Master Environmental Servicing Plan (MESP)
4134 16th Avenue
Residential Development

Prepared for:
Sixteenth Land Holdings Inc.

Prepared by:

September 2016

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1.0 INTRODUCTION

Sixteenth Land Holdings Inc. has retained a consulting team to prepare this Master Environmental and Servicing Plan (MESP) in support of an Official Plan Amendment ("OPA") application to permit the development of a residential community on the Subject Property.

The Subject Property is municipally known as 4134 16th. Avenue, in the City of Markham, Region of York. The Subject Property is located in Part lots 16, 17 and 18, Concession 5. Except for an area adjacent to Kennedy Road, the balance of the Subject Property is currently used by its former owner York Downs Golf & Country Club for a golf course.

The Subject Property is a total of 168.64 hectares (416.72 acres), and is located on the north side of 16th. Avenue, on the west side of Kennedy Road, and has a small amount of frontage onto the east side of Warden Avenue as well. There is existing residential development surrounding the Subject Property on all sides.

The current golf course use has been in operation since York Downs Golf & Country Club opened on site in the early 1970s. The current Official Plan designation of 'Private Open Space' for the areas outside of the valleylands reflects this historic golf course use.

Sixteenth Land Holdings Inc. intends to develop the Subject Property for a residential community and is submitting an OPA to redesignate the developable portion of the Subject Property from 'Private Open Space' to appropriate urban residential designations to permit the development of residential uses.

This report has been prepared in conjunction with the OPA application in support of the redesignation as proposed in the draft OPA and in the Planning Report (Gatzios Planning, August 2016). Please refer to the draft OPA and to the Planning Report for a description of the proposed Official Plan land use designations proposed for the Subject Property.

1.1 PURPOSE

This Master Environmental Servicing Plan (MESP) has been prepared in accordance with City of Markham, Region of York and Toronto and Region Conservation Authority (TRCA) requirements for the completion of a MESP for the Subject Property. It fulfills MESP requirements outlined in the York Downs MESP Terms of Reference approved by the City of Markham.

This MESP is one of several background studies to be undertaken as input to the Official Plan Amendment for the Subject Property. This MESP addresses a range of environmental and servicing issues including surface water, groundwater, fluvial geomorphology, terrestrial and

aquatic resources and municipal servicing needs. It provides environmental and servicing data and designs required for the formulation of draft plans of subdivision within the Subject Property.

The purpose of the MESP is to provide input to the preparation of the Official Plan Amendment including:

a. Characterizing and evaluating the existing physical conditions of the site including the natural landform, existing geology, hydrogeology, hydrology, and natural heritage features.

b. Opportunities and Constraints mapping identifying a range of environmental features and functions, their approximate limits and preliminary management requirements (e.g. setback and buffers). This preliminary mapping provided land use input to the study team to assist in the preparation of a preliminary concept plan.

c. Recommendations for a Natural Heritage System (NHS) to be incorporated in the concept plan, including delineating natural features boundaries of natural features in the field, providing recommendations for buffer and setback requirements, identifying permitted uses in the NHS (e.g. potential for trails, roads, services, stormwater management, watercourse relocation), and identifying other potential mitigative or restoration/enhancement opportunities within or adjacent to the NHS.

d. A Proposed Stormwater Management Plan identifying design criteria and Stormwater Management Practices (location, type, sizing) to be incorporated into development plans including Low Impact Development opportunities.

e. Input to the Servicing and Grading Report (SGR) and Transportation Study including assessing environmental implications of servicing and grading, transportation needs and recommendations, where appropriate, road crossing locations and designs, servicing crossing locations and construction practices as well as implications of servicing to groundwater levels and local use.

f. Identifying geotechnical and hydrogeological recommendations for the development plan based on water balance and feature based water assessment.

g. Identifying how the MESP recommendations meet requirements set out in the Provincial Policy Statement (PPS), Regional and Local Official Plans and any other applicable documents including identification and mapping of significant natural heritage features and areas (PPS significant and Regional).

h. Recommending monitoring requirements for the development plan.

1.2 STUDY AREA

The Subject Property is a total of 168.58 hectares (416.57 acres), and is located on the north side of 16th. Avenue, on the west side of Kennedy Road, and has a small amount of frontage onto

the east side of Warden Avenue as well. There is existing residential development surrounding the Subject Property on all sides. The Subject Property is illustrated on **Figure 1.1.**

Berczy Creek traverses the western portion of the Subject Property, and the Bruce Creek traverses the Subject Property in a roughly north / south direction, bisecting the Subject Property into west and east tableland areas.

1.3 PREVIOUS STUDIES

The following approved studies/guidelines/documents were reviewed in preparation of this MESP. A complete listing of references is provided at the end of this report:

- City of Markham Official Plan (1987), and City of Markham Official Plan 2014 (as partially approved October 30, 2015);
- Erosion and Sediment Control Guidelines for Urban Construction, Toronto and Region Conservation Authority et al, December 2006.
- MMM Rouge River Watershed Hydrology Update (2001);
- TRCA Rouge River Watershed Plan (2007);
- TRCA Rouge River State of the Watershed Report (2007);
- TRCA Evaluation, Classification and Management of Headwater Drainage Features: Interim Guidelines (2009);
- TRCA Low Impact Development Stormwater Management Planning and Design Guide (2010);
- TRCA Stormwater Management Criteria (2012);
- TRCA Living City Policy (2014);
- TRCA Crossing Guideline for Valley and Stream Corridors (2015);
- MOEE Hydrogeological Technical Information Requirements for Land Development Applications (April 1995);
- MOECC Stormwater Management Planning and Design Manual (2003);
- Geotechnical Engineering Design and Submission Requirements (TRCA, November 2007);
- MNR Technical Guide for River & Stream Systems: Erosion Hazard Limit (2002);
- Aquafor/AECOM City-Wide Stream Erosion Master Study/Update (2014);
- Cosburn Patterson Mather Pond H Stormwater Management Report (1997);
- Stantec Stormwater Management Pond Certification & Assumption, York Downs Pond 'H'(2008);
- Cosburn Patterson Mather Angus Glen Village Stormwater Management Design Brief (1997) and detailed engineering servicing and grading plans (2000);
- Stantec Functional Servicing Report - Angus Glen East Village (Former School Block)(2012);
- Cosburn Patterson Mather Sanitary Trunk Servicing Drawings (May 1996);
- Stantec Functional Servicing Report (2006) and Stormwater Management Report for Deacon Lands (2007); and,
- Stantec Functional Servicing Report (2015) and Stormwater Management Report for Yorkton Lands (2016).

