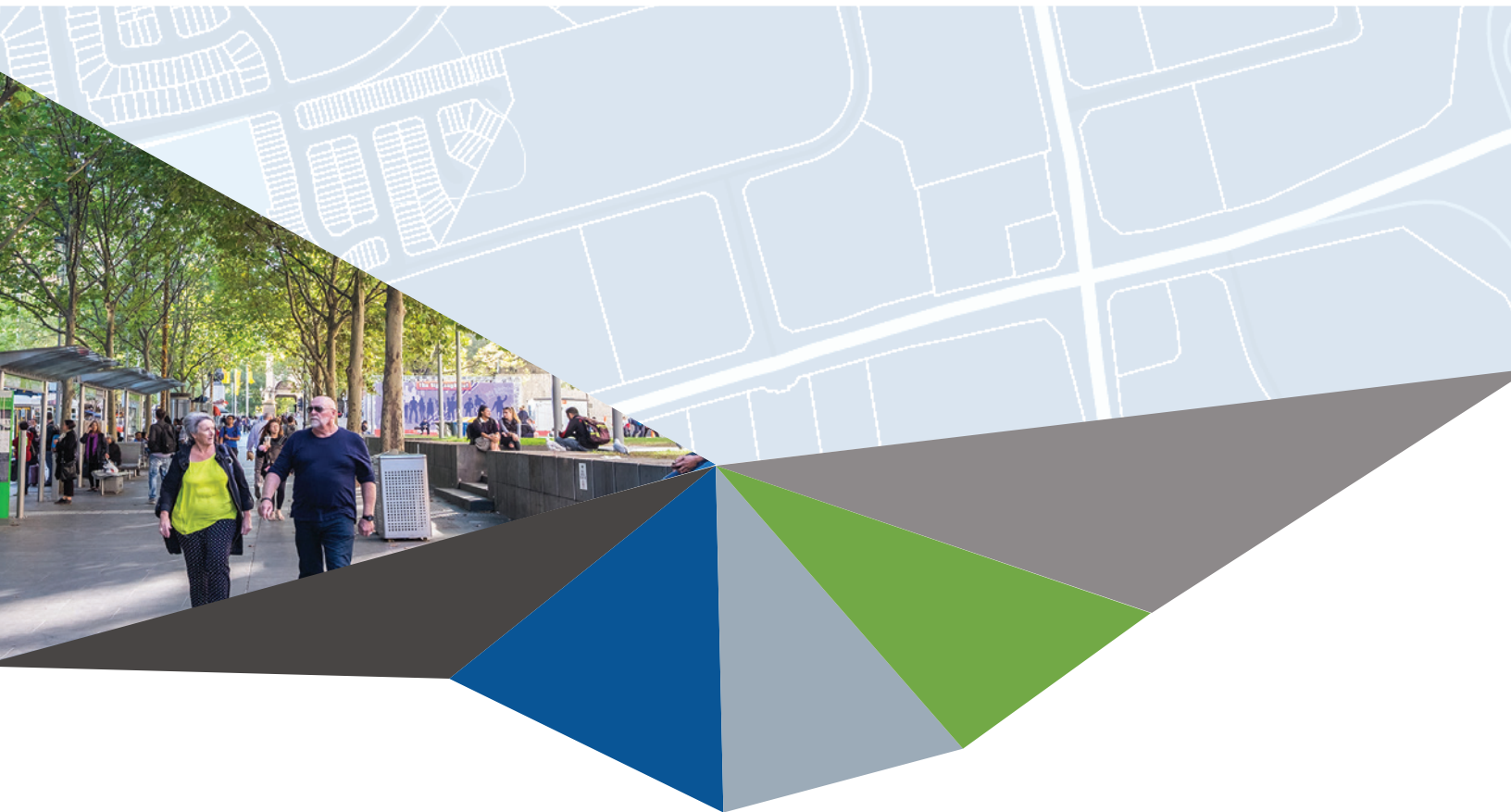


# PRELIMINARY WATER, WASTEWATER AND STORMWATER SERVICING ANALYSIS

APPENDIX 7

October 29, 2018



## TECHNICAL MEMORANDUM

|                |  |
|----------------|--|
| DATE           | August 30, 2018  |
| TO             | <b>Leigh McGrath, Urban Strategies Inc.</b>  |
| CC             |  |
| SUBJECT        | Weston Road and Highway 7 Secondary Plan<br><b>Preliminary Water, Wastewater and Stormwater Servicing Analysis</b> |
| FROM           | Kevin Brown, P.Eng.  |
| PROJECT NUMBER | 18154  |

### 1 Introduction

The Municipal Infrastructure Group Ltd. (TMIG) has been retained by Urban Strategies to conduct a servicing analysis to understand the existing water, wastewater and stormwater systems in the study area, in support of the Weston Road and Highway 7 Secondary Plan process.

Background information for the water distribution, wastewater collection and stormwater management systems were obtained from the City, through the Vaughan City-Wide Water/Wastewater and Stormwater Management Master Plans (dated June 2014).

### 2 Planning Context

The Weston Road and Highway 7 Area is defined as a “Primary Centre” in the City’s 2010 Official Plan. At that time, the Weston and 7 Area (then identified as “VCC West”) was projected to build out to approximately 6,400 residents (3,000 units) by 2031 (“Where and How to Grow”; Urban Strategies, 2009).

#### 2.1 Current Planning Considerations

At the current stage of the Secondary Plan Process, an updated range of target development densities is being considered, as presented in **Table 1**. These preliminary scenarios have been developed for gross densities (residential population plus jobs) ranging from 160 per hectare to 400 per hectare.

**TABLE 1: PRELIMINARY RANGE IN PLANNING DENSITIES**

|                               | Development Scenario (Persons + Jobs per hectare) |         |           |           |           |
|-------------------------------|---|---------|-----------|-----------|-----------|
