TRAFFIC IMPACT STUDY
VICDOM BROCK ROAD PIT EXPANSION
TOWNSHIP OF UXBRIDGE

Skelton Brumwell
& ASSOCIATES INC.

CONSULTING ENGINEERS AND PLANNERS

Revised August 2011

TRAFFIC IMPACT STUDY

VICDOM BROCK ROAD PIT EXPANSION

TOWNSHIP OF UXBRIDGE

P/N 05-1993

June 2011

Revised -August 2011

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TABLE OF CONTENTS

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P/N 05-1993 August 2011

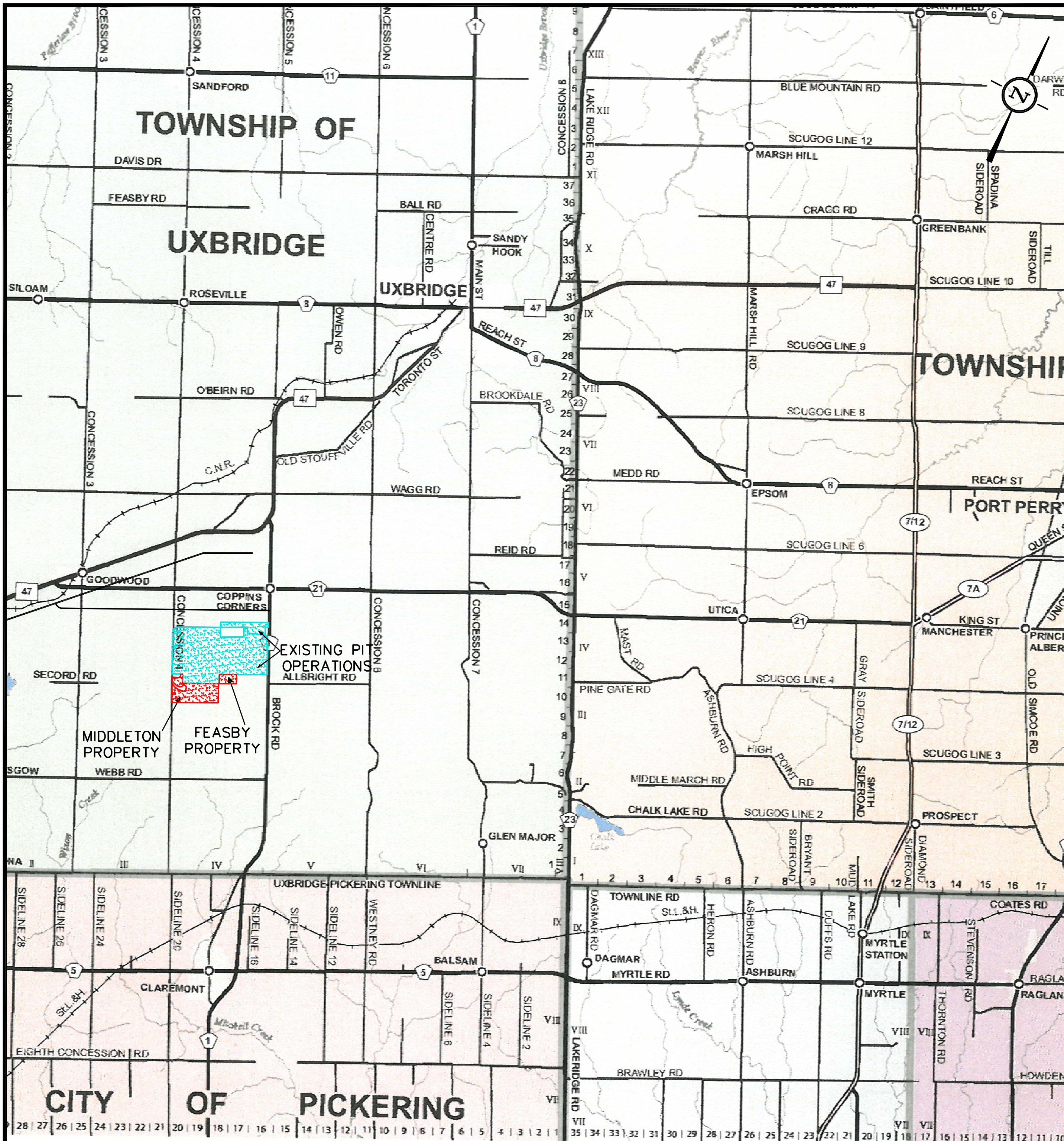
1.0 INTRODUCTION

Vicdom Sand and Gravel (Ontario) Ltd. (Vicdom) has owned an operated a gravel pit just south of Coppins Corners for many years. The existing 220 hectare pit includes three properties licenced under the Aggregate Resources Act, known as the Main Pit, Reagan Pit and Milne Pit. It is located between Brock Road (Regional Road 1) and Concession 4 just south of Regional Road 21as shown on Figure 1 - Location. The existing pits functions as one operation, sharing aggregate processing facilities and one main entrance/exit from Brock Road.

Vicdom's objective is to licence an additional 49 hectares of land in Part of Lots 10 and 11, Concession 4 of the Township of Uxbridge south and east of the existing licences. Following approval of the additional lands, Vicdom intends to amalgamate the new licence with the Main and Regan licences. The Milne pit is nearing depletion and therefore will not be included in the amalgamation.

