



Report to: Development Services Committee

Report Date: October 3, 2016

SUBJECT: Conceptual Master Plan for the Future Urban Area – Interim Report and Preliminary Community Structure Plan

PREPARED BY: Marg Wouters, MCIP, RPP Ext. 2909
Senior Manager, Policy and Research

RECOMMENDATION:

- 1) That the report dated October 3, 2016 entitled “Conceptual Master Plan for the Future Urban Area – Interim Report and Preliminary Community Structure Plan” be received;
- 2) That the report entitled “Conceptual Master Plan for the Future Urban Area – Interim Report and Preliminary Community Structure Plan” dated October 3, 2016 be released for comment, and that a Public Open House be held in Fall 2016 to gain public input;
- 3) That the report “Conceptual Master Plan for the Future Urban Area - Interim Report and Preliminary Community Structure Plan” dated October 3, 2016 be forwarded to the Minister of Municipal Affairs and Housing and York Region in support of Council’s request to the Province to continue to plan for the Future Urban Area in accordance with the York Region Official Plan 2010 in effect (i.e., at a minimum 70 residents and jobs per developable hectare), notwithstanding proposed amendments to the Provincial Growth Plan which may result in higher minimum density requirements;
- 4) And that staff be authorized and directed to do all things necessary to give effect to this resolution.

EXECUTIVE SUMMARY:

Not applicable.

PURPOSE:

The purpose of this report is to provide an update on work completed to date on the Future Urban Area Conceptual Master Plan, and to seek direction to hold a Public Open House to obtain public input on the Preliminary Community Structure Plan.

BACKGROUND:**The Conceptual Master Plan is the first step in detailed planning for the north Markham Future Urban Area**

In late 2013 and early 2014 Council initiated the Conceptual Master Plan (CMP) process by authorizing a number of supporting studies required to inform the detailed planning for the north Markham Future Urban Area (FUA). The FUA is identified in Markham's Official Plan 2014 (partially approved in October 2015 and May 2016), as one component of Markham's strategy to accommodate forecast growth to 2031. The majority of growth in Markham to 2031 is being accommodated through intensification of the existing urban area, with the Future Urban Area accommodating approximately 20 percent of residential growth.

The FUA consists of approximately 975 developable hectares 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 Robinson Creek to the east (Figure 1). Approximately 675 hectares of developable lands within the FUA are designated 'Future Neighbourhood Area'. These lands, located primarily between Major Mackenzie Drive and Elgin Mills Road, are anticipated to accommodate approximately 40,000 residents in 12,000-13,000 dwelling units. Approximately 300 hectares located north of Elgin Mills Road are designated as 'Future Employment Area'. The entire north Markham FUA will support approximately 16,000-19,000 jobs, most of which will be accommodated in 'Future Employment Area' lands. The remainder of the lands in the FUA are comprised of a natural heritage system designated 'Greenway' for protection.

The first stage of detailed planning for the FUA is taking place in the form of the Conceptual Master Plan, which is intended to provide a high level Community Structure Plan across the FUA lands, as the basis for more detailed statutory secondary plans for each of the four concession blocks. An accompanying policy document (Key Directions) will provide specific policy direction for the secondary plans and subsequent development applications.

In addition to planning and urban design, the background studies underway include a subwatershed study, transportation study, and water and wastewater studies. These integrated studies, when completed, will satisfy the Master Plans component of the Municipal Class Environmental Assessment (EA) process.

OPTIONS/ DISCUSSION:**Goal is to develop healthy and resilient new communities**

The new communities in the north Markham FUA are being planned in accordance with the vision of sustainable growth outlined in Markham's Official Plan 2014. This vision is based on four key themes: protection of the natural environment, building compact and complete communities, increasing travel options, and maintaining a vibrant and competitive economy. Consistent with the Official Plan and emerging Provincial policy, the overarching goals are to ensure the development of healthy and resilient complete communities, as described more fully in the Interim Report attached as Appendix 'A'.

Phase 1 work completed; Phase 2 work is well-advanced

The component studies of the CMP are being undertaken in a coordinated, integrated manner, each following a similar three-phase process, consisting generally of background and development of options, impact assessment of the options, and development of an implementation strategy for the preferred option.

Phase 1 has now been substantially completed and Phase 2 work is underway. Work to date is documented in the Interim Report including the development of a draft Preliminary Community Structure Plan (Figure 2).

The draft Preliminary Community Structure Plan provides an overall planning framework for the new communities and employment lands in the Future Urban Area

The draft Preliminary Community Structure Plan identifies a high level community structure across all of the FUA lands. The Plan includes 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, consistent with Markham and York Region Official Plan requirements. The broad land use categories (Residential Neighbourhood Area, Mixed Use Neighbourhood Corridor, and Mixed Use Regional Corridor) provide for a range of housing (from ground oriented units to apartments) and employment uses, and supporting commercial cores, at transit-supportive densities. The Employment Area is identified to accommodate primarily general employment uses, with opportunities for business park uses and ancillary retail and service at appropriate locations. The lands outside the Employment Area are being planned to support an overall density of 70 residents and jobs per hectare and 20 units per hectare.

Public and Stakeholder Engagement

The component studies of the CMP are being undertaken in close consultation with York Region planning and transportation staff, Toronto and Region Conservation Authority (TRCA), the Ministry of Natural Resources and Forestry (MNR), and participating landowners.

Each of the study phases anticipates the opportunity for Council and public input through reports to Development Services Committee and Public Open Houses. Consultation has been taking place with non-governmental organizations, adjacent municipalities, other agencies such as school boards and utilities, non-participating landowners, and First Nations and Métis communities.

The first Public Open House was held in January 2015 to introduce the Conceptual Master Plan work and its study components to the public and to obtain initial input for consideration in developing land use concepts. Based on the work completed in Phase 1 and Phase 2 to date, a second Public Open House is now being planned for Fall 2016 to introduce a draft Preliminary Community Structure Plan and associated policies for the FUA, which will be finalized in the third and final phases of the studies.

Staff recommend this report be forwarded to the Province and York Region in support of planning for a minimum density of 70 residents and jobs per hectare within the Future Urban Area, notwithstanding proposed amendments to minimum density requirements in the Provincial Growth Plan

The Province is currently undertaking a review of four Provincial Plans, including the Growth Plan, and has released proposed amendments to the Plans. In a separate report to Committee dated October 3, 2016 recommending Council's response to the proposed amendments, staff have outlined concerns with the proposed increases to the minimum density requirements for Designated Greenfield Areas in the Growth Plan (from 50 to 80 residents and jobs per hectare). Analysis by Regional staff indicates that the proposed Growth Plan minimum density of 80 residents and jobs per hectare for Designated Greenfield Areas Region-wide (including the FUA) would require the FUA lands to be developed at a density that could exceed 150 residents and jobs per hectare.

Given the extent of the work completed and the resources invested in the Conceptual Master Plan exercise (i.e., multi-year, multi-million dollar studies plus dedicated staff resources), one of the recommendations in the report outlining Council's response to the Province on the proposed Plan amendments, is that Council request that the Province acknowledge this work and continue to allow for planning of the FUA at 70 residents and jobs per hectare. In support of that recommendation, staff further recommend that this report, including the attached Interim Report and Preliminary Community Structure Plan, be forwarded to the Province as evidence of Markham Council's ongoing commitment to developing compact, complete, transit-supportive communities in the Designated Greenfield Area, at densities exceeding the current Growth Plan density of 50 residents and jobs per hectare.

Next Steps

Public input received at the Public Open House will be considered in the remaining phases (remainder of Phase 2 impact assessment, and Phase 3 implementation recommendations) of the Conceptual Master Plan exercise. Once finalized, the Conceptual Master Plan will be presented to Council for endorsement as the basis for the preparation of statutory secondary plans.

FINANCIAL CONSIDERATIONS:

The Conceptual Master Plan work is being undertaken by a team of City staff and consultants funded through approved capital budget projects and a Funding Agreement with participating landowners in the north Markham Future Urban Area.

HUMAN RESOURCES CONSIDERATIONS:

Not applicable.

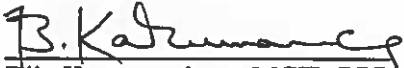
ALIGNMENT WITH STRATEGIC PRIORITIES:

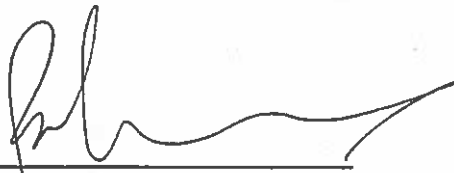
The Future Urban Area is identified to accommodate a portion of Markham's growth to 2031 in the Markham Official Plan 2014 and the Region's Official Plan 2010.



BUSINESS UNITS CONSULTED AND AFFECTED:

All relevant City departments are being consulted on an ongoing basis as part of the Conceptual Master Plan process.

RECOMMENDED BY:


Biju Karumanchery, MCIP, RPP
Director, Planning & Urban Design


Brian Lee, P. Eng
Director, Engineering

 
Jim Baird, MCIP, RPP
Commissioner of Development Services

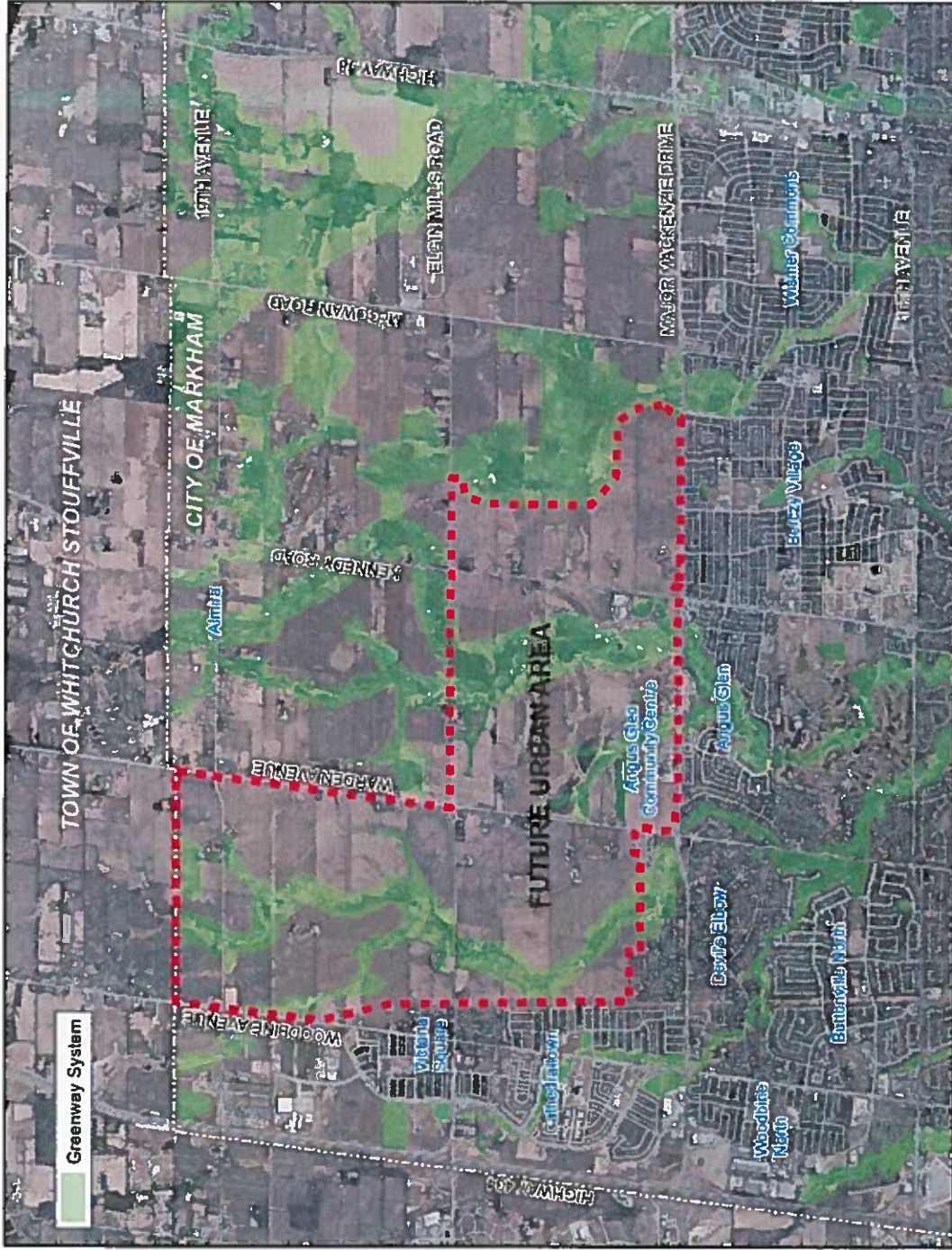
ATTACHMENTS:

Figure 1: Future Urban Area

Figure 2: Preliminary Community Structure Plan

Appendix 'A': Conceptual Master Plan for the Future Urban Area – Interim Report

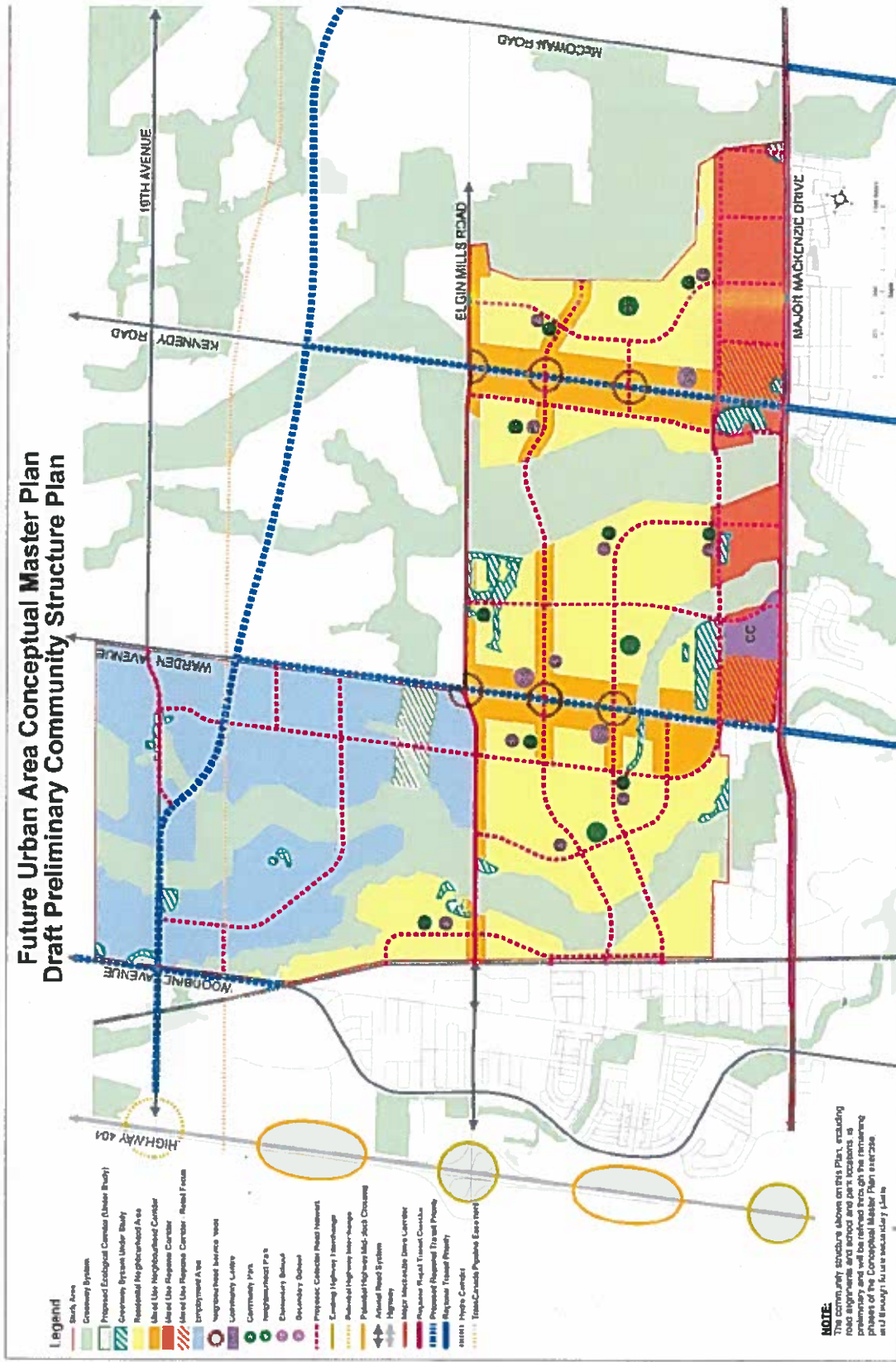
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FUTURE URBAN AREA - LOCATION MAP

 SUBJECT LANDS

Future Urban Area Conceptual Master Plan
Draft Preliminary Community Structure Plan



NOTE:
The community structure shown on this Plan, including road alignments and school and park locations, is preliminary and will be refined through the remaining phases of the Conceptual Master Plan to service and through future secondary plans.

DRAFT PRELIMINARY COMMUNITY STRUCTURE PLAN



**CONCEPTUAL MASTER PLAN
FOR THE FUTURE URBAN AREA
- INTERIM REPORT (OCTOBER 2016)**



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1.0 BACKGROUND

1.1 Purpose of the Conceptual Master Plan

Markham's Official Plan 2014¹ 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 for subsequent secondary plans and development applications. The Community Structure Plan will identify structural land use categories, a high level transportation and servicing system, an open space system and major community facility requirements. The policy direction will address 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 will be endorsed by Council prior to approval of secondary plans, which will be adopted as statutory amendments to the 2014 Official Plan.

1.2 Conceptual Master Plan Process

The Conceptual Master Plan is being informed by the findings of a number of concurrent technical studies, including a subwatershed study, a master transportation study, and master servicing (water and wastewater) studies (see Figure 2). These coordinated studies are following a Master Planning Class Environmental Assessment (EA) process under the *Environmental Assessment Act* (see Appendix A).

The CMP supporting studies are being 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 Phase 2, preliminary land use concepts are being tested against the findings and evaluation criteria established in Phase 1 to arrive at a Preferred Community Structure Plan. Phase 3 will identify implementation strategies for the Preferred Community Structure Plan. The work completed to date for each of these studies is summarized in this report.

Phase 2 is currently underway. A preliminary land use concept informed by the Phase 1 findings of all of the CMP studies, has undergone a first round of detailed impact assessment analysis, leading to the identification of the draft Preliminary Community Structure Plan presented in this report. This Plan will be further tested in the second round of impact assessment to arrive at a

¹ Partially approved by the Ontario Municipal Board on October 30, 2015 and May 26, 2016.

Preferred Community Structure Plan to be presented to Council for endorsement as the basis for secondary plans.

It is anticipated that individual secondary plans and accompanying master environmental servicing plans will be prepared for each of the concession blocks within the Future Urban Area. For the purposes of the CMP, the individual concession blocks are referred to as the 'Employment Block', 'Berczy Glen Block', 'Angus Glen Block' and 'Robinson Glen Block', as identified in Figure 3.

1.3 Public and Stakeholder Consultation

The development of the Conceptual Master Plan is being undertaken through a multi-disciplinary City staff and consulting team in close consultation with York Region, Toronto and Region Conservation Authority (TRCA), the Ministry of Natural Resources and Forestry (MNR), school boards and participating landowners. Non-government organizations, agencies, utilities, adjacent municipalities and First Nations and Métis communities are also being consulted at key points in the CMP process.

Input from the public is being provided through reports to Council and Public Open Houses during each phase of the CMP process. The first Public Open House, held in early 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 the land use concepts tested during the second phase of the studies. A second Public Open House is planned to share the findings of the first round of impact assessment analysis, and to obtain input on the draft Preliminary Community Structure Plan presented in this report. A third Public Open House will be held near the conclusion of Phase 3, prior to submission of the Conceptual Master Plan to Council for endorsement.

Following completion of the CMP, additional opportunity for public consultation will be available during the preparation and approval of the statutory secondary plans and through the processing of development applications.

1.4 Report Structure

This interim report is intended to provide a summary of the work undertaken to date in developing the Conceptual Master Plan for the Future Urban Area in north Markham. The focus of the work so far has been to understand the natural heritage system through the subwatershed study, in order to ultimately arrive at an appropriate distribution of urban land uses that minimize impacts on the system, while achieving the new community objectives identified in the Official Plan. High level land use, transportation and servicing study work has been undertaken in parallel to help inform the subwatershed study and to inform development of a conceptual community structure plan.

This report consists of eight (8) sections as follows:

- Section 1.0 provides background information on the purpose of the Conceptual Master Plan and various phases of the process;
- Section 2.0 provides an overview of proposed and existing land uses in the Future Urban Area;

- Section 3.0 provides an overview of the vision for the new communities in the Future Urban Area including guiding principles;
- Sections 4.0 through 6.0 provide a summary of the process and findings to date of each of the subwatershed, transportation and servicing (water and wastewater) studies;
- Section 7.0 provides an overview of the draft Preliminary Conceptual Master Plan for which public input is being sought; and
- Section 8.0 provides an overview of the next steps in the process.

Figures and appendices are also provided as noted in the report.

2.0 PROPOSED AND EXISTING LAND USE

2.1 Proposed Land Use - Official Plan

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 675 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 approximately 12,000 dwelling units.

Approximately 300 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.

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 is being confirmed in the Subwatershed Study currently underway, including the delineation of an east-west ecological linkage between the Berczy and Bruce Creeks which is identified symbolically in the Official Plan.

Cultural Heritage and Archaeological Resources

Markham's *Register of Property of Cultural Heritage Value or Interest* identifies 27 buildings of cultural heritage interest within the Future Urban Area lands (see Appendix B). Of the 27, seven have been designated for protection under the Ontario Heritage Act.

The remaining 20 properties of cultural value or interest have been given a preliminary evaluation rating by Markham Heritage staff, 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 20 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 10 properties, indicates buildings of significance and worthy of preservation. A Group '3' rating, indicating buildings considered noteworthy, has been assigned to 1 property, and two have been assigned a combination Group '2/3' rating.

The majority of the 20 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.

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. Development within the Angus Glen Block assumes the reconfiguration of the northerly fairways to allow for the continued operation of an 18-hole course (11 holes north of Major Mackenzie Drive plus the existing 7 holes south of Major Mackenzie Drive) while allowing for development of tablelands for neighbourhood uses. The ultimate layout of the golf course and the phasing of redevelopment of the course, has implications for infrastructure improvements (particularly the collector road network) and phasing of development.

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.

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 19th Avenue. These lands may be owned, or subject to easements, in favour of TransCanada Pipelines Limited or location 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 existing Angus Glen and Berczy communities (across Major Mackenzie Drive), and the Jennings Gate/Heritage Hill residential estate communities west of Warden Avenue, as well as the Cathedral and Victoria Square communities to the west beyond the Hydro Corridor. To the north, the employment land portion of the FUA extends to the northerly City limit, north of 19th 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 will have regard 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.

2.4 Public Consultation to Date

The first Public Open House was held in January 2015 to introduce the Conceptual Master Plan work and its study components to the public and to obtain initial input for consideration in developing land use concepts. Comments received included 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.

A similar meeting with First Nations representatives was held in June 2015. Interest was expressed in procedures for dealing with archaeological resources when found, and also energy sources being considered.

3.0 The Vision for New Communities in the Future Urban Area

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, institutional, employment, etc, 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 for Development of the Future Urban Area

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.

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.

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.

The Preferred Community Structure Plan and Key Directions resulting from the CMP process will address these principles.

TABLE 1: PRINCIPLES & PARAMETERS FOR PLANNING THE FUTURE URBAN AREA	
	PROTECTING AND ENHANCING THE NATURAL ENVIRONMENT
PP1	Confirm and refine the Greenway System to ensure protection and enhancement of natural heritage features and functions and water resources
PP2	Design with regard for nature heritage and enhance the urban forest – ensure development minimizes impacts to natural features, topography and soils, and enhances the urban forest
	BUILDING COMPACT, COMPLETE COMMUNITIES
PP3	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
PP4	Identify a housing mix that provides for a range of housing types and tenure, including affordable housing
PP5	Identify appropriate locations for mixed use Community Cores that provide a focus of retail and community services within reasonable walking distance from the majority of the population, and accessible by transit
PP6	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
PP7	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
PP8	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
PP9	Recognize, conserve, promote and integrate cultural heritage resources in community design
PP10	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
PP11	Ensure access to local food through opportunities for urban agriculture
	MAINTAINING A VIBRANT AND COMPETITIVE ECONOMY
PP12	Plan for the range of jobs in the 'Future Employment Area' lands anticipated 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
	INCREASING TRAVEL OPTIONS (MOBILITY)
PP13	Identify a comprehensive transportation system that emphasizes walking and cycling and transit as increasingly viable and attractive alternatives to the automobile
PP14	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
	ADOPTING GREEN INFRASTRUCTURE AND DEVELOPMENT STANDARDS
PP15	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
PP16	Identify best management practices for green buildings to reduce demands on energy, water and waste systems
	IMPLEMENTATION
PP17	Public Engagement – encourage involvement of all stakeholders
PP18	Phasing and Sequencing/Financial Impact – identify general phasing, sequencing and cost of development

4.0 SUBWATERSHED STUDY

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 a Conceptual Master Plan, including transportation and servicing plans, the Subwatershed Study will reflect and refine the City's Greenway System and identify strategies to protect, enhance and restore ecological functions within the system.