1.4 STUDY TEAM AND REPORT STRUCTURE

A multidisciplinary team has studied the environment and servicing of the MESP Subject Property. The assembled MESP team and their responsibilities include:

- Stantec Consulting - addressing study integration and team management, municipal servicing and site grading, hydrology, hydraulics, and stormwater management;
- Beacon Environmental - addressing terrestrial ecology, fluvial geomorphology, limits of development, impact assessment, ecological restoration and sustainability, environmental protection, and management of aquatic resources;
- R. J. Burnside & Associates Limited – addressing geology and hydrogeology;
- Gatzios Planning + Development Consultants Inc.– addressing municipal planning matters and preparing the OPA and implementing draft plan of subdivision and ZBLA;
- MBTW – addressing urban design, landscape design, parks, and trail planning; and,
- Poulos & Chung - addressing transportation.

The MESP report has been separated into the following Tabs.

Tab 1 – MESP Introduction
Tab 2 – Natural Environment Report / Environmental Impact Study
Tab 3 – Hydrogeological Assessment and Water Balance
Tab 4 – Fluvial Geomorphology Report
Tab 5 – Servicing and Grading Report
Tab 6 – Transportation Assessment of Internal Roadway Network Options

1.5 LANDOWNERSHIP AND PARTICIPATION

The entire Subject Property is owned by Sixteenth Land Holdings Inc. The participating land ownership is illustrated on **Figure 1.2.**

1.6 PRE-CONSULTATION SUMMARY

Meetings were held with City of Markham (City) and Toronto and Region Conservation Authority (TRCA) on the following dates to discuss various items related to the MESP:

- January 14, 2016 – Application Pre-Submission Consultation meeting with City and TRCA
- March 2, 2016 - MESP Terms of Reference discussions
- June 6, 2016 – Pre-Consultation with TRCA on Erosion Threshold
- June 10, 2016 – Workshop with City Staff

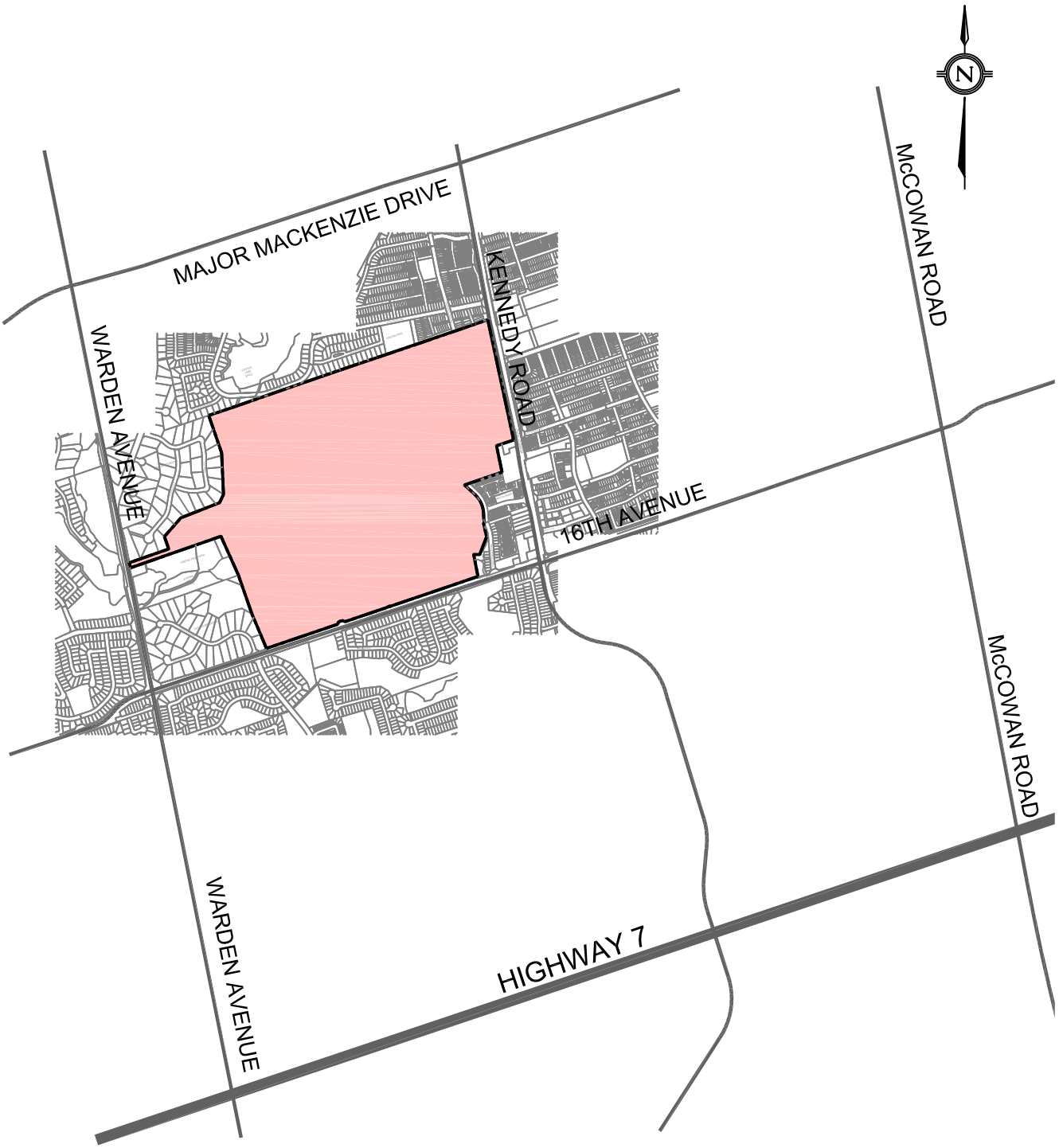
The approved Terms of Reference for the overall MESP report are included in **Appendix 1**.