|                               | 160   | 200     | 250       | 300       | 400       |
| Total Persons+Jobs/ha (Gross) | 16,600  | 20,700  | 25,900    | 31,100    | 41,400    |
| Existing and Established      | 1,900   | 1,900   | 1,900     | 1,900     | 1,900     |
| New Persons and Jobs          | 14,700  | 18,800  | 24,000    | 29,200    | 39,500    |
| Total Jobs                    | 1,930   | 2,480   | 3,160     | 3,840     | 5,200     |
| Total Population              | 12,740  | 16,340  | 20,830    | 25,330    | 34,320    |
| Total Residential Units       | 5,790   | 7,430   | 9,470     | 11,510    | 15,600    |
| New Space (m <sup>2</sup> )   | 679,600   | 871,400 | 1,111,200 | 1,351,000 | 1,830,700 |

Source: Hemson Consulting Ltd. (August 2018)

Water and wastewater servicing requirements are based on the ultimate serviced populations (residential and employment). As such, these are directly impacted by changes in density.

Stormwater management design requirements are generally driven by the percentage of impervious land area. With the range in development densities being considered at this stage of the Secondary Plan process, it is anticipated that the higher densities would be achieved almost entirely through increased building height, with minimal changes to the floor plate areas. As a result, the stormwater management requirements are not expected to vary for the different development scenarios.

### 3 Water Distribution

The Weston Road and Highway 7 Secondary Plan area is currently serviced primarily from Pressure District 6 (PD6). The lands west of Weston Road and south of Highway 7 are currently serviced from Pressure District 5 (PD5). The primary water infrastructure for the Study Area consists of the following:

- 300 mm watermain along Weston Road, Chrislea Road, Colossus Drive and Wings Road
- 400 mm watermain along Windflower Gate
- 350 mm watermain along Rowntree Dairy Road

A map of the water distribution system surrounding the Study Area is provided in **Figure 1**.

