

AREA SERVICING PLAN (SUBMISSION) May 2011

407 West Employment Area, North Oakville West

PREPARED FOR:

Bentall Kennedy

PREPARED BY:



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1.0 Introduction

This Area Servicing Plan (ASP) has been prepared for Bentall Kennedy (Canada) LP on behalf of bcIMC Realty Corp., who have significant ownership in the 407 West Employment Area in North Oakville West. The 407 West Employment Area is the area bounded by Dundas Street on the south, Tremaine Road on the west, Highway 407 ETR on the north and Bronte Road on the east. This is an area identified for future urban development by the Regional Municipality of Halton (Region) and the Town of Oakville (Town) in Official Plan Amendment OPA 198. The majority of the Secondary Plan for North Oakville West (OPA 289) was approved by the OMB on December 4, 2009; there is an area of the lands which are still under appeal and generally consist of the lands between Bronte Road and the natural heritage area to the west of Bronte Road. The approved Secondary Plan requires the completion of the Master Servicing Plan to confirm infrastructure requirements.

This report has been prepared as a component of the North Oakville West Secondary Plan (NOWSP). This report is the work of MMM Group Limited (MMM), however, in certain instances as referenced in the report, utilizes research and input from other available sources. This report is intended to satisfy the Secondary Plan requirement for the preparation of a Master Servicing Plan. Subsequent to the approval of the North Oakville West Secondary Plan the Region has asked that the name Master Servicing Plan be replaced with Area Servicing Plan to avoid confusion with the Regional Water and Wastewater Master Plan. The Report has therefore been prepared to address the requirements of the Secondary Plan (Master Servicing Plan) and the Area Servicing Plan (ASP).

This report addresses the servicing issues by providing conceptual frameworks for the extension and development of water and wastewater systems. To facilitate orderly development of its infrastructure, the Region of Halton recently prepared an update to its Halton Water and Wastewater Master Plan. The Region's report entitled "Water and Wastewater Master Plan Review" – October 2002, has served as a starting point for the review of the Secondary Plan servicing requirements. In 2007 the Region undertook an update to the Master Plan from which elements have been presented and incorporated.

The purpose of this ASP is to apply the Region's proposed servicing concept to the specific Secondary Plan land use proposal and to suggest refinements that are required to each to facilitate orderly development. As noted above, this report satisfies the requirements in the approved Secondary Plan. It satisfies the requirements of the ASP Terms of Reference prepared by the Region of Halton.

The specific purposes of this report are to provide:

- Detailed information on proposed land uses.
- Detailed information on system demands (water) and flows (wastewater).
- A specific plan for implementing the Region's Master Plan in and around the 407 West Employment Area.
- A discussion of the impact that the proposed development of the 407 West Employment will have on planned Regional Infrastructure in terms of proposed capacity and timing.

1.1 **Proposed Development**

The 407 West Employment Area along with the Sixteen Hollow Area form the North Oakville West Secondary Plan. This study evaluates only the 407 West Employment Area. The study area contains, for

the most part, proposed employment lands as well as a significant Natural Heritage System. The Land Use Concept Plan is shown as Exhibit 1.1 was prepared by MMM based on more detailed study but is generally consistent with the NOWSP Master Plan. The total site area of the development lands and natural areas is approximately 252 hectares (624 ac). The total developable area is approximately 160 hectares (394 ac) or approximately 60% of the total site area.

To evaluate both vertical infrastructure (pumping stations, reservoirs, treatment plants) and linear infrastructure the anticipated equivalent population values were considered. It is anticipated that the majority of the development in the study area will consist of employment uses, including General/Light Employment and Office Development and related Service/Commercial uses. The equivalent population for the proposed land use is 125 cap/ha.



1.2 Timing and Phasing

It is anticipated that the 407 West Employment Area will begin development in 2013 with occupancy in 2015. The development will likely be phased with the first phase adjacent to Dundas Street with future phases extending northward due to proximity to Regional Infrastructure.

1.3 Consultation with the Region of Halton

At the outset of this study, the Region of Halton was consulted with respect to its proposed infrastructure plans as generally set out in its report "Water and Wastewater Master Plan Review" and the June 2008 update.

1.4 Interim Servicing

This Report has been prepared to provide the Region of Halton with a plan for the overall servicing of the 407 West Employment Area in a comprehensive fashion. The Region's Master Plan and investigations by the Study Team identify that there may be opportunities to service early stages of the Employment Area through interim measures, particularly along Dundas Street West.

The Region has indicated in their Capital Delivery Report (February 2010) that the infrastructure required to service the 407 West Employment Area would be part of Phase 2 of the 2008 Residential Allocation Program. As the timing of these projects is unknown, there may be the need for front-end funding for some regional projects or interim servicing to allow for development of the 407 West Employment Area in the short term.

If necessary, to accommodate seamless development between phases, additional interim servicing should be investigated.

1.5 Report Organization

This Report has been organized as follows:

1.0 Introduction

This chapter defines the purpose of the report and describes the subject lands and the proposed development.

2.0 Water

This chapter reviews the proposed water infrastructure required to service the subject lands. The review applies the Halton Master Plan Concept to the 407 West Employment Area Land Use Plan and recommends refinements to the servicing plan.

3.0 Wastewater

This chapter reviews the proposed wastewater infrastructure required for the subject lands. The review applies the Halton Master Plan Concept to the 407 West Employment Area Land Use Plan and recommends refinements to the servicing plan.

4.0 Timing This chapter discusses the timing requirements for regional water and wastewater projects to facilitate the development of the 407 West Employment Area.

2.0 Water

2.1 Region's Water & Wastewater Master Plan Update – June 2008

The Region's Water and Wastewater Master Plan in 2002 set out a strategy for the long term and orderly development of the Region's infrastructure. The Region's 'South Halton Water and Wastewater Master Plan Update" dated June 2008 updated the strategy for the water supply and distribution system. In the case of water, this report addressed supply, pressure districts, storage and distribution. This report also addresses timing. It provided conceptual information on the location of proposed infrastructure; however, this is subject to more detailed review when considering the servicing corridors available through the road network that is proposed as part of the Land Use Plan for the 407 West Employment Area.

This ASP report has been prepared to develop on and complement the Region's plans by providing more specific information on how it can be implemented in the context of the specific plans for the 407 West Employment Area. Therefore, to provide appropriate context, the Region's Plan as it relates to the 407 West Employment Area is summarized in this section.

2.1.1 Supply

Historically water supply for South Halton has come from three main sources, the Burlington Water Purification Plant, the Oakville Water Purification Plant, and wells within Milton (to service specific areas of Milton).

The 2002 Master Plan concluded that the long-term growth of Halton would require the construction in stages of a new water treatment plant that will have an ultimate capacity of 220 ML/d. The first stage of this new plant (Burloak) has been recently completed.

This new supply is critical to meet the Region's medium and long-term growth projections for both the 407 West Employment Area and the Region as a whole. For the purpose of the remainder of this report it is assumed that the first stage of this plant is on-line.

2.1.2 Pressure Districts

The subject lands are located within the Oakville pressure district identified as Zone 3 or O-3. Zone 3 in Oakville includes all lands with an elevation of 128 to 166m. The zone boundary is generally parallel to Sixteen Mile Creek on the east, along Highway 407 to the north, along Tremaine Road to the west, and generally in between Upper Middle Road and the Q.E.W. to the south as shown on Exhibit 2.1.

Supply for Zone 3 is currently via a booster pumping station at Eighth Line and Upper Middle Road and the Kitchen Reservoir and Pump Station at Regional Road 25 and Upper Middle Road. Storage is provided at the Moore Reservoir on Sixth Line north of Burnhamthorpe Road (north of Dundas Street).

In the future, the supply to Zone 3 will be augmented via a 1200mm watermain connection on Dundas Street from 400m east of Bronte Road to Neyagawa Boulevard. This supply will be connected to the existing Zone 3 water supply (Moore Reservoir on Sixth Line) via the existing 600mm watermain on

Dundas Street connecting to the existing Sixth Line main which links the Eighth Line Water Booster Pumping Station (WBPS) with the Moore Reservoir.

2.1.3 Storage

Storage for Oakville Zone 3 is currently provided at the R.J. Moore Reservoir on Sixth Line. Until 2002, Zone 3 also provided the storage for Zone 4, where it was pumped to Zone 4 on an as required basis. In 2002, an elevated storage tank was constructed in Zone 4 on Trafalgar Road north of Burnhamthorpe Road.

To address increased demands in Oakville and Milton, the Region will also be constructing a new 30ML Zone 4 reservoir in Milton to service the North Oakville East Lands and existing Zone 4 lands.