1.7 PROPOSED PLAN

The proposed residential development is detailed in the two draft plan of subdivision applications and associated Zoning By-Law Amendment applications that accompany the OPA application. There is one draft plan of subdivision for the east portion of the property and one for the west portion of the property. The west draft plan of subdivision contains the valleylands associated with both Berczy Creek and Bruce Creek. References in this report to the two draft plans or to specific lots / blocks within each, will include 'East' or 'West' to denote the appropriate area. **Figure 1.3** illustrates the composite overall development plan for the Subject Property.

The East draft plan of subdivision contains a mix of residential, open space blocks, elementary school block, parks, and SWM ponds.

The West draft plan of subdivision contains a mix of residential, mixed use, open space blocks, parks, and SWM ponds.



Stantec

BEACON ENVIRONMENTAL

BURNSIDE

NOT TO SCALE

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SUBJECT PROPERTY

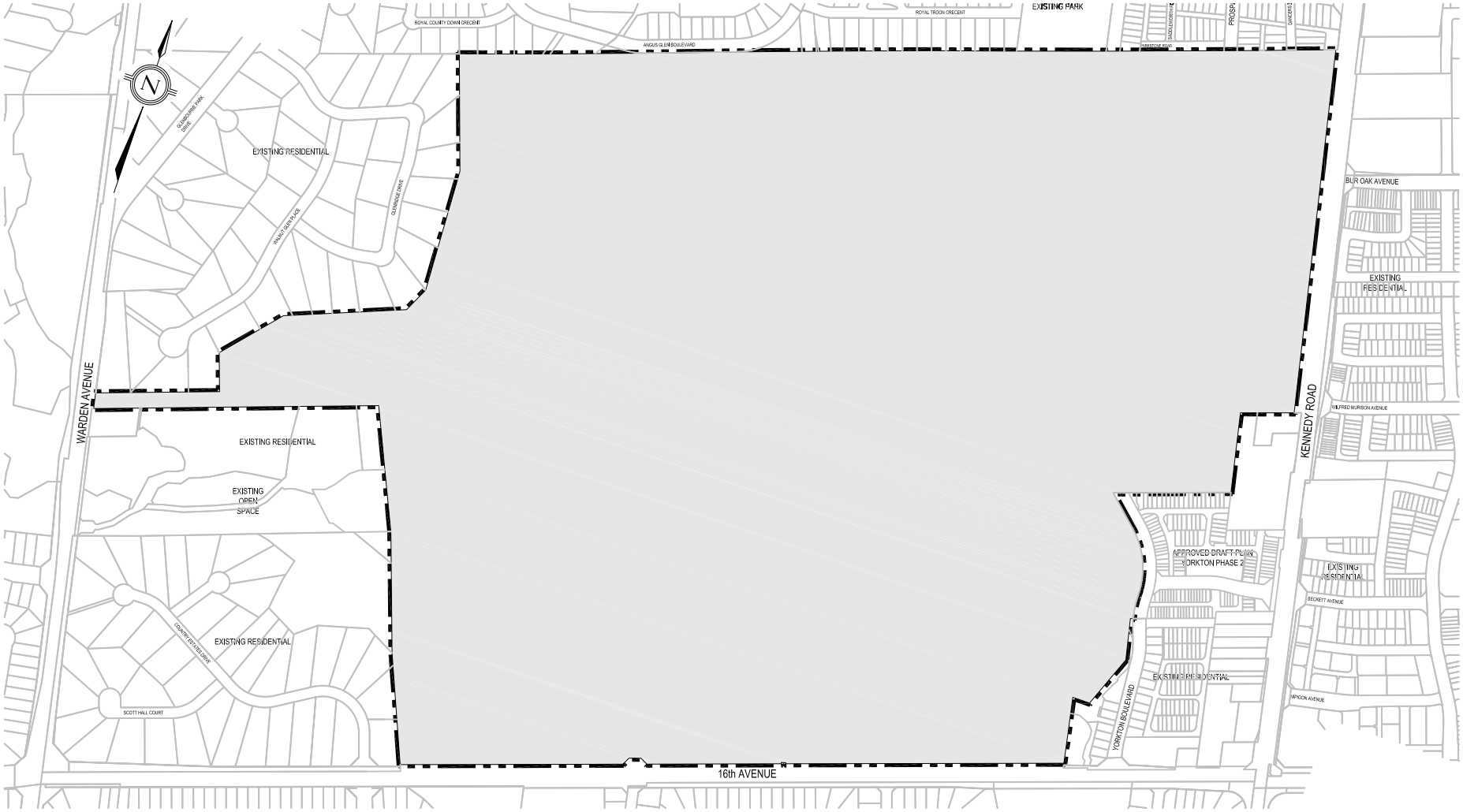
MESP
SERVICING AND GRADING REPORT
4134 16TH AVENUE
RESIDENTIAL DEVELOPMENT

FIGURE 1.1

LOCATION PLAN
FOR SUBJECT PROPERTY

August 2016

File: V:\01606\Active\160622264\Drawing\sheet_files [MESP]\Figure 1.1 – Location Plan.dwg – Revised by <Luk, James> , Tue, Aug 16, 2016 , 6:15 PM