The existing entrance from Brock Road will serve the amalgamated operation, and no increase in the maximum annual tonnage of material to be extracted from the expanded pit is proposed.

This study is intended to address policies and support applications for amendments to the Region of Durham Official Plan and the Township of Uxbridge Official Plan and Zoning By-law, and the application under the Aggregate Resources Act for licencing of the additional lands.



LEGEND

EXISTING PIT OPERATION

SITE

SOURCE: THE REGIONAL MUNICIPALITY OF DURHAM - ROADS MAP

TRAFFIC IMPACT STUDY
VICDOM SAND & GRAVEL LTD.
UXBRIDGE PIT EXPANSION

FIGURE 1
LOCATION

N.T.S.

P/N 1993 | MAY 2011

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2.0 CONTEXT

The market area for the Brock Road Pit is Durham Region and the eastern GTA particularly southern York Region. Primary haul routes from the pit are shown on Figure 2- Haul Routes. Traffic from the pit travels south along Brock Road other Regional Roads or Provincial Highways or north to Regional Road 21 then west to Highway 47 or east to Regional Road 23 or Highway 7/12. All of these roads are designated Type "A" Arterial Roads, part of the "Strategic Goods Movement Network" in the Durham Region Official Plan, 2008.

The entrance to the pit, located approximately 1 kilometre south of Regional Road 21 was constructed in 1962 In 1984 the entrance was widened and a right turn taper and right turn acceleration lane added. Brock Road in the vicinity of the entrance has a two lane cross section with wide gravel shoulders. The expanded pit will continue to utilize the existing entrance and haul routes.

3.0 TRAVEL DEMAND

3.1 Horizon Year and Time Period of Analysis

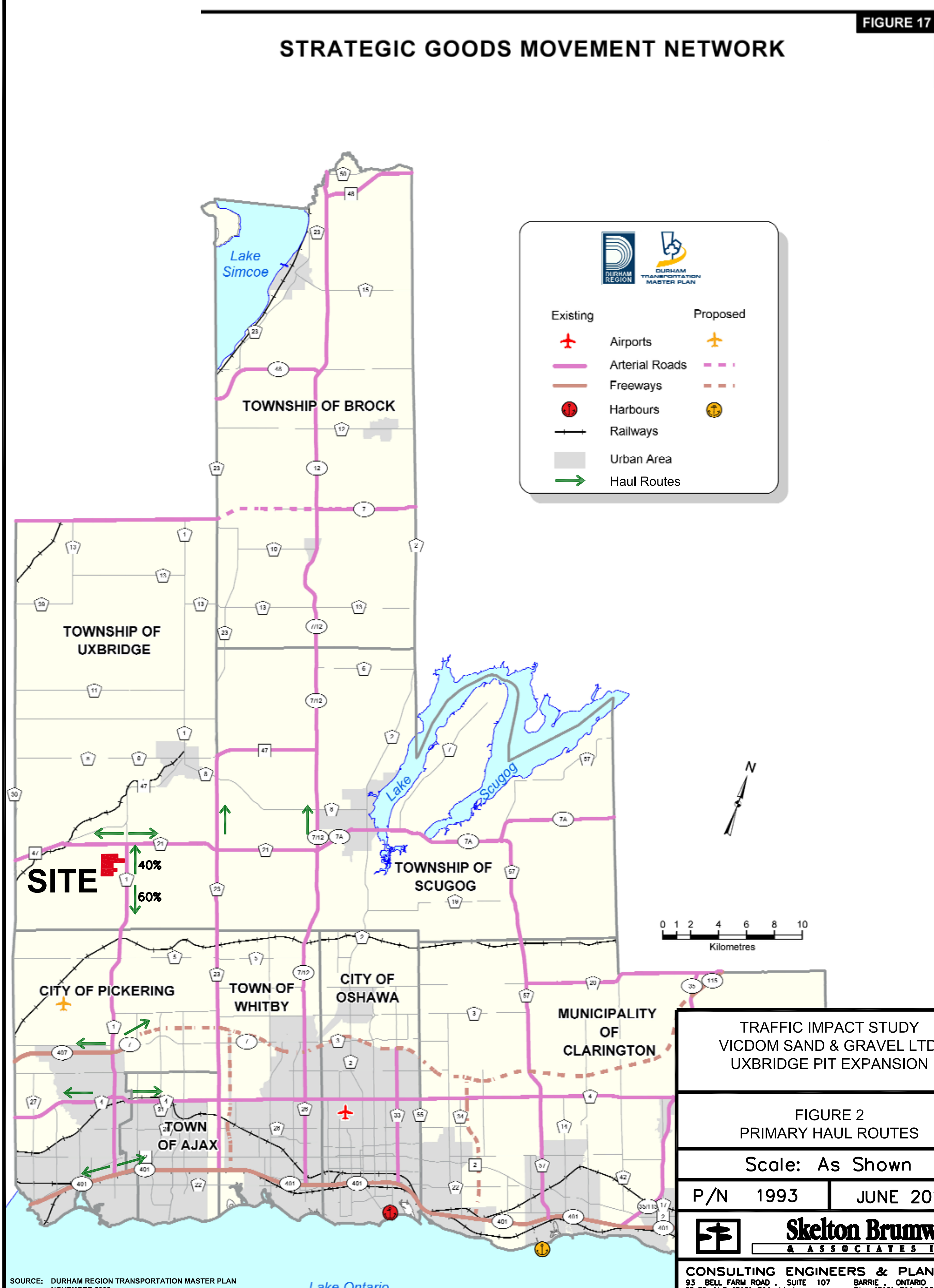
It is assumed for the purposes of this study that the expansion to the pit will be approved in 2012. A study horizon of 10 years to 2019 has been used.