The existing storage available in Oakville Zone 3 is sufficient for long term build-out of the 407 West Employment Area as well as all other lands serviced by Zone 3.

2.1.4 Distribution

Development in Oakville is currently serviced via a series of trunk watermains that connect sources of supply, pumping, and storage to a local distribution network.

To support growth, the Region proposes a series of new trunk watermains that interconnect with and expand the existing system and connect to the new proposed sources of supply, pumping and storage as described above. The 407 West Employment Area will connect to the existing Zone 3 system at Dundas Street and Bronte Road, looped along Tremaine Road and internally through the 407 West Employment Area to ultimately connect to the future watermain (Regional Project #5854) in the adjacent Sixteen Hollow Area. Water service will be distributed to the local network from the Dundas Street and the internal regional watermains.

2.1.5 Region's Timing and Development Charge Projects

Exhibit 2.2 summarizes the Region's proposed timing and cost (from the Capital Delivery Report dated February 2010) for the completion of the water system construction required to service the 407 West Employment Area and other interdependent areas of Oakville and Milton.



PRINTED ON: FILE NAME: X: \DIV10\14-09222\MUN\ASP-FSS Exhibits\EX2.1-FIG8.3_Regional Water Plan.dwg_EX 2.1

Exhibit 2.2 – Region's Water Projects

Project	Development	Region's	Estimated In-
	Charge Cost	ID #'s	Service Date
Supply			
Additional Zone 3 Pump at Washburn Reservoir	Unknown	6113	Apr 2012
Additional 75ML/d Zone 3 Capacity at Kitchen Reservoir	\$5,615,000	3820	Oct 2010
Sub-Total	\$5,615,000 +		
Transmission			
600mm WM on Appleby Line - existing 600WM to	¢050.000	6112/5524	Apr 2012
Appleby Line Reservoir	\$959,000	0115/5554	Api 2012
900mm WM on Dundas Street - Appleby Line to	¢0 737 000	2812	Mar 2012
Tremaine Road	φ 9 ,737,000	3012	Wai 2012
1200mm WM on Dundas Street - Tremaine Road to	¢6 705 000	5851	Mar 2012
Bronte Road	φ0,795,000	5051	Wai 2012
Sub-Total	\$17,491,000		
Local			
600mm WM on Tremaine Road - Dundas Street to	¢1 644 000	5853	w/
approx. 950m North	φ1,044,000	5055	Development
600mm WM through North Oakville Lands - Tremaine	¢3 635 000	5627	w/
Road to Bronte Road	φ3,035,000	5027	Development
Sub-Total	\$5,279,000		
TOTAL	\$28,385,000		

Projects and costs shown in Exhibit 2.2 have been taken from the Region of Halton – 2008 Water and Wastewater Master Plan Update dated June 2008. Some of the works described will also provide service to other areas of Halton.

The infrastructure described above will be constructed on an as-required basis for each phase of development. For example, the 600mm watermain on Tremaine Road from Dundas Street to the proposed new East-West Road within the 407 West Employment Area will not be constructed until the proposed development plan proceeds. In many instances works such as the treatment plants, storage, and pumping stations will be constructed incrementally. In the case of linear infrastructure, it will be extended incrementally to provide local service connectivity and looping.

2.2 Expected Water Demand

In this section, water demands under various conditions have been assessed using the design criteria that the Region has utilized in the Development Charge (DC) Update Report. To develop the estimated demands, the system design criteria is first set out and then applied to the proposed development statistics from Exhibit 1.1.

The flow demand, storage volume requirements, and pumping station capacities are similar to those used by the Region in developing the Master Plan Update. Any difference in the demand estimated in the Master Plan or DC Update Report is due to an increase of undevelopable natural heritage areas throughout the 407 West Employment Area .

Exhibit 2.3 sets out the system unit demands. Exhibit 2.4 summarizes the Water System Design Criteria.

Exhibit 2.3 – System Unit Demands

	Residential L/cap/day	Commercial L/employee/day	Industrial L/employee/day	Institutional L/employee/day
Average Day Demand	330	213	302	74
Maximum Day Peaking	1.9	1.9	1.9	1.9
Factor				
Peak Hour Peaking Factor	3.00	3.00	3.00	3.00

Exhibit 2.4 – Water S	ystem Design	Criteria
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Component	Condition/Description	Criteria
Pumping Stations	With adequate zone storage available	Maximum day flow to zone and all subsequent zones
	Without adequate storage available	The greater of peak hour flow or maximum day plus fire to the zone and the maximum day flow to all subsequent higher zones
Storage	Balancing storage	25% of maximum day demand
	Fire storage	Largest expected fire zone (based on land use)
	Total	125% of Balancing + Fire (allows for 25% Emergency Storage)
Fire flow	Minimum flow (single family residential)	5,500 L/min for 2 hours @ minimum 140 kPa (20 psi)
	Minimum flow (industrial/commercial/institutional)	15,000 L/min for 3 hours @ minimum 140 Pa (20 psi)
System pressure	Normal operating conditions	280 kPa (40 psi) to 700 kPa (100 psi)

Exhibit 2.5 summarizes the projected demands under various conditions for the 407 West Employment Area at build-out by applying the above criteria to the development statistics described in Exhibit 1.1.

Exhibit 2.5 – Flow Dema	ands: Linear Infrastructur	e (407 West Employn	nent Area Land Use Plan
Population Projections			

	Residential (ML/d)	Commercial (ML/d)	Industrial (ML/d)	Institutional (ML/d)	Total (ML/d)
Average Day Demand	0.0	0.8	3.7	0.0	4.5
Maximum Day	0.0	1.5	7.0	0.0	8.5
Peak Hour	0.0	2.4	11.1	0.0	13.5

2.3 Region's Concept Plan Applied to the 407 West Employment Area

One of the important purposes of this report is to apply the Region's Master Plan Update water distribution concept to the approved North Oakville West Secondary Plan for the 407 West Employment Area . As stated at the outset of this Report, the Report's purpose is to adapt the Region's servicing concept to the approved Secondary Plan, not to modify it. As a result of this principle, and because the estimated demand based upon the approved Secondary Plan is similar to the demand assumed by the Region, no changes are recommended to the Region's proposed supply, pumping, or storage system network.

The development of a community plan has however created the opportunity, and in fact the need, for a 'plan specific' trunk water main distribution network to be developed to replace the generic one that the Region applied in the absence of a Secondary Plan.

The proposed ASP water distribution network is illustrated in Exhibit 2.6. To address environmental sensitivities and minimize impact, all mains are proposed to be located on existing or proposed road allowances.

The proposed ASP water distribution system is essentially the same as the distribution from the Region's Master Plan Update (MPU) with minor changes based on the outcome of land uses proposed by the approved Secondary Plan. The following key elements of the proposed distribution network that are the same as the Region's MPU water system include:

- The 1200mm PD3 supply main on Dundas Street from Bronte Road to Tremaine Road (Region Project # 5851); and
- The 600mm PD3 watermain on Tremaine Road from Dundas Street to the proposed East-West Collector through the 407 West Employment Area (Region Project #5853).

Changes to the network to respond to the proposed Land Use Plan and road pattern include the following minor changes to the Region's MPU.

• A slight relocation of the east-west 600mm watermain to better match the proposed road alignment (Region Project # 5627).

Finally, to maintain required fire flows and adequate pressure during all phases of development, the local north-south watermains should connect to the 1200mm diameter watermain on Dundas Street.

The proposed changes to the distribution system will have no change to the development charge projects.

2.4 Water Distribution Modelling Analysis

The Region of Halton provided a copy of the Region's Water Distribution Model dated August 12, 2008 to assist MMM in modelling the proposed Area Servicing Plan watermain system. The following recommendations are based on the update of the Region's model to include the proposed ASP watermain system shown in Exhibit 2.6.



2.4.1 Water Distribution Modelling Results for Peak Hour and Maximum Day

The proposed ASP system was incorporated into the Region of Halton's Water Distribution Model to determine if the proposed ASP water system would be adequate to service the 407 West Employment Area. Exhibit 2.7 summarizes the results of the distribution modelling. Copies of the Peak Hour and Maximum Day model results have been included in Appendix A.

