supported by transit priority measures (reserved bus lanes, HOV lanes, and transit signal priority) to improve reliability and service. Providing Viva Curbside service on future Rapid Transit corridors will help transition the network to full rapid transit service. The inclusion of HOV lanes on major arterials will also support and improve transit by removing it from mixed traffic. It is expected that by 2031, rapid transit on Major Mackenzie Drive will extend from Jane Street to Leslie Street and HOV lanes will continue easterly into Markham. As well, HOV lanes on Woodbine Avenue by 2031 will precede the longer term development of rapid transit in that corridor. GO Rail service is also expected to expand with new Richmond Hill GO Rail Line stations at Stouffville Road and Bloomington Road by 2031.

The segments of the future Donald Cousens Parkway between Major Mackenzie Drive and Markham Road, and between Warden Avenue and 19th Avenue, are anticipated to be in place by 2031.

Generally, the regional roads adjacent to and within the FUA are all expected to be widened to four lanes. Sections of Major Mackenzie Drive, Woodbine Avenue, and Kennedy Road are expected to be six lanes including two HOV lanes south of Major Mackenzie Drive. Moreover, HOV lanes are expected along Highway 404 north of Highway 7. All HOV lanes, on both arterial roads and on Highway 404, have been identified as eligible for use by vehicles with two or more occupants (HOV 2+) as well as taxis, buses and motorcycles.

### **5.2.3 Preferred Transportation Strategy**

The following observations and recommendations outlining a preferred transportation strategy are made on the basis of the above traffic demand analysis for the horizon year 2031:

- Traffic modelling based on the arterial and collector road network and transit modal share assumptions outlined above indicates that, as expected, southbound and westbound trip volumes are significantly higher than northbound and eastbound in both existing and 2031 conditions during the morning peak period.
- As expected, Major Mackenzie Drive and 16th Avenue, with high westbound traffic which is the predominant travel pattern during the morning peak period, are expected to be congested. As well, major north-south arterials south of Major Mackenzie Drive would also be expected to be congested at least during the morning peak period. Highway 404 is expected to be congested due to significant traffic volumes in the southbound direction during the morning peak period.

- This highlights the need for a highly efficient transit system which is frequent and accessible. Such a system should be combined with transit oriented development of appropriate land use mix and density to generate the desired levels of transit ridership. As well, travel demand management initiatives and emerging technologies will be also required. The traffic conditions of the FUA and the broader study area were analyzed assuming that a large extent of trips (i.e., 18% or over 3,800 trips from the FUA in the AM peak period) are expected to be moving by transit.
- The definition of frequent transit service in the Region's Transportation Master Plan for the year 2031 (in anticipation of rapid transit expansion closer to the FUA in the longer term) may not by itself be sufficient to support the desired levels of transit usage. An earlier extension of the Major Mackenzie Drive rapid transit system easterly from its planned terminus at Leslie Street by 2031 will better support the goal of building transit ridership. This will go hand-in-hand with the principle of developing the FUA as a compact, complete community with full retail and service employment, as well as community facilities and services that would make it more supportive of transit and active transportation modes of travel (walking, cycling, etc.).

Further discussions with stakeholders are expected to better define the specific transit system that would make transit usage more attractive for those that choose to live and/or work in the FUA. Phasing and funding considerations should also be addressed as part of such next steps so that a realistic and feasible implementation plan can be identified.

- Auto trips from the FUA destined to Richmond Hill and employment areas east and west of Highway 404 and near Highway 404 / Highway 7 represent opportunities with the greatest potential for conversion from auto to transit travel mode and must strongly influence the transit routing recommendations.
- Arterial road improvements (including HOV network), transit improvements, the new interchange of Highway 404 at 19th Avenue, other planned interchange improvements (e.g., ramp extensions), and the Highway 404 mid-block collector road crossings in the broader study area are all essential requirements.
- The collector road system for the FUA, as identified in the preferred Community Structure Plan, appears to be properly sized in terms of access points. There is a need for at least two north-south and two east-west collector roads to traverse the full length of the FUA neighbourhood lands. This is essential to provide enough capacity for traffic to move efficiently in and out of the FUA and access the arterial road system, provide good access and connectivity to the surrounding communities, and to provide for circulation flexibility and active transportation opportunities.
- The Berczy Glen Block appears to be the most challenged with regard to access to/from the arterial road system. This is due to its limited westward connectivity through the Hydro Corridor and lack of connection opportunities southward to Major Mackenzie Drive. As well, high levels of congestion on Warden Avenue and the desire to avoid out-

of-the-way travel for access to/from Elgin Mills Road accentuate the access problem for this Block. Two collector road crossings of Berczy Creek within this Block are provided not only for capacity purposes but also for good connectivity, internal flow balancing, route options, and active transportation opportunities.

- Collector roads will generally provide for two lanes of travel except for the east-west collector road located just south of Elgin Mills Road which will be a major collector road with four travel lanes.
- An active transportation network consisting of pedestrian facilities on both sides of all local and collector roads and in-boulevard cycling facilities (multi-use pathways) along all collector roads is recommended. This continuous, connected and low stress network will make walking and cycling within the FUA an attractive trip choice for residents of all ages and abilities.
- Transportation Demand Management (TDM) strategies for the FUA will be supported by a road network and land use pattern which allow for a more efficient use of the transportation system by providing a built environment which supports alternative modes of transportation such as walking and cycling for everyday trips. It will be a requirement of each subdivision and site plan to implement TDM measures that reduce auto dependency by encouraging a greater proportion of trips to be made by walking, cycling and transit.

#### **5.2.4 Next Steps**

##### Need for Phasing Plan

The phasing of development within the FUA is key in ensuring the Community Structure Plan can be implemented in a safe and sustainable manner by providing the residents of this new community with access to adequate municipal services and facilities, including roads, trails, cycling, water and wastewater, fire stations, parks, and community facilities. To accomplish this goal, a master phasing plan will be required to accompany secondary plans and master environmental servicing plans.

##### Completion of EA Process

Certain new roads identified in the Conceptual Master Plan will require further Class EA undertakings before construction. Based on preliminary cost estimates these undertakings will generally follow the Municipal Class EA process for Schedule C projects.

The Class EA Master Plan has been undertaken in a manner that fulfills Phases 1 and 2 of the Municipal Class Environmental Assessment (EA) process. Phases 3 and 4 of the Municipal Class EA undertaking for Schedule C projects will need to be completed prior to construction. Phase 3 of the EA process will involve the development of alternative design concepts, which will finalize the location and configuration of the conceptual collector road alignments shown in the preferred Community Structure Plan, and Phase 4 will document the rationale, and the planning, design and consultation process of the project in an Environmental Study Report.

## 5.3 Water Servicing Study

### 5.3.1 Phase 1 - Background

Phase 1 of the Water Servicing Study included review of the existing municipal and regional water systems servicing Markham, identification of the future regional system and identification and evaluation of municipal water servicing strategies for servicing of the FUA.

The FUA is located within regional pressure districts PD6 (generally supplying lands south of Elgin Mills Road), and PD7 (generally supplying lands north of Elgin Mills Road). The Region of York Water and Wastewater Master Plan (YWWWMP) identified infrastructure required for servicing of the FUA, including a new PD7 pump station and associated watermains.

#### Water Servicing Strategies

Based on the available infrastructure and proposed Regional services, two strategies were developed to service the FUA; ultimate servicing and interim servicing (prior to Regional upgrades). These strategies were based on the road network shown in a preliminary Community Structure Plan (documented in Volume 2 of the Conceptual Master Plan).

#### 5.3.1.1 Ultimate Servicing

##### Pressure District 6 (PD6)

Existing communities within PD6 are serviced by existing infrastructure. The existing system is sufficient for servicing the Future Urban Area, which will be developed with its own watermain network, connecting to existing infrastructure. New regional infrastructure for servicing PD6 is not required.

##### Pressure District 7 (PD7)

Existing communities in Markham within the PD7 district are currently serviced by a single Regional watermain supply point from Richmond Hill, along Elgin Mills Road. Typically, for system safety another supply point is required. The YWWWMP preferred servicing strategy includes a new PD7 pumping station and watermains to provide a secondary feed. The PD7 pumping station is proposed to be constructed adjacent to the existing North Markham Reservoir (located near McCowan Road and Stouffville Sideroad). Timing of construction of the pump station and associated infrastructure is identified as 2031-2035 in the YWWWMP.

#### 5.3.1.2 Interim Servicing

##### Pressure District 6 (PD6)

As noted, Future Urban Area lands within PD6 will be serviced by a network of watermains connecting to the existing PD6 infrastructure. As PD6 is adequately supplied, additional regional infrastructure is not required for servicing. As such, interim and ultimate options will reflect the same requirements.

### Pressure District 7 (PD7)

The existing PD7 system lacks system security as a result of it having only one Regional supply point from Richmond Hill along Elgin Mills Road. In the event of this watermain going temporarily out of service (e.g., due to breaks, reconstruction, etc), the area within PD7 could be temporarily supplied with water from the PD6 district; however pressures and flows in the PD7 area would not be able to meet the City's criteria and would leave the area vulnerable to emergency situations until the Regional watermain comes back into service.

The construction of the Regional water infrastructure (PD7 pumping station and associated watermains) is not planned until after the 2031 build-out horizon of the FUA. Until the infrastructure under the ultimate servicing scenario is built, a secondary supply by means of a feedermain on 19<sup>th</sup> Avenue crossing Highway 404, or a temporary booster station would be required for the servicing of the Employment Block lands north of Elgin Mills Road on an interim basis to add security of supply for the PD7 area. The preferred location for the temporary booster station is in the vicinity of Warden Avenue and Elgin Mills Road, due to its proximity to both PD6 and PD7 zones.

### **5.3.2 Phase 2 – Impact Assessment**

The Phase 2 impact assessment was undertaken in two iterations of testing. The first iteration considered an additional supply point from Richmond Hill along 19<sup>th</sup> Avenue, and the proposed north Markham PD7 pumping station. The additional supply point would add to the zone security when the pumping station is complete. The City wide water model considered that the 19<sup>th</sup> Avenue watermain was to be constructed.

In the second iteration of testing, the potential secondary supply point along 19<sup>th</sup> Avenue (connecting to the system in Richmond Hill) was eliminated to reflect the update to the YWWWMP. There is currently no existing or planned Regional infrastructure north of Elgin Mills Road and west of Highway 404, to provide a secondary supply point along 19<sup>th</sup> Avenue. As such, the interim servicing for the FUA is modeled with the proposed temporary booster station only.

Without the availability of the Regional or local municipal infrastructure on 19<sup>th</sup> Avenue from Richmond Hill, a temporary booster station is the preferred option to service the FUA PD7 until ultimate infrastructure is constructed by the Region. However, additional consultation will be had with the Region and the Town of Richmond Hill to determine if there is opportunity to service Markham PD7 with the Town of Richmond Hill's infrastructure in the interim, or if there is a possibility of reinstating the 19<sup>th</sup> Avenue Regional feedermain.

### **Water Model Overview**

A water model was prepared for the Future Urban Area to assess watermain sizing and requirements based on design demands, including maximum day demand plus fire and maximum hour demand, and a scenario where the existing 600mm Regional watermain on

Elgin Mills Road is temporarily out of service requiring the interim booster station to supply sufficient water to service lands in PD7 while continuing to supply water to lands in PD6.

### **5.3.3 Preferred Water Servicing Alternative**

Generally, watermains will follow the road network throughout the FUA, including municipal and regional roads.

The FUA lands within PD6 will be developed with a network of watermains connecting to the existing PD6 infrastructure, where existing system security already exists under interim and ultimate scenarios.

The FUA PD7 system will ultimately be supplied by two regional supply points (i.e., existing 600mm on Elgin Mills Road at Highway 404 and a new feedermain from a new North Markham Pump Station and Reservoir in Stouffville). Interim servicing will be provided by a secondary feed from the temporary booster station, in the event that a feedermain on 19<sup>th</sup> Avenue (from Richmond Hill) will not be made available before the build out horizon of the FUA lands.

The preferred water servicing infrastructure alternative under interim and ultimate scenarios is illustrated in Figure 8.

### **5.3.4 Next Steps**

#### Need for Phasing Plan

Further consultation will be undertaken with York Region and the Town of Richmond Hill on the PD7 watermain on 19<sup>th</sup> Avenue, as a secondary supply point for Markham's PD7 existing and proposed development.

The master environmental servicing plans (MESPs) submitted in support of secondary plans will be required to include watermain analysis and confirm that phasing of development will meet City criteria for providing a secure water distribution system. MESPs will also be required to identify any water infrastructure required external to the secondary plan area.

#### Completion of EA Process

As indicated above, the alignments of the new watermains will generally follow the FUA road network and will be required to be constructed as a condition of approval of development. Accordingly, the watermains in the FUA will be designated as Schedule A projects and are considered pre-approved and can proceed to implementation by a landowner without any further Municipal Class EA requirements. Watermain projects that cross a watercourse using trenchless technology and are required to be constructed as a condition of approval of a development, are designated as Schedule A/A+ pre-approved projects and can be implemented by a landowner without any further Municipal Class EA requirements.

The proposed temporary booster station (required if the 19<sup>th</sup> Avenue watermain does not proceed) is considered a Schedule B project of the Municipal Class EA process. In the event the City proposes to undertake its design and construction, the City would need to satisfy the Municipal Class EA process for Schedule B projects. However, if the temporary booster station is required as a condition of approval of development whereby the landowner is required to construct it, design and construction can proceed without any further Municipal Class EA requirements.

The Class EA Master Plan has been undertaken in a manner that fulfills Phases 1 and 2 of the Municipal Class Environmental Assessment (EA) process. Phases 3 and 4 of the Municipal Class EA undertaking for any identified Schedule C projects will need to be completed prior to construction. Phase 3 of the EA process will involve the development of alternative design concepts, which will finalize the location and configuration of the water infrastructure, and Phase 4 will document the rationale, and the planning, design and consultation process of the project in an Environmental Study Report.

## **5.4 Wastewater Servicing Study**

### **5.4.1 Phase 1 - Background**

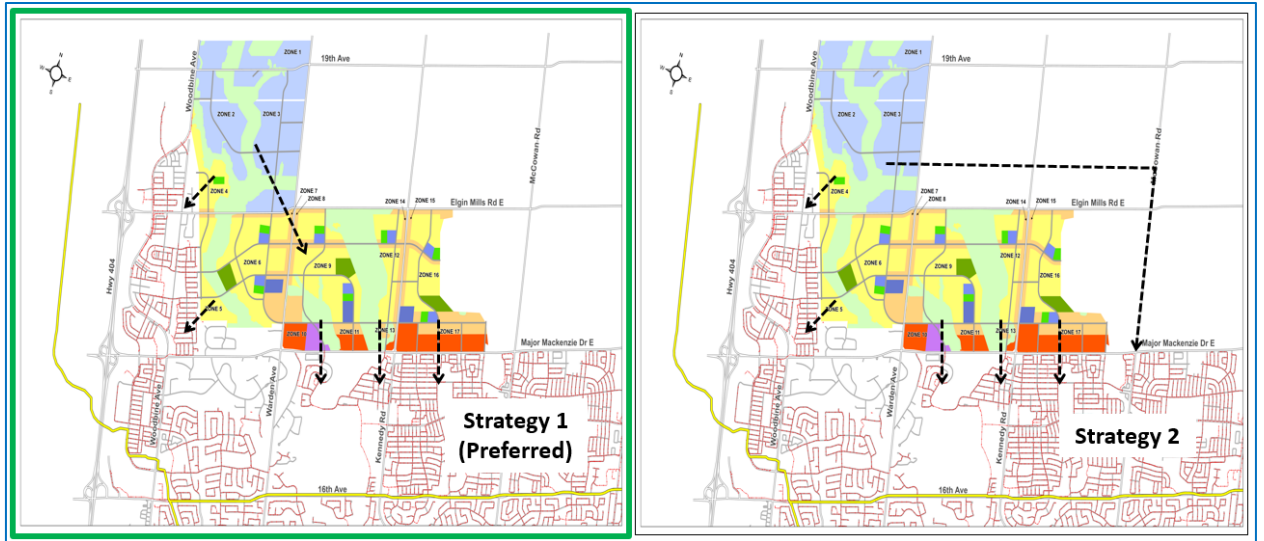
Phase 1 of the Wastewater Servicing Study included review of the existing municipal and Regional wastewater systems servicing Markham, identification of the future Regional system and identification and evaluation of municipal wastewater servicing strategies for the FUA.

The wastewater servicing strategies required an assessment of the capacity of the existing wastewater services south of Major Mackenzie Drive, to the 16<sup>th</sup> Avenue York-Durham Sewage System (YDSS), west of McCowan Road and east of Highway 404.

