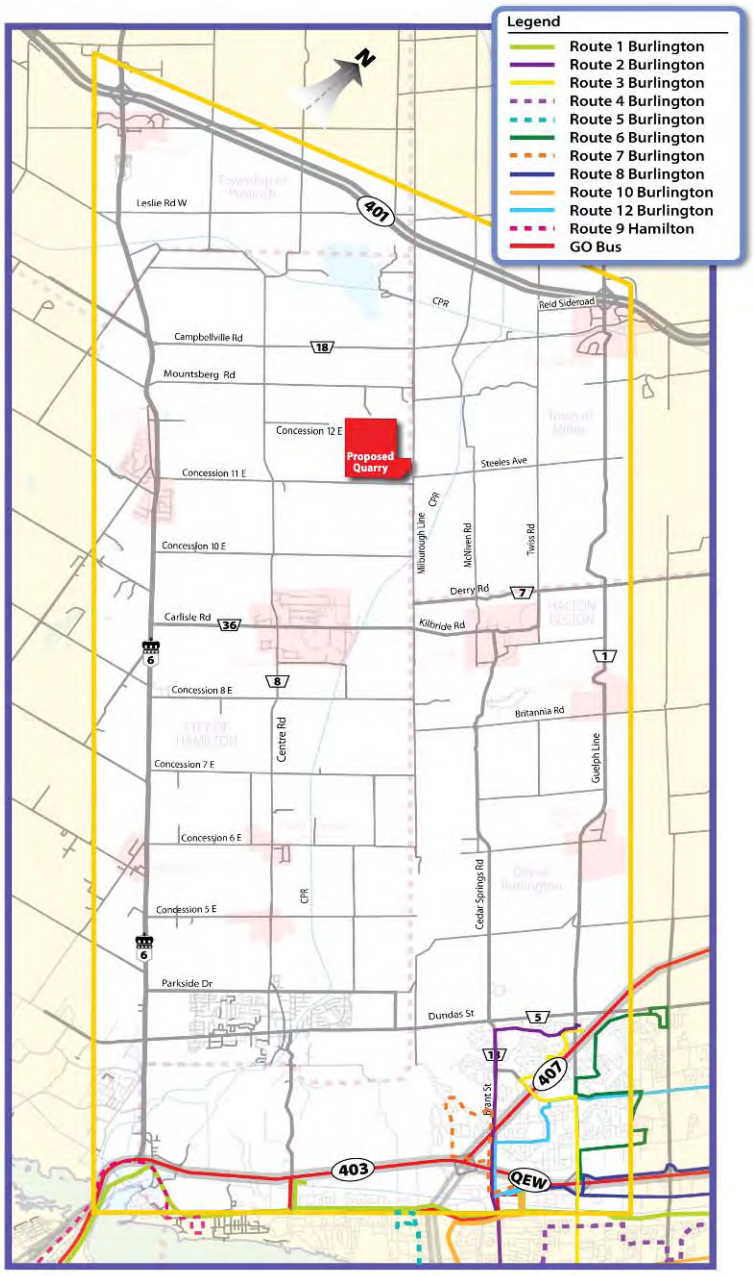

Exhibit 3-9: Existing Transit Routes

Table 3-1: Transit Route Schedule

Transit System	Route Number and Name	Frequency During Peak Periods
Hamilton Street Railway	9 – Rock Gardens	AM – No Service PM – Every 60 minutes
GO Transit	Lakeshore Bus	AM – Every 30 minutes PM – Every 30 to 40 minutes
GO Transit	Hamilton – York U Bus	AM – Every 32 minutes PM – Every 32 minutes
GO Transit	Lakeshore Train	AM – No Service PM – Every 60 minutes
Burlington Transit	1 – East to Burlington West to Hamilton	AM – Every 15 minutes PM – Every 15 minutes
Burlington Transit	2 – Brant	AM – Every 15 minutes PM – Every 15 minutes
Burlington Transit	3 – Guelph	AM – Every 15 minutes PM – Every 15 minutes
Burlington Transit	6 – Headon Forest	AM – Every 30 minutes PM – Every 30 minutes
Burlington Transit	7 – Tyandaga	AM – Every 5 minutes PM – Every 5 minutes
Burlington Transit	8 – Harvester	AM – Every 30 minutes PM – Every 30 minutes
Burlington Transit	10 – New	AM – Every 15 minutes PM – Every 15 minutes
Burlington Transit	12 – Uppermiddle	AM – Every 30 minutes PM – Every 30 minutes

3.5 Constraints

The constraints within the study area include schools, fire stations, settlement areas, locations with substandard visibility, long steep grades, parks and recreation areas, churches / cemeteries and community facilities. **Exhibit 3-10** illustrates the location of these constraints, which is based on information obtained from the Official Plans of Hamilton and Halton, Map Art and field investigations.