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SIXTEENTH LAND HOLDINGS INC. (SUBJECT PROPERTY)

MESP
SERVICING AND GRADING REPORT
4134 16TH AVENUE
RESIDENTIAL DEVELOPMENT

FIGURE 1.2

LANDOWNERSHIP PLAN

August 2016

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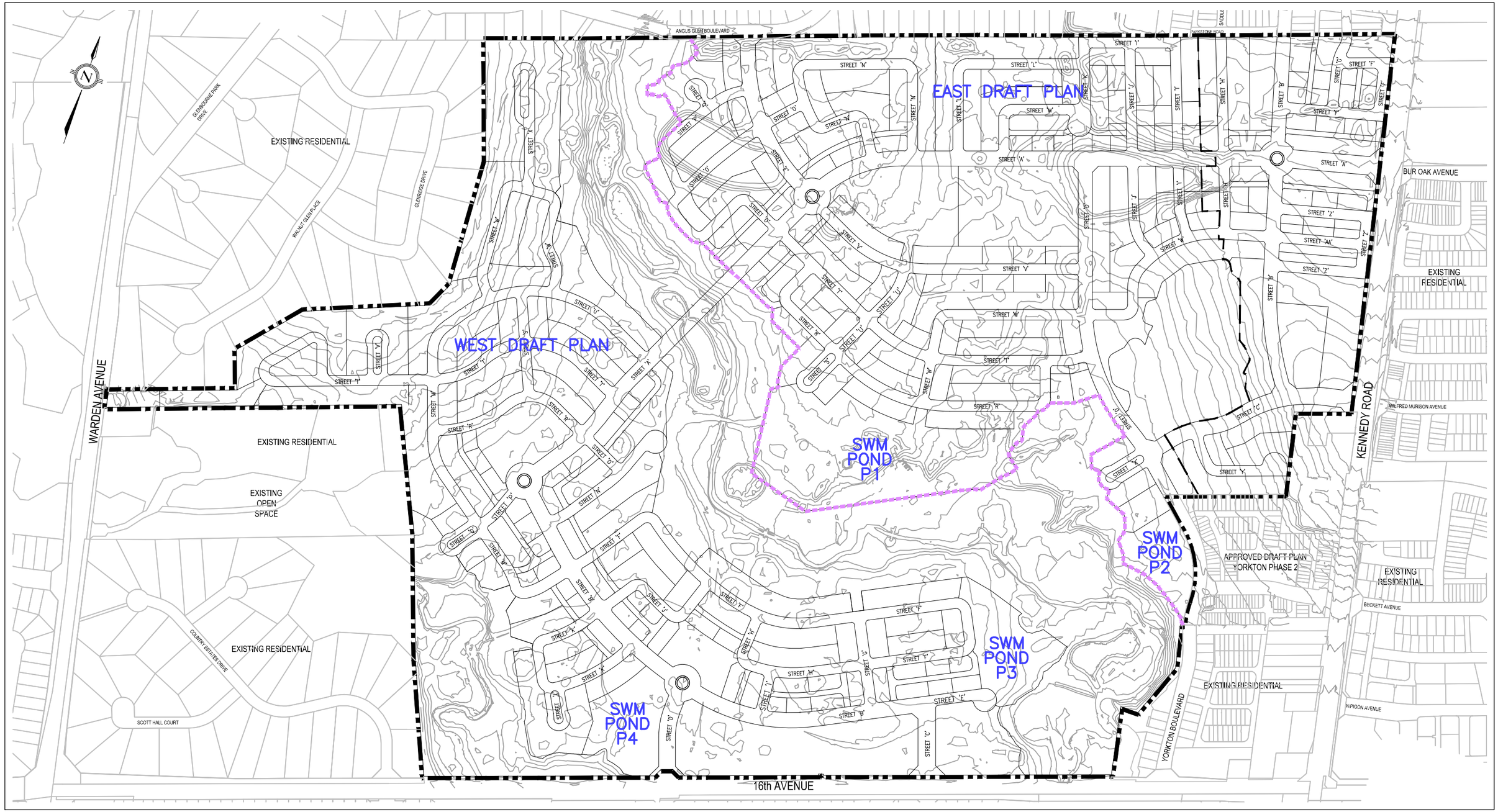

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BEACON ENVIRONMENTAL

BURNSIDE

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SUBJECT PROPERTY

DIVIDE BETWEEN WEST AND EAST DRAFT PLANS

MESP
SERVICING AND GRADING REPORT
4134 16TH AVENUE
RESIDENTIAL DEVELOPMENT

FIGURE 1.3

DEVELOPMENT PLAN
FOR SUBJECT PROPERTY

August 2016

File: V:\01606\Active\160622264\Drawing\sheet_files [MESP]\Figure 1.3 – Development Plan.dwg – Revised by <Luk, James> , Wed, Aug 24, 2016 , 6:15 PM

Appendix 1 TERMS OF REFERENCE

Terms of Reference for a Master Environmental Servicing Plan (MESP) For York Downs

July 2016

Preamble

The following provides an overview of the City of Markham's Submission Requirements for Master Environmental Servicing Plans (MESP's). The MESP is to be prepared in support of Secondary Plans for specific development areas, and is to be completed in conformance with the requirements outlined in the City's Official Plan. These submission requirements are intended to be generic and summarize the information requirements for an MESP completed anywhere within the City of Markham. Nevertheless, it is recognized that the submission requirements may be tailored to be specific to the available information and/or guidance from higher level studies (such as the Subwatershed Study for the City's Future Urban Area).