#### **Wastewater Servicing Strategies**

The screening analysis undertaken in Phase 1 recommended a combination of increasing capacity and building new infrastructure to accommodate the growth within the FUA. Based on the available infrastructure and proposed Regional services, two strategies were developed to service the FUA as follows:

1. Convey wastewater from the all of the FUA lands to the existing wastewater system, with upgrades to accommodate the additional flow, ultimately connecting to the YDSS at 16<sup>th</sup> Avenue between Warden Avenue and Kennedy Road; and
2. Similar to Strategy 1, except flows from the Employment Block would be conveyed via an east-west new trunk sewer north of Elgin Mills Road to the York Region's proposed North Markham Collector along McCowan Road. Residential development within the Employment Block would connect to the existing system west of the FUA and ultimately south to the YDSS on 16<sup>th</sup> Avenue east of Woodbine Avenue.



Strategy 1 was selected as preferred for further testing. Based on Strategy 1 and a land use option based on the road network shown in an earlier version of the Community Structure Plan (documented in Volume 2 of the Conceptual Master Plan), preliminary servicing concepts were further prepared for assessment.

### Wastewater Servicing Concepts

Further to selection of Strategy 1, two concepts were developed for servicing the FUA to the south. Both concepts include the same outlets A and B to the Woodbine Avenue system for the FUA lands west of Berczy Creek. A screening level assessment of WW-1 and WW-2 was undertaken as part of the first iteration of impact assessment to identify which concept was best to refine and test further.

Servicing concept WW-1, as illustrated in Figure 9 follows the FUA road layout to align wastewater servicing and provides preliminary pipe sizes and system depths, as well as existing system improvements to the south of Major Mackenzie Drive.

The existing wastewater systems south of Major Mackenzie Drive (Angus Glen Boulevard – Outlet C, Prospectors Drive – Outlet E, The Bridle Walk – Outlet F) were designed to take wastewater flows from development between Major Mackenzie Drive and Elgin Mills Road. These wastewater systems were not designed for flow from development areas north of Elgin Mills Road (i.e., the Employment Block). As such, the existing system at outlet C would require upgrades to accommodate additional flows. Outlet F at the Bridle Walk is also noted as requiring improvements as the anticipated flows from the FUA have increased from the original design flows.

A second servicing concept WW-2 assumed one major outlet for the FUA south of Major Mackenzie Drive, at Angus Glen Boulevard – Outlet C. Based on the qualitative evaluation of constructability, maintenance and operation, staged implementation, maximized use of existing infrastructure, system depth and disruption, Concept WW-1 was identified as the preferred servicing concept for further testing in the second iteration of impact assessment.



## Identification of Servicing Alternatives within the Future Urban Area

First iteration testing considered following the road alignment within the FUA with a few options for existing system improvements. The second iteration identified additional alternatives. Throughout the FUA, four alternatives of the wastewater collector systems were evaluated with various options in the Employment Block as identified below and in Figure 10:

<b>Alternatives Considered in Evaluation of Wastewater Systems</b>	
<b>FUA Alternative 1a:</b>	<ul style="list-style-type: none"> <li>• Follows FUA collector road layout</li> <li>• Gravity sewers</li> </ul>
<b>FUA Alternative 1b:</b>	<ul style="list-style-type: none"> <li>• Follows FUA collector road layout</li> <li>• Pumping Station and forcemain in the Employment Block</li> </ul>
<b>FUA Alternative 2:</b>	<ul style="list-style-type: none"> <li>• Generally follows FUA collector road layout,</li> <li>• Alternate Berczy Creek crossing in the Employment Block</li> </ul>
<b>FUA Alternative 3:</b>	<ul style="list-style-type: none"> <li>• Follows FUA collector road layout,</li> <li>• Gravity sewers,</li> <li>• Directs flows from the Employment Block west of Berczy Creek to the Woodbine Avenue system</li> </ul>

## Existing System Improvements

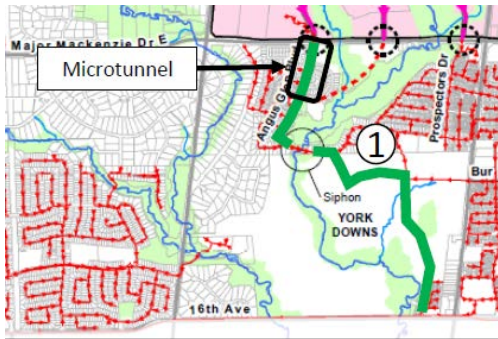
Peak design flows from the FUA were developed from updated quantification and were assessed with the available capacity in the existing systems to identify the need for existing system upgrades. As illustrated in Figure 9, the following upgrades to the existing systems were highlighted as part of the analysis:

- The Bridle Walk sanitary sewer, between Major Mackenzie Drive and Bur Oak Avenue (general area of conveyance from area between Kennedy Road and Robinson Creek)
- Angus Glen Boulevard from Major Mackenzie to YDSS at 16<sup>th</sup> Avenue (primary outlet for general area between Berczy Creek and Bruce Creek).

The Bridle Walk existing sewer will be required to be upsized from 375-450mm to 450/525mm along the same alignment (Major Mackenzie Drive to Bur Oak Avenue) to convey the proposed flows from the Robinson block.

The existing system south of Major Mackenzie Drive between the primary outlet at Angus Glen Boulevard and York Region's YDSS at 16<sup>th</sup> Avenue has a few options for improvements. With the anticipated development of the York Downs golf course lands, the following alternatives were reviewed:

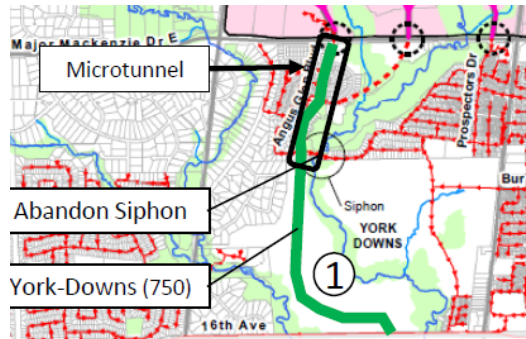
**AGYD Alternative A**



Upgrade existing system from Major Mackenzie Drive to 16<sup>th</sup> Avenue, following existing alignment along Angus Glen Boulevard and easement on the east side of Bruce Creek

(from 525-750mm to 750/900/1200mm)

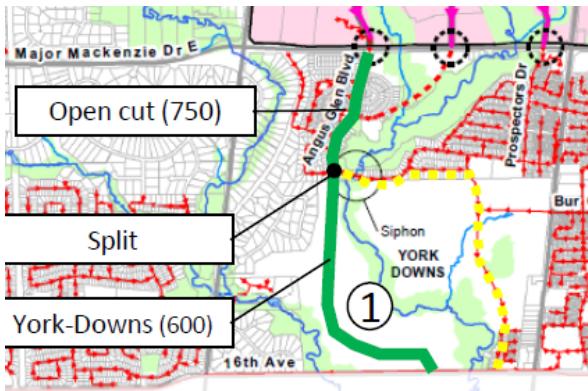
**AGYD Alternative B**



Upgrade along Angus Glen Boulevard, eliminate siphon, and construct new pipe through York Downs lands with a new connection to the YDSS on the west side of Bruce Creek

(from 525-675mm to 750/1200mm)

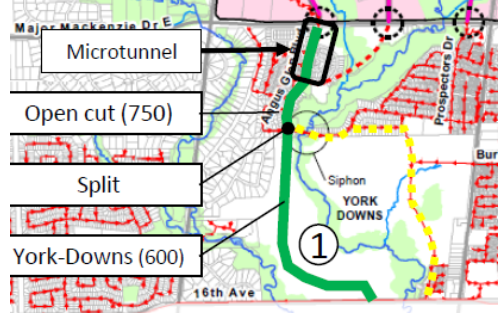
**AGYD Alternative C-i**



Upgrade along Angus Glen Boulevard, use of siphon and existing sewer system within existing easement east of Bruce Creek, and construct new sewer system from upstream of siphon, through York Downs on the west side of Bruce Creek, to convey flows in excess of existing system to the east

(from 525-675mm to 600/750/1200)

**Alternative C-ii**



### Model Overview

A model prepared for the Future Urban Area was calibrated to local rainfall and flow data collected in 2014. The City is concurrently undertaking a City-wide wastewater servicing study that has prepared and calibrated a comprehensive model of the entire wastewater system. The FUA model is now part of the City's overall wastewater system model.

### **5.4.3 Preferred Wastewater Servicing Alternatives**

In reviewing potential alignment options throughout the Future Urban Area and the existing systems to the south, the preferred servicing concept is FUA Alternative 1 (sewer follows the road network) and AGYD Alternative C (use of existing trunk sewer and construction of new smaller split sewer through York Downs). These alternatives allow for maximizing use of existing infrastructure along with construction of new smaller pipes to convey flows above capacity of the existing pipe.

Within the Future Urban Area, the wastewater sewer system that follows the collector road network and associated creek crossings, reaches depths of approximately 15 metres. There are opportunities to reduce the depth of the system by incorporating a pumping station and forcemain in the Employment Block (in the lower areas west of the creek crossing, as noted in FUA Alternative 1b). This sub-alternative can be further examined with landowners and agencies as part of subsequent master environmental servicing plans. Other options for consideration are construction of a sewer system along roads identified in the secondary plans and draft plans (i.e., roads not part of the primary collector system identified in this CMP process), or along alternate routes due to phasing/timing of construction.

The preferred wastewater servicing alternatives for the FUA, the potential location of the pumping station and pipe depths are illustrated on Figure 11.

### **5.4.4 Next Steps**

The preferred wastewater servicing alternatives will be further reviewed with options for a gravity system throughout the FUA, or a pumping station in order to provide for a shallower sewer system.

MESPs will reflect the preferred servicing alternatives selected by the City and identify if variations to the alignment are required based on phasing within Blocks, as well as any infrastructure required external to the secondary plan areas.

### Need for Phasing Plan

The master environmental servicing plans (MESPs) submitted in support of secondary plans will be required to include wastewater analysis and confirm that phasing of development meets City criteria. MESPs will also be required to identify any wastewater infrastructure required external to the secondary plan area.

### Completion of EA Process

The construction of wastewater servicing projects may require further EA undertakings. Wastewater mains that follow road allowances or which are required as a condition of draft plan approval of a subdivision are designated Schedule A projects. All sewers that cross a creek using trenchless technology are designated Schedule A+ projects. Schedule A/A+ projects are considered pre-approved and can proceed to implementation by a landowner without any further Municipal Class EA requirements.

In the event a sewage pumping station option is selected, the project would be considered a Schedule B project and can proceed to implementation by a landowner without any further Municipal Class EA requirements if its construction was a condition of approval of development.

The Class EA Master Plan has been undertaken in a manner that fulfills Phases 1 and 2 of the Municipal Class Environmental Assessment (EA) process. Phases 3 and 4 of the Municipal Class EA undertaking for any identified Schedule C projects will need to be completed prior to construction. Phase 3 of the EA process will involve the development of alternative design concepts, which will finalize the location and configuration of the wastewater infrastructure, and Phase 4 will document the rationale, and the planning, design and consultation process of the project in an Environmental Study Report.

## 6.0 COMMUNITY STRUCTURE PLAN

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The planning objectives of the Conceptual Master Plan are outlined in the Official Plan. In addition to identification of a Greenway System, and delineation of 'Future Neighbourhood Areas' and 'Future Employment Areas', the policies provide for the development of a comprehensive road and transit network, integrated open space network and identification of neighbourhoods and mixed use community cores to meet the needs of the community.

The preferred Community Structure Plan shown in Figure 12 provides for these structural components. The Plan represents a balance between the Official Plan objectives of protecting and enhancing the natural environment and developing compact, complete new communities to accommodate assigned growth. More specifically, impacts to natural heritage features and functions were minimized in accommodating required densities and the supporting transportation and servicing network. This balance was derived from intensive, integrated analysis which weighed the findings of the supporting subwatershed, transportation, servicing and planning studies, and which also considered existing uses and public input.

The community structure identified in this Plan is intended to form the basis of land use and transportation schedules in secondary plans. It is anticipated that secondary plan schedules will reflect further refinements to certain components of the Plan based on the more detailed technical study that will occur during the preparation of master environmental servicing plans and community design plans for each of the secondary plan areas. Further refinements to the road network may also result from subsequent environmental assessment processes. Any refinements resulting from subsequent analysis are considered acceptable where the underlying principles of the Community Structure Plan are not compromised.

The following sections describe the function of each of the structural components identified in the Community Structure Plan.

### 6.1 Greenway System

The Greenway System shown in the Community Structure Plan is based generally on the 'Greenway System' in the Official Plan 2014, with refinements that reflect the findings of the subwatershed study. Some of the elements of the Greenway System have been further refined since the Preliminary Community Structure Plan released in October 2016. Others remain under study. A minor change in the Greenbelt outer boundary along Bruce Creek in the Angus Glen Block, resulting from the approval of the Greenbelt Plan 2017, will be reflected in the secondary plan for the block.

Elements requiring further analysis as part of the subwatershed study or subsequent master environmental servicing plans are shown as hatched on the Plan as follows:

- A proposed ecological corridor north of Elgin Mills Road (described further in Section 6.1.1)
- Additional wetland, woodland and headwater drainage features
- Minor adjustments due to detailed floodplain analysis.

### **6.1.1 Proposed Berczy-Bruce Ecological Corridor**

The proposed ecological corridor shown on the Community Structure Plan represents an open wildlife corridor between the main tributary of Berczy Creek west of Warden Avenue and the Bruce Creek wetland on the east side of Warden Avenue. This corridor represents a small segment of a more extensive conceptual 'Core Linkage Enhancement' element (the Linkage) in the Greenway System identified in the Official Plan, which is intended to ultimately provide an east-west natural heritage linkage between the predominantly north-south valley systems in Markham. The Core Linkage Enhancement extends from Berczy Creek eastward to the Little Rouge Creek and beyond, as shown in Map 4 – Greenway System in the Official Plan (see Figure 13).

This Linkage is part of Markham's long term vision for a connected and integrated natural heritage system. It implements a fundamental principle of conservation and natural heritage planning by ensuring a system of natural corridors across the landscape that connect natural habitats and support the long term survival and sustainability of both plant diversity and wildlife.

The desire to achieve the Linkage in its current alignment in north Markham has been part of the public record for 24 years in various forms. It was first identified in 1993 through the Markham Natural Features Study, and confirmed in 2009 through the Environmental Policy Review and Consolidation Study which formed the basis of the Greenway System in the 2014 Official Plan. The Linkage is now Council policy through adoption of the Official Plan.

One of the criteria for establishing the conceptual alignment of the Core Linkage Enhancement in the Official Plan was to minimize the amount of tableland needed to complete the east-west connection. The alignment follows existing and protected surface water and natural heritage features (woodlands and wetlands) as much as possible, and includes lands already protected through the Provincial Greenbelt Plan.

The Berczy-Bruce segment of the Linkage, identified on the Community Structure Plan as 'Proposed Ecological Corridor' is one of the few areas where tablelands will be needed to implement the Linkage. The general location of the corridor is at the minimum distance between the two valley systems and further minimizes the amount of tableland needed for the east-west connection by incorporating wetlands and other natural heritage features that meet the criteria for protection.

The location, size and function of the proposed Berczy-Bruce ecological corridor has been defined through a separate City-led study in conjunction with the Conceptual Master Plan supporting studies. The study identified the need, function and location of the ecological corridor. The report also identifies the need for a purpose-designed wildlife crossing structure across Warden Avenue and the mid block collector. These wildlife passage structures are used regularly where wildlife road conflicts are to be managed and several design options are available for consideration. The City will work with the Region of York when Warden Avenue is upgraded to address specific design requirements.

The City is currently developing a concept plan for the ecological corridor to demonstrate how the corridor can provide for multiple benefits and be integrated with adjoining land uses, as the basis for further defining how the corridor is to be implemented. Methods of acquisition being explored include the location of compatible portions of stormwater management facilities, delivery of compensation for natural heritage impacts elsewhere in the FUA (e.g., for impacts related to road crossings of tributaries or tableland wetlands and woodlands), parkland dedication for the employment lands, or acquisition through the City's Environmental Land Securement Fund.

The delivery of the proposed 200 metre wide open ecological corridor is an underlying assumption in all of the Conceptual Master Plans studies, including the subwatershed study. Refinements to the configuration of the corridor are anticipated through the further work associated the preparation of the master environmental servicing study and secondary plan for the Employment Block.