The integrated land use planning, subwatershed, transportation and servicing (water and wastewater) studies will also address 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 undertaken in three phases as follows:

- Phase 1 Characterization – understanding the existing natural resources and functions in the study area
- Phase 2 Impact Assessment – assessing the potential impacts of urbanization
- Phase 3 Management/Implementation Strategy – identifying integrated management strategies to preserve and enhance ecological functions and meet regulatory requirements

A fourth phase involves long term monitoring to evaluate the effectiveness of the Management/Implementation Strategy.

The following provides an overview of work undertaken and findings to date.

4.1 Phase 1 – Characterization

The 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:

Groundwater: The hydrogeologic setting within the FUA consists of highly permeable surficial soils which allow for great opportunities for infiltration and groundwater recharge. The shallow groundwater flow system (baseflow) is of high quality and is mostly connected to the stream reaches and the valleyland terrestrial systems within the study area and the Robinson Swamp complex. Implementation of infiltration and groundwater recharge measures through LID best management practices, where functionally appropriate, during the post development stage will be an important measure to maintain the water balance and the ecological connection and the healthy habitats within the streams.

The majority of the FUA is located with the Credit Valley, Toronto and Central Lake Ontario (CTC) source groundwater protection region. As such, the Ministry of the Environment and Climate Change (MOECC), York Region and the TRCA will require that post development infiltration/recharge meets pre-development conditions.

Surface Water: The surface water quality within the study area is generally of high quality. The Regional Floodplain through the FUA is generally contained within the Greenway System identified in the Official Plan. There are a number of significant wetlands and woodlots identified for protection within the study area which should provide some flood attenuation. Development of urban land uses will increase the rate and volume of stormwater runoff locally, and potentially further downstream including the Unionville Special Policy Area (SPA). Stormwater management controls should be implemented to appropriately manage the increased rate and volume of runoff from future development and prevent any increase of water levels and erosion within the downstream watercourse, especially within the SPA.

There are a number of headwater drainage features ('small streams') within the study area that contribute and convey sediment to the downstream drainage system and are therefore an integral component of the downstream channel formation process. The headwater drainage features also play an important role in providing cool and nutrient balanced discharge to the downstream Redside Dace (RSD) occupied habitats within the study area. Because of their importance, some of these headwater drainage features will remain on the landscape. Others will be replaced with Low Impact Development (LID) measures to replicate their functions and reduce impacts on the receiving system and the occupying habitats.

Geomorphology (stream stability): Channel erosion is a necessary natural process; however the removal of vegetation and replacement with urban land uses, which are generally less pervious, will increase surface runoff and potential for downstream channel erosion. Post development analysis must include proper stormwater management and the setting of erosion threshold targets to prevent long-term and potentially costly downstream erosion. Maintenance of the riparian vegetation along the valley buffers will also play an important role in reducing future long-term erosion in the creeks.

Terrestrial: The current levels of natural cover and wetland cover within the FUA are well below literature-based thresholds that would support optimal terrestrial, wetland and hydrological functions in the subwatersheds. Any future development in this area should focus on ensuring that the water budget of these features is maintained, which will help to sustain and enhance the existing natural features and associated biodiversity.

The FUA and neighbouring lands sustain a relatively high number of locally- to regionally-significant species and quality indicator species, associated with forest, open field and wetland

features. Any future development within the area should consider opportunities to integrate and enhance features and functions that will sustain diversity under urban conditions.

The water budget of wetland features within the FUA is supported by both groundwater discharge and surface hydrology. Future development in this area should focus on maintaining the existing quality and quantity of the existing sources and the hydrologic regimes to sustain sensitive features, communities and species.

The forest and wooded features in the FUA are almost entirely located within the Greenway System and are associated with lowland conditions and/or wet soils. In contrast, there is very little upland forest present. These forest and wooded features should be protected. In addition, these areas should be complemented by restoration of upland forests in adjacent areas that are currently agricultural land with an emphasis on reinforcing function (e.g. hydrological, connectivity, core habitat, habitat diversity and other functions).

The open country habitats present within the FUA support a range of locally, regionally, and provincially important bird species. The bulk of these areas exist outside of the Greenway System, and are expected to be lost as the tablelands are developed. Landscape scale tools, studies and approaches during urbanization of the area will be used to identify opportunities for protection and restoration of these habitats, where possible.

Aquatic: The Berczy, Bruce and Robinson Creeks all support diverse fish communities that include the endangered Redside Dace and other, more common, cool water fish species. Groundwater discharge into these creeks is an important factor in creating the conditions necessary for the presence of these species, based on their patterns of distribution in Ontario. Groundwater discharge to all three creeks affects their temperature. In the summer, groundwater reduces stream temperatures and in the winter, groundwater increases stream temperatures. Future development should include proper stormwater management (including water balance and LIDs) to ensure sufficient fresh groundwater discharge into the creeks through baseflow. Headwater drainage features play an important role in providing nutrient and thermal cooling baseflow to the creeks and these functions should be maintained for the majority of the features during urbanization of the FUA.

4.2 Phase 2 – Impact Assessment (1st Iteration)

The impact assessment analysis in Phase 2 is being undertaken in two steps. The results below are from the first iteration of impact assessment, which assumed a distribution of urban land uses that would achieve the population and employment and density targets identified for the Future Urban Area, and the road and servicing networks required to support the land uses. The land use concept tested was similar to the draft Preferred Community Structure Plan described in Section 7.0 (see Figure 11).

The following are the results of the first iteration of impact assessment by discipline. These results are being assessed comprehensively and will be used as inputs in refining the draft Preliminary Community Structure Plan in the second iteration of impact assessment.

Groundwater: a state-of-the art groundwater model was used to understand the impacts of urbanization of the FUA on the local groundwater regime and the associated ecological system within the natural heritage environment. The main key areas analyzed in the model include:

- Groundwater recharge;
- Discharge to streams and wetlands;
- Discharge contribution areas to streams; and
- Water budgets for the FUA, subwatersheds and Robinson Swamp complex.

The results of the first iteration analysis has shown that the existing groundwater flow system which is supporting a healthy natural heritage system in the FUA would be impacted under the draft Preliminary Community Structure Plan without proper mitigation. Key impacts would include significant reduction in groundwater recharge and baseflow to creeks due to the high permeability of the soils, combined with the proposed change in land use from agriculture to urban (i.e., significant addition of impervious cover). The following preliminary mitigation measures should be considered to minimize the impact of the proposed urbanization on the natural system:

- Development within the FUA should consider LID best management practices (BMPs) that capture 6 to 10 mm of precipitation per impervious hectare to address/mitigate potential infiltration related impacts, high flows and downstream erosion; and
- Area specific infiltration should be further evaluated based on surficial soils and land topography. This will better address impact and mitigation measures at the local scale.

Hydrology (Surface Water): Preliminary results of the hydrologic analyses have demonstrated that urbanization of the FUA without any stormwater management would significantly increase runoff and downstream flooding and degrade water quality. Peak flows for the Regional Storm event would increase along the Robinson Creek and Berczy Creek with water levels increasing by up to 14 cm through the Unionville SPA. Careful application of stormwater management best practices including end-of-pipe stormwater management facilities, LIDs and storage within open spaces will provide the required quality and quantity mitigation measures. The TRCA and MNRF's current policy stance on Regional Storm is that developments especially upstream of flood prone areas like the Unionville SPA should provide quantity control up to the Regional storm level. Discussion regarding acceptable options and guidelines with stakeholders is ongoing.

Terrestrial: Development of tablelands in the FUA will result in losses of cultural meadow, cultural thicket, and potentially cultural woodlands, plantations, and hedgerows. Vegetation within the Greenway System will be minimally impacted.

Negative impacts from urbanization on wildlife will be anticipated based on the removal of habitat for amphibians and locally sensitive species, and removal and fragmentation of habitat present in the wooded features where the northerly east/west collector crossing of Bruce Creek is proposed. Some negative impacts on wildlife will also be expected in the open country breeding bird habitat within the tablelands, small woodland/plantation features, and/or amphibian habitat. Sensitive wildlife habitats that were identified within the tablelands included open country bird Species at Risk such as Bobolink, Eastern Meadowlark, and Barn Swallow, and locally rare/sensitive bird species such as Vesper Sparrow, Black-billed Cuckoo, and Brown Thrasher.

Other impact considerations include:

- Surface water linkage – wetland features associated with the existing watercourses and their tributaries have strong functional linkages with frequent flooding events. It is important that this flooding function is not altered during urbanization of the FUA.
- Groundwater linkage - many of the wetland communities are anticipated to have strong functional linkages with the ground water system. Results from the groundwater modelling

suggest that changes to the average depth to groundwater table is minimal, especially after LID BMPs scenarios are considered.

Aquatic (Fisheries): Urbanization could have direct and indirect impacts on the aquatic system within the receiving watercourses. Direct impact occurs when a stream is channelized or when road crossings are proposed over watercourses with fish habitat. Indirect impact occurs when a change in the landscape (e.g., increased imperviousness and reduction in infiltration, degradation of water quality including thermal cooling, etc.) through the hydrology and hydraulic linkages could impact aquatic habitats in the watercourses.

In the Future Urban Area, Redside Dace is the focus of aquatic habitat protection and management due to its endangered status. Additional target fish species have been identified in the draft Rouge River Fisheries Management Plan, but it has been assumed in the Phase 2 impact analysis that the protection of Redside Dace habitat will address, or take precedence over, the requirements of the other target species within the FUA.

4.3 Key Impact Considerations

The following are the key impacts and mitigation measures that will need to be considered during the urbanization of the Future Urban Area:

Head Water Drainage Features (HWDF)

Evaluation, classification and management of the HWDF within the FUA was completed in Phase 1 using the TRCA HWDF guideline. Key functional attributes such as; flow and feature form, riparian vegetation, fish and fish habitat, and terrestrial habitat were used in the assessment to determine the appropriate management scenarios for each HWDF. During the Phase 2 assessment it was determined that the majority of the HWDFs located outside of the NHS are ephemeral and provide negligible supply of flows, sediment and/or nutrient to the receiving watercourses. Based on TRCA's HWDF guideline, it was determined that most of these HWDFs could be removed and their functions replicated through LID BMPs. A number of HWDFs with intermittent or perennial flow function have been identified to remain on the landscape because of their important contribution to downstream terrestrial and aquatic habitats and communities and water should continue to be directed to the locations that currently receive it.

Stormwater Management Facilities

The first iteration of impact assessment assumed 21 SWM facilities for the neighbourhood lands. These facilities will be mostly located outside of the Greenway System. Stormwater management facilities for the employment lands will be mostly located within each site (source control). These facilities are expected to provide the required quality and quantity control according to applicable guidelines.

Regional Storm Control – The first iteration has shown that urbanization of the FUA will increase water levels within the downstream Unionville SPAs of the Rouge River. According to the TRCA draft guideline on approaches for managing regulatory event flow increases due to urbanization, the following approaches must be examined at various stages of land development:

1. Off-line control (assessments to be completed at the subwatershed study, e.g., stormwater management ponds and other open space storage areas such as parks, buffers, etc)
2. On-line control (assessment to be completed during Master Environmental Servicing Plan [MESP] and/or subsequent environmental studies)
3. Policy changes (changes in the existing Unionville SPAs policies to allow for increases in water levels within that area)
4. Downstream flood remediation/mitigation (assessment could be completed at the MESP and later stages of environmental studies)

Approaches 1 and 4 are feasible and practical and should be explored prior to any consideration for land development. The City and TRCA will not allow development in the FUA to cause any increase in water levels within the Unionville SPAs unless proper mitigation based on the above four approaches is implemented.

Low Impact Development (LID) - the first iteration of impact assessment has identified the soils within the study areas of high permeability and therefore the need for LIDs to mitigate the impact of urban development (i.e., the increases in imperviousness and loss of infiltration function). First iteration results indicate that infiltration measures up to 10mm per impervious areas would be required to mitigate impacts of development on water balance, infiltration and baseflow. The appropriate type, location and conditions for LIDs within the FUA are currently under study by a working group consisting of landowners, consultants, various City departments and approval agencies, taking into account, among other things, long term financial impacts to the City.