In circumstances where a Subwatershed Study (for instance) precedes a Secondary Plan and MESP process, some of the data/analyses listed herein may not require new work or it may be appropriate to build upon the technical analyses and assessments conducted in the primary or parent studies, subject to scope concurrence with the City and its partners. References in the table below to the need to refine SWS recommendations are intended to apply to circumstances where refinement may be needed if there are substantive differences in land use assumptions between the MESP and the SWS and/or legislative requirements, policies or engineering standards that have arisen since the completion of the SWS (e.g. Species At Risk [SAR], Climate Change, etc.).

These Terms of Reference summarize only the information and content which is required for an MESP. Further details of the scope of work required for MESP's (i.e. analytical tools and methodology, monitoring, field investigations, mapping and reporting formats and requirements, etc.) are to be defined in the Terms of Reference for each specific MESP. Development proponents are required to consult with the City of Markham and the City's Study Partners (e.g., Toronto and Region Conservation Authority (TRCA), Ministry of Natural Resources and Forestry (MNRF), Regional Municipality of York (Region), adjacent municipalities, as appropriate) to establish and prepare the Terms of Reference for each MESP, prior to initiation.

Task	Required Components
1.	**Executive Summary** The Executive Summary shall include the following: • Integrated summary of the work completed and conclusions of the individual sections • Identification of inter-relationship between the various sections • Concise summary of the significance and implications of the findings of the MESP • Summary of conclusions and recommendations
2.	**Introduction** The MESP shall include the following, subject to consultation with City and Study Partners: • Purpose of the MESP including its relationship to higher level documents and/or other relevant Studies, and its relationship to neighbouring lands in terms of servicing, transportation etc.; Terms of Reference for the MESP should also include a section clearly outlining the study requirements • Study area location, attributes, descriptions, figures and boundaries, including rationale for determination of study extent • Setting (existing land use, natural features, etc.) • Study objectives; the MESP is to: o be completed in support of proposed land development within the corresponding Secondary Planning Area o be completed to advance detail and be consistent with the recommendations from higher level and/or relevant studies, as applicable o describe and evaluate opportunities and constraints and conceptual mitigation related to the hierarchy of protection, enhancement, or if required, compensation, for the natural heritage and hydrologic features potentially impacted within the study area; to evaluate these features and their functions in terms of opportunities and constraints for the management of Greenway System in the context of the development, specifically to determine the potential implications to the natural heritage and hydrologic features and valley lands in compliance with the approved policies in the OP (existing 1987 and the partially approved 2014) o outline site design or management techniques that may be required to mitigate, enhance or compensate for the potential adverse effects to the natural heritage and hydrologic features and functions o provide sufficient level of site investigation, servicing investigation and conceptual design, in recognition of potential access restrictions to some locations, to ensure that significant natural heritage and hydrologic features and their functions are protected and managed in the governing studies, where applicable, as part of the completion of the MESP o identify opportunities to reduce servicing and transportation crossings of the Greenway System [Note: more detailed investigations will be required in support of individual

	development applications; however, those study requirements will be appropriately scoped as a result of this investigation.] • Scope Outline • Study team that include an inter-disciplinary team with expertise including but not limited to environmental, hydrogeological/geotechnical, engineering, planning, landscape architects and public consultation and transportation. • Maps depicting land ownership and participation in the study • Report structure outline • Summary of pre-consultation activities with City, TRCA, MNRF, Region , and others as required • Background review of existing relevant studies (e.g. transportation studies, approved watershed, subwatershed, drainage studies, fisheries management plans, best management practices guides, natural heritage systems planning guides, flood and stormwater management studies, etc.)
3.	**Planning and Environmental Policy Context** • Identify and define applicable Federal, Provincial, Regional, TRCA and Municipal planning and environmental policies including existing 1987 City of Markham Official Plan and the applicable sections of the partially approved City of Markham 2014 Official Plan which supersede it . This includes policy review of the applicable Official Plan policies • Reference existing relevant studies (e.g. approved watershed, subwatershed, drainage studies, fisheries management plans, best management practices guides, natural heritage systems planning guides, flood and stormwater management studies, urban design studies, transportation studies, trail studies, etc.) which represent the parent studies and governing documents for the MESP. Identify, list and summarize applicable sections of each document as they relate to the MESP • Define requirements for compliance with any relevant Subwatershed and other applicable studies • Identify Greenway System including natural heritage and hydrologic features identified for protection in the applicable Official Plan policies.
4.	**Characterization of <u>Existing</u> Conditions: Constraints and Opportunities** The MESP will include assessment/identification (as applicable) of constraints and opportunities to the Greenway System related to: • **Monitoring** o Pre-development monitoring of adequate duration established consultatively with City and TRCA staff • **Physical Setting** o Physiography - – characterization of physiographic setting and landform; o Topography – topographic survey of the study area and boundary, including all on-site structures, watercourses, drainage routes, culverts and general location of treed

areas, etc.; and

- Geology – surficial geology description and mapping, bedrock geology and stratigraphic interpretation of the subsurface sediments