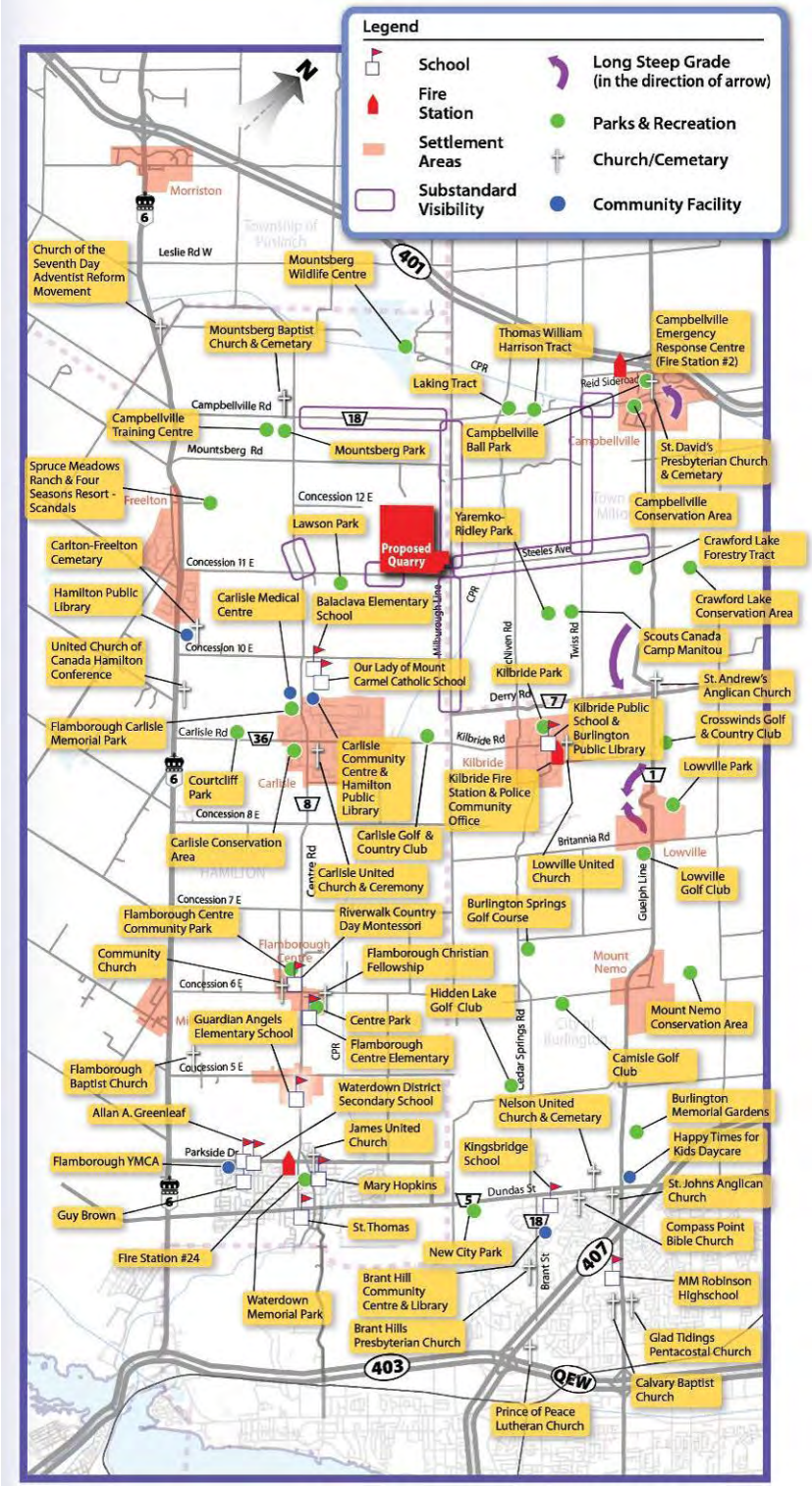

Exhibit 3-10: Constraints within the Study Area

3.6 Natural Features

There are numerous natural features within the study area, such as environmentally sensitive areas (ESAs), lakes, floodplains, wooded areas and settlement areas. The natural features within the study area in the City of Hamilton and Region Halton were obtained from Hamilton's Geographic Information System (GIS) and Halton's Official Plan and are shown in **Exhibit 3-11**.