	Peak Hour	Maximum Day
Minimum HGL	193.71 m	197.39 m
Node for Minimum HGL	NO-228,229,236,237,238, 239,240,&241	NO-236,237,238&239
Maximum HGL	193.80 m	197.43 m
Node for Maximum HGL	NO-246 ,252, WJ-1150-O, & WJ-3114-O	NO-245,246, 251, 252, WJ-150-O, WJ3114-O, & WJ-3116-O
Minimum System Pressure (psi)	49.39 psi	50.32 psi
Node for Minimum System Pressure	WJ-3046-O	NO-239
Maximum System Pressure (psi)	66.53 psi	71.69 psi
Node for Maximum System Pressure	NO-252	NO-252

Exhibit 27_	Results of Water	Distribution	Modelling for	r Pronosed /	SP Water System
	NESUIS UI Walei	DISTINUTION	would initial initial	r rioposeu /	AOF WALEI OYSLEIII

The results of the distribution modelling show that the proposed ASP water system will provide adequate flow and pressure to all locations in the ultimate development condition. It should be noted that the maximum headloss in the proposed system is only 0.02m during a maximum day demand and 0.06m during a peak hour demand. The low headloss in the overall system indicates that the watermains are adequately sized and that increasing the watermain sizes from the proposed 1200/600mm trunk watermains and the 300mm distribution watermains is not required.

2.4.2 Water Distribution Modelling Results for Maximum Day plus Fire

The proposed ASP system was also modelled to determine if the proposed water distribution system could meet the Region's fire requirements of 5,500 L/minute for residential development and 15,000 L/minute for commercial/institutional/industrial development.

The results of the maximum day plus fire modelling indicate that the fire flow of 15,000 L/minute at a residual pressure of 20 psi is available at all nodes within the 407 West Employment Area. Therefore, it can be concluded that the proposed ASP water system is adequately sized for the maximum day plus fire demands.

2.5 Additional Design Considerations

2.5.1 Local Service Watermains

The 407 West Employment Area Land Use Plan proposes developments that front onto external roads such as Dundas Street, Tremaine Road, and Bronte Road where Regional DC watermains are proposed. These proposed developments will require water services and in some cases may require local watermains to service these developments. The ASP primarily addresses the watermain sizes for the transmission and major distribution watermains. Local distribution have been preliminarily sized in the study but will need to be addressed in more detail through the Functional Servicing Reports supporting the various Draft Plans of Subdivision and will be in accordance with the Region's published standards for water connections.

2.5.2 Mitigation Measures for Single Feed Watermain Supplies

The ultimate water distribution is a well-designed network of interconnected watermains with multiple loops to ensure security and flexibility in servicing the full build out of the proposed Area Servicing Plan. While it is a priority to loop systems where possible and as soon as the opportunity is available, it will be necessary to service development areas with single feed watermains during various phases of development until the future watermain loops can be constructed. This includes the internal 600mm diameter watermain which will not be looped until the adjacent Sixteen Hollow Area is developed.

3.0 Wastewater

3.1 Region's Water & Wastewater Master Plan

In developing its Water and Wastewater Master Plan and subsequent update, the Region considered a wide variety of possible strategies to service the expected growth with respect to both treatment and conveyance. The conclusions of the Region's work with respect to treatment and conveyance (including conveyance options) as it affects the 407 West Employment Area are summarized in the following sections.

3.1.1 Treatment

Wastewater treatment for Oakville is provided at three Wastewater Treatment Plants (WWTP). These plants are Mid-Halton, Oakville South East, and Oakville South West. The recommended alternative in the Master Plan proposed that all wastewater treatment for growth in Oakville and Milton be at the Mid-Halton WWTP.

The first phase of Mid-Halton WWTP was constructed in 1991 with a rated capacity of 20,000 m³/d. It was subsequently re-rated to 25,000 m³/d. The Region completed an expansion of the plant to 50,000 m³/d in 2003 and has subsequently completed the next expansion to 75,000 m³/d in order to service anticipated growth within Milton and Oakville.

The Region has planned the Mid-Halton Wastewater plant and has sufficient land to allow it to be expanded in an orderly and predictable fashion. These expansions would be timed so that the capacity is available when required. Expansion of capacity will trigger the need for various other changes or improvements such as biosolids handling and a new outfall (not required until growth beyond the Halton Urban Structure Plan (HUSP)).

3.1.2 Collection System

Exhibit 3.1 is a representation of the portion of the Region's proposed wastewater collection and pumping system that are intended to service the 407 West Employment Area, the lands to their east and a portion of the expected growth in Milton.

The 407 West Employment Area generally slope from north to south and towards the centre of the lands approximately 180m to the east of Colonel William Parkway at Dundas Street. The Master Plan provides for a series of local sewers that will drain from north to south connecting to a new Trunk Sewer System on Dundas Street. The Region's Master Plan does not show the sewers within the 407 West Employment Area. One of the purposes of this report is to apply the Master Plan concept to the Land Use Plan road and development scheme and recommend a specific plan for the sewer system. At Dundas Street, a trunk system which directs the flows to the existing system at Colonel William Parkway is proposed. The existing system will intercept flow and divert it south towards the Mid-Halton Plant in a manner that minimizes impact to the existing residents of the Town of Oakville.



AREA SERVICING PLAN FOR 407 WEST EMPLOYMENT AREA

REGIONAL WASTEWATER PLAN

LEGEND:				
	STUDY LIMIT			
	WWTP DRAINAGE	BOUNDARY		
*	EXISTING WASTEW	ATER PUMPING STATION		
	EXISTING WASTEW	ATER TREATMENT PLANT		
	PROPOSED/UPGR	ADE WASTEWATER PUMPING STATION		
	PROPOSED WASTE	WATER TREATMENT PLANT EXPANSION		
	EXISTING WASTEW	ATER SEWER		
	EXISTING WASTEW	ATER FORCEMAIN		
	PROPOSED WASTE	WATER SEWER		
-	FLOW DIRECTION			
	PROPOSED WASTE	WATER FORCEMAIN		
	LAKES, RIVERS &	CREEKS		
	ANSI			
	ESA			
	PROVINCIALLY SIG	NIFICANT WETLANDS		
	REGIONAL WETLAN	IDS		
	NIAGARA ESCARPI	AENT		
	GREENBELT			
	GREENLANDS			
NINTH LINE CORRIDOR				
**EXACT LOCATION OF PROPOSED WORKS TO BE DETERMINED				
IN THE SUBSEQUENT EA OR DETAILED DESIGN PHASE				
SOURCE: H	(MK CONSU	LTANTS LIMITED		
M	IASTER PLA	N UPDATE		
JL	JNE 2008			
NTS				
		Prepared by		
		Frepared by		
🦾 Bent	tall			
Kenr	ledv			
	icay	MMM GROUP		
MAY 2011		Project No. 1409222.001		

EXHIBIT 3.1

More specifically, the lands to the west of the western natural heritage area and east of Tremaine Road will be conveyed south by an internal wastewater sewer along an internal Avenue Two to the Trunk Sewer on Dundas Street West which will then connect to the existing wastewater system at Colonel William Parkway. The external area from the lands west of Tremaine Road can connect to the system at the future Burnhamthorpe Road, Avenue One or on Dundas Street West. The wastewater flows from the lands between the two natural heritage areas will be conveyed south along an internal Street and discharged to the existing wastewater system on the south side of Dundas Street at Colonel William Parkway. The lands east of the 14 Mile Creek NHS and west of Bronte Road will be conveyed south along Avenue Four and will connect to the Trunk Sewer on Dundas Street West which will then discharge to the existing system at the south side of Dundas Street at Colonel William Parkway. The lands east of Dundas Street at Colonel William Parkway. The lands east of the 14 Mile Creek NHS and west of Bronte Road will be conveyed south along Avenue Four and will connect to the Trunk Sewer on Dundas Street West which will then discharge to the existing system at the south side of Dundas Street at Colonel William Parkway. There is the possibility for the flows from a portion of these lands to discharge to the existing system at Valleyridge Drive; this would require extending the existing sewer to Dundas Street and further analysis to confirm that there would be no adverse effects on the existing residential units downstream.

The existing system eventually discharges to the Mid-Halton WWTP and PS. No upgrades to the existing wastewater sewers are anticipated to accommodate future development. The need for a local or regional pumping station appears not to be required.

3.1.3 Region's Timing and Development Charge Projects

Exhibit 3.2 summarizes the Region's proposed timing for the completion of the wastewater construction related to the subject lands and in many cases also for other development areas, particularly areas in North Oakville East and Milton.

Project	Development Charge Cost	Region's ID #'s	Estimated In- Service Date
Local			
450mm WWM on Dundas Street - Colonel William Parkway to approx. 900m West	\$587,000	3706	With Development
TOTAL	\$587,000		

Exhibit 3.2 – Region's Wastewater Projects

Projects and costs shown in Exhibit 3.2 have been taken from the Region of Halton – Master Plan Update by KMK dated June 2008. The estimated project timing is taken from the Region of Halton - Capital Delivery Report dated February 2010.