- **Surface Water Resources**
  - Surface water hydrology and hydraulics including:
    - Existing land use drainage conditions (boundaries and patterns)
    - Existing land use hydrologic modeling
  - The Regional Storm assessment for existing and post development will be conducted using the watershed model prepared by TRCA. The consultant will conduct the modeling using the current VO2 model, but with the understanding that further assessment of the Regional impacts using the updated PCSWMM model will be required to confirm or adjust previous findings. Updates will be submitted to the City and the TRCA as amendments to the MESP
  - Water budget for existing conditions, based upon water balance for surface water with input from the groundwater component
  - In consultation with the city and TRCA, identify headwater drainage features and establish management scenarios as per the TRCA Evaluation Classification and Management of Headwater Drainage Features Guidelines (2014)
  - Update existing TRCA's floodline mapping based on current site topographic survey.
  - Surface water quality including:
    - Documentation of water quality monitoring findings for area watercourses
    - Outline of recommendations from Stormwater Management Retrofit Study/Plan including specifically any retrofit and restoration opportunities

- **Water Budget/ Water Balance**
  - Establish water budget for existing conditions, based upon water balance for groundwater with input from the surface water component. This would include (but not limited to):
    - calculation of annual infiltration with input from field tests related to soil's hydraulic conductivity and infiltration rates
    - establish targets for overall water balance including local groundwater recharge as necessary based on the extent of guidance provided by this MESP and any other relevant higher level studies (to ensure the sustainability of wetlands, woodlands, etc. and to manage runoff)
  - Feature based water balance - identify natural features within the study area and based on monitoring results provide information how each feature is sustained within their catchment areas (groundwater/surface water), hydroperiod, and expected timing to return to "normal" conditions
  - Prepare stage/storage/discharge information for storage based features using survey and monitoring data

- Prepare and calibrate hydrologic/hydrogeologic modeling or calculations using monitoring data

- **Groundwater Resources**

A hydrogeological assessment to assess the existing soil and groundwater conditions at York Downs will characterize the physiography, topography and drainage, surface water flow conditions and describe the surficial and bedrock geology, hydrostratigraphy, local aquifers, groundwater use and water quality, and the interpreted groundwater flow systems. Water balance calculations for pre-development, post-development and post-development with mitigation will also be provided.

An extensive groundwater and surface water monitoring network has been established on the property including 28 monitoring wells, 16 drive point piezometers and 6 staff gauges. Monthly monitoring began in March 2016 and is on-going. In addition to this data, historical groundwater and surface water monitoring data previously subject to PTTW monitoring requirements are also considered.

- Hydrogeological investigations including:
  - Existing groundwater level**s**, flow direction and gradients
  - Aquifer locations and vul**n**erability
  - Groundwater recharge and discharge zones
  - Baseflow contribution to wetlands and watercourses
- Major groundwater resources and groundwater users in the area from MOECC water well and water taking permits and other relevant information
- Refine/define targets for overall water balance as necessary based upon scale of assessment and extent of guidance provided by higher level studies

- **Source Water Protection Plan including:**
  - Wellhead Protection Area – Quantity
  - Wellhead Protection Areas – A, B, C, and D
  - Groundwater Vulnerability – 8 and 10
  - Significant Groundwater Recharge Areas
  - Ecologically Significant Groundwater Recharge Areas
  - Surface Water Intake Protection Zones
- **Fluvial Geomorphology**
  - Existing land use fluvial geomorphologic conditions including:
    - Reach delineation
    - Rapid assessments

	▪ Detailed geomorphic field assessment ▪ Meander belt width assessments for major tributaries throughout the study area, using MNRF and TRCA approved assessment protocols in support of erosion hazard delineation ▪ ▪ Meander belt width delineation in support of Redside Dace habitat limits, where present in consultation with MNRF o Erosion threshold assessment including consideration of downstream areas • **Aquatic Resources** o Aquatic community d**e**scription including: ▪ Physical conditions including channel form, in-stream cover, spawning habitat, refuge habitat, riparian cover, etc. ▪ Fisheries community composition and significant/sensitive species including aquatic species or communities that have designations under the Endangered Species Act or the Species At Risk Act o **Hydrologically sensitive features and key hydrologic features** ▪ Natural features' dependencies on surface water and/or groundwater based upon hydrogeological investigations. ▪ Identification and delineate (including staking) of all wetland features (provincially and locally significant wetlands and unevaluated wetlands) in consultation with the Ministry of Natural Resources and Forestry (as required), TRCA and the City. ▪ Identification and delineation of valleyland features and buffers • **Terrestrial Resources** o Vegetation community description and floral inventories including: ▪ Ecosystem context ▪ Community description using MNRF ELC standards ▪ Identification of Areas of Natural and Scientific Interest (ANSI) ▪ ▪ Identification of vegetative communities and significant/sensitive species including species or communities that have designations under the Endangered Species Act or the Species At Risk Act ▪ Identification and delineation (including staking) of woodlands. Any proposals for removal of woodlands will require completion of woodland assessment using the City's established Terms of Reference for Woodland Evaluation. This work can be completed separately (prior to impact assessment) or as part of this MESP. ▪ Habitat conditions and species. Acceptable methods should be clarified for birds, amphibians/reptiles and mammals and approved by City and TRCA staff.