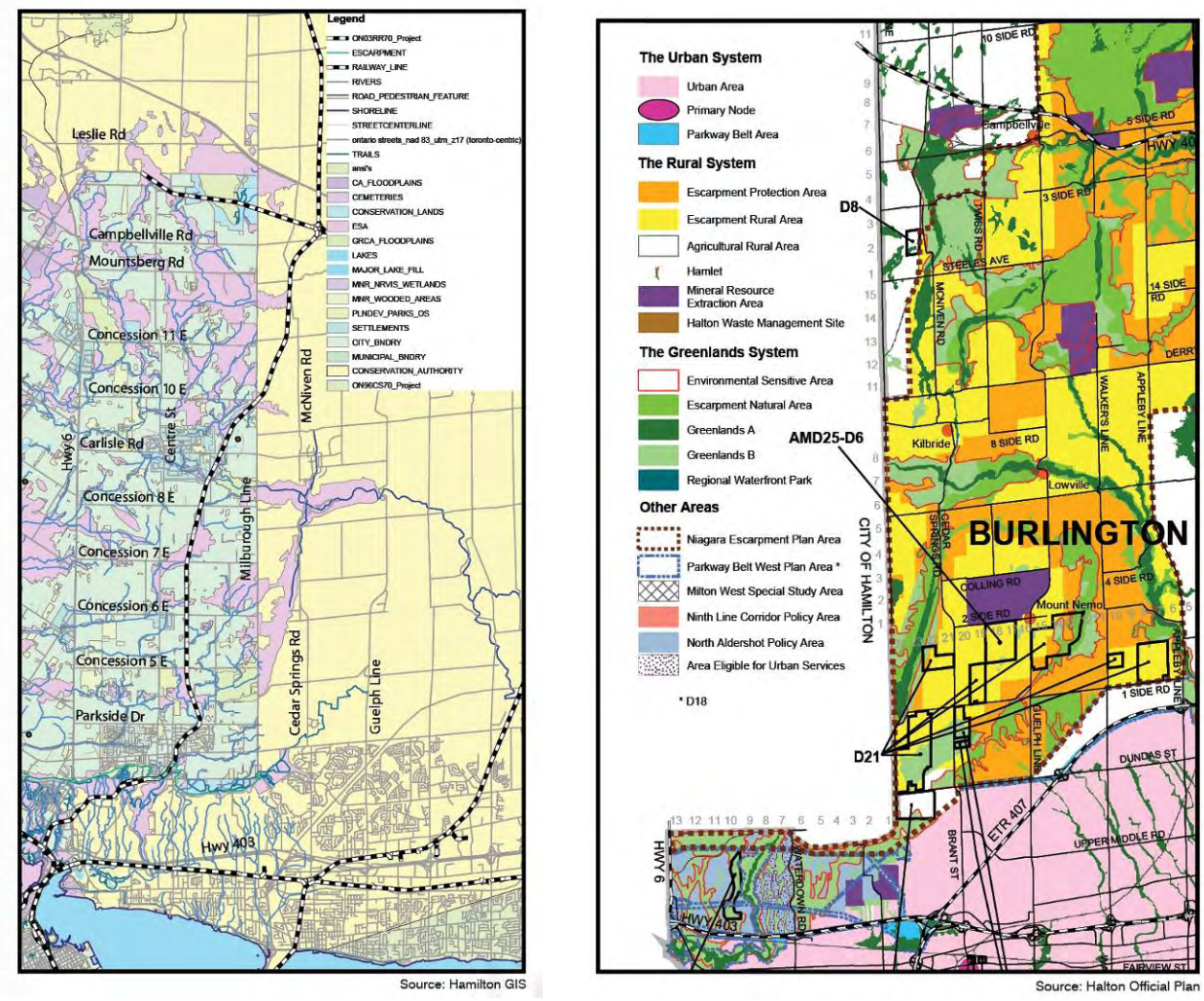

Exhibit 3-11: Hamilton's Natural Features (left) and Halton's Natural Features (right)

4. PROJECT DESCRIPTION

4.1 Quarry Operations

The expected start of operations for the proposed Flamborough Quarry is subject to the timing of approvals. The quarry is proposed to operate year round, 12 hours per day Monday to Friday and 6 hours on Saturdays.

The estimated breakdown of truck types accessing the quarry is as follows:

- 40 tonne trailer 0%
- 35 tonne trailer 38%
- 23 tonne tri-axle 44%
- 12 tonne tandem 7%
- 3-6 tonne 11%

Photo 4 - 1: 35 Tonne Trailer Configuration

4.2 Quarry Trip Generation

4.2.1 Estimates for the Generation of Site Truck Traffic

In order to estimate the truck traffic that may be generated by the proposed Flamborough Quarry, a detailed review of tickets from three other existing pits in the general area was undertaken. The ticket information included the date of the ticket and the product name and quantity. From this information, specific assumptions can be developed and confirmed as described in this section.

The number of trips to be generated by the proposed quarry was identified by sorting the number of loads for a proxy location from highest to lowest and then selecting an appropriate percentile day.