3.2 Historic Traffic Volumes

The Region of Durham provides Average Annual Daily Traffic (AADT) volumes for Regional Roads on its web site. The AADT's for Brock Road in two locations are shown on Table 1 and included in Appendix A. The traffic count locations were 200 metres north of Regional Road 5, approximately 7 kilometres south of the site entrance, and between Regional Road 21 and Highway 47 north of the site.

The annual rate of change in the AADT's for Brock Road between 1999/2000 and 2010 varied widely. However, the average change the over the 10 or 11 year period varied from about 6% south of the site in the City of Pickering to about 4% north of the site.

Population, and therefore traffic volume, has grown faster in the urban area of Pickering than in the rural area in the vicinity of the site. The "Growth Plan for the Greater Golden Horseshoe, 2006", prepared under the *Places to Grow Act 2005*, directs that future population growth in Durham be concentrated in the urban centres along Lake Ontario. Therefore, the increase in



TRAFFIC IMPACT STUDY
VICDOM SAND & GRAVEL LTD.
UXBRIDGE PIT EXPANSION

FIGURE 2
PRIMARY HAUL ROUTES

Scale: As Shown

P/N 1993	JUNE 2011

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traffic volume on Brock Road in the rural area will continue to be less than in the Urban area. It is assumed that the AADT for Brock Road in the vicinity of the site will increase by an average of approximately 3% through the study period.

Table 1 – Historic Traffic Volumes

Year	Brock Road	
	200 m North of RR 5	200m South of Hwy 47 Junction
1999	4270	
2000		2860
2001		
2002	6930	3090
2003	7280	3740
2004	8330	3980
2005	7880	4020
2006	6153	3591
2007	8320	3410
2008	8000	
2009	8190	3720
2010	8450	3920
Average Annual Increase	6%	4%

3.3 Detailed Traffic Counts

Detailed traffic counts were requested from the Region of Durham for the intersection of Brock Road and Regional Road 21. The counts were taken on Thursday May 14, 2009. This data is included in Appendix A.

The detailed count shows that on Brock Road south of Regional Road 21 (Highway 47) the peak AM hour traffic volume occurred between 7:15 and 8:15 am when there was a total of 621 vehicles, or 16.7% of the 2009 AADT. South bound traffic represents 75% of the total volume during that hour. The PM Peak Hour occurred between 5:00 and 6:00 pm when the total number of vehicles was 654, or 17.6% of the 2009 AADT. North bound traffic was 68% of the total. The directional distribution of traffic in the AM and PM peak hours suggest that Regional Road 21 is primarily used by commuters from areas to the north, east and west travelling to and from the urban areas to the south.

Given the peak hours for shipping from the pit, as described below, the AM Peak Hour will be analysed as the most relevant condition for the pit expansion. The directional split for the AM Peak Hour is 75% south bound and 25% north bound.

3.4 Projected Background Traffic

Based on an average growth in traffic volume of 3%, the future traffic volumes on Brock Road are shown in Table 2.

Table 2 – Projected Background Traffic Volumes

Location	Year	AADT Annual Increase 3%	Peak Hour % of AADT	Peak Hour Volume	Northbound 25%	Southbound 75%
Pit Entrance	2010	3,920	16.7%	655	164	491
	2012	4,160	16.7%	695	174	521
	2022	5,590	16.7%	934	234	700

3.5 Site Generated Traffic

3.5.1 Traffic Volume

Traffic volumes for the operation were calculated based on the operational and transportation information provided by the Bruno Giordano of Vicdom Sand and Gravel.

The amount of material shipped from the site will vary from year to year depending on market conditions. However, it cannot exceed the maximum tonnage permitted by the Licence under the Aggregate Resources Act. The combined licences for the existing operation permit a maximum of 2,165.000 tonnes per year. No increase in maximum tonnage is requested relative to the expansion. The annual average production is 1,000,000 Tonnes. Calculations for both the average and maximum tonnage are included in Appendix B.

Eighty percent of the annual tonnage is shipped from April 1st to December 31st each year due to reduced demand in the winter. The traffic generated by the operation is, and will continue, to be comprised primarily of trucks transporting the aggregate products from the pit to customers, with relatively small numbers of employee and service vehicles. Additional truck traffic will be generated by the importation of limestone products for resale.

The truck traffic generated by gravel pits tends to be distributed relatively evenly throughout the day. While the hours of operation for the pit are between 6:00 and 6:00 pm, for the purposes of this analysis it is assumed that 90% of the daily volume will shipped during the 10 hour period between 6:00 am and 4:00 pm.

The peak traffic volume from the pit is calculated to be 380 vehicles per day or 34 vehicles per hour at the average annual production of 1,000,000 tonnes and 759 vehicles per day or 71 vehicles per hour at the maximum annual production of 2,165.000 tonnes. There will be no increase in traffic relative to the expansion of the pit.