## **6.2 Transportation Network**

The transportation network shown in the Community Structure Plan consists of an arterial and collector road network which provides the basic network on which transit services and pedestrian and cycling connections will be developed. The policy direction throughout the Official Plan is to reduce reliance on the automobile and plan for active transportation (walking and cycling) and transit.

The arterial road network and transit network are based on the elements shown in Map 2 – Centres and Corridors and Transit Network, and Map 10 - Road Network of the Official Plan, taking into account the proposed updates to the transit network identified through the June 2016 York Region Transportation Master Plan (TMP) update.

### Arterial Road Network

The components of the arterial road network include Major Mackenzie Drive, Woodbine Avenue, Warden Avenue, Kennedy Road, 19th Avenue, and the proposed Donald Cousens Parkway (DCP) from Markham Road to Highway 404 at 19th Avenue. The arterial road network is primarily under the jurisdiction of York Region, with the exception of 19th Avenue east of Woodbine Avenue, which is a City arterial road.

Proposed road improvements in the vicinity of the Future Urban Area include:

- A potential Highway 404 interchange at 19th Avenue
- Potential Highway 404 mid-block crossings between 19th Avenue and Elgin Mills Road, and between Elgin Mills Road and Major Mackenzie Drive.

The alignment of the DCP is conceptual, as shown in the Region's TMP, to be confirmed through a Class EA process at a later date.

### Transit Network

The transit network reflected in the Community Structure Plan is based on the network identified in Map 2 – Centres and Corridors and Transit Network, but updated to reflect the Region's TMP as follows:

- Proposed Regional Rapid Transit Corridor along Major Mackenzie Drive extending from Richmond Hill, through the FUA lands, and connecting with a potential GO Station at Donald Cousens Parkway
- Proposed Regional Rapid Transit along Woodbine Avenue (subject to further study) south of Major Mackenzie Drive
- Proposed Frequent Transit Service (intervals of up to 15 minutes) along Woodbine Avenue, Warden Avenue, Kennedy Road, and Elgin Mills Road
- Proposed Frequent Transit Service along the proposed Donald Cousens Parkway
- Proposed High Occupancy Vehicle (HOV) on arterials south of Major Mackenzie Drive.

### Collector Network

The proposed collector network provides access to the arterial road system, and also provides for internal flow balancing, circulation flexibility, and active transportation opportunities. Based on population and employment to be accommodated in the FUA, the need has been identified for at least two (2) north-south and two (2) east-west collectors within each (concession) block. These collectors are required to provide sufficient capacity for traffic to move efficiently in and out of the FUA, provide access to the arterial road system, provide good access and connectivity to the surrounding communities, and to provide circulation flexibility and active transportation opportunities. The alignment of the collectors shown conceptually in the Community Structure Plan has regard for connections with existing roads and signalized intersections, and avoids to the extent possible sensitive natural heritage areas and cultural heritage resources. Further refinements of the alignments are expected as a result of further analysis undertaken as part of the MESP and EA processes, which will minimize impacts to the natural environment to the extent possible.

### Active Transportation - Cycling Facilities

Urban Design Guidelines being prepared for the Future Urban Area will provide details regarding the location and type of proposed cycling facilities, which will be reflected in secondary plans.

## **6.3 Neighbourhood Areas and Mixed Use Neighbourhood Corridor**

The intent of the Conceptual Master Plan is to provide guidance on the distribution of land uses and the application of appropriate land use designations in secondary plans to ensure the development of compact, complete and transit-supportive communities across the Future Urban Area lands. These new communities are intended to accommodate a portion of the total population and employment growth in Markham to 2031 as identified in the Official Plan.



In addition to the Greenway System, the elements of compact and complete communities that need to be established in a coordinated manner across the Future Urban Area in the Community Structure Plan include:

- An appropriate range and distribution of housing and jobs to accommodate forecasted population and jobs to 2031;
- An integrated open space system consisting of linkages between natural areas within the Greenway System, parkland, and school sites;
- Identification and distribution of major community facilities (e.g., high schools, community centres, emergency services); and
- Identification of mixed use centres and corridors (community cores), providing a focus of local retail, commercial and community services (schools, parks, other services), within reasonable walking distance from the majority of the population, and with connections to transit.

The distribution and intensity of lands uses should reflect the various levels of transit facilities to be provided (e.g., the highest densities along the proposed Major Mackenzie Drive Regional Rapid Transit corridor, and higher densities along the proposed north-south Proposed Frequent Transit Network corridors).

#### Residential Neighbourhood Area

Lands within the Residential Neighbourhood Area are intended to be developed with predominantly ground-oriented housing types, such as detached, semi-detached and townhouse dwellings. Neighbourhoods should be organized around neighbourhood centres that are within reasonable walking distances (400 metres or 5 minute walk) of all residents. Neighbourhood centres could consist of schools, parks/open space or retail nodes. The proposed distribution/organization of neighbourhoods is illustrated in the Open Space Network and Neighbourhood Structure Plan described in Section 6.6 and attached as Figure 14.

The Residential Neighbourhood Areas (including the Mixed Use Neighbourhood Corridors described below) will accommodate most of the larger community facilities needed to support the new communities. A community park will serve each of the 'Neighbourhood' Blocks south of Elgin Mills Road. In the Angus Glen Block, the community park may be provided as two larger neighbourhood parks, recognizing the facilities already provided by the existing community centre. No additional community centre facilities have been identified to date, however, the need for additional recreation and culture facilities is expected to be confirmed as part of the update to the City's Recreation and Leisure Master Plan. The requirement for a fire station site has been incorporated in the Community Structure Plan.

Based on the anticipated population and housing types, the need for three high school sites have been identified, two by York Region District School Board and one by the York Catholic District School Board. The high school sites are shown evenly distributed amongst the three

'Neighbourhood' Blocks, taking into account school board needs and the potential function of these sites within the open space network.

Potential elementary school sites are shown conceptually in the Open Space Network and Neighbourhood Structure Plan and the Community Structure Plan. At the request of the school boards, an additional elementary school site has been incorporated in the Community Structure Plan. The location and distribution of these school sites reflects the principal of co-locating school sites and neighbourhood parks as focal points/centres for neighbourhoods, as well as forming an integral part of a larger integrated parks and open space system. The location of these schools is conceptual and will be confirmed through secondary plans.

The intended land uses in the Residential Neighbourhood Area lands are most consistent with the 'Residential Low Rise' land use designation in the Official Plan, however there may be areas where modifications to the 'Residential Low Rise' designation or application of the 'Residential Mid Rise' or 'Mixed Use Low Rise' designations may also be appropriate, as determined through the preparation of secondary plans. The ultimate land use designations applied will reflect appropriate transition conditions with adjacent existing communities.

#### Mixed Use Neighbourhood Corridor

These corridors form part of the Neighbourhood Areas and are intended to be developed with higher density housing forms (e.g., townhouses, stacked townhouses) along the north-south Proposed Frequent Transit Network corridors, and along certain east-west collector roads. Although retail and service uses may be provided throughout these corridors, it is anticipated that retail and service uses within the Residential Neighbourhood Areas will be concentrated at major intersections in the Neighbourhood Service Node locations identified on the Plan. However, the majority of the retail and service facilities required to serve the new neighbourhoods are expected to be accommodated within the Mixed Use Regional Corridor along Major Mackenzie Drive.

The intended land uses in the Mixed Use Neighbourhood Corridor are most consistent with the 'Residential Mid Rise' and 'Mixed Use Low Rise' and 'Mixed Use Mid Rise' designations in the Official Plan. As for the Residential Neighbourhood Area, variations of these designations in terms of building types, height or density, or the application of other designations may be appropriate, as determined through the preparation of secondary plans.

### **6.4 Mixed Use Regional Corridor**

This corridor is intended to be developed at the highest densities in the FUA, reflecting the transit-supportive densities required to support the rapid transit corridor anticipated along Major Mackenzie Drive. A mix of high density residential and commercial uses are anticipated in this corridor.

The intended land uses in the Mixed Use Regional Corridor are consistent with the 'Residential Mid Rise', 'Residential High Rise', 'Mixed Use Mid Rise' and 'Mixed Use High Rise' designations in the Official Plan. Variations of these designations or the application of

other similar designations may be appropriate, as determined through the preparation of secondary plans.

Appropriate transition conditions will be reflected in the land use policies to ensure that transit-supportive built form and uses on the north side of Major Mackenzie Drive are compatible with established and planned neighbourhoods in the Angus Glen and Berczy communities south of Major Mackenzie Drive.

## **6.5 Employment Area**

The Conceptual Master Plan is intended to provide guidance on appropriate employment land use designations and policies in the Employment Block north of Elgin Mills Road, recognizing the proximity of the lands to the existing Highway 404 employment lands corridor, and including the identification of appropriate areas to meet ancillary retail and service needs within the employment area.

Both the Regional Official Plan Review and Markham Official Plan Review identified the need for urban expansion to accommodate employment growth in Markham. In particular, the need was identified for large parcels of land appropriate for industrial purposes (manufacturing, warehousing, etc). The employment lands within the Employment Block are intended to meet this need. These lands represent the last opportunity in Markham for additional employment lands within reasonable distance of 400 series highways, and specifically along Highway 404.

The intended land uses in the Employment Area are consistent with the 'Business Park Employment', 'General Employment' and 'Service Employment' designations in the Official Plan, with the majority of the lands intended for 'General Employment' purposes. Any 'Service Employment' lands would be located along arterial roads, and where possible, at the interface of the employment lands with neighbourhood lands so that the retail and service uses provided are available to serve both the employment lands and the neighbourhood lands.

The secondary plan for the Employment Block will also account for the alignment of the extension of the Donald Cousens Parkway from Markham Road to a new Highway 404 interchange at 19<sup>th</sup> Avenue. As mentioned, the alignment shown in the Official Plan is conceptual, to be confirmed through a Class EA process at a later date.

## **6.6 Integrated Parks and Open Space Network**

The location of schools and parks in the Community Structure Plan reflects the more detailed conceptual system shown in the Open Space Network and Neighbourhood Structure Plan identified in Figure 14.

The Open Space Network and Neighbourhood Structure Plan illustrates the principles of school/park campuses functioning as focal points and organizing elements for neighbourhoods, within reasonable walking distance of all residents. The Plan also shows how the passive natural open spaces of the Greenway System can be linked with the active programmed community and neighbourhood parks, to provide an open space system that is

easily accessible within neighbourhoods and between neighbourhoods. In addition to the parks, open space and school sites, connectivity will be provided through streets and a system of pedestrian and cycling trails.

The parks are distributed generally in accordance with the following principles:

- Community parks should be within a 10 minute walking distance (approximately 800 metres) of intended park users
- Neighbourhood parks should be located within a 5 minute walking distance (approximately 400 metres) of intended park users
- Neighbourhood parks and elementary schools should be co-located where possible
- Connections should be provided between the parks and open space system and the Greenway System, streets, utility corridors, and pedestrian and cycling trails
- Parks are located to take advantage of topography and views where appropriate.

The amount and distribution of parkland shown in the Residential Neighbourhood Area lands is based on the assumption that all parkland dedication for ground-oriented dwellings will be provided in land.

## **6.7 Achievement of 2031 Population and Employment and Minimum Densities**

The Community Structure Plan assumes the delivery of compact communities in the FUA which accommodate the population and jobs originally anticipated in the York Region and Markham strategies for accommodating growth to 2031.

Analysis undertaken during the Conceptual Master Plan process suggests that in achieving the minimum 20 units per hectare, and 70 residents and jobs per hectare density thresholds required in the Markham and York Region Official Plans, and to deliver an appropriate mix of housing types, a population of approximately 45,000 is expected.

This population is expected to be housed in approximately 14,000 dwelling units distributed amongst the four Residential Neighbourhood Areas. Overall, the mix of housing types is anticipated to be approximately 80 percent ground-oriented (mainly detached, semi-detached and townhouse units) and 20 percent apartments. The residential neighbourhood lands in the Employment Block and Berczy Glen Block are anticipated to contain mainly ground-oriented housing types, with some higher density forms along arterial roads to support transit. The Angus Glen and Robinson Glen Blocks are expected to accommodate a greater proportion of higher density housing types, given the identified Mixed Use Regional Corridor lands adjacent to the Major Mackenzie Drive rapid transit corridor.

Approximately 5,000 jobs are estimated within the Residential Neighbourhood Area and Mixed Use Corridors, consisting mainly of institutional, retail and service jobs (i.e., population-related), and assuming a small percentage working from home. The greatest proportion of jobs are assumed within the Angus Glen and Robinson Glen Blocks, again reflecting higher density and retail/service uses associated with the Mixed Use Regional Corridor along Major

Mackenzie Drive. An additional 11,000-13,000 jobs are anticipated within the employment lands of the Employment Block, based on a density of 50-60 jobs per developable hectare.

It is anticipated that each of the Residential Neighbourhood Area Blocks will achieve the required minimum density of 20 units per developable hectare. Given the greater opportunities for population-related jobs in the Angus Glen and Robinson Glen Blocks, and relatively fewer opportunities in the Berczy Glen and Employment Block (residential portion), the minimum 70 residents and jobs per developable hectare requirement will be applied as an average across all four Blocks. These targets are reflected in the key policy direction for secondary plans outlined in Chapter 7.

## 7.0 KEY POLICY DIRECTION FOR SECONDARY PLANS

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The purpose of developing a Conceptual Master Plan for the Future Urban Area was to identify a high level community structure across the entirety of the lands, to ensure that the future new communities in each of the concession blocks are planned and developed in a coordinated, integrated manner in accordance with the requirements of the York Region and Markham Official Plans.

The next step in the planning for these communities is the preparation and approval of secondary plans. Master environmental servicing plans, which identify the required water, wastewater, stormwater and transportation infrastructure required to support the communities, and community design plans which provide detailed urban design direction for communities, will be prepared to inform the secondary plans and provide guidance for implementation of the secondary plans through development applications.

The requirements for sustainable community growth outlined in the York Region and Markham Official Plans were distilled into the guiding principles/parameters identified in Table 1. Building on the Community Structure Plan and the Open Space Network and Neighbourhood Structure Plan, and the findings of each of the supporting subwatershed, transportation, water and wastewater master plans, this section outlines the key policy direction to be addressed in secondary plans, and reflected in the accompanying community design plans. The policy direction is provided in Table 2 organized according to the associated guiding principles.

In addition to the policy direction provided in Table 2, Urban Design Guidelines for the Future Urban Area are being developed which provide further guidance for the development of community design plans for each of the secondary plan areas, and the review of subsequent development applications.

Table 2 is intended to highlight the key policy requirements that need to be addressed in secondary plans. The York Region and Markham Official Plans, as well as the York Region New Communities Guidelines (2013), should be referred to for additional requirements. Recognizing the integrated nature of the guiding principles, efforts have been made to minimize repetition in policy direction.

As noted in Chapter 6, it is anticipated that the components of the Community Structure Plan will be further refined as a result of additional analysis and consultation undertaken during the preparation of secondary plans, or through subsequent environmental assessment processes for certain municipal infrastructure. Refinements can be considered as long as the underlying principles of the Community Structure Plan are not compromised. References in the policy direction to consistency with the Community Structure Plan should be read with this understanding.