3.2 Expected Sewage Generation

In this section sewage generated in the 407 West Employment Area Land Use Plans has been assessed and compared to the Master Plan. The design criteria that the Region has utilized in the Master Plan are used in this analysis. To develop the estimated sewage generation, the system design criteria is first set out and then applied to the proposed development statistics from Exhibits 1.1.

The Region of Halton wastewater system criteria is as follows:

Land Use	Unit	Collection System	Treatment
Residential	L/cap/d	275	365
Commercial	m ³ /ha/d	24.75	17.5
Industrial	m ³ /ha/d	34.375	25.8
Institutional	m ³ /ha/d	11.00	11.0

Exhibit 3.3 – Average Day Wastewater Flow

The modified Harmon Peaking Factor equation is used to determine the peak flows for the collection system. The average day wastewater flow criteria for wastewater treatment includes an allowance for infiltration. An infiltration allowance of 0.286 L/s/ha is added to the peak system flows for designing the collection system.

The treatment capacity flow generated by the 407 West Employment Area is:

Exhibit 3.4 – Generated WWTP Flows: 407 West Employment Area Land Use Plan Projections

	Residential	Commercial	Industrial	Institutional	Total
	ML/d	ML/d	ML/d	ML/d	ML/d
Average Daily Flow	0.0	0.7	3.4	0.0	4.1

Pumping stations and sewers are designed based upon peak flows. Flows will increase as various subcatchment areas are connected to the Trunk Sewer. Exhibit 3.5, which follows, estimates the peak flow to the existing wastewater sewer on Colonel William Parkway. This is the full flow from the 407 West Employment Area.

The difference in the peak flows between the Region's projections and from those generated from the 407 West Employment Area Land Use Plan combined with the proposed increase in pipe slope in some instances will impact the sizing of the Dundas Street trunk sewer by one pipe size in some locations.

Exhibit 3.5 – Peak G	Senerated Collection	System at Colone	l William Parkway	Trunk Sewer:	407 West
Employment Area C	Dnly	-	-		

	Residential L/s	Commercial L/s	Industrial L/s	Institutional L/s	Total L/s
Average Flow	0.0	8.6	39.0	0.0	69.6
Peaking Factor	4.3	3.358	2.867	4.3	
K	0.80	0.80	0.80	0.80	0.80
Infiltration	0.0	8.6	28.0	0.0	36.6
Total	0.0	31.7	117.5	0.0	149.2

3.3 Region's Concept Plan Applied to the 407 West Employment Area

The proposed sewer system to service the 407 West Employment Area is described in this section and as well as the proposed drainage boundaries as illustrated on Exhibit 3.6.

Dundas Street Sewer

As discussed in Section 3.1, the Region proposes that all wastewater flows from the 407 West Employment Area drain to a trunk sewer system along Dundas Street. As plans were being developed for the 407 West Employment Area, alternative locations for this sewer were considered. At this stage it has been determined that Dundas Street would be a feasible alignment for the sewer.

The Master Plan recommends that the Dundas Street gravity sewer directing flows from the entire 407 West Area to the gravity sewer on Dundas Street and ultimately to the existing wastewater sewer on Colonel William Parkway. This study generally supports that conclusion.

A preliminary design has been undertaken for the trunk sewer on Dundas Street, which is presented on the attached drawings, P1-P13.

Internal Collection Systems

In order to convey wastewater drainage from the subject lands to the Dundas sewer collection system, various alternative system layouts were evaluated. The common elements of the system layouts were:

- all sewers are located on proposed road alignments; and
- all crossings of watercourses on natural features follow proposed road alignments.

A number of factors were considered that would influence the proposed alternatives. The factors include environmental features, existing topography, proposed road patterns, stormwater management facilities, and the relative ease of sewer construction.



While Exhibit 3.6 shows the preferred alignment for the internal sewers, there is flexibility in the location of these sewers and the corresponding drainage boundaries. The sizing of the Dundas Street sewer has considered this flexibility and as such will allow the plan to evolve as it moves forward over time. The costs for local sewers are not considered to be DC recoverable.

A local or regional pumping station does not appear to be required.

External Drainage Areas

Two other tributary areas will connect to the Dundas Street trunk sewer at various locations. Due to their shorter lengths and smaller tributary areas they are considered to be local sewers. Together they service an approximate area of 69 hectares of developable lands with an estimated equivalent population of 3805 people. These local sewers allow the Dundas Street trunk to be kept at a nominal depth.

The adjacent Tremaine-Dundas Secondary Plan Area, City of Burlington will discharge wastewater flows to the Dundas Trunk system. A Secondary Plan is currently being prepared for the area to determine the preferred land use concept. At present there are 3 land use options proposed which includes approximately 56 hectares of developable land. For the purpose of this study the most conservative option of entirely residential was used to evaluate the downstream wastewater sewer. The wastewater flows generated by the Tremaine-Dundas Community are shown in Exhibit 3.7.

Exhibit 3.7 – Peak Generated Collection System Flows	to Dundas Trunk Sewer: Tremaine-Dundas
Community	

	Residential L/S	Commercial L/S	Industrial L/S	Institutional L/S	Total L/S
Average Flow	6.0	0.0	0.0	0.0	60
Average Flow	0.9	0.0	0.0	0.0	0.9
Peaking Factor	3.560	4.3	4.3	4.3	
K	1.0	1.0	1.0	1.0	1.0
Infiltration	16.0	0.0	0.0	0.0	16.0
Total	40.6	0.0	40.6	0.0	40.6

The Sixteen Hollow Area to the east of the 407 West Employment Area are designated employment in the NOWSP with a large component of open space. A large portion of the developable lands represent the future Oakville Hospital located at approximately Dundas Street and Third Line. Due to the proximity of these lands to the existing wastewater trunk sewer on Third Line or Bronte Road, it is likely that the wastewater flows from the Sixteen Hollow Area will not discharge to the Dundas Street wastewater sewer. However, there is available capacity within the system to accommodate these flows should these lands connect to this system. The wastewater flows generated by the Sixteen Hollow Area are shown in Exhibit 3.8.

	Residential L/s	Commercial L/s	Industrial L/s	Institutional L/s	Total L/s
Average Flow	0.0	0.0	3.6	0.5	4.1
Peaking Factor	4.3	4.3	3.652	3.652	
K	0.80	0.80	0.80	0.80	0.80
Infiltration	0.0	0.0	2.6	1.1	3.7
Total	0.0	0.0	13.3	2.6	15.9

EXHIBIT 3.8 – Peak Generated Collection System Flows to Dundas Trunk Sewer: Sixteen Hollow Area Only

3.4 Sewer Sizing and Technical Analysis

Flows and sewer sizes were developed using Regional design criteria. Detailed design sheets are provided in Appendix B.

The sewers were sized utilizing the modified Harmon Peaking Factor equation with offsetting peaks for residential and employment.

Conceptual Plan-Profiles of the Wastewater Sewer design are provided in Appendix C.

4.0 Timing

4.1 General

To accommodate planned long-term growth, effective timing and phasing of infrastructure construction is key in providing cost effectiveness, while ensuring that adequate capacity exists as it is required.

Fixed infrastructure such as plants and pumping stations may be constructed incrementally, typically in a modular format. By contrast, linear infrastructure such as pipes and manholes must be completed from point A to B, where B outlets to the treatment system or connects to the supply system.

4.2 Water

In this section, information is provided with respect to the water demands to assist the Region in timing the staging of its infrastructure construction. As noted earlier, for most elements, this information must be combined with similar information from other communities in the Region.

4.2.1 Demand

The water demand created by the North Oakville West Secondary Plan requires various elements of infrastructure to be in place. These elements are:

- Water Treatment
- Pumping Station
- Storage
- Distribution

The capacity requirements of the water treatment and pumping systems are determined based on the maximum daily flow. The required water treatment and pumping system upgrades to facilitate development of the 407 West Employment Area is anticipated to be in place as part of the Phase 1 2008 Residential DC Project Program. Once these projects are complete the Region should confirm that no further upgrades to the treatment and pumping facilities are required for development of the 407 West Area as well as other communities within the Region of Halton.

4.2.2 Timing of Infrastructure Elements

In this section of the ASP, the timing of the various elements of the water system is generally discussed. In the case of many of the elements of the water infrastructure such as storage, pumping, and major distribution, it will be necessary for the Region to run its water model and to understand the timing of the development of other areas of the Region.

Treatment

• Many of the required projects to increase the supply are currently underway and are anticipated to be completed prior to development of the 407 West Employment Area.