3.5.2 Directional Distribution

Based on current markets, the current and predicted directional distribution of traffic is 60% to and from the south and 40% to and from the north. The total peak hour traffic volumes for average and maximum production with directional distribution are shown in Tables 3A and 3B.

Table 3A - Traffic Distribution at Pit Entrance/Brock Road – Average Production

Existing Pit (2010)	34	10	7	7	10
Total 2010	655	10	7	7	10
Background Traffic (2012)	661				
Expanded Pit (2012)	34	10	7	7	10
Total 2012	695	10	7	7	10
Background Traffic (2022)	900				
Expanded Pit (2022)	34	10	7	7	10
Total 2022	934	10	7	7	10

Table 3B – Traffic Distribution at Pit Entrance/Brock Road – Maximum Production

	vph	Right (60%)	Left (40%)	Right (40%)	Left (60%)
Background Traffic (2010)	621				
Existing Pit (2010)	71	21	14	14	21
Total 2010	692	21	14	14	21
Background Traffic (2012)	661				
Expanded Pit (2012)	71	21	14	14	21
Total 2011	732	21	14	14	21
Background Traffic (2022)	900				
Expanded Pit (2022)	71	21	14	14	21
Total 2022	971	21	14	14	21

4.0 EVALUATION OF IMPACTS

4.1 Methodology

The intersections of the pit entrance with Brock Road was evaluated using the method described in the Highway Capacity Manual[1]. The level of service definitions area included in Appendix C. “McTrans Traffic Software” was used to carry out the calculations.

The objective of the analysis is to identify "problem" intersections and traffic movements. For rural areas, "problem" intersections and movements are typically defined as those where:

- the overall intersection volume/capacity (v/c) ratio exceeds 0.70; or,
- the individual movement v/c ratio exceeds 0.70; or,
- an exclusive turning movement generates queues which exceed the available storage space.

Generally, traffic impacts should be mitigated when site generated traffic creates or worsens a "problem" situation.

4.2 Analysis

As shown in Tables 3A and 3B, all turning movements related to the Vicdom Brock Road Pit entrance will continue to have a good to fair level of service throughout the study period at the average and maximum production rates. The Summary sheets are included in Appendix D.

The level of service of the intersection based on average production in 2010 is “A” for northbound Brock Road and “B” and “C” for right and left turns respectively from the entrance.

Whereas the level of service of the intersection based on maximum production in 2022 is “A” for northbound Brock Road and “C” for right and left turns from the entrance.

[1] Highway Capacity Manual Special Report 209 Third Edition@ Transportation Research Board, National Research Council, Washington, D.C., 1998.

5.0 CONCLUSIONS

Based on our research and analysis, we conclude the following.

- The existing Vicdom Brock Road Pit generates about 380 vehicles per peak day or 34 vehicles per hour in an average production year, and would generate about 759 vehicles per peak day or 71 vehicles per hour at the maximum annual tonnage permitted by the pit licences.
- No increase in production will occur as a result of the expansion of the pit.
- Traffic generated by the operation is and will continue to be primarily trucks transporting aggregate materials to the current markets in the southern Durham and eastern GTA areas.
- Traffic to and from the pit uses, and will continue to primarily use, Regional Roads and Provincial Highways that are part of the Strategic Goods Movement Network in the Region.
- All of the turning movements at the intersection of the Vicdom Pit entrance and Brock Road will continue to operate at a good to fair level of service throughout the study period.

Therefore, no mitigation measures are warranted or proposed.

All of which is respectfully submitted,
SKELTON, BRUMWELL & ASSOCIATES INC.

per:

Scott W. Brumwell, P.Eng.
Vice President

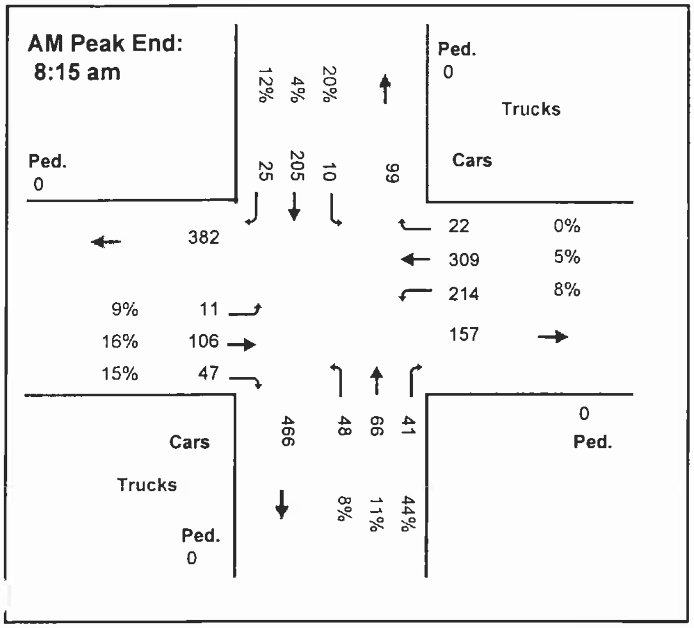
APPENDIX A

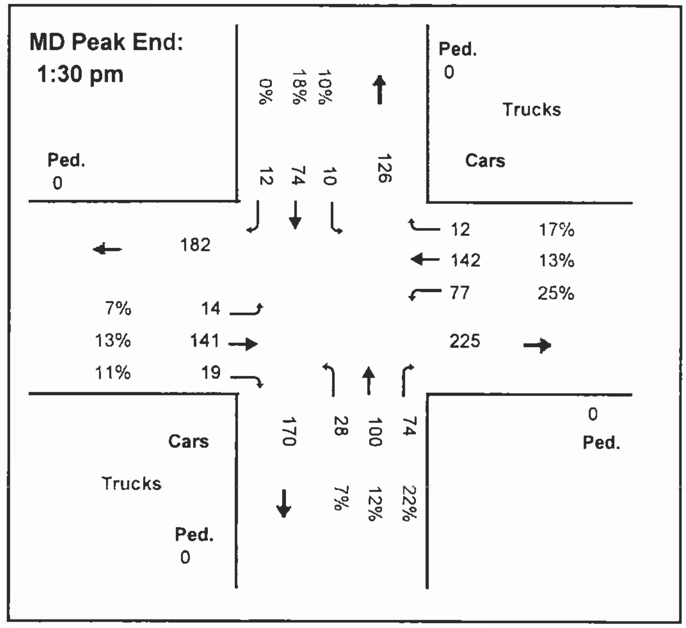
Traffic Count Information

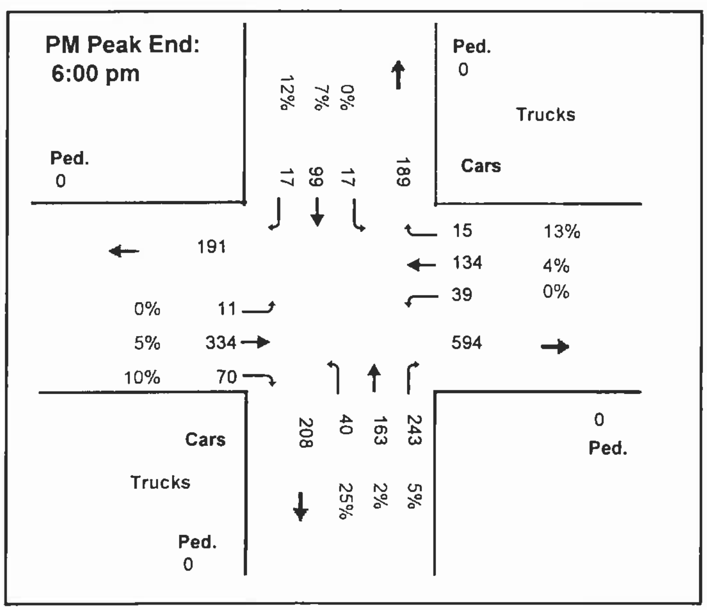
REGIONAL RD 1 @ REGIONAL RD 21

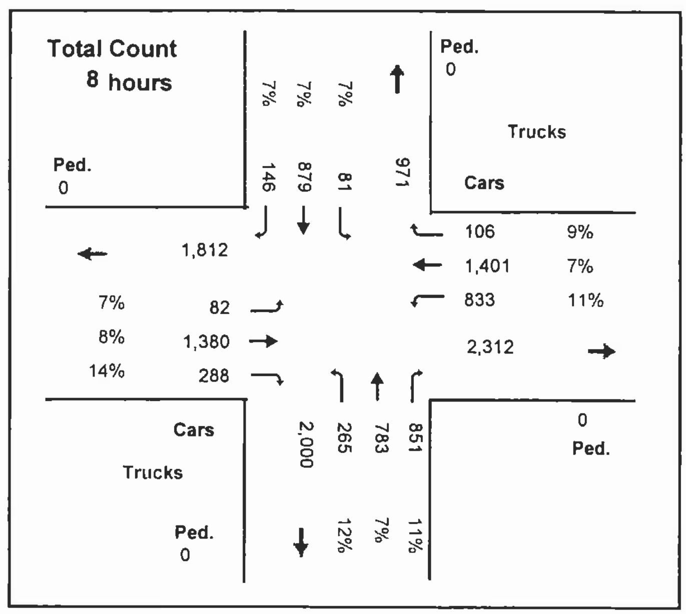
Uxbridge

Count Date: 14-May-2009 **Count Day:** Thursday









15 MIN REPORT

Count ID: 8,519 **REGIONAL RD 1 @ REGIONAL RD 21** **Municipality: Uxbridge** **Date: 14-May-2009**