**Table 2: Key Direction for Secondary Plans in the Future Urban Area**

Principles & Parameters	Key Direction
<b>Vision, Goals and Objectives</b>	
<p>The Official Plan requires the preparation of secondary plans, master environmental servicing plans (MESPs) and community design plans for the FUA.</p> <p>Individual secondary plans and accompanying community design plans are anticipated to be prepared for each of the concession blocks within the Future Urban Area.</p>	<p>Secondary plans will:</p> <ol style="list-style-type: none"> <li>1. Identify the vision, goals and objectives for the community within the secondary plan area that articulate a community identity, consistent with the CMP vision statement.</li> <li>2. Provide policy direction regarding community structure, consistent with the Community Structure Plan.</li> </ol> <p>Community design plans will:</p> <ol style="list-style-type: none"> <li>1. Demonstrate how community identity will be delivered by means of more detailed urban design guidance related to both the public and private realm.</li> </ol>
<b>Protecting and Enhancing the Natural Environment</b>	
<p><b>PP1</b> Confirm and refine the Greenway System to ensure protection and enhancement of natural heritage features and functions and water resources</p>	<p>Secondary plans will:</p> <ol style="list-style-type: none"> <li>1. Identify on one or more schedules: <ul style="list-style-type: none"> <li>o the Greenway System, reflecting the Greenway System shown in the Community Structure Plan; and</li> <li>o additional features worthy of protection that were not captured as part of the CMP analysis.</li> </ul> </li> <li>2. Provide policy direction regarding: <ul style="list-style-type: none"> <li>o protection of the natural heritage features and system in accordance with the recommendations of the CMP subwatershed study and Official Plan policies;</li> <li>o opportunities regarding restoration and enhancement of the Greenway System to be implemented as part of development approvals to ensure their long term sustainability within an urban setting, consistent with the recommendations of the subwatershed study;</li> <li>o water resource management, in accordance with the recommendations of the subwatershed study and Official Plan policies;</li> <li>o the mitigation of unavoidable impacts of infrastructure projects, in accordance with the recommendations of the subwatershed study; and</li> <li>o provision of a trail system to be integrated with the active transportation network outside the Greenway System.</li> </ul> </li> </ol>

		<p>Community design plans will:</p> <ol style="list-style-type: none"> <li>1. Demonstrate how the Greenway System is integrated within the fabric of the community, including its function within an integrated open space system, and the integration of a connected trail system.</li> <li>2. Provide direction on the appropriate interface between development and the Greenway System.</li> </ol>
<b>PP2</b>	<p>Design with regard for natural heritage and enhance the urban forest – ensure development minimizes impacts to natural features, topography and soils, and enhances tree canopy</p>	<p>Secondary plans will:</p> <ol style="list-style-type: none"> <li>1. Provide policy direction regarding innovation in the design of the community to ensure development has regard for natural heritage landscapes, to the extent possible, by: <ul style="list-style-type: none"> <li>o minimizing impacts to natural features;</li> <li>o having regard for existing topography; and</li> <li>o maintaining soil quality.</li> </ul> </li> <li>2. Provide policy direction on a strategy for increasing urban forest cover in the community.</li> </ol> <p>Community design plans will:</p> <ol style="list-style-type: none"> <li>1. Demonstrate how development will have regard for natural heritage landscapes.</li> <li>2. Identify opportunities to enhance the urban forest.</li> </ol>
<b>Building Compact Complete Communities</b>		
<b>PP3</b>	<p>Provide for the daily needs of residents through the organization of residential neighbourhoods, mixed use centres and corridors, and an integrated open space network, all integrated with a transportation network that includes transit and active transportation</p>	<p>Secondary plans will:</p> <ol style="list-style-type: none"> <li>1. Identify on one or more schedules: <ul style="list-style-type: none"> <li>o appropriate land use designations reflecting the intended built form and function of the broad land use categories in the Community Structure Plan;</li> <li>o the required number of schools, parks, and other community facilities in accordance with the Community Structure Plan;</li> <li>o proposed place of worship sites in accordance with Official Plan policy (i.e., Council’s site reservation policy)</li> <li>o a transportation network, including walking, cycling, trails and transit facilities in addition to roads, reflecting the transportation network shown in the Community Structure Plan and the recommendations of the CMP transportation study</li> </ul> </li> </ol>



		<ol style="list-style-type: none"> <li>2. Provide policy direction regarding each of the components identified on schedules, including: <ul style="list-style-type: none"> <li>○ appropriate uses, building types, height and density for each of the land use designations (which may vary from the policies of the Official Plan Part 1); and</li> <li>○ integration/linkage of the land use and infrastructure components.</li> </ul> </li> <li>3. Provide policy direction that provides for development that is resilient, and built form that can evolve and diversify over time (e.g., live/work units).</li> <li>4. Provide policy direction for detailed planning and phasing of Mixed Use Regional Corridor lands, particularly with respect to built form and parking.</li> </ol> <p>Community design plans will:</p> <ol style="list-style-type: none"> <li>1. Demonstrate integration and linkages between land uses, the open space network and the transportation network, with specific focus on the active transportation network.</li> </ol>
<b>PP4</b>	Identify a housing mix that provides for a range of housing types and tenure, including affordable housing	<p>Secondary plans will:</p> <ol style="list-style-type: none"> <li>1. Provide policy direction to provide for a range of appropriate housing types and sizes within the 'Residential' and 'Mixed Use' land use designations, consistent with the Community Structure Plan to meet the needs of all residents, including those with special needs.</li> <li>2. Provide policy direction regarding the provision of affordable and shared housing, including the housing types most likely to meet the definition of affordable (i.e., typically smaller, higher density housing types, coach houses, second suites); and how the anticipated dwellings units within the community contribute to City and York Region affordability targets (i.e., 25% of new units).</li> </ol> <p>Community design plans will:</p> <ol style="list-style-type: none"> <li>1. Demonstrate the distribution of housing types within the secondary plan area consistent with the land use designations.</li> </ol>
<b>PP5</b>	Identify appropriate locations for mixed use community core areas that provide a focus of retail and community services within reasonable walking	<p>Secondary plans will:</p> <ol style="list-style-type: none"> <li>1. Provide policy direction regarding the associated land use designations identified for the Mixed Use Regional Corridor – Retail Focus and Neighbourhood Service Node (Primary and</li> </ol>

	<p>distance from the majority of the population, and that are accessible by transit</p>	<p>Secondary) components of the Community Structure Plan and the Open Space Network and Neighbourhood Structure Plan, to ensure:</p> <ul style="list-style-type: none"> <li>○ the Mixed Use Regional Corridor – Retail Focus lands provide the highest order of mix of uses and densities, and provide a focal point for the FUA communities;</li> <li>○ the Neighbourhood Service Nodes provide for neighbourhood scale services, providing a neighbourhood focus;</li> <li>○ services are available within a reasonable walking distance from residents and near planned transit routes; and</li> <li>○ provision of live/work opportunities.</li> </ul> <p>2. Provide policy direction for retail, service, office and institutional buildings to be designed to be pedestrian-oriented, transit-supportive, multi-storey, and integrated into communities and pedestrian and cycling networks, with high quality urban design.</p> <p>3. Provide policy direction on how retail will be delivered or phased to achieve an ultimate mixed use form.</p> <p>Community design plans will:</p> <ol style="list-style-type: none"> <li>1. Demonstrate the appropriate mix of built form and land use in each node.</li> <li>2. Demonstrate how the Mixed Use Regional Corridor and Neighbourhood Service Nodes may develop over time.</li> </ol>
<p><b>PP6</b></p>	<p>Identify an integrated open space network as one of the main organizing elements of the community (including natural areas, parkland and other open space); and ensure the open space network is well connected to the active transportation network</p>	<p>Secondary plans will:</p> <ol style="list-style-type: none"> <li>1. Identify on schedules, an integrated network and hierarchy of parks and public spaces that provide for: <ul style="list-style-type: none"> <li>○ active recreational spaces;</li> <li>○ passive recreational spaces; and</li> <li>○ urban squares/meeting places/informal gathering spaces.</li> </ul> </li> </ol> <p>Community design plans will:</p> <ol style="list-style-type: none"> <li>1. Demonstrate how an integrated open space network is being delivered as a main organizing element of the community, consistent with the secondary plan schedules that identify the Greenway System and parks, and the principles demonstrated in the CMP Open Space Network and Neighbourhood Structure Plan.</li> <li>2. Identify an integrated trail system as part of the active transportation network, and parks and</li> </ol>

		open space network, consistent with the policies of the Official Plan 2014 and Greenbelt Plan 2017.
<b>PP7</b>	Identify the community infrastructure (public facilities and services) needs of the community through a community infrastructure plan, as well as opportunities for places of worship	<p>Secondary plans will:</p> <ol style="list-style-type: none"> <li>1. On schedules and through policy direction, provide for the major community facilities identified on the Community Structure Plan and any additional facilities and services that may be identified through further review and consultation with service providers.</li> <li>2. Provide policy direction for the delivery of community services in community hubs, where possible, and for consideration of locating large community facilities in community cores to contribute to the development of these areas as community focal points.</li> <li>3. Provide for place of worship sites in accordance with Official Plan policies.</li> </ol> <p>Community design plans will:</p> <ol style="list-style-type: none"> <li>1. Demonstrate how community facilities and place of worship sites identified on land use schedules will be integrated within the community, and how they will be accessible by active transportation and transit.</li> </ol>
<b>PP8</b>	Plan to achieve a minimum density of 70 residents and jobs per developable hectare, and 20 units per developable hectare across the 'Future Neighbourhood Area' lands	<p>Secondary plans will:</p> <ol style="list-style-type: none"> <li>1. Identify appropriate land use designations and densities and additional policy direction that ensures the minimum density requirements for the Residential Neighbourhood Area lands in the Community Structure Plan are met as follows: <ul style="list-style-type: none"> <li>o A minimum density of 20 units per developable hectare will be achieved within each secondary plan area; and</li> <li>o A minimum 70 residents and jobs per developable hectare will be achieved on average across all lands within the 'Future Neighbourhood Area' designation.</li> </ul> </li> <li>2. Provide policy direction for appropriate transition to established neighbourhoods, employment areas, the Greenway System and Countryside lands.</li> </ol> <p>Community design plans will:</p> <ol style="list-style-type: none"> <li>1. Demonstrate appropriate transition between established neighbourhoods, employment areas, the Greenway System and Countryside lands.</li> </ol>

<p><b>PP9</b></p>	<p>Recognize, conserve, promote and integrate cultural heritage resources in community design</p>	<p>Secondary plans will:</p> <ol style="list-style-type: none"> <li>1. Provide policy direction regarding the cultural heritage resources identified in the CMP, including appropriate uses for the buildings.</li> <li>2. Provide policy direction regarding archaeological resources within the secondary plan area.</li> </ol> <p>Community design plans will:</p> <ol style="list-style-type: none"> <li>1. Demonstrate how the cultural heritage resources identified in the CMP will be integrated into community design, having regard for road alignments, appropriate lot sizes, use of buildings as landmarks, etc.</li> </ol>
<p><b>PP10</b></p>	<p>Create community identity through establishment of a high quality public realm, placemaking and a high standard of urban design (distinctive built form, streetscapes, parks and open space, landmarks and views, public art, etc); ensure communities are designed to be accessible by all, regardless of age or physical ability</p>	<p>Secondary plans will:</p> <ol style="list-style-type: none"> <li>1. Provide policy direction on the creation of a distinct community identity through high quality design that: <ul style="list-style-type: none"> <li>o provides pedestrian scale, safety, comfort, accessibility and connectivity;</li> <li>o complements the character of existing areas and fosters each community's unique sense of place;</li> <li>o promotes sustainable and attractive buildings that minimize energy use;</li> <li>o promotes landscaping, public spaces and streetscapes;</li> <li>o ensures compatibility with and transition to surrounding land uses;</li> <li>o emphasizes walkability and accessibility through strategic building placement and orientation;</li> <li>o is transit-supportive; and</li> <li>o creates well-defined centrally located urban public spaces that provide opportunities for public art and cultural activities.</li> </ul> </li> <li>2. Provide policy direction on ensuring the community is accessible to people of all ages and abilities.</li> </ol> <p>Community design plans will:</p> <ol style="list-style-type: none"> <li>1. Demonstrate how the direction in secondary plans will be achieved, with further guidance on public realm, streets and blocks, streetscapes, landmarks, views, parks and open space plan, built form, height and massing, and opportunities for public art, in accordance with the FUA Urban Design Guidelines.</li> </ol>

<b>PP11</b>	Ensure access to local food through opportunities for urban agriculture	<p>Secondary plans will:</p> <ol style="list-style-type: none"> <li>1. Identify opportunities for urban agriculture in the secondary plan area (e.g., Greenway System, parks, utility corridors, buildings).</li> </ol> <p>Community design plans will:</p> <ol style="list-style-type: none"> <li>1. Demonstrate locations/opportunities for urban agriculture within the secondary plan area.</li> </ol>
<b>Maintaining a Vibrant and Competitive Economy</b>		
<b>PP12</b>	Plan for the range of jobs in the 'Future Employment Area' lands required to achieve the City's employment forecasts to 2031, at an overall density of 50-60 jobs per hectare; ensure employment uses are accessible by transit and active transportation networks	<p>The secondary plan for the Employment Block will:</p> <ol style="list-style-type: none"> <li>1. Identify on one or more schedules: <ul style="list-style-type: none"> <li>o appropriate land use designations reflecting the employment uses and jobs required to be accommodated (i.e., primarily 'General Employment', with limited areas of 'Business Park Employment' and 'Service Employment' designation);</li> <li>o a parks and open space network; and</li> <li>o a transportation network providing for transit and active transportation through the employment lands.</li> </ul> </li> <li>2. Provide policy direction regarding: <ul style="list-style-type: none"> <li>o limiting ancillary uses in employment lands according to York Region and Markham Official Plan policy;</li> <li>o density requirements;</li> <li>o provision of a mix of lot sizes;</li> <li>o protection of employment land through employment conversion policies;</li> <li>o transit-supportive and active transportation supportive development, where possible; and</li> <li>o sustainable building/campus practices.</li> </ul> </li> </ol> <p>The community design plan will:</p> <ol style="list-style-type: none"> <li>1. Demonstrate integration and linkages between land uses, the open space network and the transportation network, with specific focus on the active transportation network.</li> </ol>
<b>Increasing Travel Options (Mobility)</b>		
<b>PP13</b>	Identify a comprehensive transportation system that emphasizes walking and cycling and transit as increasingly viable and attractive alternatives to the automobile	<p>Secondary plans will:</p> <ol style="list-style-type: none"> <li>1. Identify on one or more schedules a transportation/mobility network, based on the Community Structure Plan, that: <ul style="list-style-type: none"> <li>o accommodates walking, cycling, transit as well as vehicles;</li> </ul> </li> </ol>

		<ul style="list-style-type: none"> <li>○ is integrated with the trail system in the open space system; and</li> <li>○ makes transit available to the majority of the community.</li> </ul> <p>2. Provide policy direction outlining additional components of the transportation/mobility plan, including:</p> <ul style="list-style-type: none"> <li>○ transportation demand management strategies to reduce single-occupancy vehicle trips; and</li> <li>○ implementation of the City's parking management strategy which will identify means of encouraging other modes of travel.</li> </ul> <p>Community design plans will:</p> <p>1. Demonstrate the incorporation of the integrated mobility network in the community design.</p>
<b>PP14</b>	Plan for a grid pattern of streets and blocks that provides for a hierarchy of street types that provide appropriate and integrated facilities for walking and cycling; and facilitates an urban form that supports transit use and also increases opportunities for people to walk and cycle	<p>Secondary plans will:</p> <p>1. Provide direction for provision of a hierarchy of streets and blocks that promote walking and cycling, and that support transit.</p> <p>Community design plans will:</p> <p>1. Demonstrate how the hierarchy of streets and blocks provides for a walkable community that also supports cycling and transit.</p>
<b>Adopting Green Infrastructure and Development Standards</b>		
<b>PP15</b>	Identify best management practices and approaches to stormwater management systems/facilities, water and wastewater systems, and the transportation network to maximize water and energy conservation and resilience at the community level	<p>Secondary plans will:</p> <p>1. Provide direction for the preparation of a master environmental servicing plan, incorporating the findings and recommendations of the CMP subwatershed, transportation, water and wastewater studies, and the requirement for more detailed environmental assessments for identified infrastructure projects.</p> <p>2. Specifically provide direction for the incorporation of the following in the MESP:</p> <ul style="list-style-type: none"> <li>○ low impact development (LID) facilities and green infrastructure as part of stormwater management strategies, in accordance with City LID guidelines; and</li> <li>○ measures to reduce energy demand at the community level through a community energy plan or similar initiative.</li> </ul> <p>Community design plans will:</p> <p>1. Demonstrate the use of LID best management practices in the community.</p>

<b>PP16</b>	Identify best management practices for green buildings to reduce demands on energy, water and waste systems	<p>Secondary plans will:</p> <ol style="list-style-type: none"> <li>1. Provide policy direction regarding proposed: <ul style="list-style-type: none"> <li>○ measures to reduce energy demand in buildings through a solar design strategy, community energy plan or similar initiative;</li> <li>○ renewable energy generation for buildings;</li> <li>○ water conservation measures to reduce potable water use;</li> <li>○ sustainable green building and development practices, including consideration of indoor air quality; and</li> <li>○ waste reduction measures.</li> </ul> </li> </ol> <p>Community design plans will:</p> <ol style="list-style-type: none"> <li>1. Provide more details on proposed initiatives to be implemented in the community, e.g., use of water efficient, drought resistant landscaping, appropriate topsoil depth, installation of rainwater harvesting systems.</li> </ol>
<b>Implementation</b>		
<b>PP17</b>	Public Engagement – encourage involvement of all stakeholders	<p>Secondary plans will:</p> <ol style="list-style-type: none"> <li>1. Be reviewed with the continued involvement of all stakeholders engaged in the CMP process.</li> <li>2. Be reviewed and considered for adoption by Council as amendments to the Official Plan 2014 in accordance with the public notice provisions of the Planning Act.</li> </ol>
<b>PP18</b>	Phasing and Sequencing/Financial Impact – identify general phasing, sequencing and cost of development	<p>Secondary plans will:</p> <ol style="list-style-type: none"> <li>1. Provide policy direction regarding the requirement for a detailed phasing plan as part of, or in coordination with the MESP which at minimum, provides for: <ul style="list-style-type: none"> <li>○ minimizing disruption to established and new neighbourhoods through orderly progression of development;</li> <li>○ identification of key benchmarks for progressing through phases, having regard for the timing of key infrastructure delivery (both temporary and permanent) as identified in the supporting studies, that respects local and regional infrastructure master plans and 10-year construction schedules;</li> <li>○ identification of the population and employment linked to each phase; and</li> <li>○ timely provision of the elements of a complete community (e.g., schools, parks, other community facilities, retail and service uses, active transportation and transit).</li> </ul> </li> </ol>

		<ol style="list-style-type: none"> <li>2. Provide policy direction requiring Developers Group Agreements for cost-sharing purposes.</li> <li>3. Provide policy direction regarding the need for the City to undertake a fiscal impact analysis of the implementation of the plan, particularly the impact of proposed new practices (e.g., LID facilities, cycling facilities).</li> </ol> <p>Community Design Plans will:</p> <ol style="list-style-type: none"> <li>1. Demonstrate how the community will be phased.</li> </ol>



## **8.0 NEXT STEPS IN PLANNING FOR THE FUTURE URBAN AREA**

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### **8.1 Approval of Secondary Plans and MESP, Phasing Plans and EAs**

With the completion of the Conceptual Master Plan, the next step in planning the Future Urban Area lands is the submission, review and approval of secondary plans and accompanying master environmental servicing plans and community design plans.