Water Distribution (mains and pumping)

- The water distribution system for the 407 West Employment Area will require the construction of the regional trunk watermains (Region Project #s 5851 & 3812) along Dundas Street prior to development.
- The internal Zone 3 trunk watermains (Region Projects #s 5853 & 5627) will be constructed incrementally as development proceeds.
- Appropriate major loops will form the backbone of an incrementally growing distribution system.

<u>Storage</u>

- It is anticipated that there is currently sufficient storage in Zone 3 to accommodate development of the 407 West Employment Area as well as full build-out of Zone 3.
- The need for storage is a function of the rate of development in the overall service area and should be reviewed by the Region on a regular basis to confirm that adequate storage remains available.
- The timing of storage system expansion must be determined in conjunction with the timing of distribution and pumping system capacity expansion. These elements can be implemented on a 'stepped' basis if required.

4.3 Wastewater

In this section, information is provided with respect to wastewater generation to assist the Region in timing the staging of its infrastructure construction. For some infrastructure such as expansion to the Mid-Halton Plant, the need is a function of growth in all areas of Halton, including the 407 West Employment Area. For the others such as the Dundas Street sewer, it is a function exclusively of the timing of the development of the 407 West Employment Area.

4.3.1 System Flows

The wastewater generation developed by the Secondary Plan similarly requires various elements of infrastructure to be in place. These elements are:

- Wastewater Treatment
- Pumping
- Collection

The capacity requirements of the WWTP are determined based on the Average Daily Flow (including inflow and infiltration) while the pumping stations and collection systems are determined from the peak flow plus infiltration. The timing of flows generated from the 407 West Employment Area is considered generally in line with the projections of the Region. Any required upgrades to the WWTP are anticipated to be completed prior to development of the 407 West Employment Area.

4.3.2 Timing of Infrastructure Elements

In this section of the ASP, the timing of the various elements of the wastewater system are discussed. Unlike the water system, it is generally possible to predict infrastructure requirements based upon expected flows and the location of development.

Treatment

- The Region has already identified a need for increased wastewater treatment capacity.
- The Region is proceeding with an EA for the next expansion of the Mid-Halton WWTP.
- The actual expansion of the Mid-Halton WWTP and the advancement of future expansions should continue to be a priority.

Collection and Pumping

- Construction of the Dundas Street trunk sewer (Region Project # 3706) is required early to facilitate the development of the 407 West Employment Area, but is not absolutely required to initiate development.
- No pumping is anticipated to be required for development of the 407 West Employment Area.
- The timing of the development collection system north from Dundas Street will be driven by the timing of development of the 407 West Employment Area.

5.0 Conclusions

5.1 General

- The proposed development is of a form and quantity similar to what was anticipated by The Region of Halton while completing its "Water and Wastewater Master Plan Review" and "Master Plan Update".
- This report provides the Region data to assist in determining the sizing of and timing of required regional infrastructure.
- The conclusions reached for servicing the 407 West Employment Area Land Use Plan in this ASP are consistent with the Region's Master Plan.

5.2 Water

- The construction of the PD3 watermains along Dundas Street is required for the development of this community.
- The local major water distribution system can be expanded incrementally.
- The development can occur on an incremental basis.

5.3 Wastewater

- The regional wastewater sewers can be provided in conjunction with the development of the 407 West Employment Area, but are not absolutely required for initial development.
- Linear infrastructure can be constructed on an incremental basis as required for development of the 407 West Employment Area as well as external lands.





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407 West Employment Lands 14-09222 Water Analysis Maximum Daily Flow - Pipe Report

ID	From Node	To Node	Length (m)	Diameter (mm)	Roughness	Flow (L/s)	Velocity (m/s)	Headloss (m)	HL/1000 (m/km)	Status	Total Forward Flow (ML)	Total Reverse Flow (ML)	Total Net Flow (ML)	Flow Reversal Count
NO-2064	NO-239	NO-238	224.7	600	120	0	0	0	0	Open				0
NO-2065	NO-238	NO-237	397.08	600	120	-5.67	0.02	0	0	Open				0
NO-2066	NO-237	NO-236	177.95	300	120	0.55	0.01	0	0	Open				0
NO-2067	NO-236	NO-235	149.93	300	120	-4.39	0.06	0	0.02	Open				0
NO-2068	NO-237	NO-228	485.08	600	120	-6.22	0.02	0	0	Open				0
NO-2069	NO-227	NO-250	235.72	600	120	14.5	0.05	0	0.01	Open				0
NO-2070	NO-227	NO-222	486.56	600	120	-17.18	0.06	0	0.01	Open				0
NO-2071	NO-235	NO-240	179	300	120	1.93	0.03	0	0	Open				0
NO-2072	NO-240	NO-241	137.52	300	120	0	0	0	0	Open				0
NO-2073	NO-235	NO-234	259.63	300	120	-6.29	0.09	0.01	0.04	Open				0
NO-2075	NO-235	NO-230	667.9	300	120	-0.04	0	0	0	Open				0
NO-2076	NO-228	NO-229	76.77	300	120	-1.93	0.03	0	0.01	Open				0
NO-2077	NO-229	NO-230	145.77	300	120	-3.54	0.05	0	0.02	Open				0
NO-2078	NO-230	NO-231	261.63	300	120	-4.62	0.07	0.01	0.03	Open				0
NO-2080	NO-247	NO-224	202.58	300	120	-2.85	0.04	0	0.01	Open				0
NO-2081	NO-224	NO-223	295.88	300	120	1.57	0.02	0	0	Open				0
NO-2082	NO-223	NO-227	245.13	300	120	1.57	0.02	0	0	Open				0
NO-2083	NO-224	NO-225	291.75	300	120	-5.94	0.08	0.01	0.04	Open				0
NO-2088	WJ-3116-0	NO-251	257.6	1,200.00	130	4.93	0	0	0	Open				0
NO-2089	NO-246	NO-252	239.94	1,200.00	130	-16.18	0.01	0	0	Open				0
NO-2090	NO-225	NO-245	162.5	300	120	-9.92	0.14	0.02	0.1	Open				0
NO-2091	NO-231	NO-246	235.73	300	120	-9.74	0.14	0.02	0.1	Open				0
NO-2092	NO-234	WJ-3114-0	155.42	300	120	-10.79	0.15	0.02	0.12	Open				0
NO-2093	NO-230	NO-247	290.29	300	120	1.05	0.01	0	0	Open				0
NO-2094	NO-224	NO-248	237.61	300	120	-0.33	0	0	0	Open				0
NO-2095	NO-248	NO-249	358.41	300	120	-6.78	0.1	0.02	0.05	Open				0
NO-2096	NO-249	WJ-3046-0	417.52	600	120	27.05	0.1	0.01	0.02	Open				0
NO-2097	NO-250	NO-228	274.07	600	120	8.32	0.03	0	0	Open				0
NO-2098	NO-251	NO-245	333.63	1,200.00	130	3.47	0	0	0	Open				0
NO-2099	NO-252	WJ-1150-0	144.25	1,200.00	130	-17.31	0.02	0	0	Open				0
WM-10406-0	WJ-3046-0	NO-222	264.75	600	120	27.05	0.1	0.01	0.02	Open				0
WM-10408-0	NO-245	NO-246	1,678.21	1,200.00	130	-6.44	0.01	0	0	Open				0
WM-10410-0	WJ-3114-0	WJ-1150-0	139.97	1,200.00	130	17.98	0.02	0	0	Open				0
WM-10416-0	WJ-3116-0	NO-249	294.55	600	120	33.83	0.12	0.01	0.03	Open				0

14-09222

Water Analysis

Maximum Daily Flow - Junction Report

	Demand	Elevation	Head	
ID	(L/s)	(m)	(m)	Pressure (psi)
NO-222	9.87	156	197.4	58.86
NO-223	0	152	197.4	64.54
NO-224	1.86	153	197.4	63.12
NO-225	3.97	152	197.41	64.56
NO-227	4.24	155	197.4	60.27
NO-228	4.03	154	197.4	61.69
NO-229	1.6	153	197.4	63.11
NO-230	0	152	197.4	64.54
NO-231	5.11	150	197.4	67.39
NO-234	4.5	153	197.41	63.13
NO-235	0	156	197.4	58.85
NO-236	4.93	157	197.39	57.42
NO-237	0	157	197.39	57.42
NO-238	5.67	160	197.39	53.16
NO-239	0	162	197.39	50.32
NO-240	1.93	156	197.4	58.85
NO-241	0	156	197.4	58.85
NO-245	0	152	197.43	64.58
NO-246	0	148	197.43	70.27
NO-247	3.9	149	197.4	68.8
NO-248	6.45	155	197.4	60.27
NO-249	0	158	197.42	56.04
NO-250	6.18	155	197.4	60.27
NO-251	1.45	154	197.43	61.74
NO-252	1.12	147	197.43	71.69
WJ-1150-0	0	152	197.43	64.58
WJ-3046-0	0	159	197.41	54.6
WJ-3114-0	0	152	197.43	64.58
WJ-3116-0	0	157	197.43	57.47