#### 3.1 Master Plan Recommendations

The 2014 Vaughan City-Wide Water and Wastewater Master Plan did not identify upgrades to the water distribution system associated with the intensification of the Weston Road and Highway 7 Secondary Plan Area. Much of the planned intensification can be accommodated within the existing distribution system as the City's watermains were generally constructed based on a design criterion of 450 Lpcd, which does not reflect the historical reductions in water demands over the past several decades. In the City's 2014 Master Plan, a water demand criterion of 300 Lpcd was adopted.

The Master Plan focussed on the City's water distribution system and assumed that the Regional Facilities (water supply sources, booster pumping facilities, storage facilities, and major transmission mains) would be upgraded by the Region as required.

The most recent update to the York Region Water and Wastewater Master Plan (July 2016) lists no projects associated with growth within Vaughan PD5 or PD6. The Region should be advised of the outcome of the Secondary Plan process (in terms of population and employment targets), such that they may assess whether there are any impacts to their current Water Master Planning.

#### 3.2 Range in Water Servicing Requirements

Based on the range in preliminary planning densities presented above (in **Section 2.1**), the overall water servicing requirements are as follows:

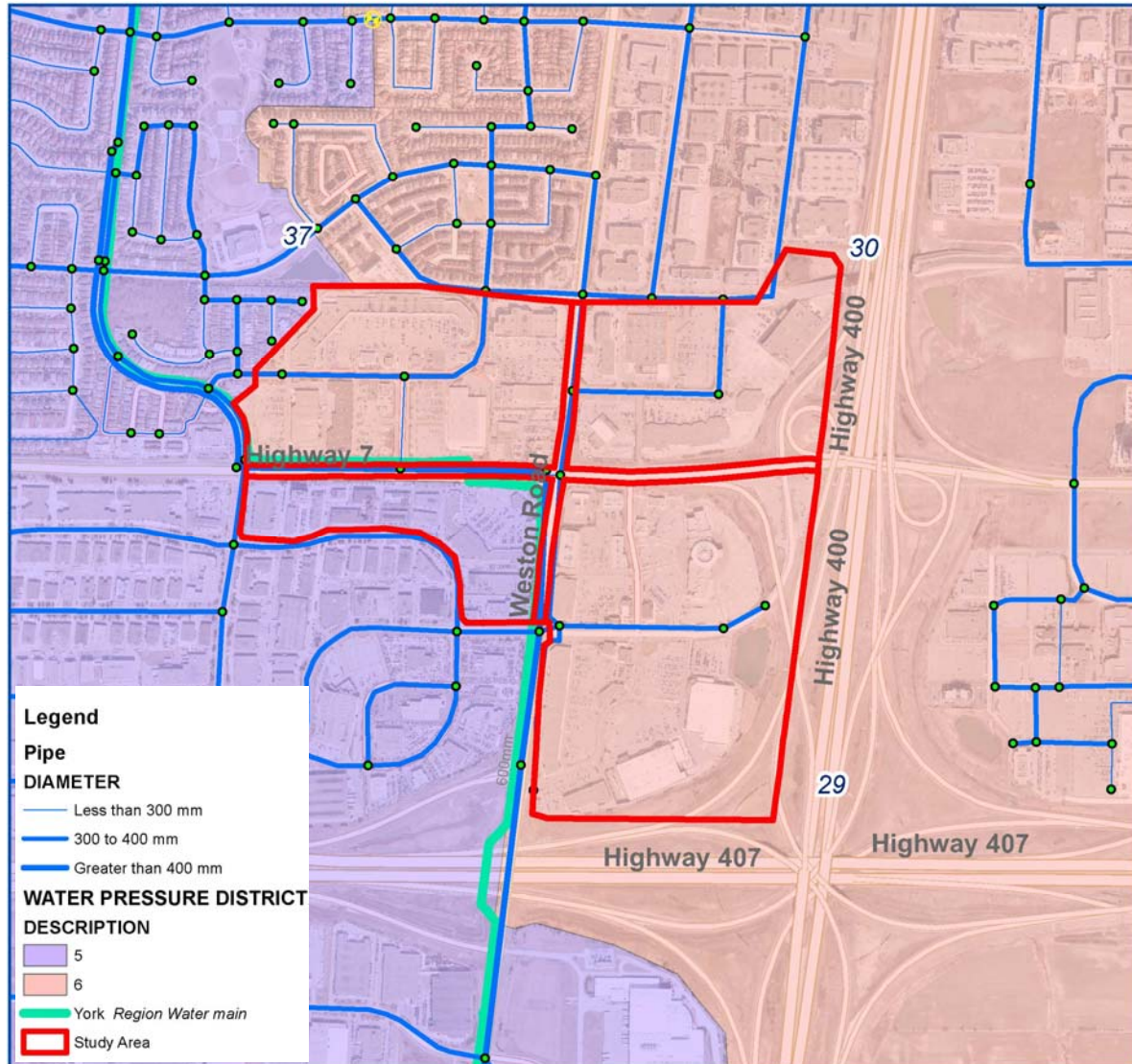
**TABLE 2: PRELIMINARY RANGE OF WATER SERVICING REQUIREMENTS**

|                          | Development Scenario (Persons + Jobs per hectare) |     |     |     |     |
|--------------------------|---|-----|-----|-----|-----|
|                          | 160   | 200 | 250 | 300 | 400 |
| Average Day Demand (L/s) | 58  | 72  | 90  | 108 | 144 |
| Maximum Day Demand (L/s) | 104   | 130 | 162 | 194 | 259 |
| Peak Hour Demand (L/s)   | 173   | 216 | 270 | 324 | 431 |
| Fire Flow (L/s)          | 300   | 300 | 300 | 300 | 300 |

As the Study Area is currently serviced via the City's water distribution system, it is assumed that the redeveloped area will be supplied from the same sources. While it is anticipated that new internal watermains will ultimately be required