Phasing plans are expected to be included as part of the MESP for each secondary plan area. At minimum, the phasing plans are expected to have regard for development occurring in an orderly progression, with regard for the timing of delivery of key infrastructure (temporary and permanent), and providing for elements of a complete community in each phase.

EA processes for identified infrastructure projects will also be completed.

### **8.2 Urban Design Guidelines**

Community design plans will be prepared as companion documents to secondary plans for each of the secondary plan areas within the FUA. Whereas secondary plans provide statutory policy direction in the form of Official Plan policy, community design plans provide a more detailed articulation of the community, such as the community vision, street layout, organization of schools and parks, built form, integration of cultural heritage buildings, sustainability features, and streetscape and other public realm considerations.

Urban Design Guidelines for the Future Urban Area are being prepared to provide additional guidance for the anticipated community design plans. The Guidelines will build on the direction provided in the CMP and the more detailed urban design policies of Markham's Official Plan and the City's best practices in community design.

### **8.3 Community Energy Plan**

The York Region and Markham Official Plans require that a community energy plan be developed for the new communities within the Future Urban Area. The community energy plan is intended to reduce community energy demands, optimize passive solar gains, maximize active transportation and transit, and make use of renewable, on-site generation and district energy options.

Preparation of a city-wide Municipal Energy Plan is currently underway. Community energy plans/strategies will help achieve city-wide greenhouse gas reduction targets, once established through the Municipal Energy Plan. The active transportation and transit component of the Community Energy Plan is being addressed through the Conceptual Master Plan.

### **8.4 Fiscal Impact Analysis**

York Region and Markham Official Plan policy direction requires the consideration of the fiscal impact/life cycle cost of development. The development of sustainable communities in the FUA requires new ways of providing municipal services and infrastructure that go beyond business as usual in Markham, particularly with respect to stormwater management and the facilities needed to encourage active transportation (walking and cycling). Further analysis is underway to determine which types of facilities will be recommended for use in the FUA, including consideration of financial impact.