Aquatic and Terrestrial Factors - The headwaters of the Berczy, Bruce and Robinson Creeks are of cool and high water quality. Redside Dace occupies most of these water courses and the MNR will require all stormwater management facilities discharging to RSD habitats to have proper water quality controls including thermal cooling measures and LIDs.

Location of Stream Crossings

Road crossings of streams within the FUA are functionally unavoidable given that streams traverse the full length of all three neighbourhood Blocks as well as the Employment Block. Crossings pose a 'risk' to aquatic communities during construction. However, fisheries data regarding Redside Dace abundance or use are not available to distinguish between locations. Consideration should be had for locations of channel instability and locations of groundwater (baseflow) discharge. Ideal crossing locations are where the channel is straight and narrow, where there are no upstream meanders and the crossing alignment is perpendicular to the channel. Higher risk crossings can be accommodated but will require larger spans and accompanying channel works. Crossings should also avoid significant groundwater/baseflow discharge areas, to avoid costly long-term mitigation. With respect to terrestrial impacts, the main concern relates to the northerly crossings of the Bruce Creek. In other areas, fragmentation of wooded valleylands should be avoided.

Strategic Locations for Parkland/Open Spaces

In addition to community design principles for locating parks, the first iteration of impact assessment recommended consideration of the following environmental criteria when locating parks:

- **Headwater Drainage Features (HWDF)** – as mentioned previously, a number of HWDF have been identified to remain on the landscape. These HWDF will require an upstream catchment area with infiltration capacity. Locating parks immediately upstream of these HWDF will be considered in the second iteration of impact assessment to accomplish the above. These HWDF can either directly or indirectly support Redside Dace habitat.
- **Infiltration/Recharge** – To mitigate impact of development (imperviousness and related reduction in groundwater recharge), parks with significant pervious surfaces should be considered in areas with the greatest soil infiltration capacity.
- **Regional Storm Storage** – the first iteration of impact assessment has shown an increase in Regional Storm water levels downstream of the FUA including the Unionville SPA. Stormwater management measures within the FUA will be required to mitigate this impact. Discussion regarding suitable options to accommodate Regional Storm events is ongoing with the TRCA, including controlling at the source within SWM facilities and open spaces (e.g., parks); on-line SWM facilities; and downstream improvement works (e.g. enlarging water crossing/bridge openings).

5.0 MASTER 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 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) measures in later development application stages.

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
- Identifying a phasing strategy for transportation infrastructure to be delivered as development progresses
- 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 is being undertaken in three phases, in parallel with the Subwatershed Study. The following provides an overview of work undertaken and findings to date.

5.1 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.

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 this preliminary 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 200,000 total person trips will originate from Markham and 185,000 will be destined to Markham during the AM peak period by the year 2031. Approximately 45% 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 17,750 trips will originate from the area and 10,650 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 44% 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 34% (including 11% to downtown Toronto) and the remainder of York Region (excluding the City of Markham) accounting for 16%. York Region is the main generator for trips destined to the FUA, with a share of 26% 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 12% of all travel in York Region by the year 2031 will be served by transit. The corresponding transit share for Markham is 16%. For the FUA specifically, the Region's travel demand forecasts suggest that 17% 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 3,380 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 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 the Phase 2 and Phase 3 works for the FUA Conceptual Master Plan, 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 year 2031 horizon. 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. Moreover, an expressway bus service is planned for Highway 404. 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. As defined by the Region, the frequent transit service is expected to run at intervals of up to 15 minutes and will be supported by an extensive network of HOV lanes in most key arterial roads, in some cases as predecessors to future rapid transit. 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.

All arterial roads in the study area are proposed for widening to four lanes north of Major Mackenzie Drive. Woodbine Avenue, Kennedy Road, Warden Avenue and McCowan Road are expected to be six lanes including two HOV lanes south of Major Mackenzie Drive. Moreover, HOV lanes are extended 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.

As a starting point in the assessment of the required lane configuration for the collector road network in the FUA, two lanes per direction were assigned to its main collectors to avoid any capacity constraints in the assignment of the traffic.

5.2. Phase 2 – Impact Assessment (1st Iteration)

A land use option based on the road network shown in the draft Preliminary Community Structure Plan in Figure 11, was tested in the first iteration of the Phase 2 impact assessment. The Phase 2 impact assessment is 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.

A comprehensive active transportation network will also be established that consists of sidewalks and cycling facilities to reduce the dependence on the automobile. For pedestrians as well as cyclists, minimizing circuitous road networks that make it difficult to enter or exit neighbourhoods will help remove barriers to increasing active transportation and access to transit routes.

Preliminary Findings and Considerations

The following observations are made on the basis of the above preliminary traffic demand analysis for the horizon year 2031 AM peak hour:

- 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 be required. The traffic conditions of the FUA and the broader study area were analyzed assuming that a large extent of trips (i.e., 17% or over 3,000 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 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 and subsequent work in the remainder of Phase 2 and in Phase 3 of the Conceptual Master Plan process are expected to better define the specific transit system and land development requirements 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.

- 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 Preliminary 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, circulation flexibility and active transportation opportunities. The number of lanes for the collector roads will be further assessed as the analysis shifts from this preliminary focus on traffic demands to developing proper lane configurations and intersection traffic controls (signals, stop signs, etc).
- 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. Further work will be undertaken in the remainder of Phase 2 on confirming appropriate collector road access to/from Woodbine Avenue.

The next steps of the transportation analysis include the completion of the Phase 2 Impact Assessment based on refined population and employment yields of the Preliminary Community Structure Plan. Additional analysis will also be undertaken to confirm the number of lanes required for the collector roads, intersection traffic controls, TDM measures, active transportation facilities and the transit network, and updates to the Regional road network as per the updated TMP. Phasing of transportation improvements will also be considered.

6.0 MASTER SERVICING STUDIES (WATER AND WASTEWATER)

The purpose of the Master Water and Wastewater studies is to develop water and wastewater servicing strategies for the new neighbourhoods and employment area identified in the Future Urban Area Conceptual Master Plan.

The Water and Wastewater Studies are being undertaken in three phases, in parallel with the Subwatershed and Transportation studies. The following provides an overview of work undertaken and findings to date.

6.1 Water Servicing - Phase 1 and 2 Analysis to Date

Phase 1 of the Water Servicing Study included review of the existing municipal and Regional water system 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 (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.

Based on the available infrastructure and proposed Regional services, two options 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 the draft Preliminary Community Structure Plan in Figure 11.

Ultimate Servicing

Existing communities in Markham within the PD7 zone are currently serviced by a single supply system 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.

Interim Servicing

The existing PD7 system lacks system security, due to only one supply point from Richmond Hill along Elgin Mills Road. If this watermain fails, the area can be temporarily supplied from the lower PD6, but pressures will not meet the City's criteria and would leave the area vulnerable to emergency situations until the watermain is repaired.

The construction of the Regional water infrastructure (PD7 pumping station and associated watermains) is not planned until after the build-out horizon of the FUA (2031). Until the infrastructure under the ultimate servicing scenario is built, a temporary pumping station is required for interim servicing of the lands north of Elgin Mills Road (Employment Block) to add security of supply for the PD7 area. The preferred location for the temporary pumping station is in the vicinity of Warden Avenue and Elgin Mills Road, due to its proximity to both PD6 and PD7 zones.

It is also suggested that the Region pursue the construction of the 19th Avenue watermain in addition to the proposed north Markham PD7 pumping station. The time required to design and construct a pumping station, in addition to constructing all the watermains needed to connect the pumping station to the Future Urban Area lands, is longer than the anticipated completion time for the shorter section of watermain along 19th Avenue across Highway 404. The additional supply point would add to the zone security when the pumping station is complete. The City wide water model considered that the 19th Avenue watermain was to be constructed.

Water servicing infrastructure under interim and ultimate scenarios is illustrated in Figure 8.

6.2 Wastewater Servicing – Phase 1 and 2 Analysis

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 servicing of the FUA.

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

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

1. Convey wastewater from the FUA to the existing wastewater system, with upgrades to accommodate the additional flow, ultimately connecting to the YDSS between Warden Avenue and Kennedy Road
2. Convey flows from the Employment Block via an east-west new trunk sewer north of Elgin Mills Road to the York Region's proposed North Markham Collector along Markham Road. Residential development within the Employment Block would connect to the existing system

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 the draft Preliminary Community Structure Plan in Figure 11 preliminary servicing concepts were prepared for assessment.

Model Overview

A model was prepared for the Future Urban Area that 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.

Concept WW-1

The servicing concept WW-1, as illustrated in Figure 9 follows the road layout to align wastewater servicing and provides preliminary pipe sizes and system depths, as well as existing system improvements required for FUA wastewater services.

The existing wastewater systems south of Major Mackenzie Drive were designed to take additional wastewater flows from development between Major Mackenzie Drive and Elgin Mills Road (Glen

Angus Boulevard, Prospectors Drive, The Bridle Walk). These wastewater systems were not designed for flow from development areas north of Elgin Mills Road (i.e, within the Employment Block). Areas west of Berczy Creek will be serviced by the existing systems (Haywood Drive, James Joyce Drive) west of the Future Urban Area. Concept WW-1 maximizes the use of the existing systems capacity designed into the original system south of Major Mackenzie Drive and to the west.

The concept and upgrades will be further refined through the second iteration of impact assessment, before a final servicing concept is fully validated.

Concept WW-2

Servicing concept WW-2, illustrated in Figure 10, shows the system layout with preliminary pipe sizes, system depth, and existing systems improvements required for FUA wastewater services, but with one major outlet for the FUA south of Major Mackenzie Drive. This concept reduces the potential need for upgrading existing systems to only one location on Angus Glen Boulevard.

Preferred Concept

A screening level assessment of WW-1 and WW-2 has been undertaken as part of the first iteration of impact assessment to identify which concept is best to refine and test further. Based on the qualitative evaluation of constructability, maintenance and operation, staged implementation, maximized use of existing infrastructure, system depth and disruption, Concept WW-1 is identified as the preferred servicing concept for further testing in the second iteration of impact assessment.

Further testing will identify existing system upgrades required from Glen Angus Boulevard south to the YDSS (16th Avenue). The upgrade of the existing system components will be challenging given the system depth, disruption to local residents, stream crossing, and alignment.

In reviewing potential alignment options south of the FUA, it is possible to divert flows into a new pipe that crosses through the existing York Downs Golf Course directly south to a newly required YDSS connection. This option is contingent on obtaining an easement or right of way through the York Downs lands (currently being considered for redevelopment) and being able to connect into the YDSS at a new location.

As well, in reviewing Concept WW-1 there are several variations in the layout to consider that do not necessarily follow the primary road network that will potentially reduce the depth of the system, provide more flexibility, and reduce servicing costs. These variations will be considered under the 2nd iteration of impact assessment.

7.0 PRELIMINARY COMMUNITY STRUCTURE PLAN

The planning objectives of the Conceptual Master Plan are outlined in the Official Plan (Section 8.12). In addition to identification of a Greenway System (being confirmed through the Subwatershed Study), 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. As well, the policies identify the need for sustainable development practices at the site and community levels, and the identification of phasing based on the servicing and transportation network requirements and other City priorities.

The findings of the subwatershed studies, transportation and servicing studies, and planning studies to date are reflected in the draft Preliminary Community Structure Plan identified in Figure 11. This Plan is presented as 'preliminary', recognizing that further analysis is still to be undertaken as part of the remaining portion of the Phase 2 impact assessment and Phase 3 implementation strategy work. At the end of Phase 3, a Preferred Community Structure Plan based on the completed analysis, will be presented to Council for endorsement as the basis for secondary plans.

The following sections describe each of the structural components identified in the draft Preliminary Community Structure Plan and underlying rationale.

7.1 Greenway System

The Greenway System shown in the Preliminary Community Structure Plan is based generally on the 'Greenway System' in the Official Plan 2014, with refinements that reflect the findings of the ongoing Subwatershed Study. The refinements requiring further analysis as part of the Subwatershed Study are shown as hatched on the Plan as follows:

- An Ecological Corridor north of Elgin Mills Road (shown conceptually as the Core Linkage Enhancement in the Official Plan) - this corridor is shown as a 200 metre wide open wildlife corridor linking the main tributary of Berczy Creek west of Warden Avenue to the natural heritage features connecting with the Bruce Creek tributary on east side of Warden Avenue;
- Additional wetland, woodland and headwater drainage features; and
- Minor adjustments due to detailed floodplain analysis (Berczy Glen, Robinson Glen).