to support the redevelopment (likely following an updated road network), the City should review the need for potential external watermain upgrades.

**FIGURE 1: EXISTING WATER DISTRIBUTION NETWORK**



### 3.3 Water Servicing Opportunities and Constraints

While a detailed review of the existing water distribution system was not requested as part of this Secondary Plan, an initial review of the local water distribution system indicates the following opportunities and constraints:

- The southwest quadrant is serviced from Pressure District 5. As these lands are at the PD5/PD6 boundary, we would anticipate that water pressures would be towards the lower end of the City’s level-of-service objectives.
- The other three quadrants receive water supply through three separate watermains which are extended into the Study Area from the 900 mm Regional Pressure District 6 feedermain along Rutherford Road. As these lands are immediately adjacent to PD5, the pressures within these quadrants should be towards the upper end of the City’s level-of-service objectives.

- Improvements to the watermain looping in the northwest and southeast quadrants should be considered, as the existing watermain configuration leaves these quadrants vulnerable to watermain breaks, or disruptions resulting from maintenance activities. A new public street network through these quadrants will provide opportunities to improve the looping.
- Further opportunities to improve the looping and to also boost pressures in the southwest quadrant could be achieved by converting the southwest quadrant from PD5 to PD6. This could be achieved through a combination of new local watermains, or by relocating some of the existing zone valves and check valves along the existing boundary.

The City is planning to initiate a Functional Servicing Study for the Weston Road and Highway 7 Area as part of their Master Plan update, which will likely be initiated towards the end of 2018. This future study will assess the overall watermain capacity in the area, and could also involve coordination with York Region to confirm servicing requirements through the Regional infrastructure (feeder mains, booster stations, and storage facilities).