	▪ Significant wildlife species and habitat conditions ▪ Conduct breeding bird and amphibian surveys, as requested by TRCA and/or MNRF as required ▪ Significant species including local, Regional, Provincial significant species, communities of conservation concern as per TRCA rankings, and species or communities that have designations under the Endangered Species Act or the Species At Risk Act ▪ Identification of wildlife linkage passages and connectivity opportunities o Confirmation of the Greenway System - Integrated characterization (Task 4) of how the existing Greenway System is interconnected, including natural heritage and hydrologic features and their functions. This would include: - Identify natural linkages and ecological corridor functions - Identification of vegetation protection zones (i.e. buffers) - Identification of complementary land uses and potential enhancement lands ▪ Establish opportunities and constraints mapping and define developable areas, undevelopable areas and any areas requiring further stud ▪ Clearly define the circumstances in which infrastructure is permitted within vegetation protection zones. LID, trails, etc
5.	**Proposed Development Plan and Municipal Servicing** Note: The timing of this section of the MESP coincides with the timing of the Community Design Plan and Sustainability Framework development. The MESP will include: • **Summary description of development, including proposed development areas, types of development, and maps** • **Study area ownership** • **Stormwater Management (SWM) servicing including:** o Functional stormwater and environmental management plan and associated hydrologic modelling (pre and post development) complete with boundaries as required o Updated hydrologic analysis and verification that stormwater management plan addresses criteria and requirements of Subwatershed Study and other parent documents as appropriate o Post development water budget to inform stormwater management plan for water quality, quantity, infiltration, groundwater and erosion control o Refine infiltration targets (for each landowner to meet) based on post development infiltration deficit (particularly in potentially significant recharge areas) based upon refined land uses and other technical information o Refine stormwater runoff control rates and/or design targets based upon refined

	land uses and other technical information o Hydraulic analysis – major infrastructure (floodplain, culverts, other crossings etc.) o If applicable, apply fluvial geomorphology recommendations for the design of open watercourses including: meander belt, erosion thresholds etc. o Outline best management practices/stormwater management recommendations/alternatives o Size and site general footpint of proposed stormwater management facilities and outfalls; where required, complete site visits with relevant agencies to review stormwater management facility/outfall locations o Delineate future land use catchment area boundaries o Delineate major and minor drainage systems o Preliminary grading plans/facility design elements, including preliminary storage-discharge relationships for stormwater management facilities o Screening and assessment of long list of low impact development (LID) techniques to be considered at detailed design stage including assessment of function and feasibility based upon proposed conditions. LID targets (infiltration, evapotranspiration, runoff) shall be established at the MESP stage based on the pre/post water balance assessment. The MESP should clearly state that LID measures will be implemented at the site specific stage consistent with the recommendations of the MESP, applicable City's OP policies and the City and TRCA LID guidelines and directions o Complete review of alternatives for Regulatory Event management and recommend preferred management strategy o Compare pre to post development stormwater conditions up to the Regional flows and water levels within downstream receiving watercourses including SPAs. o Integrate stormwater management plan requirements with future specific water budget analysis to identify appropriate mitigation measures to manage runoff volumes to specific features o Analysis and comparison of pre-development and post-development (controlled) flow conditions for modelled storm events relative to the erosion threshold (variation within +/- 5% will be allowed) o Consultation summary with MNRF to address implications on aquatic SAR (i.e. Redside Dace) • **Water supply servicing including:** o Existing infrastructure o Availability of external services o Expected population and demands o Future Population (Ultimate Scenario) within the catchment area in accordance with the current Official Plan (OP) o Identification of proposed/permitted connection points to existing water supply systems

	○ Pressure districts ○ Design criteria (average, daily, hourly, fire demand, pressure, and pipe roughness) ○ Proposed infrastructure and servicing plan ○ Water distribution modelling and pressures during maximum day, peak hour, minimum hour and maximum day plus fire conditions ○ Servicing constraints (Regional and Municipal scale), expansion, and upgrade requirements to support the proposed development Internal servicing constraints • **Wastewater/sanitary servicing including:** ○ Existing infrastructure ○ Identification of proposed/permitted connection points to existing wastewater servicing systems ○ Existing service areas and flows ○ Design criteria (generation rates and infiltration contribution) for growth ○ Proposed infrastructure and servicing plan ○ Expected population and wastewater generation ○ Future Population (Ultimate Scenario) within the catchment area in accordance with the current OP ○ Expected sanitary flow from the proposed and future developments within the area ○ Prepare and implement monitoring plan at key locations as required ○ Wastewater servicing model inclusive of existing and proposed service areas ○ Servicing constraints (Regional and Municipal scale), expansion, and upgrade requirements to support the proposed development • **Preliminary site grading including:** ○ Existing grading including existing topography and general grading/sloping direction(s) of site, location of high and low areas ○ Grading criteria including consideration of positive drainage of sewers and overland flow by gravity to receiving systems; ensure acceptable grading of site and roads ○ Proposed grading including proposed preliminary grading concept plan, location of future high and low areas, grading constraints in relation to existing and proposed servicing infrastructure and environmental/ecological features, potential requirements for cut/fill, consideration of existing and future grades of surrounding areas outside of TRCA buffers, interface with natural heritage and hydrological features ○ High level recommendations and principles to be applied for site management and phasing, related to minimizing erosion and sediment discharge to receiving watercourses during construction, consistent with City Engineering Standards

	○ Considerations of reduction in cut/fill and integration of the natural topography in post development landscaping and road design • **Conceptual natural channel design (if required) for relocated watercourses including:** ○ Base mapping ○ Design criteria (hydrology, hydraulics, channel dimensions, terrestrial and aquatic habitat) ○ Geomorphic field assessment ○ Design constraints ○ Corridor requirements (flood conveyance, erosion hazard limits, aquatic habitat, terrestrial habitat, existing City/Region trail systems) ○ Fish habitat impacts and mitigation, enhancement or if appropriate, compensation opportunities ○ Design concepts (plan view, profile, typical sections, etc.) ○ Barrier removal opportunities ○ Consultation summary with MNRF where Redside Dace (and/or other species at risk) habitats may be affected • **Road crossing, cycling and pedestrian bridge crossing, and trail system conceptual designs** Based on recommendations from relevant studies (where available), complete conceptual design of road crossings, cycling and pedestrian bridge crossing, and trail system including consideration of requirements related to hydraulics, fluvial geomorphology and wildlife passage
	Transportation The MESP at minimum will include: • Introduction ○ Study assumptions ○ Rationale and location of crossings as related to the Greenway System ○ Intersection operation methodology ○ Verification of crossing role and function ○ Transportation Association of Canada crossing vehicle capacity • Existing Conditions ○ Site and area description ○ Study area road network (including transit, bike and pedestrian) ○ Transit service ○ Existing traffic volumes ○ Existing traffic intersection operations • Future background traffic conditions ○ Planned network improvements ○ Traffic growth ○ Other area developments