Time	NORTH APPROACH										EAST APPROACH									
	Cars			Trucks			Heavies			Ped	Cars			Trucks			Heavies			Ped
	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right		Left	Thru	Right	Left	Thru	Right	Left	Thru	Right	
Period1																				
6:15	6	17	1	1	2	0	0	0	0	0	12	25	9	5	0	0	0	0	0	0
6:30	0	33	3	0	1	0	0	0	0	0	26	67	4	2	2	0	0	0	0	0
6:45	0	31	5	0	1	1	0	0	0	0	49	78	4	2	2	0	0	0	0	0
7:00	0	35	1	0	2	0	0	0	0	0	52	59	2	7	3	0	0	0	0	0
7:15	0	44	3	0	0	0	0	0	0	0	46	71	3	4	5	0	0	0	0	0
7:30	2	55	5	0	2	0	0	0	0	0	54	74	8	4	4	0	0	0	0	0
7:45	0	47	7	1	2	2	0	0	0	0	59	86	6	3	4	0	0	0	0	0
8:00	0	52	3	0	0	0	0	0	0	0	37	70	3	7	1	0	0	0	0	0
8:15	6	43	7	1	4	1	0	0	0	0	46	63	5	4	6	0	0	1	0	0
8:30	2	48	8	1	2	2	0	0	0	0	32	45	2	4	7	1	0	0	0	0
8:45	2	36	4	0	1	0	0	0	0	0	48	42	1	6	5	0	0	0	0	0
9:00	1	38	2	0	5	0	0	1	0	0	38	28	3	1	4	0	0	0	0	0
Period2																				
11:45	2	19	2	0	1	1	0	0	0	0	9	18	2	6	4	0	0	0	0	0
12:00	1	9	4	0	3	0	0	0	0	0	11	20	1	1	3	0	0	0	0	0
12:15	4	11	5	0	1	0	0	0	0	0	10	11	0	4	3	1	0	0	0	0
12:30	3	15	2	0	1	0	0	0	0	0	17	35	2	4	4	1	0	0	0	0
12:45	0	17	3	0	4	0	0	0	0	0	17	40	2	6	5	0	0	0	0	0
13:00	5	18	1	0	5	0	0	0	0	0	14	38	2	4	5	2	0	0	0	0
13:15	3	11	2	1	2	0	0	0	0	0	13	24	4	4	3	0	0	0	0	0
13:30	1	15	6	0	2	0	0	0	0	0	14	22	2	5	4	0	0	1	0	0
Period3																				
15:15	1	10	0	0	3	1	0	0	0	0	12	14	0	0	1	0	0	0	0	0
15:30	1	15	6	0	0	0	0	0	0	0	13	35	4	4	0	0	0	0	0	0
15:45	1	16	4	1	3	0	0	0	0	0	10	38	2	3	1	1	0	0	0	0
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16:30	4	12	10	0	0	0	0	0	0	0	23	48	2	1	3	0	0	0	0	0
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17:00	4	16	6	0	0	0	0	0	0	0	11	28	3	0	2	1	0	0	0	0
17:15	6	24	2	0	2	0	0	0	0	0	9	20	1	0	0	0	0	0	0	0
17:30	2	13	0	0	1	0	0	0	0	0	8	32	2	0	1	0	0	0	0	0
17:45	2	23	5	0	0	0	0	0	0	0	11	30	1	0	4	1	0	0	0	0
18:00	7	32	8	0	4	2	0	0	0	0	11	47	9	0	0	1	0	0	0	0

Time	SOUTH APPROACH										WEST APPROACH										Total
	Cars			Trucks			Heavies			Ped	Cars			Trucks			Heavies			Ped	
	Left	Thru	Right	Left	Thru	Right	Left	Thru	Right		Left	Thru	Right	Left	Thru	Right	Left	Thru	Right		
Period1																					
6:15	6	8	3	0	0	2	0	0	0	0	1	10	4	0	0	0	0	0	0	0	112
6:30	2	8	7	0	0	2	0	0	0	0	0	8	8	0	2	1	0	0	0	0	176
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7:15	12	12	3	2	3	0	0	0	0	0	2	20	7	0	1	0	0	0	0	0	238
7:30	12	12	1	1	3	5	0	0	0	0	1	18	11	0	5	2	0	0	0	0	279
7:45	9	9	9	2	0	5	0	0	0	0	6	22	8	0	6	2	0	0	0	0	295
8:00	14	20	6	1	2	5	0	0	0	0	1	26	11	1	2	2	0	0	0	0	264
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11:45	5	16	11	1	4	5	0	0	0	0	2	31	3	0	4	0	0	1	0	0	147
12:00	3	11	14	1	1	2	0	0	0	0	4	27	3	0	2	0	0	0	0	0	121
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12:30	4	12	11	0	3	5	0	0	0	0	2	32	3	0	3	1	0	0	0	0	160
12:45	6	19	12	1	5	2	0	0	0	0	5	32	8	0	5	1	0	0	0	0	190
13:00	5	39	20	1	3	5	0	0	0	0	2	25	0	1	5	0	0	0	0	0	200
13:15	8	9	14	0	3	5	0	0	0	0	1	33	3	0	6	1	0	0	0	0	150
13:30	7	21	12	0	1	4	0	0	0	0	5	32	6	0	3	0	0	0	0	0	163
Period3																					
15:15	1	12	24	0	2	0	0	0	0	0	3	30	6	1	2	0	0	0	0	0	123
15:30	2	23	35	0	3	2	0	0	0	0	3	44	6	0	2	1	0	0	0	0	199
15:45	8	21	25	0	0	0	0	0	0	0	1	54	8	0	5	0	0	0	0	0	202
16:00	11	35	44	0	0	2	0	0	0	0	4	60	6	1	1	0	0	0	0	0	251
16:15	12	45	31	0	1	3	0	0	0	0	1	55	7	0	1	4	0	0	0	0	258
16:30	5	44	62	1	1	5	0	0	0	0	4	69	7	0	3	0	0	0	0	0	304
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17:15	7	39	79	2	0	3	0	0	0	0	4	85	11	0	3	2	0	0	0	0	299
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17:45	5	37	39	4	0	1	0	0	0	0	1	73	13	0	5	1	0	0	0	0	256
18:00	11	46	44	4	4	5	0	0	0	0	0	82	26	0	6	3	0	0	0	0	352