## 4 Wastewater Collection

The Weston Road and Highway 7 Secondary Plan area lies within the Pine Valley Collector system. The Pine Valley system lies between the Islington Collector System (to the west) and the Jane Street Collector (to the east). The Pine Valley Collector discharges to York Region's Humber Pumping Station. The primary wastewater infrastructure for the Study Area consists of the following:

- 525 mm sewer along Weston Road discharging to Rowntree Dairy Road
- 525 mm sewer along Rowntree Dairy Road which ultimately discharges to Pine Valley Collector
- 375 mm sewer along Ansley Grove Road discharging into Embassy Drive sewer which ultimately discharges to Pine Valley Collector

A map of the water distribution system surrounding the Study Area is provided in **Figure 2**.

### 4.1 Master Plan Recommendations

The 2014 Vaughan City-Wide Water and Wastewater Master Plan did not identify upgrades to the wastewater collection system associated with the intensification of the Weston Road and Highway 7 Secondary Plan Area. Much of the planned intensification can be accommodated within the existing collection system as the City's sewers were generally constructed based on design criteria of 450 Lpcd, which does not reflect the historical reductions in water demands (and – by extension – wastewater generation) over the past several decades. In the City's 2014 Master Plan, residential wastewater design criteria of 364 Lpcd was adopted.

The Master Plan focussed on the City's wastewater collection system and assumed that the Regional Facilities (sewage pumping stations, trunk sewers and wastewater treatment facilities) would be upgraded by the Region as required.

The most recent update to the York Region Water and Wastewater Master Plan (July 2016) lists a few projects that are intended to service growth within the Region:

- WW11: Leslie Street Sewage Pumping Station – Third Forcemain and Pump Replacement
- WW9: Primary Trunk Sewer (through Durham Region)
- WW7: Duffin Creek Water Pollution Control Plant – Stage 1 and 2 Chlorine Chamber Expansion
- WW2: Duffin Creek Water Pollution Control Plant – Outfall

It is not clear what specific impact the intensification of the Weston Road and Highway 7 Secondary Plan Area had on those recommendations, but the Region should be advised of the outcome of the Secondary Plan process (in terms of population and employment targets), such that they may assess whether there are any impacts to their current Wastewater Master Planning.

## 4.2 Range in Wastewater Servicing Requirements

Based on the range in preliminary planning densities presented above (in **Section 2.1**), the overall wastewater servicing requirements are as follows:

**TABLE 3: PRELIMINARY RANGE OF WASTEWATER SERVICING REQUIREMENTS**

|                               | Development Scenario (Persons + Jobs per hectare) |     |     |     |     |
|-------------------------------|---|-----|-----|-----|-----|
|                               | 160   | 200 | 250 | 300 | 400 |
| Average Day Design Flow (L/s) | 70  | 88  | 109 | 131 | 175 |
| Peak Design Flow (L/s)        | 171   | 209 | 254 | 298 | 381 |
| Infiltration Flow (L/s)       | 29  | 29  | 29  | 29  | 29  |
| Total Design Flow (L/s)       | 199   | 237 | 283 | 326 | 410 |

As the Study Area is currently serviced via the City's wastewater collection system, it is assumed that the redeveloped area will continue to be serviced to the Pine Valley Collector. While it is anticipated that new internal sewers will ultimately be required to support the redevelopment (likely following an updated road network), the City should review the need for potential downstream sewer upgrades.