FIGURE 1

LOCATION MAP

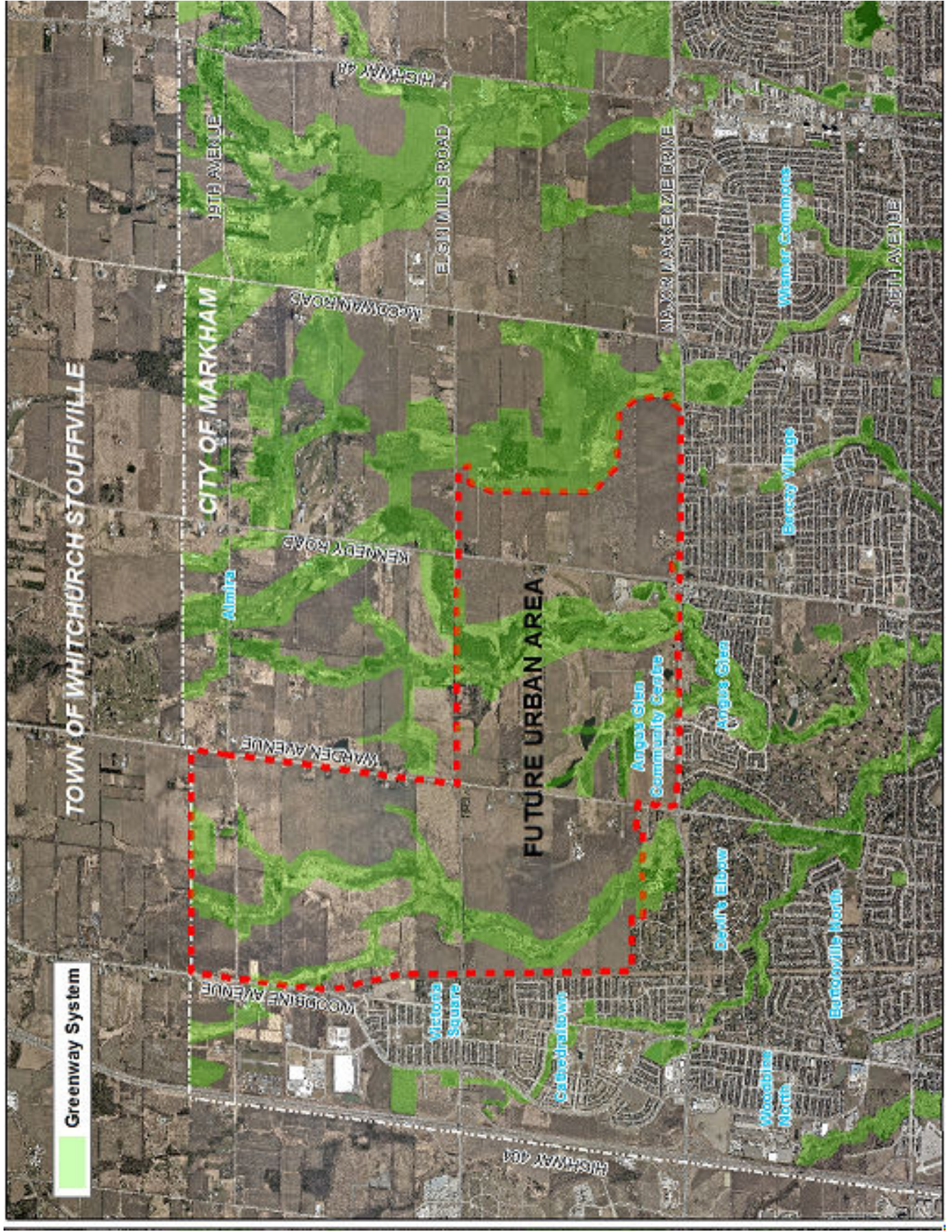


FIGURE 2

PLANNING PROCESS FOR THE FUTURE URBAN AREA

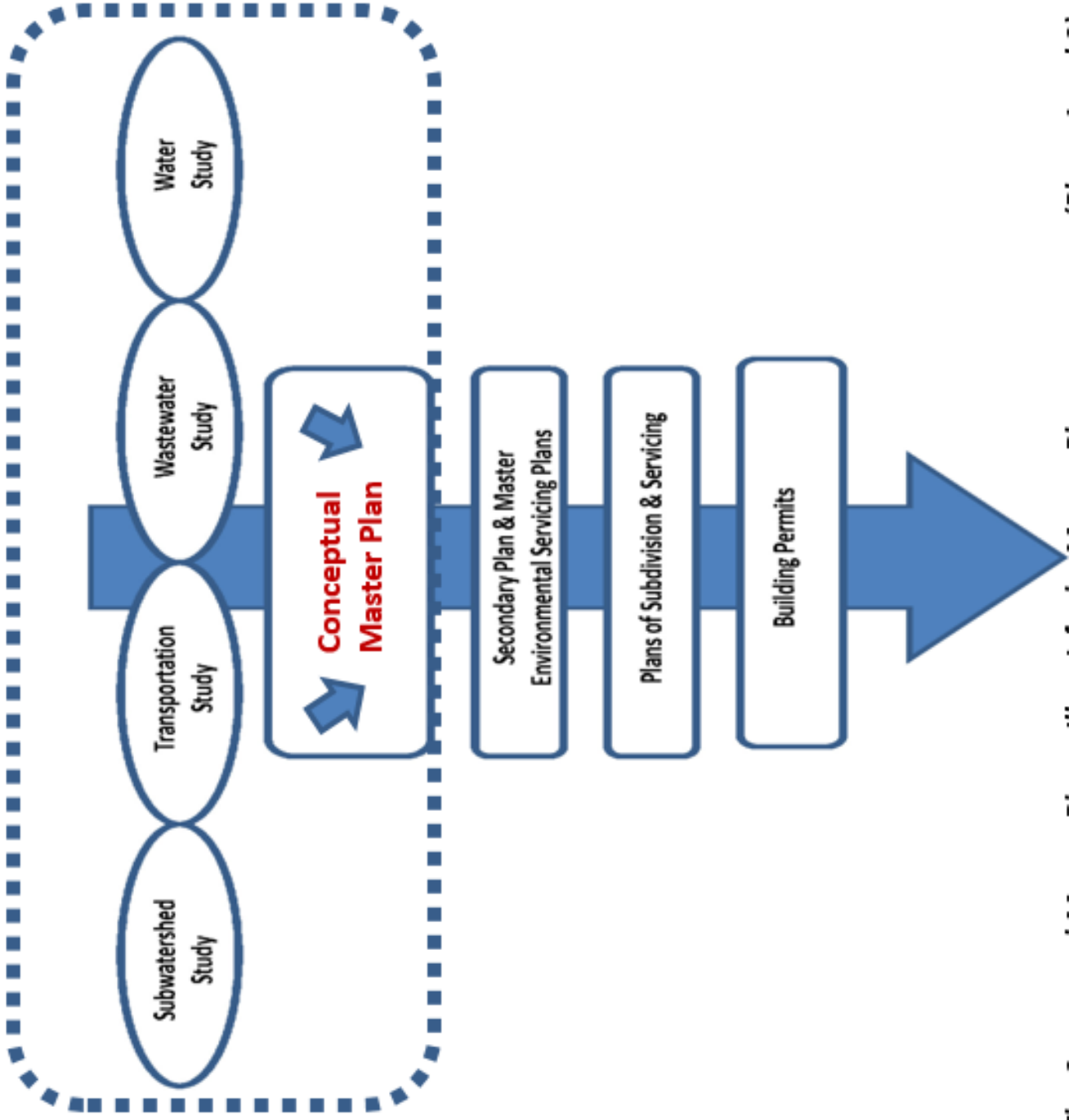


FIGURE 3

ANTICIPATED SECONDARY PLAN BLOCKS

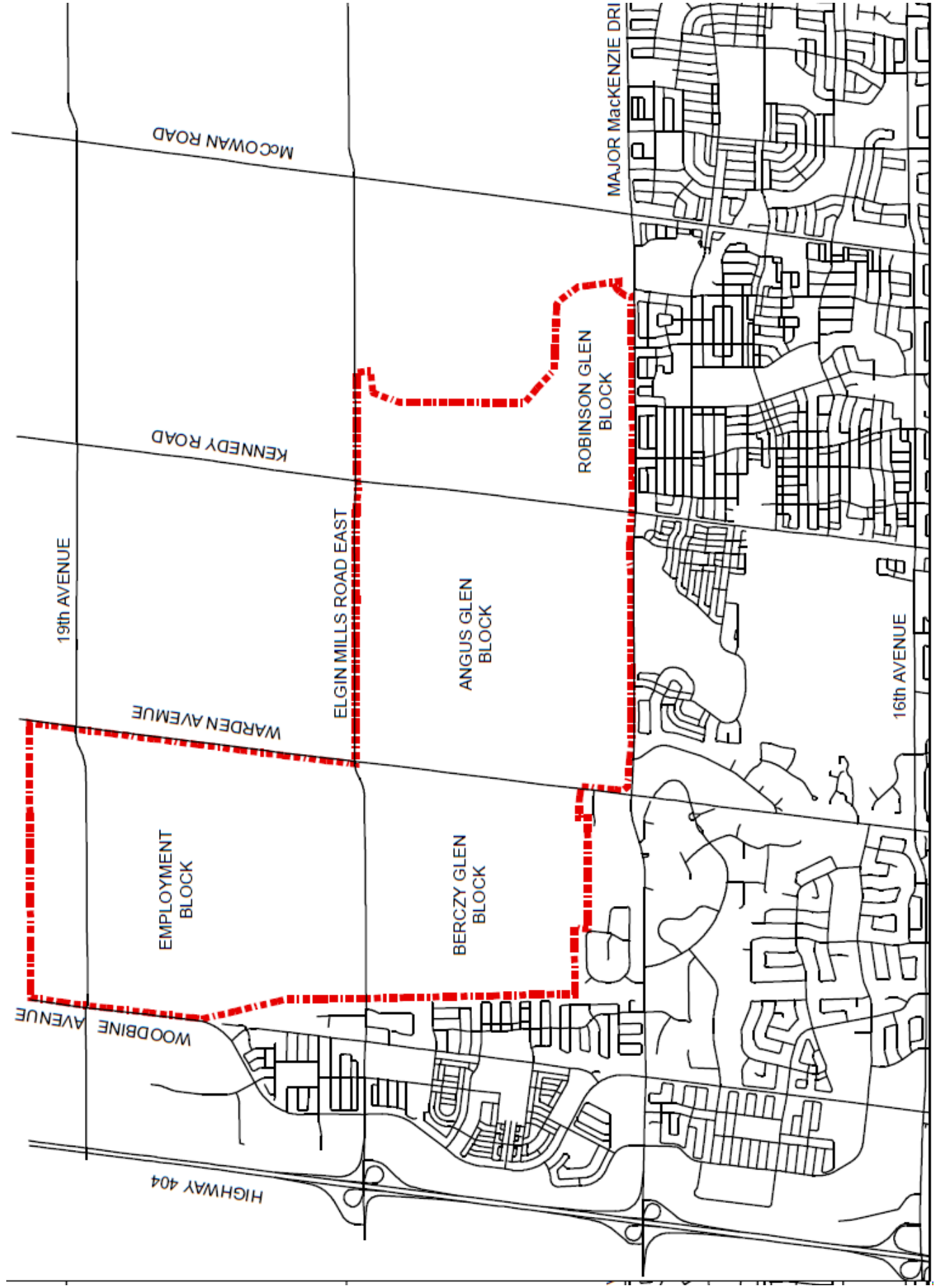


FIGURE 4

OFFICIAL PLAN LAND USE DESIGNATIONS

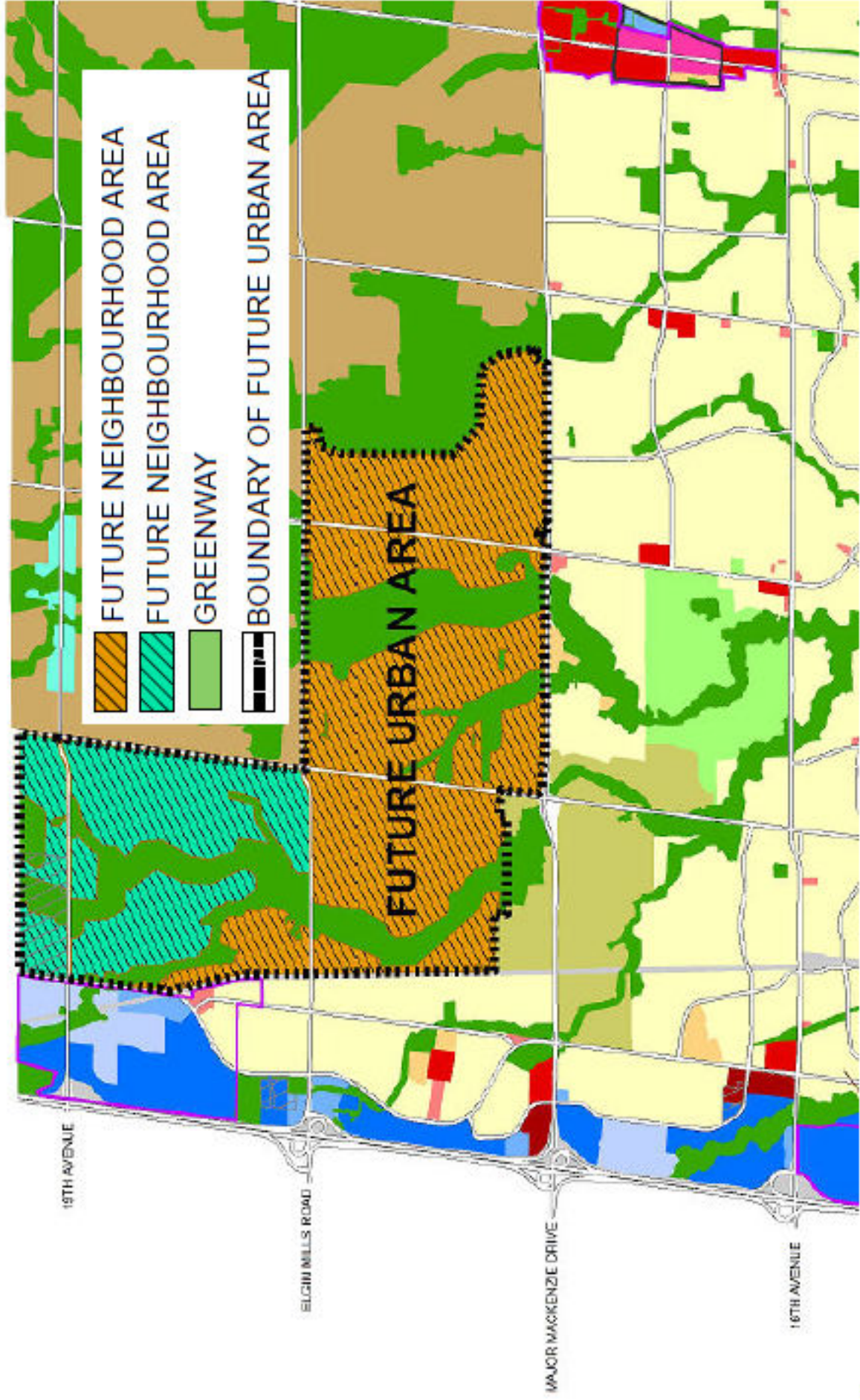
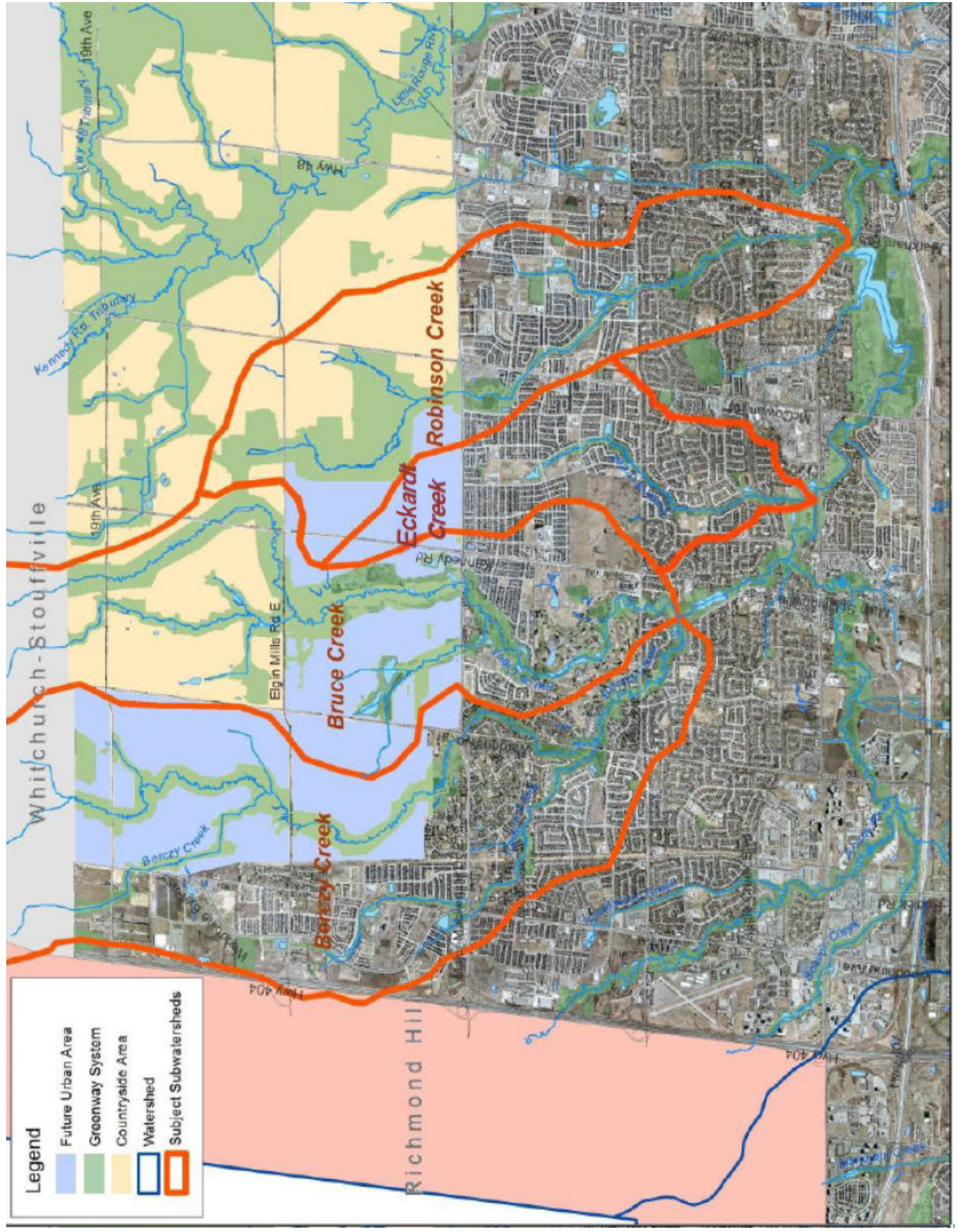


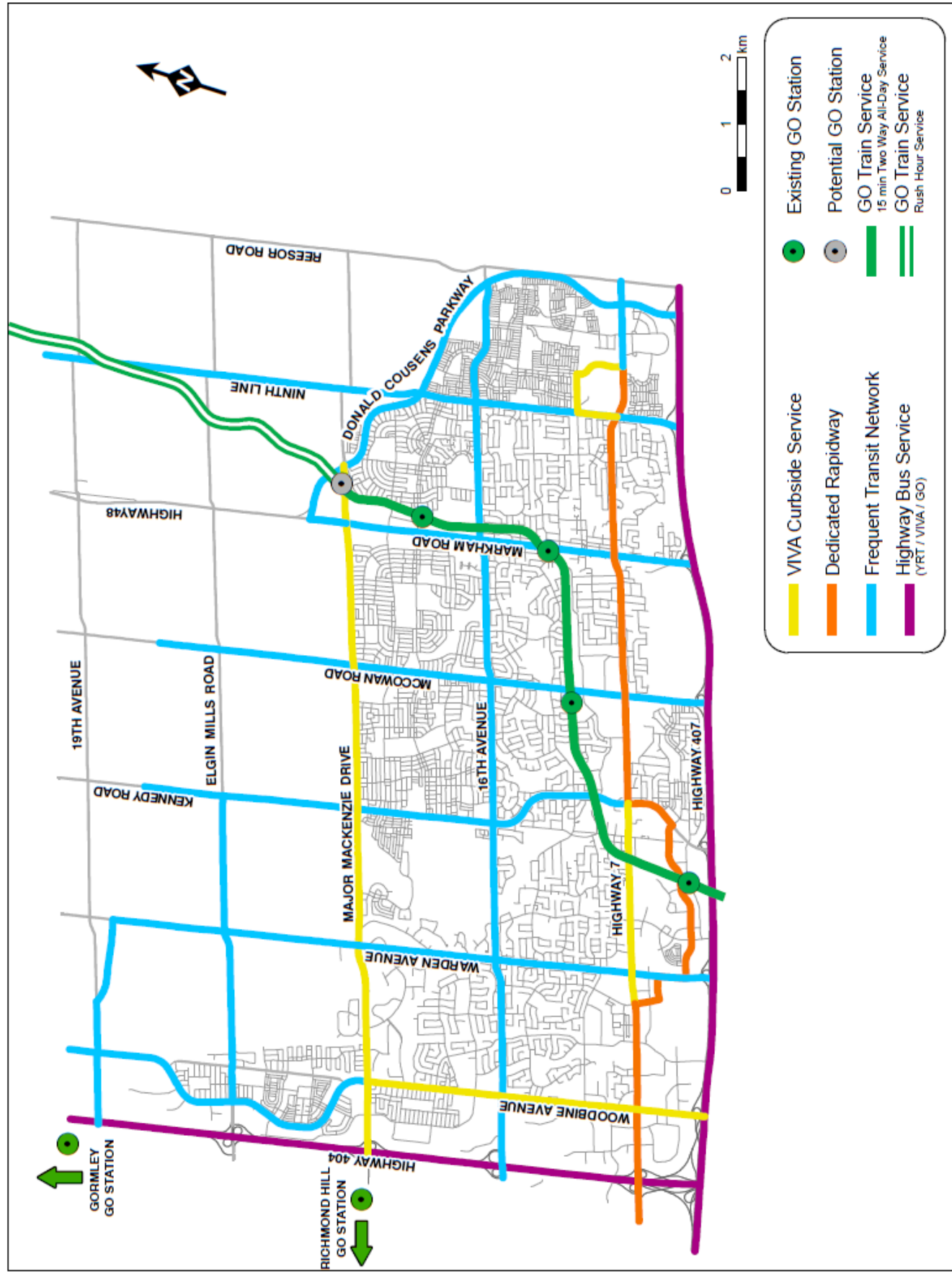
FIGURE 5

SUBWATERSHED BOUNDARIES



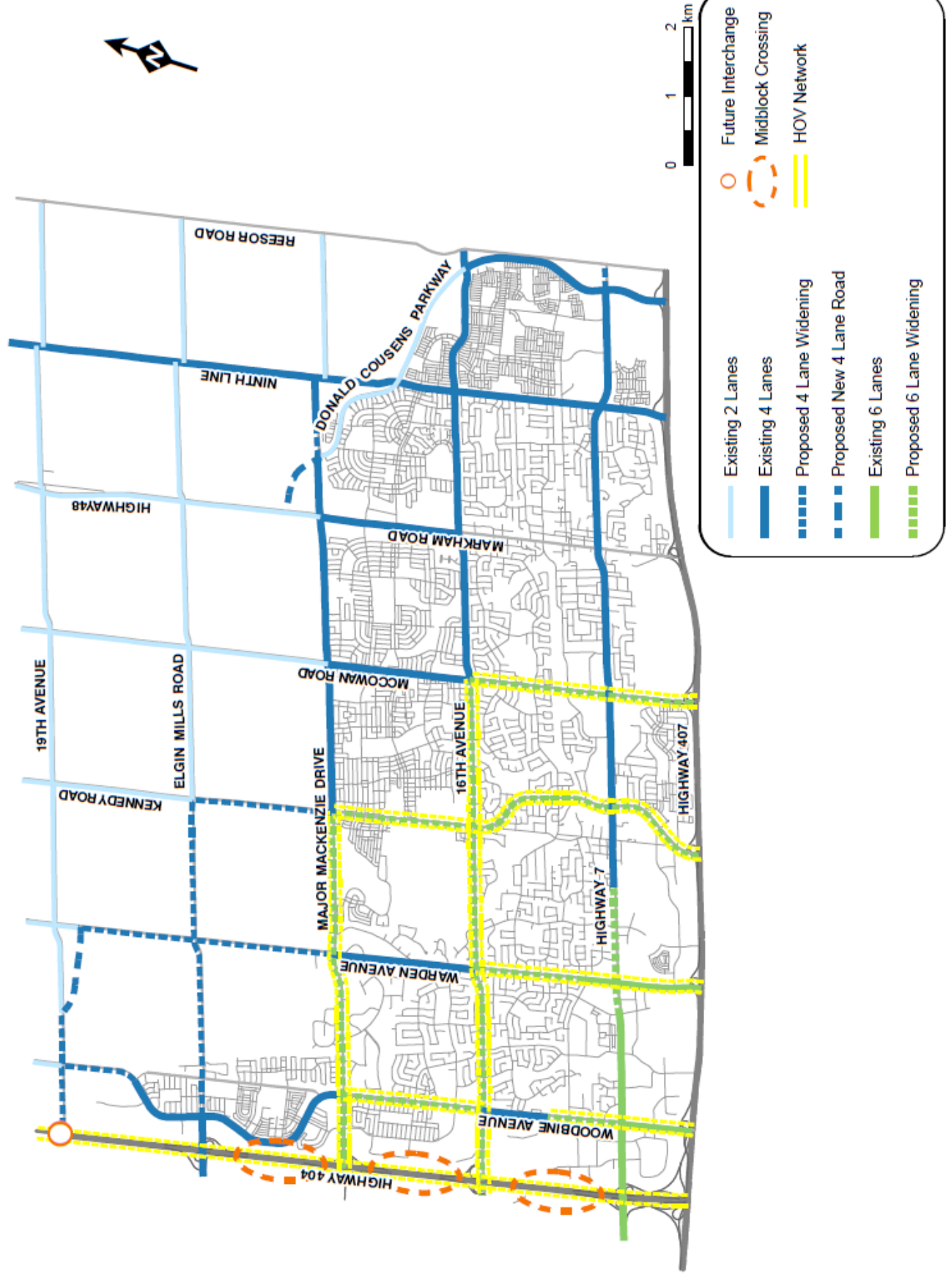
# REGIONAL TRANSIT IMPROVEMENT FOR HORIZON YEAR 2031