407 West Employment Lands 14-09222 Water Analysis Peak Daily Flow - Pipe Report

ID	From Nodo	To Nodo	Longth (m)	Diamatan (mm)	Doughnoos	Flaw (1 /a)		Headloss	HL/1000	Chatura	Total Forward	Total Reverse	Total Net Flow	Flow Reversal
ID	From Node	To Node	Length (m)	Diameter (mm)	Roughness	FIOW (L/S)	velocity (m/s)	(m)	(m/km)	Status	Flow (ML)	Flow (ML)	(ML)	Count
NO-2064	NO-239	NO-238	224.7	600	120	0	0	0	0	Open				0
NO-2065	NO-238	NO-237	397.08	600	120	-9.45	0.03	0	0	Open				0
NO-2066	NO-237	NO-236	177.95	300	120	0.76	0.01	0	0	Open				0
NO-2067	NO-236	NO-235	149.93	300	120	-7.46	0.11	0.01	0.06	Open				0
NO-2068	NO-237	NO-228	485.08	600	120	-10.21	0.04	0	0	Open				0
NO-2069	NO-227	NO-250	235.72	600	120	23.84	0.08	0	0.02	Open				0
NO-2070	NO-227	NO-222	486.56	600	120	-28.3	0.1	0.01	0.02	Open				0
NO-2071	NO-235	NO-240	179	300	120	3.22	0.05	0	0.01	Open				0
NO-2072	NO-240	NO-241	137.52	300	120	0	0	0	0	Open				0
NO-2073	NO-235	NO-234	259.63	300	120	-10.82	0.15	0.03	0.12	Open				0
NO-2075	NO-235	NO-230	667.9	300	120	0.13	0	0	0	Open				0
NO-2076	NO-228	NO-229	76.77	300	120	-3.4	0.05	0	0.01	Open				0
NO-2077	NO-229	NO-230	145.77	300	120	-6.07	0.09	0.01	0.04	Open				0
NO-2078	NO-230	NO-231	261.63	300	120	-7.87	0.11	0.02	0.07	Open				0
NO-2080	NO-247	NO-224	202.58	300	120	-4.57	0.06	0	0.02	Open				0
NO-2081	NO-224	NO-223	295.88	300	120	2.62	0.04	0	0.01	Open				0
NO-2082	NO-223	NO-227	245.13	300	120	2.62	0.04	0	0.01	Open				0
NO-2083	NO-224	NO-225	291.75	300	120	-9.84	0.14	0.03	0.1	Open				0
NO-2088	WJ-3116-O	NO-251	257.6	1,200.00	130	-29.33	0.03	0	0	Open				0
NO-2089	NO-246	NO-252	239.94	1,200.00	130	-64.61	0.06	0	0	Open				0
NO-2090	NO-225	NO-245	162.5	300	120	-16.46	0.23	0.04	0.26	Open				0
NO-2091	NO-231	NO-246	235.73	300	120	-16.39	0.23	0.06	0.26	Open				0
NO-2092	NO-234	WJ-3114-0	155.42	300	120	-18.32	0.26	0.05	0.32	Open				0
NO-2093	NO-230	NO-247	290.29	300	120	1.93	0.03	0	0	Open				0
NO-2094	NO-224	NO-248	237.61	300	120	-0.45	0.01	0	0	Open				0
NO-2095	NO-248	NO-249	358.41	300	120	-11.2	0.16	0.05	0.13	Open				0
NO-2096	NO-249	WJ-3046-0	417.52	600	120	44.75	0.16	0.02	0.06	Open				0
NO-2097	NO-250	NO-228	274.07	600	120	13.54	0.05	0	0.01	Open				0
NO-2098	NO-251	NO-245	333.63	1,200.00	130	-31.75	0.03	0	0	Open				0
NO-2099	NO-252	WJ-1150-0	144.25	1,200.00	130	-66.48	0.06	0	0	Open				0
WM-10406-0	WJ-3046-0	NO-222	264.75	600	120	44.75	0.16	0.02	0.06	Open				0
WM-10408-0	NO-245	NO-246	1,678.21	1,200.00	130	-48.21	0.04	0	0	Open				0
WM-10410-0	WJ-3114-0	WJ-1150-0	139.97	1,200.00	130	91.43	0.08	0	0.01	Open				0
WM-10416-0	WJ-3116-0	NO-249	294.55	600	120	55.95	0.2	0.03	0.09	Open				0

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Water Analysis

Peak Daily Flow - Junction Report

	Demand	Elevation	Head	
ID	(L/s)	(m)	(m)	Pressure (psi)
NO-222	16.45	156	193.73	53.63
NO-223	0	152	193.72	59.31
NO-224	3.1	153	193.72	57.89
NO-225	6.62	152	193.75	59.35
NO-227	7.07	155	193.72	55.04
NO-228	6.72	154	193.71	56.45
NO-229	2.67	153	193.71	57.87
NO-230	0	152	193.72	59.3
NO-231	8.52	150	193.73	62.17
NO-234	7.5	153	193.75	57.93
NO-235	0	156	193.72	53.62
NO-236	8.22	157	193.71	52.18
NO-237	0	157	193.71	52.18
NO-238	9.45	160	193.71	47.92
NO-239	0	162	193.71	45.07
NO-240	3.22	156	193.71	53.61
NO-241	0	156	193.71	53.61
NO-245	0	152	193.79	59.41
NO-246	0	148	193.8	65.1
NO-247	6.5	149	193.72	63.57
NO-248	10.75	155	193.72	55.04
NO-249	0	158	193.77	50.85
NO-250	10.3	155	193.71	55.03
NO-251	2.42	154	193.79	56.57
NO-252	1.87	147	193.8	66.53
WJ-1150-0	0	152	193.8	59.42
WJ-3046-0	0	159	193.74	49.39
WJ-3114-0	0	152	193.8	59.42
WJ-3116-0	0	157	193.79	52.3

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Water Analysis

Fire Flow Report

LD.	Static Demand	Static Pressure	Static Head	Fire-Flow	Residual Pressure	Available Flow	Available Flow
U	(L/s)	(psi)	(m)	Demand (L/s)	(psi)	@Hydrant (L/s)	Pressure (psi)
NO-222	9.87	58.86	197.4	500	50.99	1,419.67	20.02
NO-223	0	64.54	197.4	500	41.14	723.68	20.01
NO-224	1.86	63.12	197.4	500	49.3	991.04	20.01
NO-225	3.97	64.56	197.41	500	46.47	849.17	20.01
NO-227	4.24	60.27	197.4	500	51.68	1,349.44	20.02
NO-228	4.03	61.69	197.4	500	52.04	1,261.06	20.02
NO-229	1.6	63.11	197.4	500	48.59	959.92	20.01
NO-230	0	64.54	197.4	500	51.54	1,050.17	20.01
NO-231	5.11	67.39	197.4	500	46.92	817.96	20.01
NO-234	4.5	63.13	197.41	500	45.08	835.85	20.01
NO-235	0	58.85	197.4	500	40.56	777.88	20.01
NO-236	4.93	57.42	197.39	500	36.79	712.6	20.01
NO-237	0	57.42	197.39	500	45.84	1,030.53	20.01
NO-238	5.67	53.16	197.39	500	38.68	829.7	20.01
NO-239	0	50.32	197.39	500	34.24	730.04	20.01
NO-240	1.93	58.85	197.4	500	2.93	409.93	20
NO-241	0	58.85	197.4	500	-25.78	325.13	20
NO-245	0	64.58	197.43	500	60.37	2,622.55	20.07
NO-246	0	70.27	197.43	500	66.33	2,959.73	20.09
NO-247	3.9	68.8	197.4	500	45.55	770.51	20.01
WJ-1150-0	0	64.58	197.43	500	60.71	2,838.10	20.08
WJ-3046-0	0	54.6	197.41	500	47.38	1,403.50	20.02
WJ-3114-0	0	64.58	197.43	500	60.74	2,855.86	20.08
WJ-3116-O	0	57.47	197.43	500	53.17	2,366.35	20.06