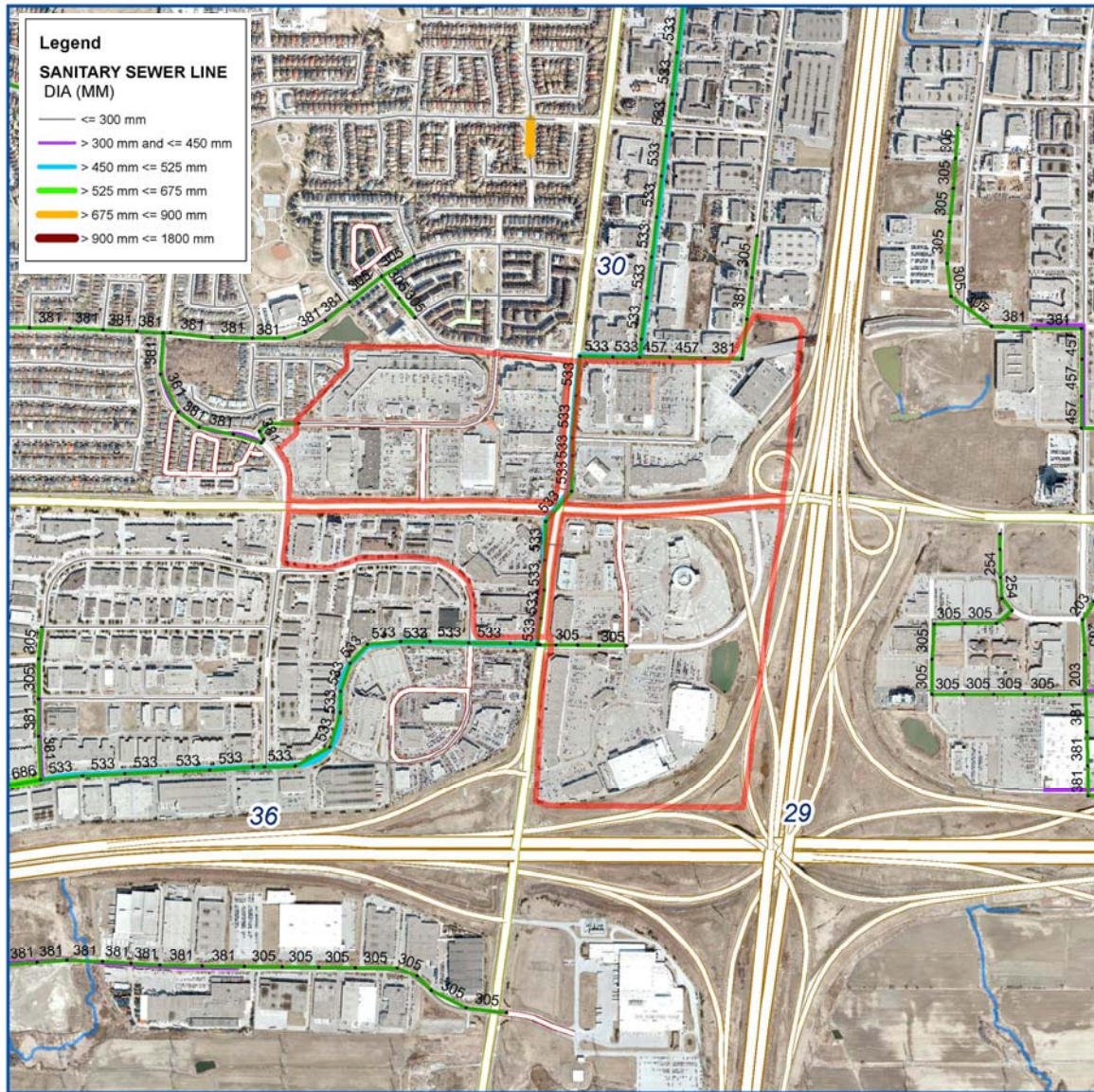
## 4.3 Wastewater Servicing Opportunities and Constraints

While a detailed review of the existing sewer capacities was not requested as part of this Secondary Plan, an initial review of the local collection system indicates the following opportunities and constraints:

- A design flow of 387 L/s would typically require a 600 mm sewer, assuming it could be built at a grade of 0.5%.
- The northwest quadrant is serviced to the west, via a 375 mm sewer along Windflower Gate and Ansley Grove Road. A typical 375 mm sewer (assumed installed at a grade of 0.5%) would have a full-pipe capacity of approximately 125 L/s.
- The other three quadrants are serviced to the south, via a 525 mm sewer along Weston Road. A typical 525 mm sewer (assumed installed at a grade of 0.5%) would have a full-pipe capacity of approximately 300 L/s.