FIGURE 6



# STUDY AREA ROAD NETWORK HORIZON YEAR 2031

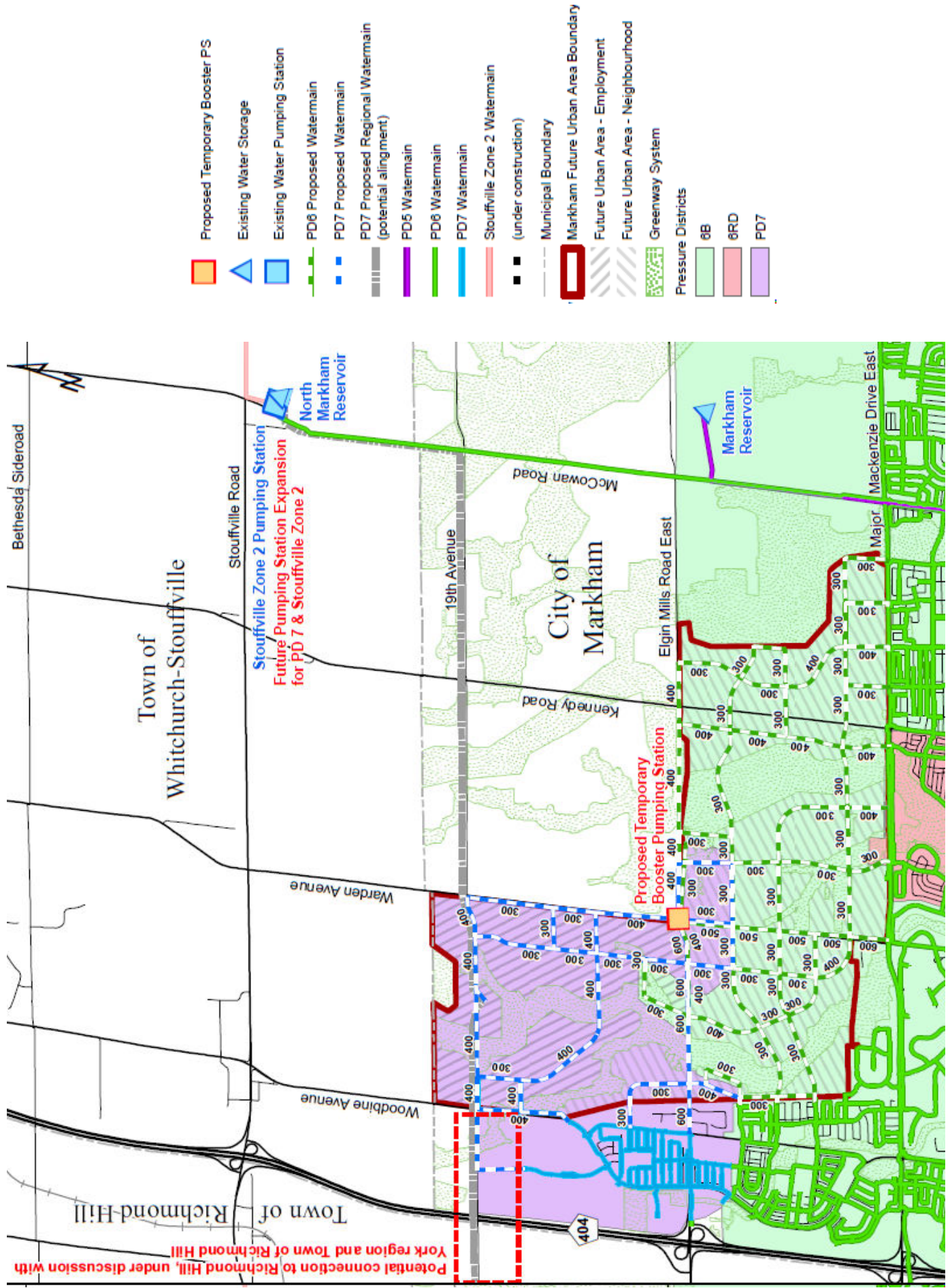
FIGURE 7





**FIGURE 8**

**PREFERRED WATER SERVICING ALTERNATIVE - INTERIM AND ULTIMATE**



# WASTEWATER SERVICING CONCEPT WW-1 (PREFERRED)

FIGURE 9

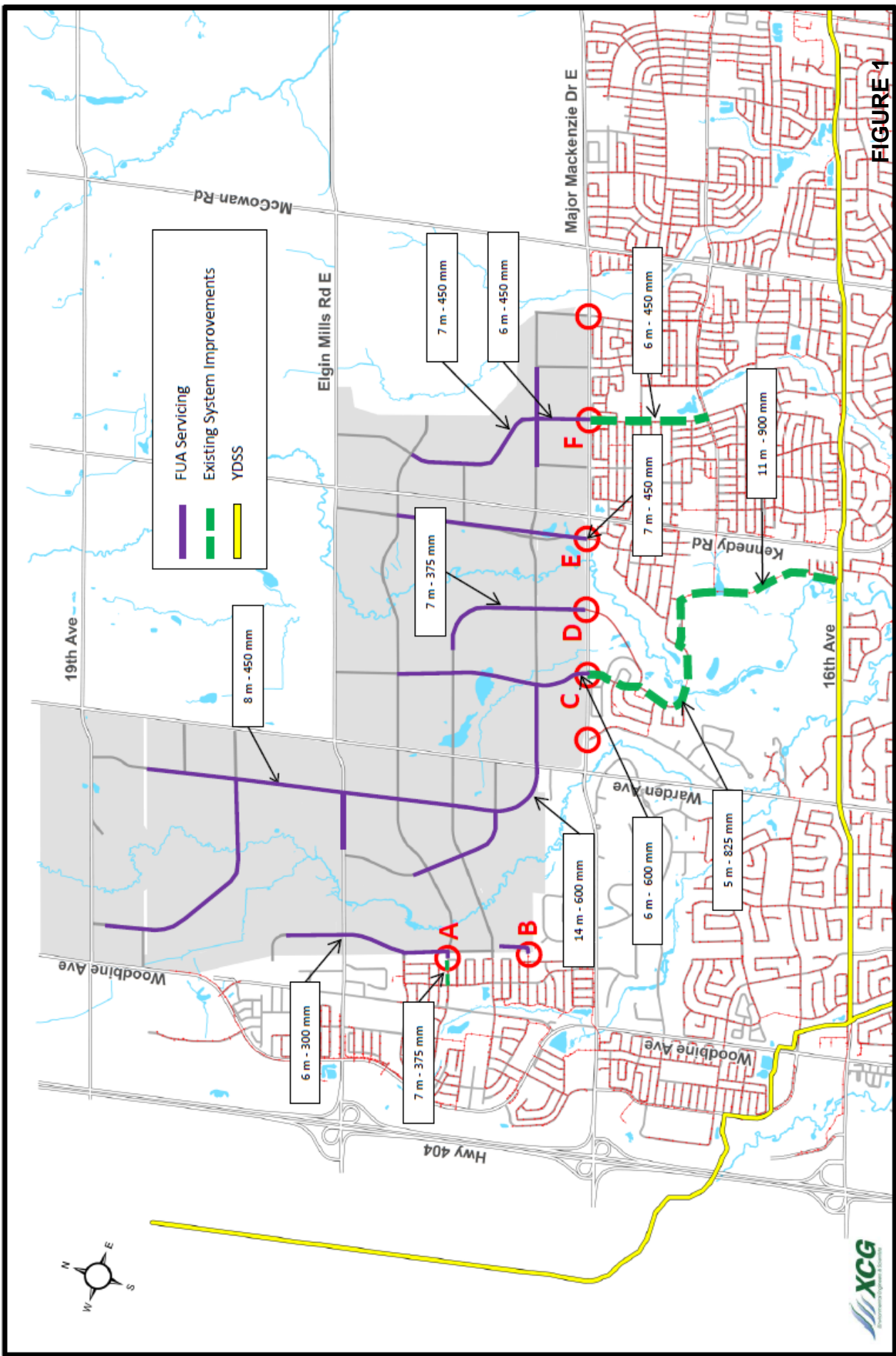


FIGURE 1

FIGURE 10

FUA WASTEWATER SERVICING ALTERNATIVES

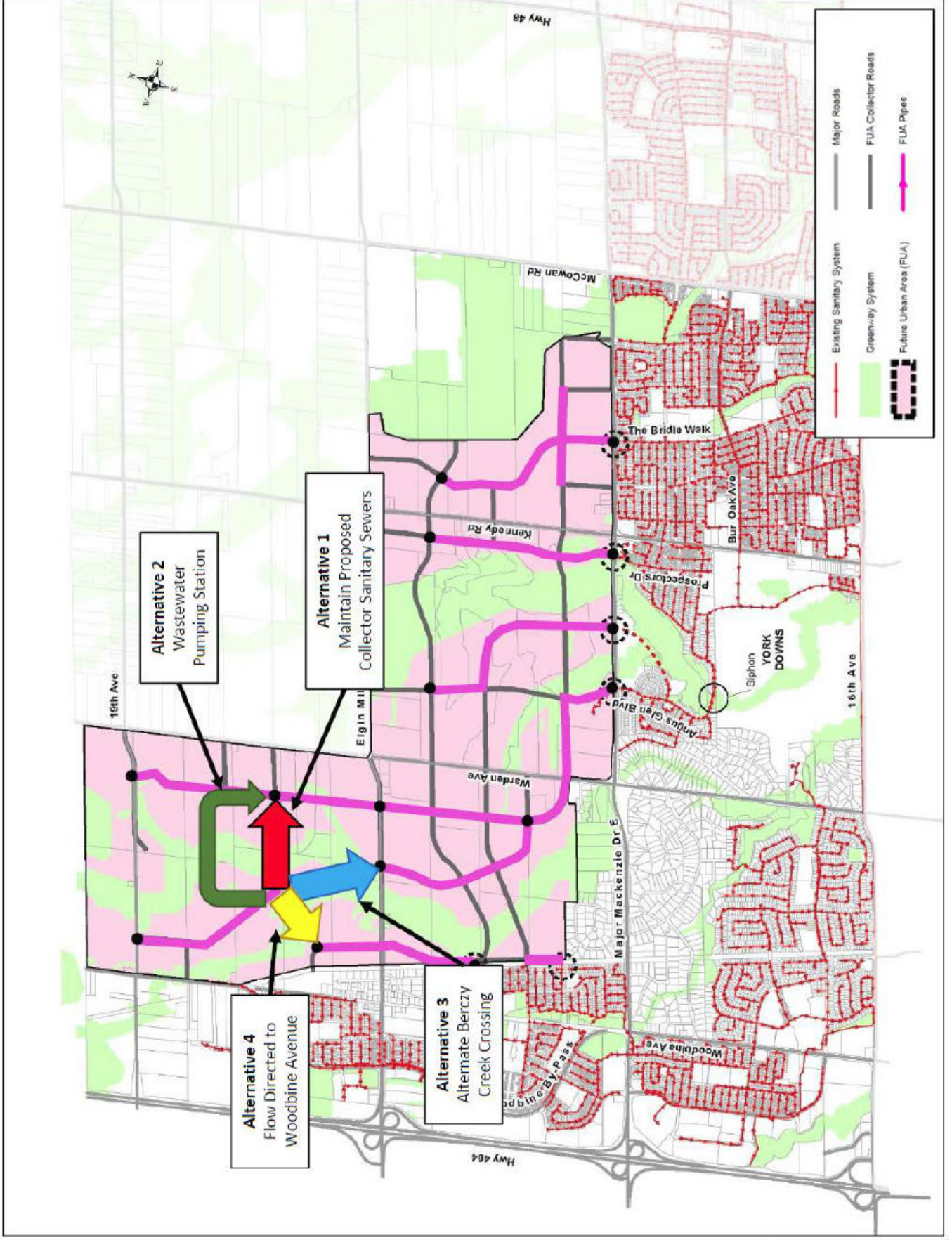
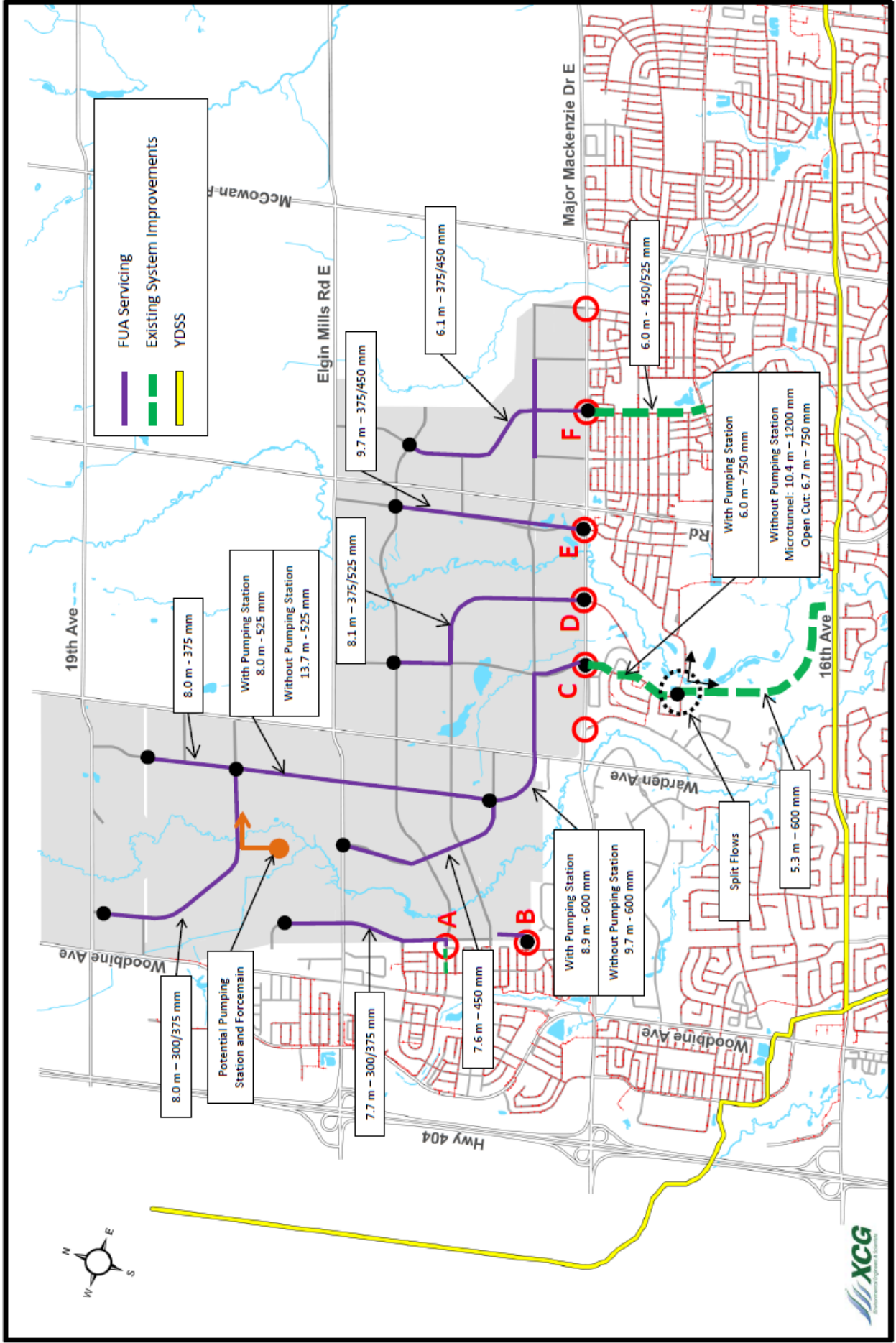