7.2 Transportation Network

The transportation network shown 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 3 – 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 Preliminary Community Structure Plan is based on the network identified in Map 3 – 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 to provide sufficient capacity for traffic to move efficiently not only within the FUA but also into adjacent existing communities. The alignment of the collectors has regard for connections with existing roads and signalized intersections, and avoiding to the extent possible sensitive natural heritage areas and cultural heritage resources.

Active Transportation - Cycling Facilities

Cycling facilities in the vicinity of the FUA are shown in Appendix D – Proposed Cycling Facilities in the Official Plan. In addition to the existing cycling facilities on Major Mackenzie Drive, proposed cycling facilities are identified on Warden Avenue, Woodbine Avenue and Elgin Mills Road, with connections on the west side of the Hydro Corridor (in the Hwy 404 North area).

7.3 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 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 Preliminary 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 with 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 Service 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 (400m or 5 minute walk) of all residents. Neighbourhoods centres could consist of schools, parks/open space or retail nodes. The distribution/organization of neighbourhoods is illustrated in the draft Open Space Network and Neighbourhood Structure Plan described in Section 7.6 and attached as Figure 12.

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. 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 need for additional fire and emergency service facilities is also being confirmed.

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 Preliminary 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 are 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 (townhouses, stacked townhouses) to support the north-south Proposed Frequent Transit Service 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 Primary and Secondary Retail 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.

7.4 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 developed to ensure that transit-supportive built form and uses on the north side of Major Mackenzie Drive are compatible with the existing and planned neighbourhoods in the Angus Glen and Berczy communities south of Major Mackenzie Drive.

7.5 Employment Area

The Conceptual Master Plan is intended to provide guidance on appropriate employment land 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 uses 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 (specifically Highway 404).

The intended land uses in the Employment Areas 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 19th Avenue. As mentioned, the alignment shown in the Official Plan is conceptual, to be confirmed through a Class EA process at a later date.

7.6 Integrated Parks and Open Space System

The location of schools and parks in the Preliminary Community Structure Plan reflects the more detailed conceptual system shown in the draft Open Space System and Neighbourhood Structure Plan identified in Figure 12.

The draft Open Space System and Neighbourhood Structure Plan illustrates the principles of school/park campuses functioning as focal points and principle 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 is 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 (approx 800 m) of intended park users

- Neighbourhood parks should be located within a 5 minute walking distance (approx 400 m) 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 bicycle 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 of all parkland dedication for ground-oriented dwellings being provided in park land.

7.7 Achievement of Population and Employment and Minimum Densities

The draft Preliminary Community Structure Plan as described will accommodate, at minimum, the approximate 12,000 units, 38,000 population, and 19,000 jobs originally anticipated to be accommodated in the Future Urban Area as part of the Region's and City's growth management strategies for growth to 2031.

Preliminary analysis suggests that in achieving the minimum 20 units per hectare and 70 residents and jobs per hectare thresholds required in the Markham Official Plan and Regional Official Plan, a population closer to 40,000 residents (approximately 12,000-13,000 units) is anticipated along with 16,000-19,000 jobs.

Preliminary analysis also suggests that the population and jobs will not necessarily be uniformly distributed across all Neighbourhood Blocks. For example, densities may be expected to be lower in the Berczy Glen Block given the lack of the higher density Mixed Use Regional Corridor, as well as the need for appropriate transition to adjacent residential estate areas.

The population and employment yields and minimum density requirements for each Block will be further refined through the completion of the Conceptual Master Plan process.

8.0 NEXT STEPS – Development of Key Policy Direction for Secondary Plans

This Interim Report describes work to date in identifying a draft Preliminary Community Structure Plan for the Future Urban Area lands. Additional analysis is still to be completed as part of the second iteration of impact assessment in Phase 2. The results of the Phase 2 impact assessment will be used to confirm a Preferred Community Structure Plan that will provide guidance for the distribution of land use in future secondary plans.

In Phase 3 of the studies, management strategies and recommendations will be developed that will solidify key policy direction for secondary plans. Examples of preliminary policy direction as identified to date in this report include, among other matters:

- protection and enhancement of natural features through a confirmed protected Greenway System and complementary land uses (e.g., locating parks in high infiltration areas);
- distribution of land uses which support transit and provide appropriate transition to existing communities;
- integration of cultural heritage resources into neighbourhood design;
- identifying a road/transit network which provides required connectivity, while minimizing impacts of stream crossings;
- established appropriate Low Impact Development (LID) best management practices to maintain water balance, enhance fish habitat, etc; and
- need for temporary water pumping station in the area of Warden Avenue/Elgin Mills Road.

The Key Directions document will also provide direction for other planning objectives to be met in the new neighbourhoods and employment lands, as outlined in the principles and parameters listed in Table 1. Examples include direction for community design that focuses on walkability; 'green' development practices, including the requirement for community energy plans; phasing of development to ensure infrastructure is available to support development in a cost effective manner (with particular regard for the phasing of the redevelopment of the golf course lands); and any other matters identified through the Conceptual Master Plan process.

Upon completion of Phase 3 of the Conceptual Master Plan process, the Preferred Community Structure Plan and Key Policy Direction will be presented to Council for endorsement as direction for the preparation of more detailed secondary plans. Secondary plans will be approved as statutory amendments to the Official Plan with additional opportunity for public input. The secondary plans will form the basis for plan of subdivision and site plan applications, and ultimately building permits.

LOCATION MAP

FIGURE No. 1

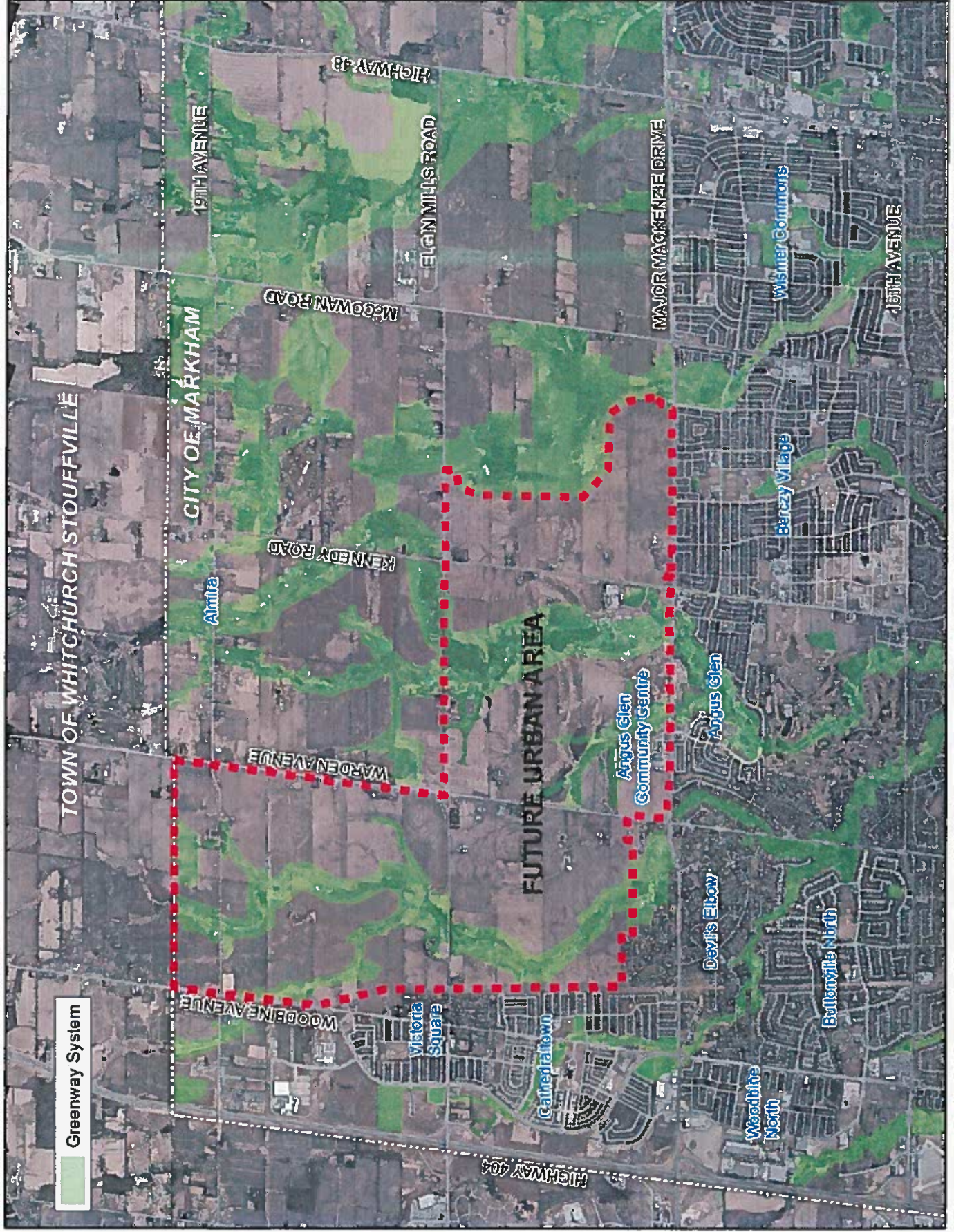
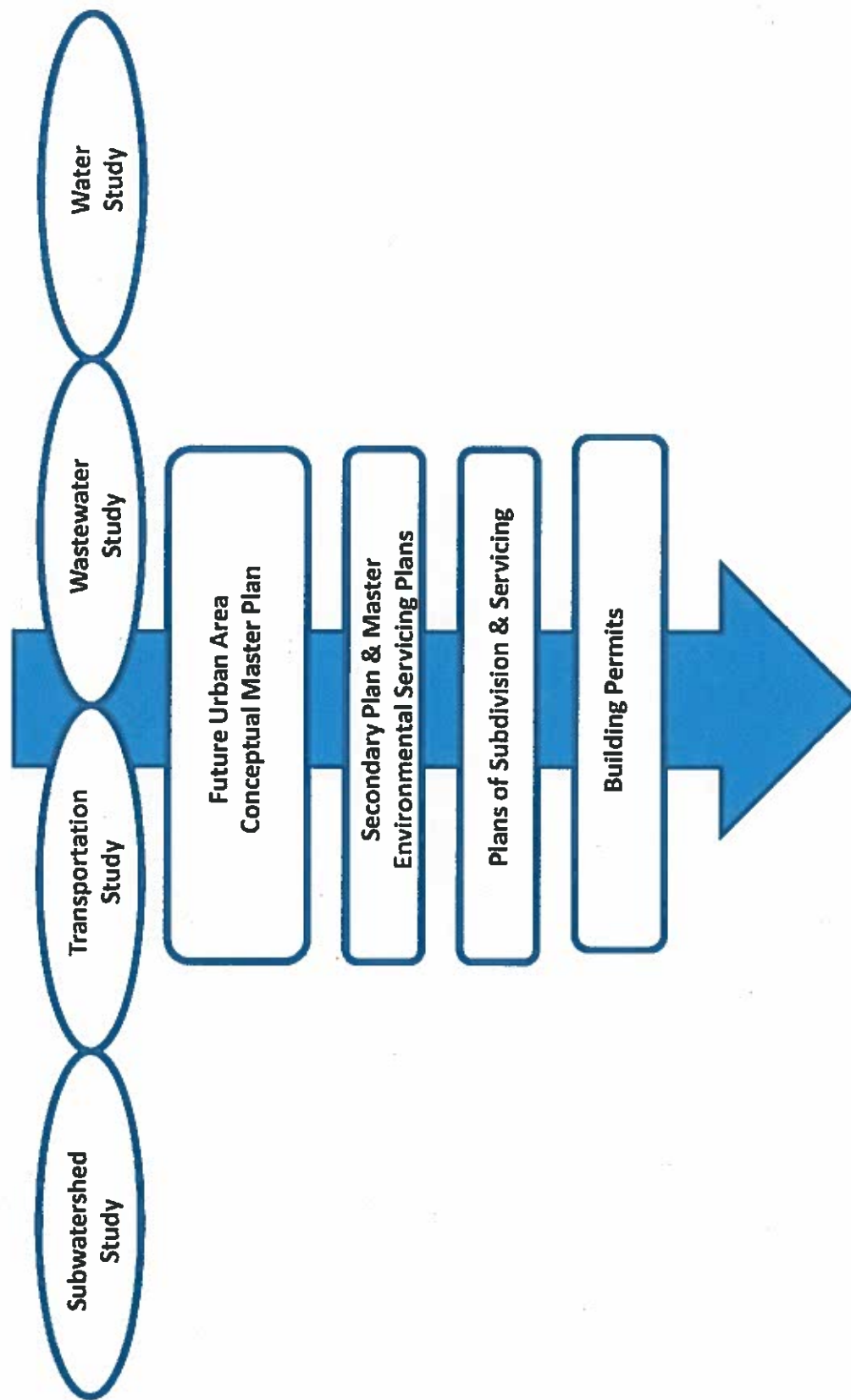