APPENDIX B

Site Generated Traffic

APPENDIX B
SITE GENERATED TRAFFIC
VICDOM BROCK ROAD PIT

PIT AGGREGATE

Production

Average	1,000,000	tonnes
Maximum	2,165,000	tonnes

Fleet Usage	Tonnes Per Load	% of Trips
Triaxle	23	40%
Tractor with Trailer/ Triaxle with Pony	35	60%

Average per Load 30.2 tonnes

Annual Trip Generation

	Total Annual Tonnage	Tonnes Per Load	Trips Per Year
Average Year	1,000,000	30.2	33,113
		Total Trips Out	33,113
		Total Trips In	33,113
		Total Trips (Out + In)	66,225
Maximum Year (Licence Limit)	2,165,000	30.2	71,689
		Total Trips Out	71,689
		Total Trips In	71,689
		Total Trips (Out + In)	143,377

Daily Trip Generation

Percentage (%) shipped in peak months		80%
Peak Months:	April to December	9
Average number of working days per month:		21

Total Annual Tonnage	Total Trips Per Year	Total Working Days in Peak Months	Trips Per Day
1,000,000	66,225	189	350
2,165,000	143,377	189	759

APPENDIX B
SITE GENERATED TRAFFIC
VICDOM BROCK ROAD PIT

IMPORTED LIMESTONE

Annual Tonnage	100,000	tonnes
Tonnage per Load	35	tonnes

Annual Trip Generation

	Total Annual Tonnage	Tonnes Per Load	Trips Per Year
	100,000	35	2,857
		Total Trips Out	2,857
		Total Trips In	2,857
		Total Trips (Out + In)	5,714

Daily Trip Generation

Total Annual Tonnage	Total Trips Per Year	Total Working Days in Peak Months	Trips Per Day
100,000	5,714	189	30

TOTAL TRIP GENERATION

Peak Hours of Operation	
From:	6:00 AM
To:	4:00 PM
Total Hours:	10
% Shipped in Peak Hours	90%

Total Annual Tonnage	Trips Per Day	Average Trips Per Peak Hour	Minutes Between Trips
1,000,000	380	34	2
2,165,000	789	71	1

APPENDIX C

Level of Service Definition

LEVEL OF SERVICE AT UNSIGNALIZED INTERSECTIONS

The assessment of unsignalized intersections is based on the method described in the "Highway Capacity Manual, Special Report 209", published in 1994 by the Transportation Research Board.

The term "Level of Service" is often used to assist in clarifying the arithmetic analysis associated with traffic engineering. "Level of Service" implies a qualitative measure of traffic flow at an intersection, and is dependent upon vehicle delay and vehicle queue lengths at the approaches. The Level of Service can be determined based on the ratio between traffic volumes and approach capacity or "V/C" ratio. The following table describes the characteristics of each level:

Level of Service	Description	Avg. Stop Delay(s)	V/C Ratio
A	Little or no traffic delay occurs. Approaches appear open, turning movements are easily made, and drivers have freedom of operation.	≤5.0	0-0.59
B	Short traffic delays occur. Many drivers begin to feel somewhat restricted in terms of freedom of operation.	5.0 - 15.0	0.60-0.69
C	Average traffic delays occur. Operations are generally stable, but drivers emerging from the minor street may experience difficulty in completing their movement. This may occasionally impact on the stability of flow on the major street.	15.0 - 25.0	0.70-0.79
D	Long traffic delays occur. Motorists emerging from the minor street experience significant restriction and frustration. Drivers on the major street will experience congestion and delay as drivers emerging from the minor street interfere with the major through movements.	25.0 - 40.0	0.80-0.89
E	Very long traffic delays occur. Operations approach the capacity of the intersection.	40.0 - 60.0	0.90-0.99
F	Saturation occurs, with vehicle demand exceeding the available capacity. Extremely long traffic delays occur.	≥60.0	≥ 1.00

APPENDIX D

Intersection Analysis

TWO-WAY STOP CONTROL SUMMARY

General Information

Analyst	TPP / SWB
Agency/Co.	Skelton, Brumwell & Associates
Date Performed	27/06/2011
Analysis Time Period	Peak AM Hour

Site Information

Intersection	VicDom Pit Entrance/RR 1
Jurisdiction	Region of Durham
Analysis Year	2010 Average Production

Project Description 05-1993

East/West Street: VicDom Pit Entrance

North/South Street: Brock Road

Intersection Orientation: North-South

Study Period (hrs): 0.25

Vehicle Volumes and Adjustments

Major Street	Northbound			Southbound		
Movement	1	2	3	4	5	6
	L	T	R	L	T	R
Volume (veh/h)	10	155			466	7
Peak-Hour Factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00
Hourly Flow Rate, HFR (veh/h)	10	155	0	0	466	7
Percent Heavy Vehicles	10	--	--	0	--	--
Median Type	Undivided					
RT Channelized			0			1
Lanes	0	1	0	0	1	1
Configuration	LT				T	R
Upstream Signal		0			0	

Minor Street	Eastbound			Westbound		
Movement	7	8	9	10	11	12
	L	T	R	L	T	R
Volume (veh/h)	7		10			
Peak-Hour Factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00
Hourly Flow Rate, HFR (veh/h)	7	0	10	0	0	0
Percent Heavy Vehicles	100	0	100	0	0	0
Percent Grade (%)	-2			0		
Flared Approach		N			N	
Storage		0			0	
RT Channelized			1			0
Lanes	1	0	1	0	0	0
Configuration	L		R			