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Water Analysis

Average Daily Flow - Junction Demands

			Elevation
ID	Area (ha)	Demand (L/s)	(m)
NO-222	21.35	6.58	156
NO-223	0.00	0.00	152
NO-224	4.01	1.24	153
NO-225	8.59	2.65	152
NO-227	9.19	2.83	155
NO-228	8.74	2.69	154
NO-229	3.48	1.07	153
NO-230	0.00	0.00	152
NO-231	11.08	3.41	150
NO-234	9.74	3.00	153
NO-235	0.00	0.00	156
NO-236	10.68	3.29	157
NO-237	0.00	0.00	157
NO-238	12.27	3.78	160
NO-239	0.00	0.00	162
NO-240	4.20	1.29	156
NO-241	0.00	0.00	156
NO-245	0.00	0.00	152
NO-246	0.00	0.00	148
NO-247	8.44	2.60	149
NO-248	13.97	4.30	155
NO-249	0.00	0.00	158
NO-250	13.38	4.12	155
NO-251	3.16	0.97	154
NO-252	2.43	0.75	147
WJ-1150-0	0.00	0.00	152
WJ-3046-O	0.00	0.00	159
WJ-3114-0	0.00	0.00	152
WJ-3116-0	0.00	0.00	157

Demand Rate:

213 l/cap/day





THE REGIONAL MUNICIPALITY OF HALTON

SANITARY DESIGN SHEET

PROJECT No .: 14-09222

PROJECT NAME: 407 West Employment Area

P3

P2

E6

P1

E5

C2

BLK E2-14, E2-11, E2-13

DUNDAS STREET EXTERNAL 2

BLK E2-10

P2

P1

P1

F5

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CONSULTANT: MMM Group

Peaking Manhole Tributary Population Q κ Length Tributary Area (Hectares) in Increment Accumulated Increment Accumulated Average Factor Street From То Average P Μ metres D Res. Comm. Ind. Inst. Total Res. Comm. Ind. Inst. Total Res. Comm Ind. Inst. Total Res. Comm Ind. Inst. Total L/s **AVENUE 1-AVENUE 3** BLK E1-3, E1-4, E1-5 G4 G3 284 12.4 12.4 12.4 12.4 1551 1551 1551 1551 4.937 0.80 3.669 BLK E1-2.E1-1.P2-1.G7 G3 G2 268 15 198 15 28 28 1988 353 353 11.263 0.80 3 38 AVENUE 1 28.3 28.3 1551 1551 0.80 3.669 G2 G1 65 0.0 0.0 11.263 BLK P2-2, P2-3, P2-4, G8-1 G1 C5 582 14.7 14.7 43 (43.0 1834 1834 5373 5373 17.100 0.80 3.216 8.9 BLK E2-1 C6 8 9 1114 3 545 C5 183 89 89 1114 1114 1114 0.80 3.769 Burnhamthorpe Road BLOCK G8-3, G8-4 C8 C7 130 6.7 6.7 6.7 6.7 836 836 836 836 2.662 0.80 3.849 C4 6.7 836 3.849 C7 101 0.0 0.0 6.7 836 2.662 0.80 BLK E2-3 C9 C4 236 3.5 35 3.5 3.5 435 435 435 435 1.385 0.80 4.005 Avenue Three 51.9 51.9 379 6486 BLK G8-2 C5 C4 220 3.0 3.0 379 6486 20.645 0.80 3.138 BLK G9-1, E2-7 C4 C3 184 6.5 6.5 68.6 68.6 813 813 8570 8570 27.277 0.80 3.021 6 BLK G9-2, E2-8, E2-9-1 C3 C2 314 6.2 6.2 74.8 74.8 774 774 9344 9344 29.740 0.80 2.984 Burnhamthorpe Road - AVENUE TWO - DUNDAS STREET D5 2.976 Blk E1-7, E1-8 D4 221 75 75 7.5 75 935 935 935 935 0.80 3.819 BLK E1-6, G3, E1-10 D4 D3 7.9 15.4 15.4 984 984 1919 1919 6.107 0.80 3.600 258 7.9 509 D3 D2 158 41 41 19.4 19.4 509 2428 2428 7.726 0.80 3 5 1 9 BLK G5, G6 BLK C2, C3-2 D2 D1 271 4.1 4.1 23.5 23.5 508 508 2935 2935 9.342 0.80 3.450 DUNDAS STREET EXTERNAL 1 то E1 56 56.0 56.0 56.0 2170 2170 2170 2170 6.907 1.00 3.558 3.2 3.2 395 BLK E1-9 E1 D1 3.2 56.0 59.2 395 395 2170 2565 8.164 0.99 3.499 3330 D1 140 0.0 56.0 26.6 82.6 2170 5500 17.506 0.94 3.206 E2 0.0 BLK C3-1 3.1 3.1 56.0 29.7 85.7 385 385 2170 3715 5885 18.731 0.93 3.179 5 E2 C2 423 **AVENUE ONE - AVENUE FOUR - DUNDAS STREET** BLK E2-2 P9 P8 260 13.3 13.3 13.3 13.3 1663 1663 1663 1663 5.292 0.80 3.647 P8 P7 13.3 1663 1663 3.647 110 0.0 13.3 5.292 0.80 0.0 P7 P6 153 0.0 0.0 13.3 13.3 1663 1663 5.292 0.80 3.647 1 0 P6 P5 99 0.0 0.0 13.3 13.3 1663 1663 5.292 0.80 3.647 BLK E2-4, E2-5 P5 P4 10.7 24.0 24.0 1335 0.80 3.443 228 10.7 1335 2998 2998 9.541 BURNHAMTHORPE STREET 978 BLK E2-6, E2-12 P10 P4 232 7.8 7.8 7.8 7.8 978 978 3.111 0.80 3.806 978 P4 P3 112 From P10 0.0 0.0 31.8 31.8 3975 3975 12.652 0.80 3.336

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DATE PRINTED: DATE REVISED:

06-May-11

DESIGNED BY:

CHECKED BY:

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eaking	Q	Total	Q			SEWER			
Factor	Peak	Infil-	Total	<u>.</u>	•		V	(m/s)	REMARKS
M	Dry L/s	tration L/s	L/s	Size (mm)	Siope (m/m)	u (L/s)	Full	Act. Flow	
3.669	14.49	3.55	18.04	300	0.005	88.891	1.26	0.91	
3.380	30.46	8.10	38.56	300	0.005	88.891	1.26	0.91	
3.669	33.06	8.10	41.16	300	0.030	217.738	3.08	2.22	
3.216	43.99	12.29	56.29	300	0.007	105.177	1.49	1.07	
3.769	10.69	2.55	13.24	300	0.020	177.782	2.52	1.36	
3.849	8.20	1.91	10.11	300	0.005	88.891	1.26	0.79	
3.849	8.20	1.91	10.11	300	0.005	88.891	1.26	0.79	
4.005	4.44	1.00	5.43	300	0.005	88.891	1.26	0.65	
3.138	51.83	14.84	66.67 85.53	300	0.010	125.711	1.78	1.28	
2.984	70.99	21.38	92.37	375	0.010	227.929	2.06	1.49	
0.010	0.00		44.00		0.005	00.004	1.00	0.00	
3.819	9.09	2.14	21.98	300	0.005	88.891	1.26	0.83	
3.519	21.75	5.55	27.30	300	0.005	88.891	1.26	0.91	
3.450	25.79	6.72	32.50	300	0.005	88.891	1.26	0.91	
3.558	24.57	16.02	40.59	450	0.005	262.081	1.65	1.15	
3.499	28.26	16.92	45.18	450	0.005	262.081	1.65	1.19	
3 206	52 51	23.64	76 15	450	0.005	262 081	1 65	1 19	
3.179	55.41	24.52	79.93	450	0.005	262.081	1.65	1.19	
3.647	15.44	3.80	19.24	300	0.010	125.711	1.78	1.24	
3.647	15.44	3.80	19.24	300	0.010	125.711	1.78	1.24	
3.647	15.44	3.80	19.24	300	0.010	125.711	1.78	1.24	
3.443	26.28	6.86	33.13	300	0.012	137.709	1.95	1.40	
3 806	9 47	2 24	11 71	300	0.010	125 711	1 78	1.03	
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3.336	33.76	9.09	42.86	300	0.012	137.709	1.95	1.40	
3.336	33.76	9.09	42.86	300	0.012	137.709 88.891	1.95	1.40	
0.200	00.40	10.00	50.52	000	0.000	00.001	1.20	0.01	
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3.652	12.15	3.75	15.89	450	0.010	370.638	2.33	1.03	
3.126	50.58	15.30	65.88	450	0.010	370.638	2.33	1.68	
3.113	52.07	15.79	67.86	450	0.005	262.081	1.65	1.19	
4.500	249.77	45.67	295.44	525	0.005	395.330	1.83	1.31	