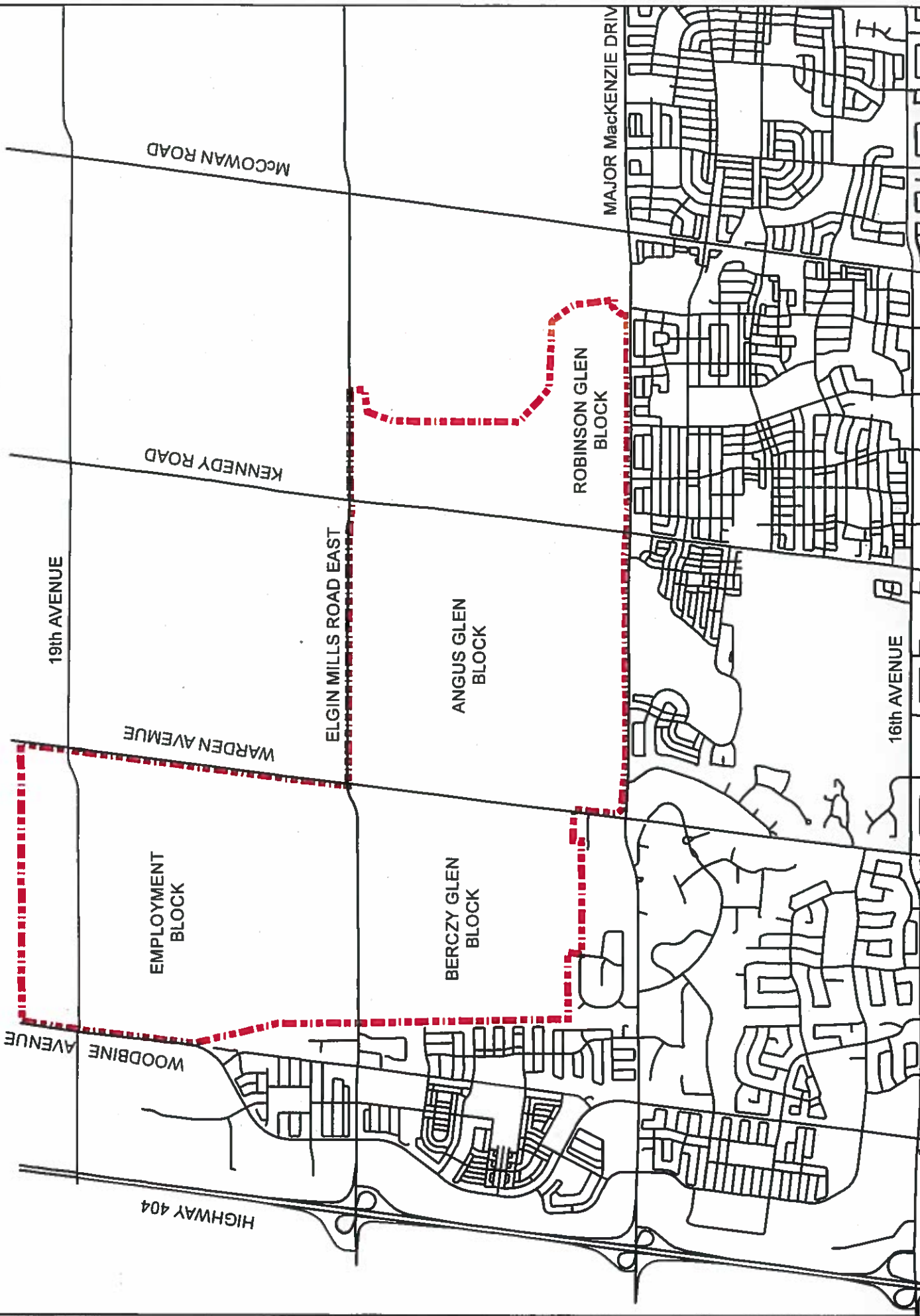
FIGURE No. 2

PLANNING PROCESS FOR THE FUTURE URBAN AREA



ANTICIPATED SECONDARY PLAN BLOCKS

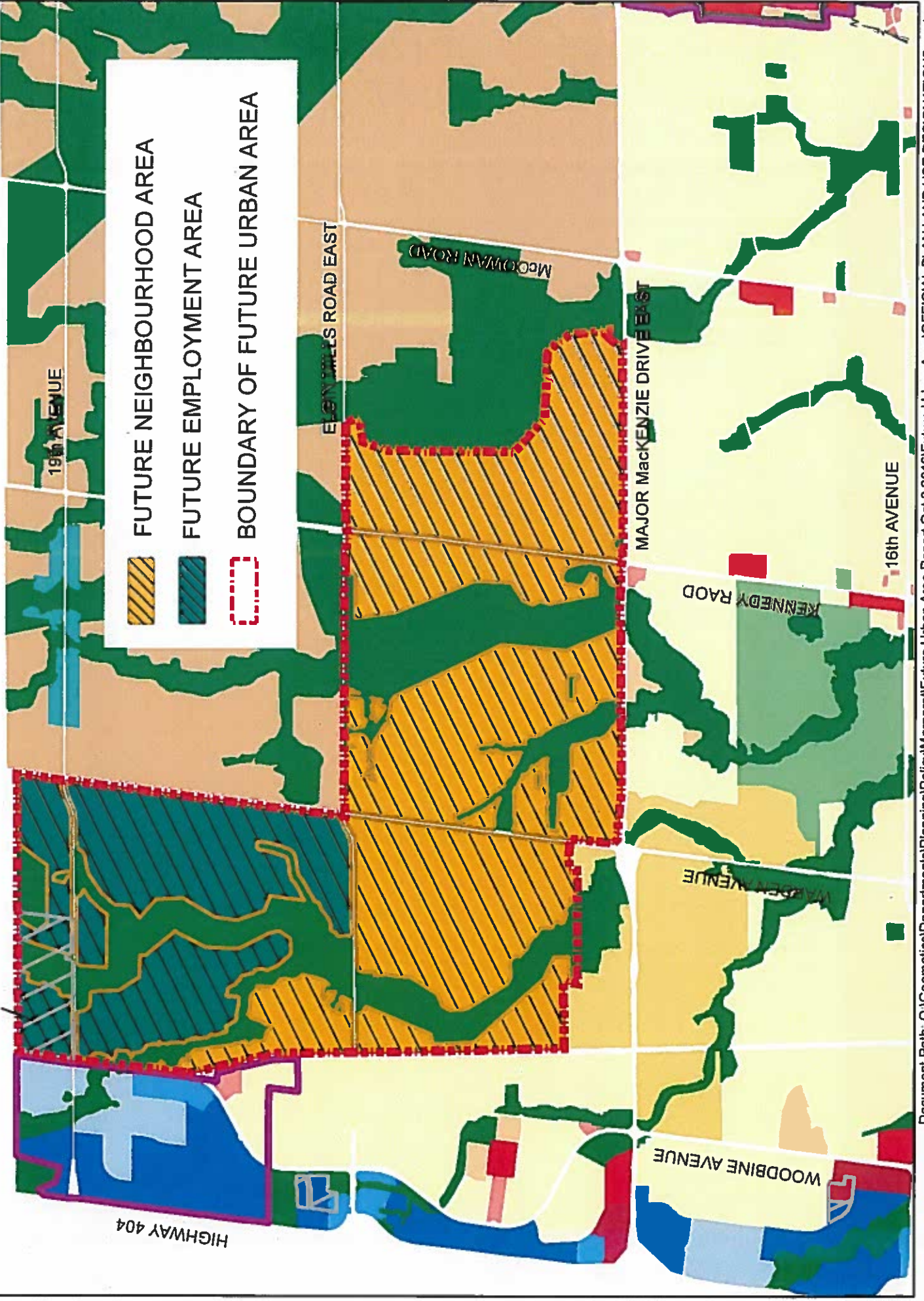
FIGURE No. 3



OFFICIAL PLAN LAND USE DESIGNATIONS

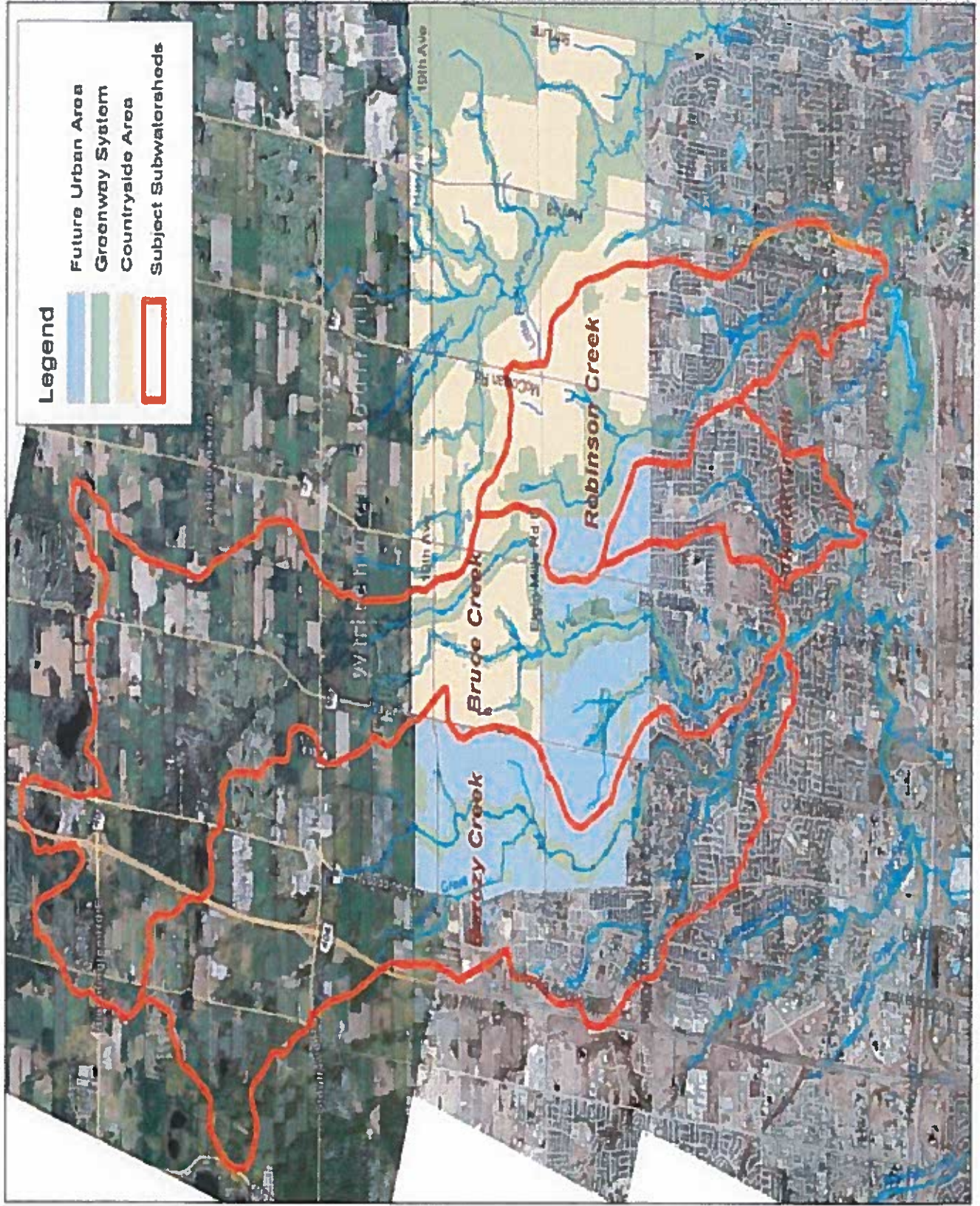
See Section 9.9.4

FIGURE No. 4



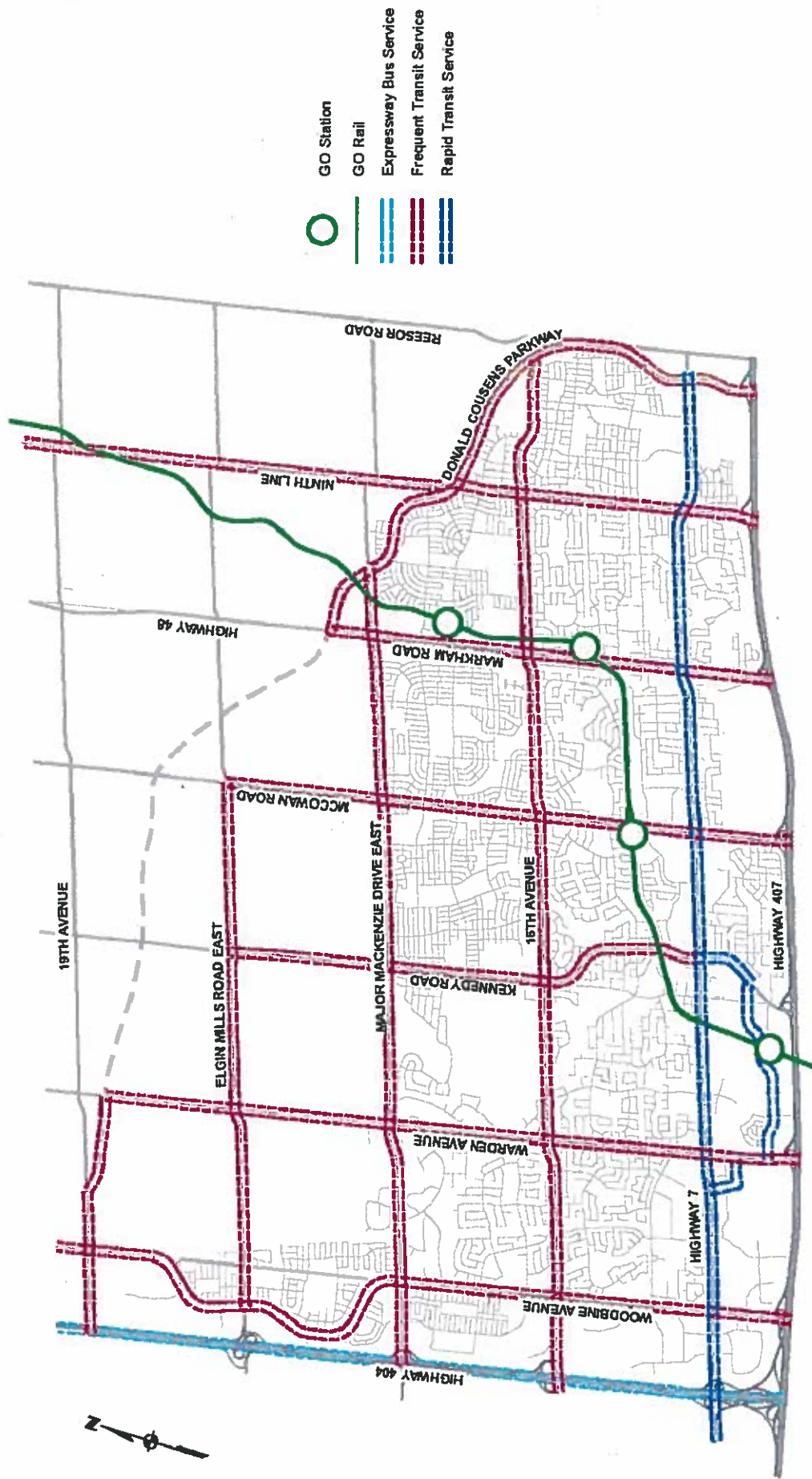
SUBWATERSHED BOUNDARIES

FIGURE No. 5



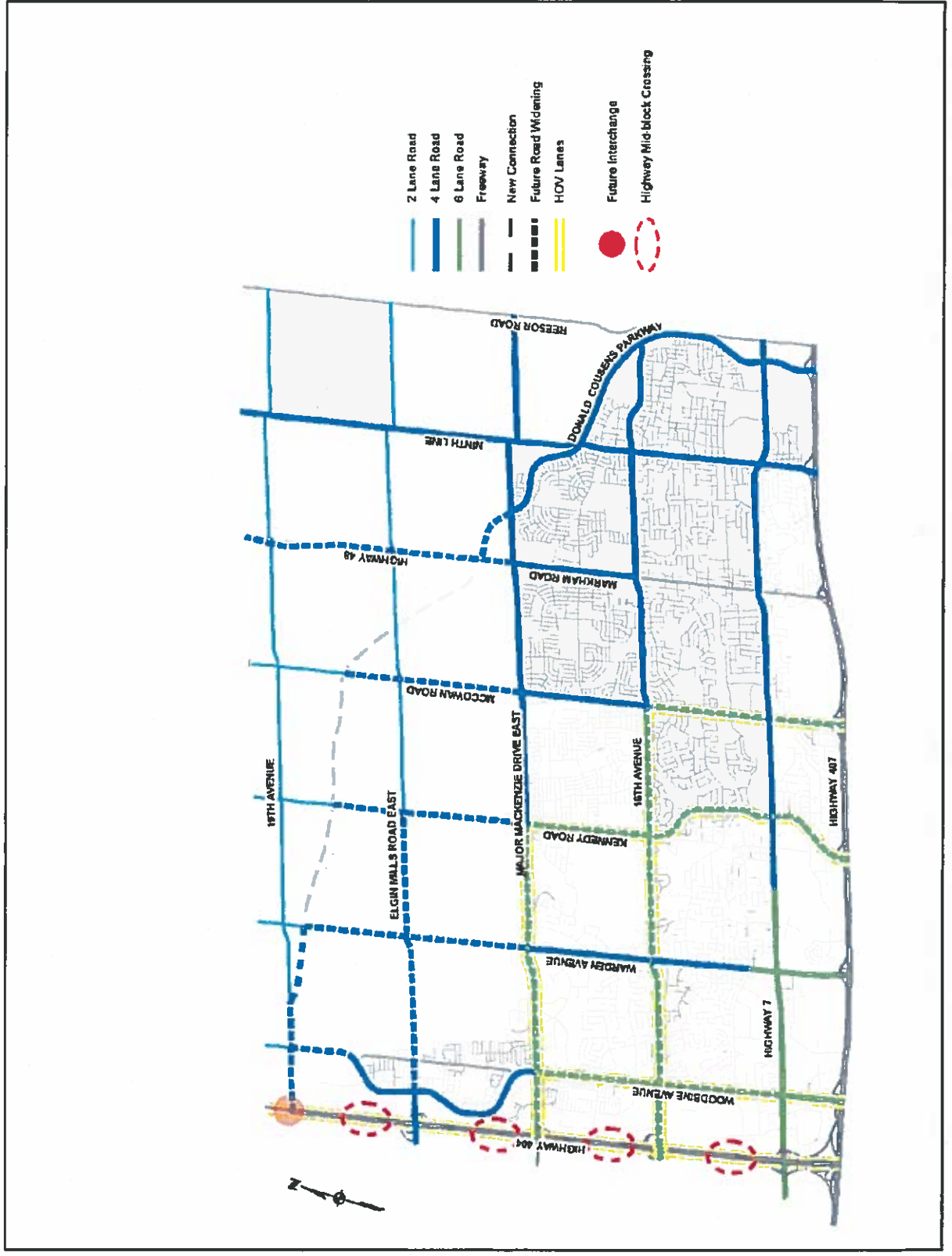
REGIONAL TRANSIT NETWORK TO 2031

FIGURE No. 6



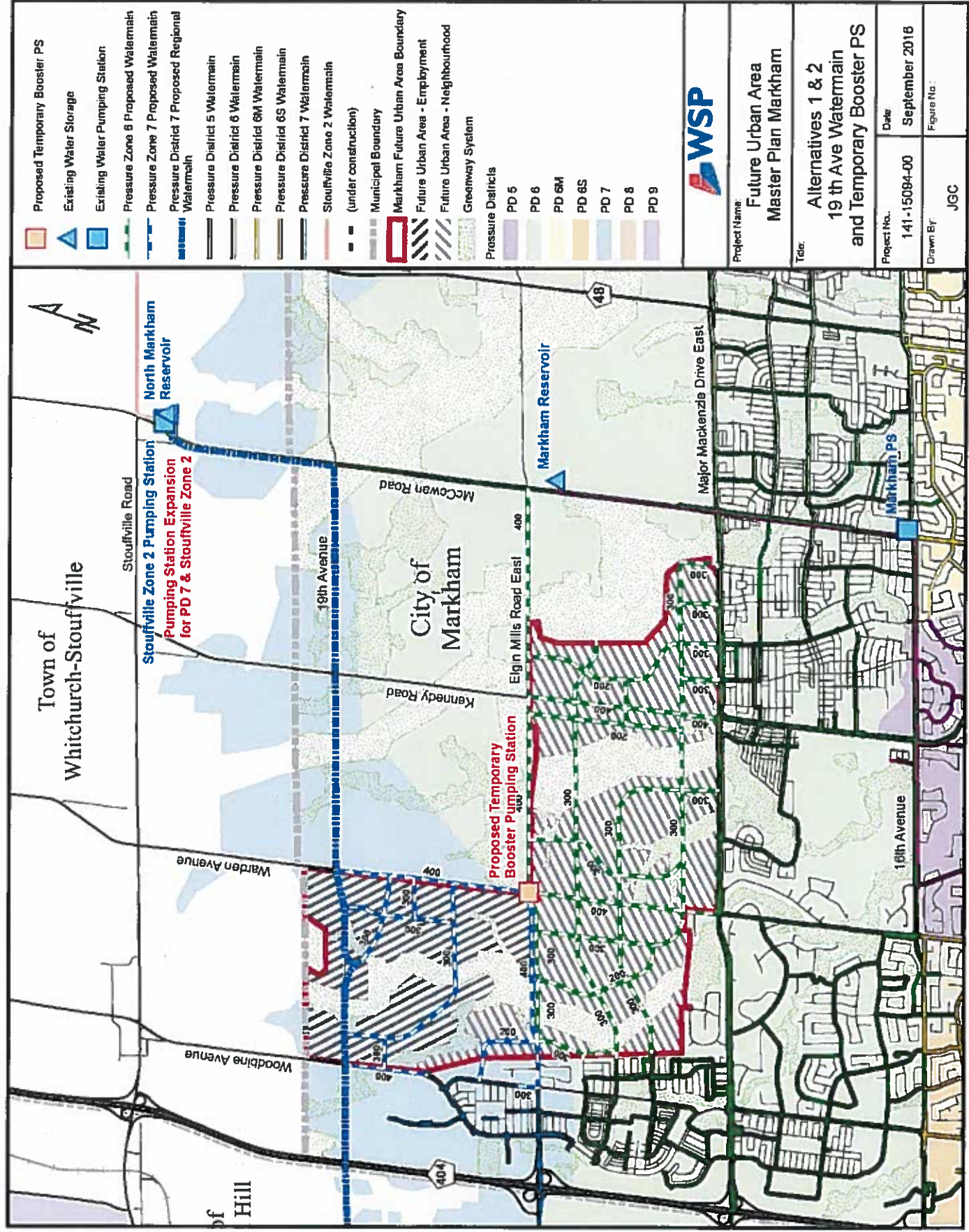
REGIONAL ROAD NETWORK TO 2031

FIGURE No. 7



WATER SERVICING- INTERIM & ULTIMATE SCENARIO INFRASTRUCTURE

FIGURE No. 8



- Proposed Temporary Booster PS
- Existing Water Storage
- Existing Water Pumping Station
- Pressure Zone 6 Proposed Watermain
- Pressure Zone 7 Proposed Watermain
- Pressure District 7 Proposed Regional Watermain
- Pressure District 5 Watermain
- Pressure District 6 Watermain
- Pressure District 6M Watermain
- Pressure District 6S Watermain
- Pressure District 7 Watermain
- Stouffville Zone 2 Watermain
- (under construction)
- Municipal Boundary
- Markham Future Urban Area Boundary
- Future Urban Area - Employment
- Future Urban Area - Neighbourhood
- Greenway System
- Pressure Districts
- PD 5
- PD 6
- PD 6M
- PD 6S
- PD 7
- PD 8
- PD 9