Delay, Queue Length, and Level of Service

Approach	Northbound	Southbound	Westbound			Eastbound		
Movement	1	4	7	8	9	10	11	12
Lane Configuration	LT					L		R
v (veh/h)	10					7		10
C (m) (veh/h)	1055					336		449
v/c	0.01					0.02		0.02
95% queue length	0.03					0.06		0.07
Control Delay (s/veh)	8.4					15.9		13.2
LOS	A					C		B
Approach Delay (s/veh)	--	--				14.3		
Approach LOS	--	--				B		

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TWO-WAY STOP CONTROL SUMMARY

General Information		Site Information	
Analyst	TPP / SWB	Intersection	VicDom Pit Entrance/RR 1
Agency/Co.	Skelton, Brumwell & Associates	Jurisdiction	Region of Durham
Date Performed	27/06/2011	Analysis Year	2022 Maximum Production
Analysis Time Period	Peak AM Hour		

Project Description 05-1993	
East/West Street: VicDom Pit Entrance	North/South Street: Brock Road
Intersection Orientation: North-South	Study Period (hrs): 0.25

Vehicle Volumes and Adjustments

Major Street	Northbound			Southbound		
Movement	1	2	3	4	5	6
	L	T	R	L	T	R
Volume (veh/h)	22	225			675	15
Peak-Hour Factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00
Hourly Flow Rate, HFR (veh/h)	22	225	0	0	675	15
Percent Heavy Vehicles	10	--	--	0	--	--
Median Type	Undivided					
RT Channelized			0			1
Lanes	0	1	0	0	1	1
Configuration	LT				T	R
Upstream Signal		0			0	

Minor Street	Eastbound			Westbound		
Movement	7	8	9	10	11	12
	L	T	R	L	T	R
Volume (veh/h)	15		22			
Peak-Hour Factor, PHF	1.00	1.00	1.00	1.00	1.00	1.00
Hourly Flow Rate, HFR (veh/h)	15	0	22	0	0	0
Percent Heavy Vehicles	100	0	100	0	0	0
Percent Grade (%)		-2			0	
Flared Approach		N			N	
Storage		0			0	
RT Channelized			1			0
Lanes	1	0	1	0	0	0
Configuration	L		R			

Delay, Queue Length, and Level of Service

Approach	Northbound	Southbound	Westbound			Eastbound		
Movement	1	4	7	8	9	10	11	12
Lane Configuration	LT					L		R
v (veh/h)	22					15		22
C (m) (veh/h)	880					214		333
v/c	0.03					0.07		0.07
95% queue length	0.08					0.22		0.21
Control Delay (s/veh)	9.2					23.1		16.6
LOS	A					C		C
Approach Delay (s/veh)	--	--				19.2		
Approach LOS	--	--				C		

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APPENDIX E

Curriculum Vitae

Scott Brumwell, P. Eng.

Skelton Brumwell
& ASSOCIATES INC.

Scott W. Brumwell, B.Sc. (Eng.), P. Eng.
Vice President, Principal

EDUCATION

Bachelor of Science in Engineering
University of Guelph, 1983
Majored in Water Resources Engineering

PROFESSIONAL BACKGROUND

Skelton, Brumwell & Associates Inc.
1987 to present

Vice President and Principal Engineer responsible for coordination of various municipal engineering projects undertaken by the firm. Specializing in development servicing design (roads, sewers, watermains), master servicing planning, stormwater management, transportation impact analysis and Phase I Environmental Site Assessments.

R. E. Clipsham Limited
1983 to 1987

Project Engineer responsible for the preparation of designs, reports, cost estimates and tender documents for various municipal engineering projects undertaken by the firm.

MEMBERSHIP & ASSOCIATIONS

Professional Engineers of Ontario (designated as a Consulting Engineer)

Qualified Designer for Sewage Systems and Plumbing (All Buildings) under Section 2.17 of the Ontario Building Code (BCIN 24241)

Institute of Transportation Engineers

Canadian Water Resources Association

Kempenfelt Rotary Club

Chairman of the Simcoe County Chapter Executive of the Professional Engineers of Ontario (1990-1991)

Skelton Brumwell & ASSOCIATES INC.

Scott W. Brumwell, B.Sc. (Eng.), P. Eng.
Vice President, Principal

WORK RELATED COURSES

Consulting Engineers of Ontario
and Ontario Ministry of Natural Resources
Urban Drainage Design, 1988

Ministry of the Environment
Implementation of pollution control measures for urban stormwater runoff, 1989

Ministry of Transportation
New MTO Drainage Management Policy and Practice, 1989

The Canadian Institute
Subdividing Land, 1990

The Canadian Institute
Effluent Management for the 1990's, 1990

Technical University of Nova Scotia
Stormwater Management, 1991
Executive Enterprises Inc.

Effective Strategies for Environmental Site Assessments and Cleanup, 1993.

Ministry of the Environment
Stormwater Management Practices and Planning, 1994

University of Toronto
Preparation and Review of Traffic Impact Studies, 1994

University of Toronto
Environmental Legislation and Auditing, 1996

Ministry of the Environment
Stormwater / CSO Technology Transfer Conference, 1998

Ontario Traffic Conference
Rural Roadway Safety Initiatives, 2005