FIGURE 11

PREFERRED WASTEWATER SERVICING ALTERNATIVES



**FIGURE 12**

**COMMUNITY STRUCTURE PLAN**

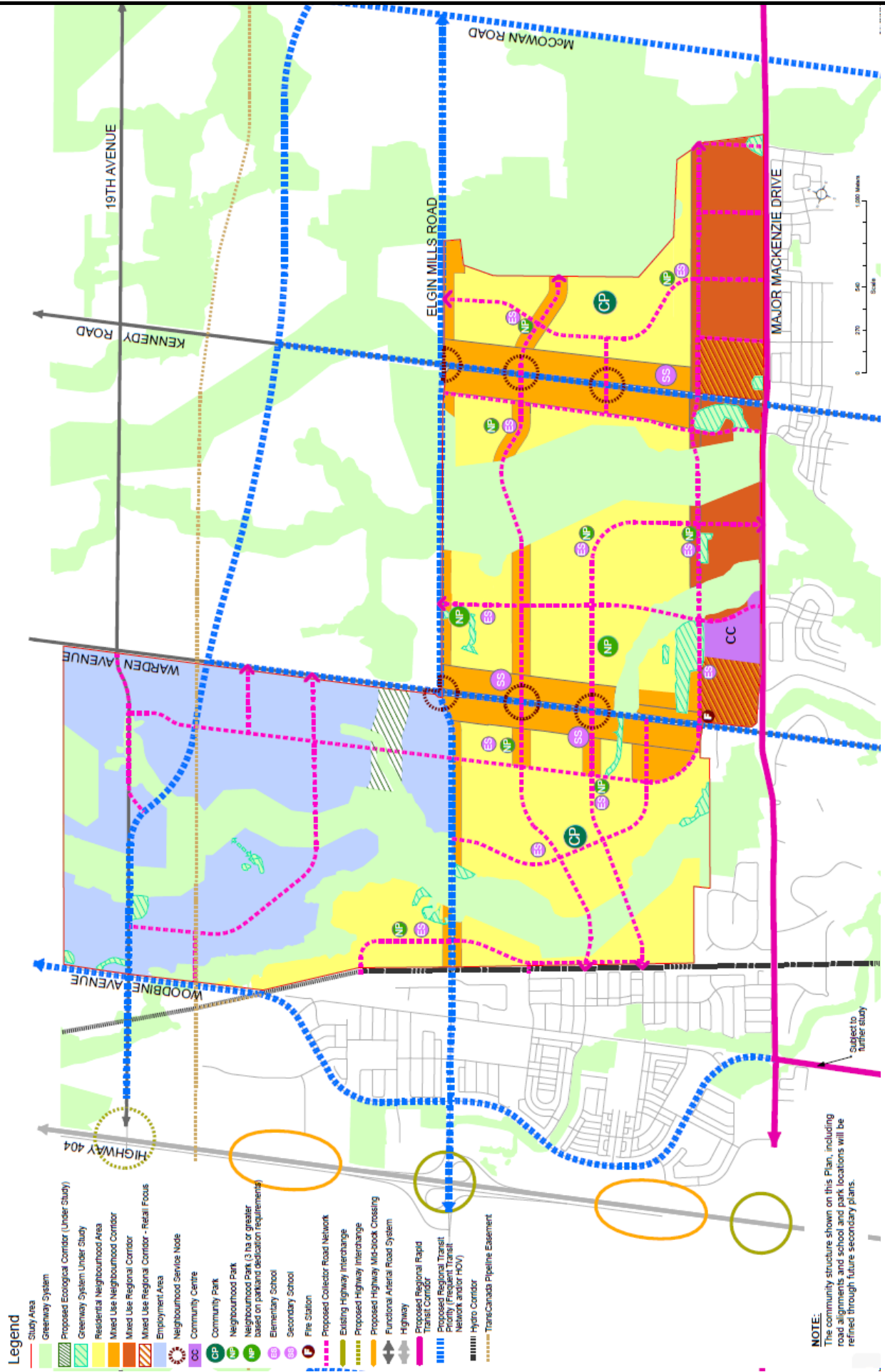
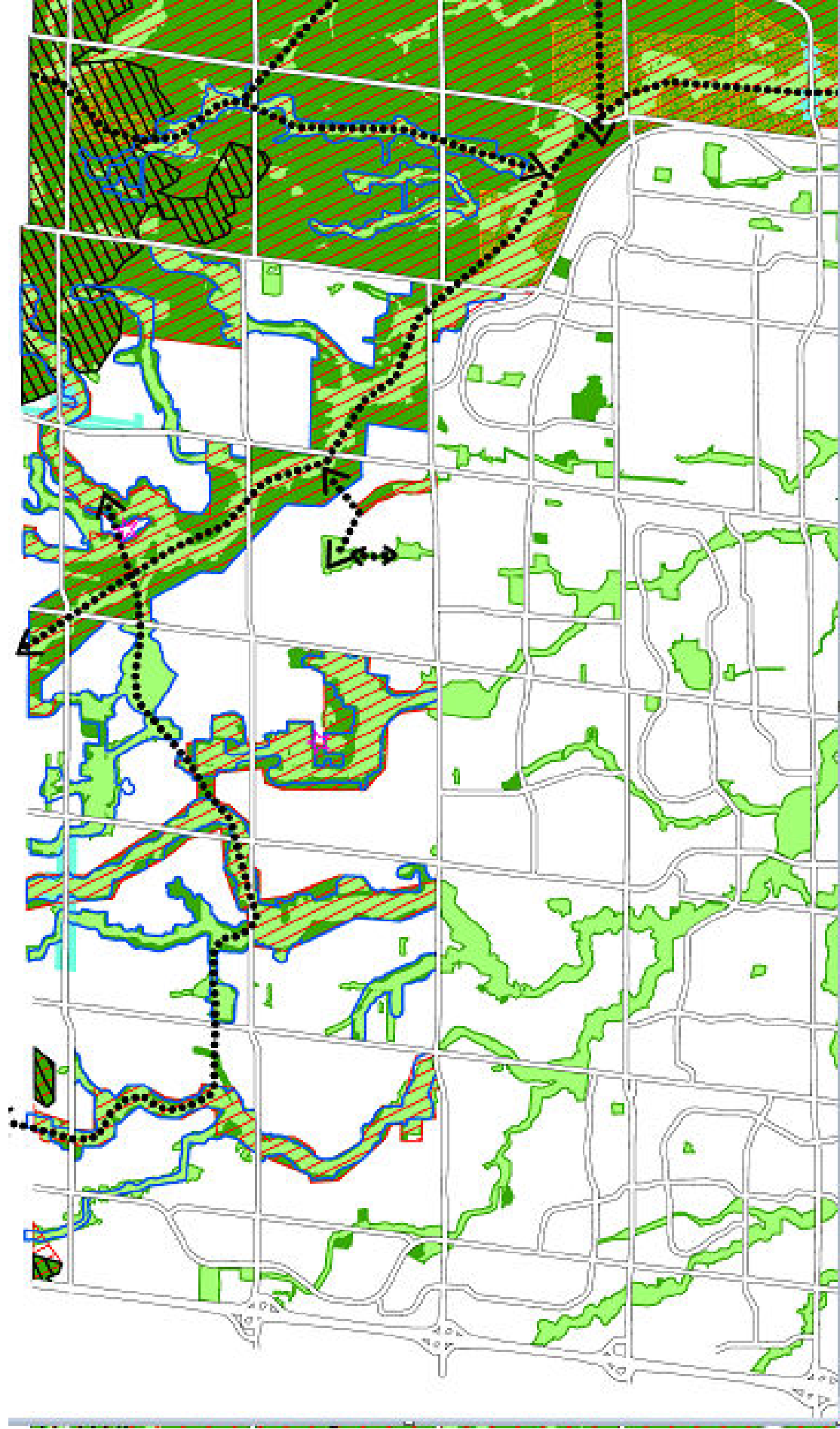


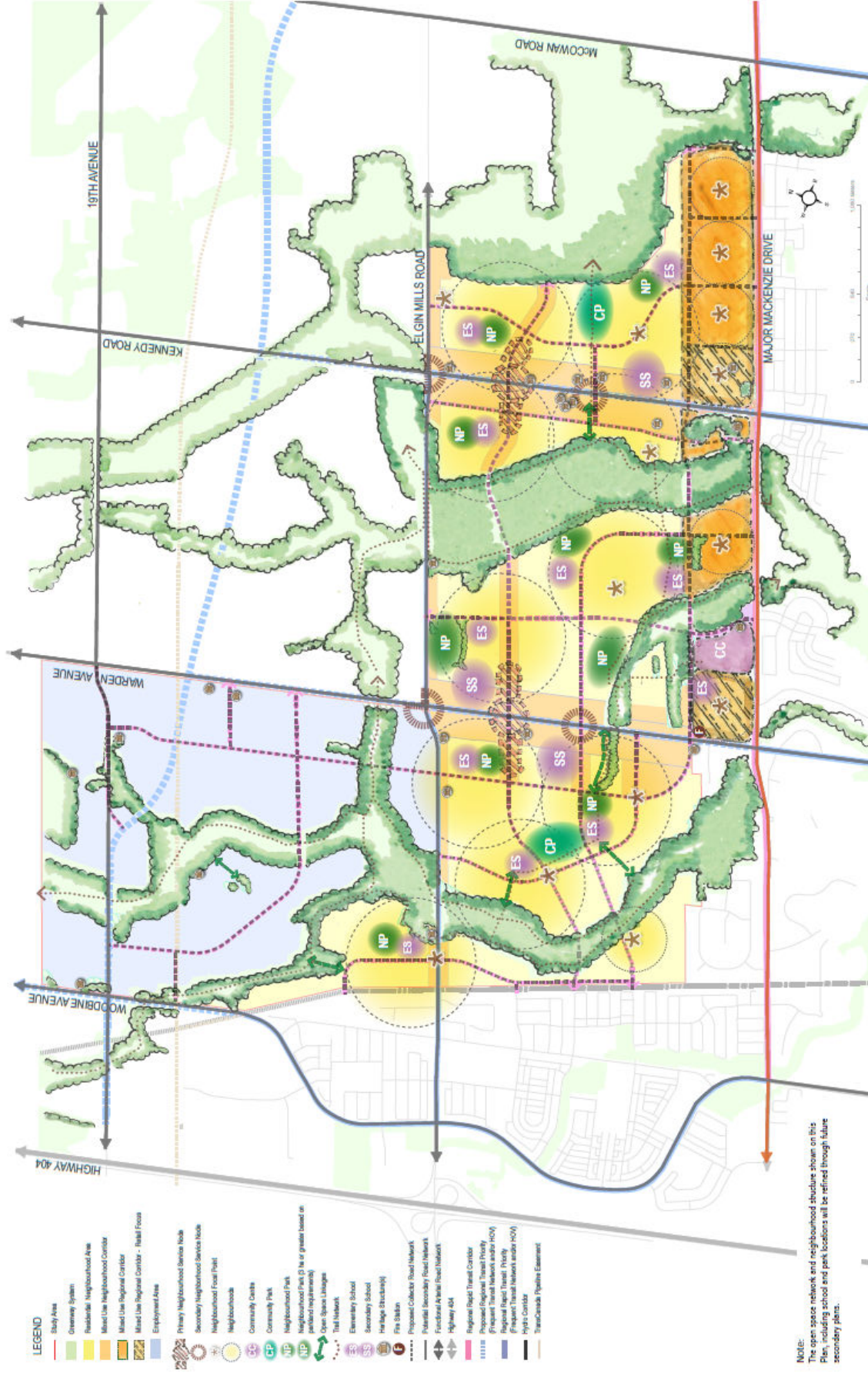
FIGURE 13

CORE LINKAGE ENHANCEMENT



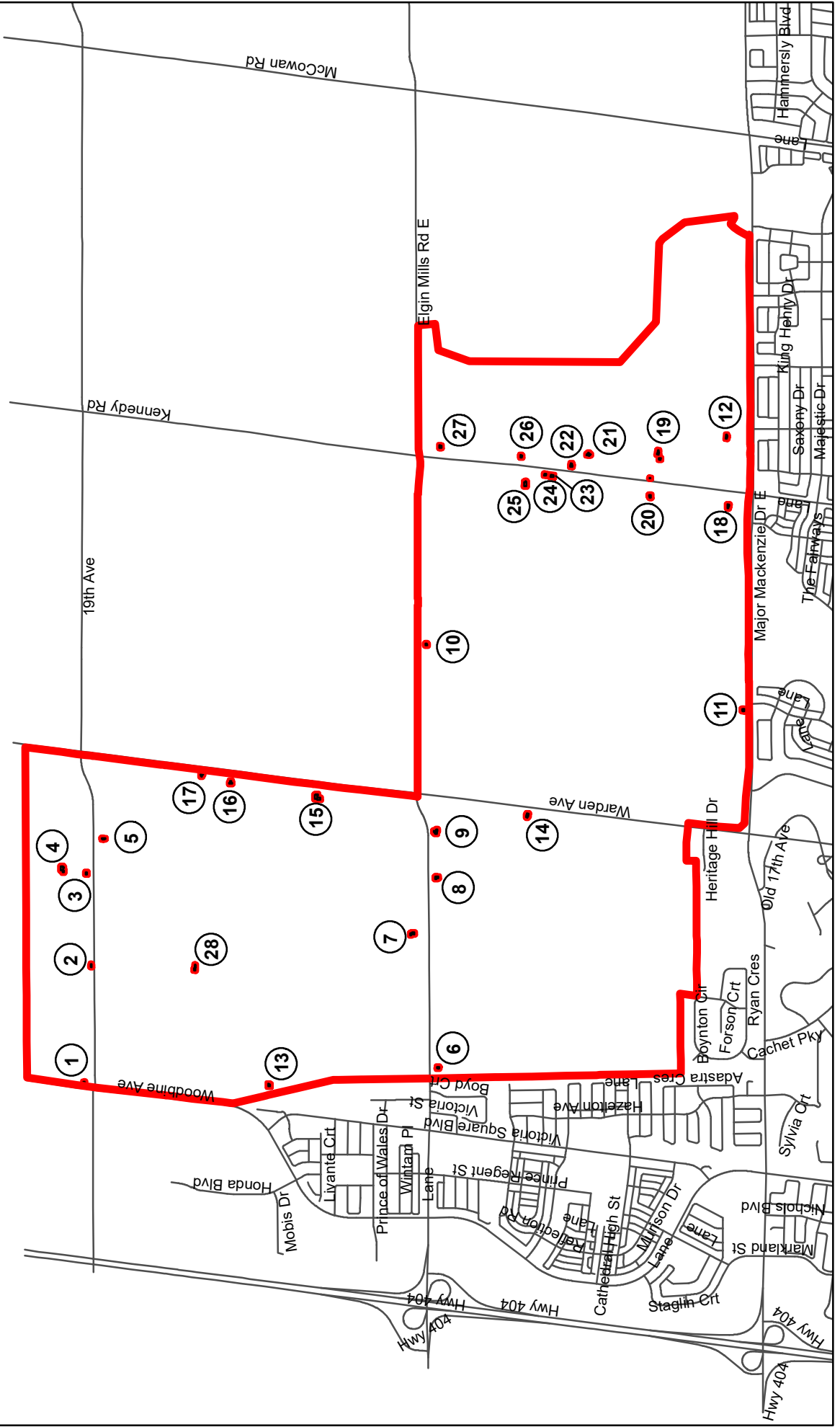
**FIGURE 14**

**OPEN SPACE NETWORK AND NEIGHBOURHOOD STRUCTURE PLAN**



# CULTURAL HERITAGE RESOURCES APPENDIX 'A'

-  FUA Boundary
-  CULTURAL HERITAGE RESOURCES





**APPENDIX B: Cultural Heritage Resources**

	<i>Resource Address</i>	<i>Legal Description</i>	<i>Name</i>	<i>Year</i>	<i>Heritage Status</i>	<i>Group</i>
1.	3010 19TH AVE	CON 4 PT LOT 31	S.S. #7 School House	1902	Part IV (Individual)	2
2.	3270 19TH AVE	CON 4 PT LOT 31	John Doner House	1876	Listed	3
3.	3466 19TH AVE	CON 4 PT LOT 31	Gormley Wideman House	1859	Listed	1
4.	3490 19TH AVE	CON 4 PT LOT 31	Gormley Wideman Barn and Drive Shed	c. 1900	Listed	2/3
5.	3565 19TH AVE	CON 4 PT LOT 30 SAVE AND EXCEPT PART 6 EXP RP9622	Mrs. Lewis House	c. 1875	Listed	2
6.	3151 ELGIN MILLS RD E	CON 4 PT LT 25 65R20663 PT 1	Thomas Frisby Jr. House	c. 1915	Listed	2
7.	3450 ELGIN MILLS RD E	CON 4 PT LOT 26	William Ford House	c. 1875	Listed	2
8.	3575 ELGIN MILLS RD E	CON 4 PT LT 25 65R18216 PT 2	Schell-Frisby House	c. 1860	Listed	1
9.	3693 ELGIN MILLS RD E	CON 4 PT LT 25 64R5956 PT 1	Toll House	c. 1870	Listed	1
10.	4075 ELGIN MILLS RD E	CON 5 PT LTS 24 & 25 65R19400 PT 2	William Summerfeldt House	c. 1850	Listed	2
11.	4022 MAJOR MACKENZIE DR E	CON 5 LOT 21 PT LOTS 22 and 23	George Pingle Jr. House	1842	Part IV (Individual)	2
12.	4638 MAJOR MACKENZIE DR E	CON 6 PT LOT 21	Jacob Pingle Sr. House	c. 1840	Listed	2
13.	11139 VICTORIA SQUARE BLVD. (address change)	CON 4 PT LT 27	Henry Lever House	c. 1855	Listed	
14.	10508 WARDEN AVE	CON 4 PT LT 24	Trudgeon House	c. 1875	Listed	2
15.	10988 WARDEN AVE	CON 4 PT LT 27 65R20145 PT 1	Brumwell Barn	c. 1900	Listed	2/3
16.	11172 WARDEN AVE	CON 4 PT LOT 28	S.S. #12 Clayton School	1874	Part IV (Individual)	1
17.	11242 WARDEN AVE	CON 4 PT LOT 29	Schell House	c. 1840	Listed	2
18.	10060 KENNEDY RD	CON 5 PT LTS 21 & 22 65R16981 PTS 2-5	John Pingle House	c.1875	Listed	2
19.	10225 KENNEDY RD	CON 6 PT LT 22 65R19262 PT 1	Pingle Burying Ground and Homer Wilson House and J.P. Carr Cottage	c. 1900	Part IV (Individual)	1

<b>20.</b>	<b>10228 KENNEDY RD</b>	CON 5 PT LTS 21 & 22 65R16981 PTS 2-5	George Pingle House	c. 1880	Listed	2
<b>21.</b>	<b>10379 KENNEDY RD</b>	CON 6 PT LOT 23	The Sommerfeldt Homestead	c. 1840	Part IV (Individual)	2
<b>22.</b>	<b>10411 KENNEDY RD</b>	CON 6 PT LOT 23	The George Henry Sommerfeldt Homestead	1856	Part IV (Individual)	1
<b>23.</b>	<b>10450 KENNEDY RD</b>	CON 5 PT LTS 23 AND 24 65R23784 PTS 15 18 19 2 AND PT PT 21	Barn	1930	Listed	2/3
<b>24.</b>	<b>10476 KENNEDY RD</b>	CON 5 PT LTS 23 AND 24 65R23784 PTS 15 18 19 2 AND PT PT 21	T. Wagg House	c. 1930	Listed	2
<b>25.</b>	<b>10504 KENNEDY RD</b>	CON 5 PT LOT 24 PT LOT 25	H. Storey Barn Complex	c. 1900	Listed	2
<b>26.</b>	<b>10537 KENNEDY RD</b>	CON 6 PT LOT 24 64R3831 PT 1	Arthur Wegg House	c. 1922	Part IV (Individual)	2
<b>27.</b>	<b>10725 KENNEDY RD</b>	CON 6 PT LOT 25 SHOWN AS 64R7303 PT 2	Samuel Eakin House	c. 1845	Listed	1
<b>28.</b>	<b>11251 WOODBINE AVE</b>	CON 4 PT LOT 29	David Hopper House	c. 1850	Listed	1