	○ Background traffic volumes ○ Background traffic intersection operations • Proposed development ○ Development statistics ○ Vehicular trip generation ○ Non-auto trip generation ○ Trip distribution and assignment • Total traffic conditions ○ Total traffic volumes ○ Assessment, comparison and evaluation of alternative road networks ○ Mobility connectivity – internal and external ○ Total traffic intersection operations ○ Transportation demand management ○ Recommended transportation network ▪ Road classification ▪ Non-auto facilities (Including transit, bike and pedestrian) ▪ Future transit service ▪ Right of way ▪ Cross sections
7	**Phasing** The MESP will include: • Development and construction phasing and staging (Phase 1 has been identified as per **Figure 1**. Remaining phases will be identified at a later stage and will be included in the MESP as updates or amendments) • Mobility connectivity - internal and external • Requirements for interim stormwater and environmental management and servicing, and associated recommendations
8	**Potential Development Impacts and Proposed Mitigation/Enhancements** An impact assessment shall be conducted after the characterization of the Environment and once a Conceptual Plan has been developed. The impact assessment should include the application of the Mitigation Hierarchy. The Mitigation Hierarchy will be established in consultation with the City and TRCA staff and will prioritize the determination of avoidance, minimization and mitigation to alleviate environmental harm and the removal of natural heritage and hydrologic features. Requests for consideration of natural heritage compensation are always treated as a last resort outcome. The MESP will include: • Assessment of impacts on surface and groundwater resources ○ Development footprint and site grading ○ Assessment of the impacts of the development on the surface water and groundwater systems and any mitigation measures required prior to construction

	○ Define impacts of buried services and roads • List mitigation and enhancement techniques to achieve subwatershed study recommendations (as available) • Recommend list of acceptable LID techniques to maintain water budget, based upon long list of general mitigation techniques previously advanced (see Section 5); final LID and Best Management Practices (BMPs) to be established at the detailed design stage. Provide target information values for landowners. • Apply and advance the recommendations from the Subwatershed Study (as available) related to headwater drainage features completed as part of the subwatershed studies or related studies as available. The MESP shall recommend management scenarios for each feature based on established protocols and management scenarios in the subwatershed studies (as available) • Characterization of groundwater quality where potential exists for development to alter conditions (e.g., individual septic systems) • Assess impacts on aquatic and aquatic habitats and recommend suitable mitigation, enhancement, and compensation measures where applicable including consultation summary with MNRF to address implications on aquatic SAR (e.g. Redside Dace) • Assess impacts on vegetation and vegetative communities and recommend suitable mitigation measures, enhancements and compensation where applicable • Assess impacts on woodlands and recommend suitable mitigation measures, enhancements and compensation where applicable • Assess impacts on wildlife and wildlife habitat and recommend suitable mitigation, enhancement, and compensation measures where applicable • Update the PCSWMM model established by AMEC for the upstream Future Urban Area (FUA) with the post development hydrologic conditions for the site for the Regional Storm event. Modeling to be completed once PCSWMM is available. • Use the FUA PCSWMM model to complete a Regional Storm event impact assessment for the downstream receiving system including SPAs. Provide mitigation measures (if required) to address any increases in water levels in the SPAs that result from the proposed development of the York Downs lands. • Apply and advance the recommendations from the subwatershed study (as available) related to channel protection, buffers and/or setback delineation in accordance with criteria established in the applicable Official Plan and related Official Plan Amendments (OPAs) • Identify enhancement and compensation requirements based on recommendations from higher level studies • Effects on connectivity, and fragmentation and isolation of habitat • Complete a feature specific water budget analysis and identify mitigation, enhancement and potential compensation measures as applicable • Assess impacts to, and identify protection, enhancement and potential compensation approaches as applicable for the management of species at risk based on the federal Species At Risk Act (SARA) and/or the Provincial Endangered Species Act (ESA)

	• Description of how the recommended watercourse and stormwater management strategy and Greenway System address requirements of higher level studies • Integrated assessment of impacts to interconnection between the existing Greenway System with groundwater, surface water, wetlands, woodlands, and other natural heritage features • Summarize impacts on the natural environment and natural processes to protect, enhance or if appropriate, compensate, the natural environment and natural processes from the impacts of development
10	**General and Public Consultation** The MESP will: • Outline how all consultation requirements have been met for the Planning Act and the Municipal Class EA for the first two phases in the Planning and Design Process of the Class EA for all major road, water and wastewater projects at a minimum, where applicable • Include appropriate consultation within the context of the Planning Process
11	**Monitoring** Monitoring requirements must be included in the MESP in accordance with findings of the MESP and any relevant environmental studies or other higher level documentations where applicable. The following requirements must be satisfied in this MESP for all phases (see **Figure 1**) in this study**:** • Phase 1 – minimum two (2) years monitoring • Remaining Phases - minimum three (3) years monitoring • Terrestrial and aquatic system • Valleylands and Creek system • Surface and Groundwater systems • Water balance/ water budget for all feature based natural systems • During construction and post-construction monitoring activities • Other monitoring requirements (e.g. MNRF, Region)
12	**Future Study Requirements (Draft plan stage, detailed design stage, etc.)** • Native soil preservation
13	**Conclusions/Recommendations**