1	May 2	2011	AW	lssued	in support of D	raft Plan Submissior	1		
NQ	D	ate	By		REVISI	ONS	MANU	CAD	
Des	sign	S.V	W.	Ch'kd	A.W.	Date			
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			Bloc	E2-9	147.0 146.0 146.0 146.0 148.0 148.0 148.0	0 + 100 12000 PVC WATERMAIN 0 + 0800 PVC WATERMAIN 0 + 0600 PVC
7 0 1.00% MH7 0	76A PVG SAM 0 MH145	1,480 MH78A B-3750 DVC SAM @ 1,900 0,25% 0,25% 0,25% 0,25%	51.3-315¢ 51.3-315¢ PVC SAN HH146	H79A 000 90.0-3	Block C2	CONC SAN @ 9-980 9-980 9-980 12000 PVC WATERMAIN 9-920 NC SAN 9-920 PVC WATERMAIN 9-920 PVC WATERMAIN 9-920 PVC WATERMAIN 9-920 PVC WATERMAIN 9-920 PVC WATERMAIN 9-920 PVC WATERMAIN 9-920 PVC VIA PV
475A 6 MH144 30%	Block G9-				Idd. NATUR HERITA AREA	Alt MH29A+ 880 HH29A+ 880 HO.0-450 HO.0-450 HO.0-450 HO.0-450 HO.0-450 HO.0-450 HO.0-450 HO.0-450 HO.0-450 HO.0-450 HO.0-450 HO.0-450 HO.0-450 HO.0-450 HO.0-450 HO.0-450 HO.0-450 HO.0-450 HO.0-450 HO.0-450 HO.0-450 HO.0-450 HO.0-450 HO.0-450 HO.0-450 HO.0-450 HO.0-450 HO.0-450 HO.0-450 HO.0-450 HO.0-450 HO.0-450 HO.0-450 HO.0-450 HO.0-450 HO.0-450 HO.0-450 HO.0-450 HO.0-450 HO.0-450 HO.0-450 HO.0-450 HO.0-450 HO.0-450 HO.0-450 HO.0-450 HO.0-450 HO.0-450 HO.0-450 HO.0-450 HO.0-450 HO.0-450 HO.0-450 HO.0-450 HO.0-450 HO.0-450 HO.0-450 HO.0-450 HO.0-450 HO.0-450 HO.0-450 HO.0-450 HO.0-450 HO.0-450 HO.0-450 HO.0-450 HO.0-450 HO.0-450 HO.0-450 HO.0-450 HO.0-450 HO.0-450 HO.0-450 HO.0-450 HO.0-450 HO.0-450 HO.0-450 HO.0-450 HO.0-450 HO.0-450 HO.0-450 HO.0-450 HO.0-450 HO.0-450 HO.0-450 HO.0-450 HO.0-450 HO.0-450 HO.0-450 HO.0-450 HO.0-450 HO.0-450 HO.0-450 HO.0-450 HO.0-450 HO.0-450 HO.0-450 HO.0-450 HO.0-450 HO.0-450 HO.0-450 HO.0-450 HO.0-450 HO.0-450 HO.0-450 HO.0-450 HO.0-450 HO.0-450 HO.0-450 HO.0-450 HO.0-450 HO.0-450 HO.0-450 HO.0-450 HO.0-450 HO.0-450 HO.0-450 HO.0-450 HO.0-450 HO.0-450 HO.0-450 HO.0-450 HO.0-450 HO.0-450 HO.0-450 HO.0-450 HO.0-450 HO.0-450 HO.0-450 HO.0-450 HO.0-450 HO.0-450 HO.0-450 HO.0-450 HO.0-450 HO.0-450 HO.0-450 HO.0-450 HO.0-450 HO.0-450 HO.0-450 HO.0-450 HO.0-450 HO.0-450 HO.0-450 HO.0-450 HO.0-450 HO.0-450 HO.0-450 HO.0-450 HO.0-450 HO.0-450 HO.0-450 HO.0-450 HO.0-450 HO.0-450 HO.0-450 HO.0-450 HO.0-450 HO.0-450 HO.0-450 HO.0-450 HO.0-450 HO.0-450 HO.0-450 HO.0-450 HO.0-450 HO.0-450 HO.0-450 HO.0-450 HO.0-450 HO.0-450 HO.0-450 HO.0-450 HO.0-450 HO.0-450 HO.0-450 HO.0-450 HO.0-450 HO.0-450 HO.0-450 HO.0-450 HO.0-450 HO.0-450 HO.0-450 HO.0-450 HO.0-450 HO.0-450 HO.0-450 HO.0-450 HO.0-450 HO.0-450 HO.0-450 HO.0-450 HO.0-450 HO.0-450 HO.0-450 HO.0-450 HO.0-450 HO.0-450 HO.0-450 HO.0-450
40m @ -0.5%	MH145 MH145 MH77A 60m © 0.5%	40m @ -0.5%	60m © 0.5%	WATERMAN MH79/ MH79/	CLEARANCE	8 10th @ 5.0% 14n @ −3.1 14n @ −3.1 14n @ −3.1 14n @ −3.1 14n @ −3.1
5-900¢ CONC @ 0.305 46.8-375¢ ⁹⁹¹ PVC @ 1.00% ¹⁹¹ 00 ⁰² +6 ⁶ +6 ⁶	% % % 111.7-9000 50.3-375ø 01.00% 111.7-9000 50.3-375ø 01.00% 111.7-9000 01 092 082 01 092 082 01 092 082	Ø CONC @ 0.25% 75.5-375Ø PVC @ 1.00%	9+860 142.29 145.22 9+860 142.24 145.22 0 0 0 0 0 145.22 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	-375ø <u>275</u> ø 0 1.00% <u>141</u> 0 0 00 0 00 0 00 0 00 0 00 0 00 0 00 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	90.0-375¢ PVC @ 1.	9+980 9+980 10+000 140.78

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1	May 2	2011	AW	lssued	in support c	of Draft Plan	Submission			
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Des	Design S.W.			Ch'kd	A.W.	Date				
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Regional Drawing N♀ Consultant File № 14-09222 CONTRACT NΩ Drawing N♀ P7

407 WEST EMPLOYMENT LANDS CONCEPTUAL PLAN-PROFILE AVENUE ONE

TITLE

PROPERTY LINE
WASTEWATER SEWER
WASTEWATER MANHOLE
STORMWATER SEWER
STORM MANHOLE
WATERMAIN
EXISTING CONTOUR ELEVATION

1	May 2	2011	AW	lssued	in support o	of Dro	aft Plan Subn	nission		
NQ	D	ate	By		REVISIONS					
Des	sign	S.	W.	Ch'kd	Ch'kd A.W. Date					
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KEY PLAN LEGEND PROPERTY LINE WASTEWATER SEWER \longrightarrow WASTEWATER MANHOLE STORMWATER SEWER STORM MANHOLE WATERMAIN -150.0- EXISTING CONTOUR ELEVATION 100 Commerce Valley Dr. West Thornhill, Ont. L3T OA1 Tel (905) 882-1100 Fax (905) 882-0055 www.mmm.ca TITLE 407 WEST EMPLOYMENT LANDS CONCEPTUAL PLAN-PROFILE BURNHAMTHORPE ROAD Consultant File Nº 14-09222 Regional Drawing N♀ CONTRACT N₽ Drawing N♀ P6

								-MH147	MH148	3				MH149		
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FILE NAME: X: \DIV10\14-09222\TE\F. CAD\0G_Surface.dwa_Burnhamthorpe_(P4) PRINTED_ON: Friday

100	Received Block G	Open Space A A A A A A A A A A A A A A A A A A A	V PROPERTY LINE US WASTEWATER SEWER US STORMWATER SEWER US STORMMANHOLE US US
а а а а а а а а а а а а а а	300¢ PVC WATERMAIN PC SAN © 1.00% % MH20A PE ROAD MH173 % So	Acenue Two Arenue Two	
PROPOSED GROUND	-1.3%	158 157 156 157 156 157 156 157 156 157 156 157 158 157 156 157 158 151 150 149 148 147 148 147 148 147 148 141 142 141 140 139	
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100 Commerce Valley Dr. West Thornhill, Ont. L3T OA1 Tel (905) 882-1100 Fax (905) 882-0055 www.mmm.ca TITLE 407 WEST EMPLOYMENT LANDS CONCEPTUAL PLAN-PROFILE DUNDAS STREET mon Consultant File Nº 14-09222 Regional Drawing N♀ CONTRACT N₽

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