The City is planning to initiate a Functional Servicing Study for the Weston Road and Highway 7 Area as part of their Master Plan update, which will likely be initiated towards the end of 2018. This future study will assess the overall sanitary sewer capacities in the area, also accounting for the servicing requirements of lands upstream of the Study Area. That future study could also involve coordination with York Region to confirm servicing requirements through the Regional infrastructure (trunk sewers and pumping stations).

FIGURE 2: EXISTING SANITARY SEWER NETWORK



## 5 Stormwater Management

The existing study area is a mix of commercial and industrial development, with impervious coverage estimated at 90% or higher. There are three primary drainage areas for the Study Area:

- The quadrants west of Weston Road drain to an existing stormwater management pond located south of Highway 407;
- The southeast quadrant drains to the existing stormwater management pond located south of the existing movie theatre; and,
- The northeast quadrant drains to a ditch running along the west side of Highway 400.

It is expected that most of the development in the study area incorporate on-site peak flow controls in accordance with City standards for commercial/industrial development (i.e. 180 L/s/ha maximum release rate), some of the sites may have installed oil-grit separators to address water quality, and no sites within the study area incorporate runoff volume

control measures. The controlled discharge rate from the individual properties in the Study Area need to be confirmed prior to redevelopment.

## 5.1 Master Plan Recommendations

The 2014 Vaughan City-Wide Stormwater Management Master Plan included recommendations for future development of the Weston Road and Highway 7 'Future Secondary Plan Area'. The Master Plan recommended that redevelopment sites draining to existing end-of-pipe stormwater management facilities control peak flow rates to existing levels and/or in accordance with the existing pond design criteria. For redevelopment of properties not draining to existing SWM facilities (i.e. north of Highway 7 and east of Weston Road), the Master Plan recommended on-site controls to meet peak flow control targets.

## 5.2 Stormwater Servicing Requirements

All new developments within the Weston Road and Highway 7 Secondary Plan study area will be required to adhere to most up-to-date City of Vaughan, Toronto and Region Conservation Authority (TRCA), and Ministry of the Environment, Conservation and Parks (MECP; formerly the Ministry of the Environment and Climate Change) standards.

These more stringent standards will be applied to redevelopment, which will significantly reduce runoff volumes, further reduce peak flow rates and reduce pollutant loadings at the source. However, it is noted that the planned on-site controls will not achieve the Humber River unit rate targets for peak flow control, which are applied to new, greenfield development.

With reduced runoff volumes and peak flow rates from the study area, the existing stormwater management facility in the south-east quadrant of the study area could be modified (within its current footprint) to optimize its performance for extended detention and peak flow control, benefitting flooding and erosion downstream in Black Creek.

## 5.3 Stormwater Management Opportunities and Constraints

The 2014 Stormwater Management Master Plan suggested that if redevelopment of the northeast quadrant of Highway 7 and Weston Road were to occur in an integrated fashion, with all properties redeveloping over a relatively short period of time, it may be economical to construct a new end-of-pipe stormwater management facility instead of individual on-site controls to address water quality and quantity control.

As it appears feasible to achieve the applicable stormwater management criteria through on-site controls, a new, centralized stormwater management facility is not recommended for the northeast quadrant as part of the Secondary Plan, but could be considered by landowners in the future if there is a co-ordinated approach to stormwater management. Another option could be to expand the existing pond in the southeast quadrant.

## 6 Next Steps

Once the development alternatives are further defined, a more detailed analysis of the servicing requirements of the alternatives will be prepared. The subsequent analysis will review details such as sub-block definition and determining the appropriate servicing locations for the Study Area. This subsequent review will consider the impacts of dividing the existing parcels into smaller development blocks, and further define the strengths, weaknesses, opportunities and threats (SWOT) associated with the redevelopment of the Study Area.

A Functional Servicing Report will not be prepared as part of this Secondary Plan Process, as this will be undertaken at a later date in conjunction with an update of the City's Infrastructure Master Plans. Rather, the servicing component of this Secondary Plan Process will establish the needs and general policies that should be considered when the City proceeds to the update of the Master Plans.