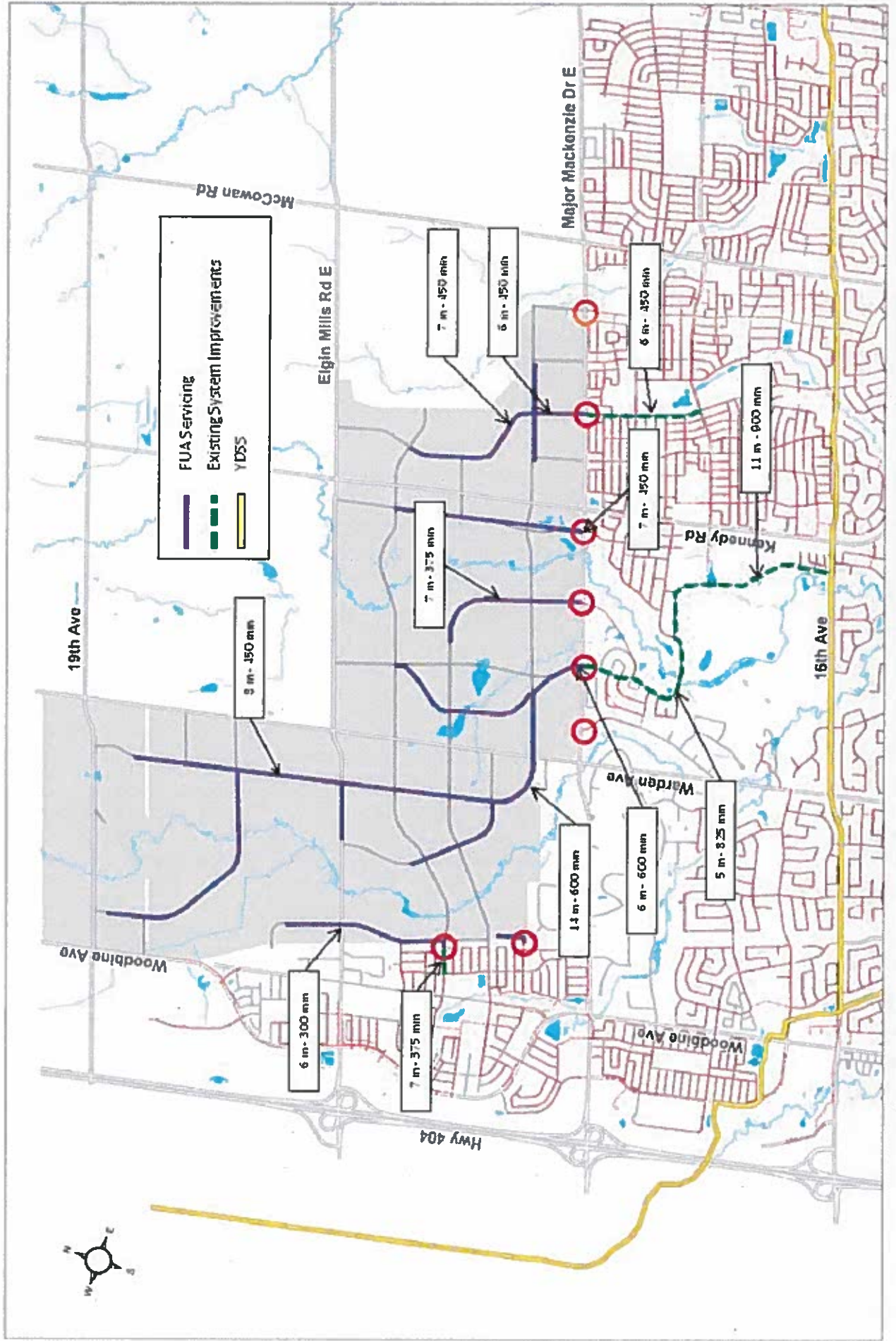


Project Name	
Future Urban Area Master Plan Markham	
Title	
Alternatives 1 & 2 19 th Ave Watermain and Temporary Booster PS	
Project No.	Date
141-15084-00	September 2016
Drawn By:	Figure No.:
JGC	

WW-1: WASTEWATER SERVICING (PREFERRED)

FIGURE No. 9

(CONNECTION TO EXISTING SYSTEMS SOUTH OF MAJOR MACKENZIE DRIVE)



WW-2:- WASTEWATER SERVICING (ONE OUTLET SOUTH OF MAJOR MACKENZIE DRIVE)

FIGURE No. 10

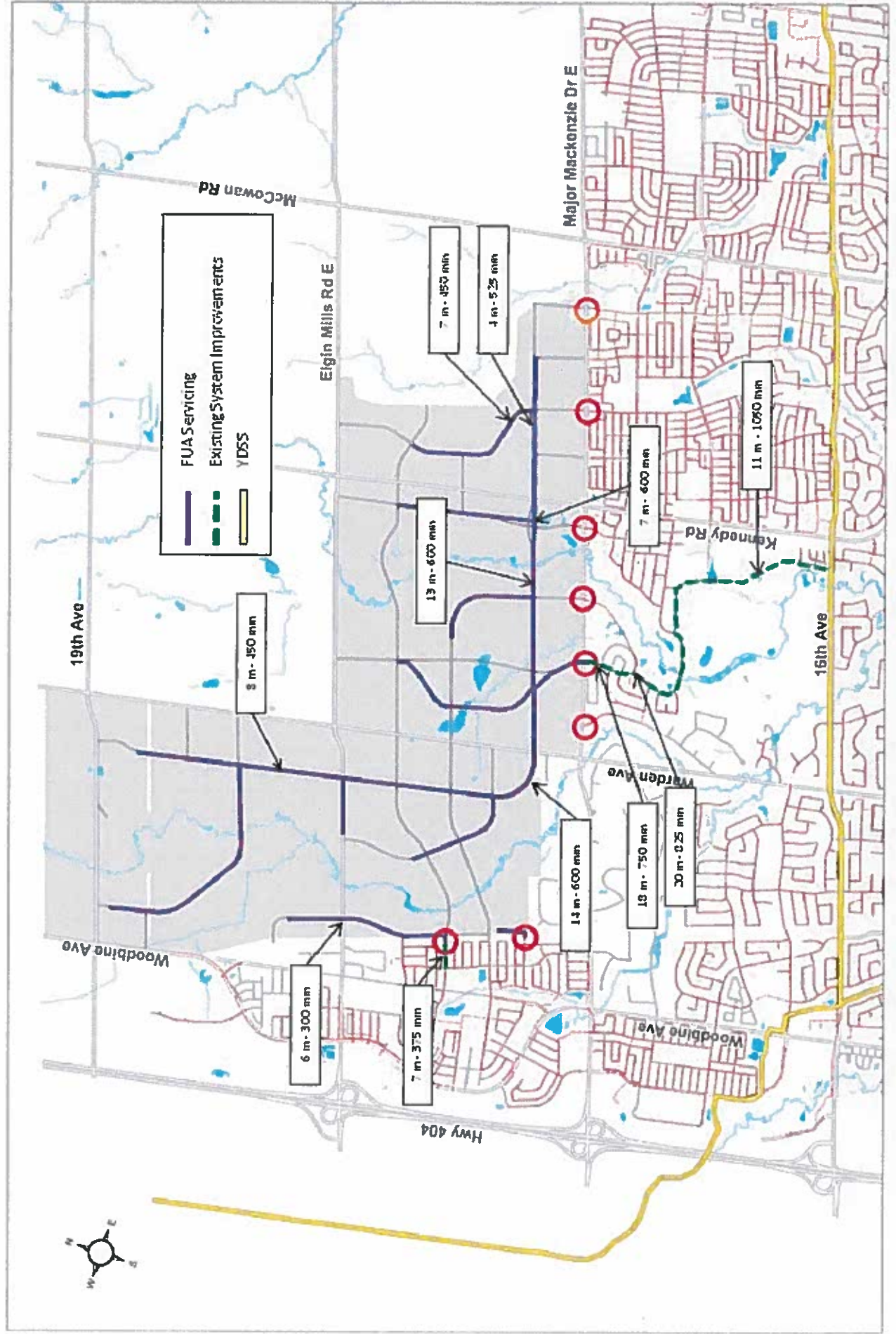
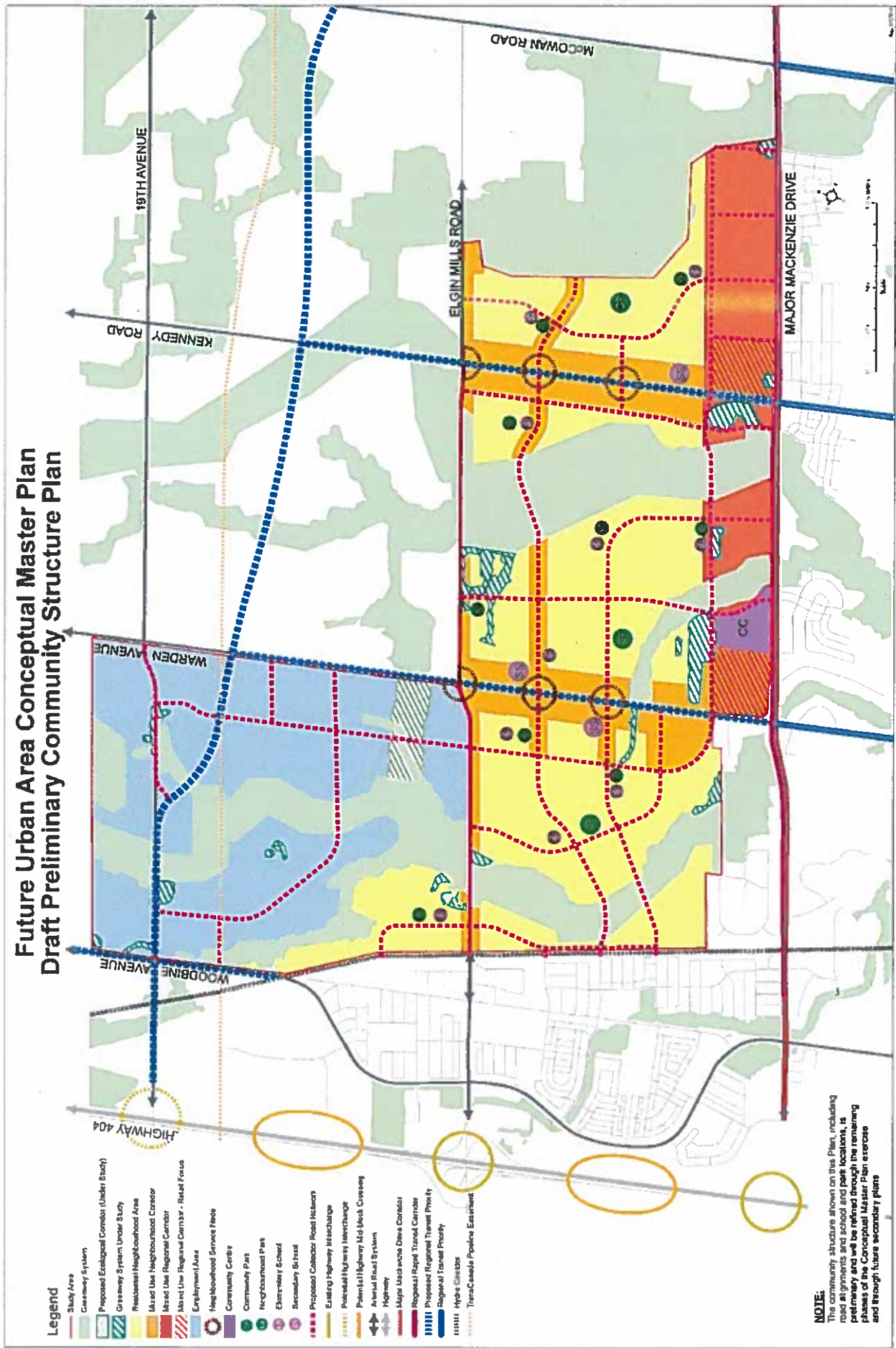


FIGURE No. 11

Future Urban Area Conceptual Master Plan
Draft Preliminary Community Structure Plan



Legend

- Study Area
- Greenway System
- Proposed Ecological Corridor (Under Study)
- Greenway System Under Study
- Residential Neighbourhood Area
- Mixed Use Neighbourhood Corridor
- Neighbourhood Regional Corridor
- Major Use Regional Corridor
- Major Use Regional Corridor - Retail Focus
- Employment Area
- Neighbourhood Service Needs
- Community Centre
- Community Park
- Neighbourhood Park
- Elementary School
- Secondary School
- Proposed Collector Road Network
- Existing Highway Interchange
- Proposed Highway Interchange
- Proposed Highway Mid-Block Crossing
- Arterial Road System
- Highway
- Major Motorway Drive Corridor
- Regional Rapid Transit Corridor
- Proposed Regional Transit Priority
- Suggested Transit Priority
- Hydro Obstacles
- TransCanada Pipeline Easement

NOTE:
The community structure shown on this Plan, including road alignments and school and park locations, is preliminary and will be refined through the remaining phases of the Conceptual Master Plan exercise and through future secondary plans

APPENDIX B

Cultural Heritage Resources

<i>Map No.</i>	<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.	11251 WOODBINE AVE	CON 4 PT LOT 29	David Hopper House	c. 1850	Listed	1
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

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

CULTURE HERITAGE RESOURCES APPENDIX 'B'

 FUA Boundary