An 85th percentile day was selected resulting in an estimated 570 trips into and 570 trips out of the quarry each day. The 85th percentile is a common threshold used in other applications within transportation engineering (such as setting speed limits or establishing design hours).

The number of trips generated by the traffic accessing the proxy location does not vary appreciably by day of week. Further there is no specific correlation in the proxy data associated with the number of trips generated and the month of the year. There are numerous representative days in August (the peak month for background traffic) that are very close to the selected 85th percentile day for site traffic. As a result, no further day of week or month of year factors were applied.

A proxy location provides a realistic and reliable measure of the characteristics of the expected truck types accessing the proposed quarry. The use of this data accounts for trucks that are not necessarily loaded to capacity and so provides for a more conservative estimate of trips generated by the quarry. The truck fleet distribution adopted for estimating the generation of site truck traffic is described in **Section 4.1**.

It is acknowledged that the use of double-trailers may increase in the future but only single unit dump trucks were used to provide a more conservative estimate of trips generated by the quarry. Both single unit and double-trailer trucks were used as design vehicles for the intersection geometric design.

If it is assumed that the quarry will operate for 5.5 days per week (based on hours of operation – 12 for Monday to Friday and 6 for Saturday), the result is a total for site generation very similar to what has been provided to the public and used in previous studies and is summarized as follows.

During an average maximum day, it is estimated that there will be 1140 truck trips consisting of 570 inbound and 570 outbound truck trips. The average maximum day is defined as a day when the number of trips exceeds the average daily per day by 35%. Therefore, the typical number of truck trips is much lower.

Based on aggregate operations elsewhere in Ontario [16], 12% of the shipping traffic travels during the AM peak hour and 10% during the PM peak hour. Peak hour refers to the street peak hour and not the facility peak hour. Therefore, during the AM peak hour, the proposed Flamborough Quarry is estimated to generate 70 trucks entering and 70 exiting. During the PM peak hour, it is estimated to generate 60 trucks entering and 60 trucks exiting. This is based on the assumption that the quarry is operating at maximum capacity (i.e. at the tonnage maximum of three million tonnes/year).

The distribution of quarry truck traffic is provided in **Section 5.6** following discussion on aggregate supply and demand.

[16] Walker Environmental Assessment, Traffic Impact Assessment, iTRANS Consulting, February 2006

4.2.2 Employee Trip Generation

The employee trip generation was derived based on staffing requirements, which were provided by St. Marys. The quarry will require approximately 30-35 staff to operate the quarry per shift. Staff typically work in 12-hour shifts. In addition to the staff, about 10-20 contractors can be anticipated for operations, maintenance and other miscellaneous tasks during the day. These trips are assumed to occur outside of the peak hours. To be conservative, we have assumed 35 employees for the peak AM and PM hours. The employee trip generation is summarized in **Table 4-1**.

Table 4-1: Quarry Employee Trip Generation

Time Period	In (vph)	Out (vph)
AM Peak	35	5
PM Peak	5	35

To be conservative, we assumed all trips for the 35 employees occur in the peak periods and a nominal 5 trips leaving to account for pick-up/drop off.

The trip distribution for the employee components of the development was based on a review of the information provided in the ***2006 Transportation Tomorrow Survey*** (TTS) conducted by the University of Toronto Joint Program. The review looked at the number of trips from all the TTS planning districts to the Flamborough district. The results were filtered based on work trips and a start time of between 6:30am to 9:30am. A summary of the raw TTS output is shown in **Table 4-2**.

Table 4-2: Raw TTS Output Summary

Trip Origin	Number of Trips	% of Distribution
Flamborough	1832	37.9%
Hamilton	956	19.8%
Burlington	591	12.2%
Cambridge	258	5.3%
Dundas	233	4.8%
Brantford	145	3.0%
Stoney Creek	127	2.6%
Ancaster	126	2.6%
Mississauga	124	2.6%
Brant	99	2.0%
Halton Hills	72	1.5%
Guelph	51	1.1%
Waterloo	36	0.7%
Puslinch	24	0.5%
Brampton	23	0.5%
Markham	20	0.4%
St Catharines	19	0.4%
Kitchener	19	0.4%
North Dumfries	18	0.4%
PD 8 of Toronto	17	0.4%
Milton	17	0.4%
Oakville	16	0.3%
Glanbrook	16	0.3%
Total	4839	100.0%

The trips were divided based on the likely travel route to the site. For the trips that originate in Flamborough, population density was used to determine trip location and then trips were assigned to the network based on the probable route. The employee trip distribution and assignment for the proposed development is summarized in **Table 4-3.**

Table 4-3: Quarry Employee Trip Distribution

Direction: To/From	Via	In/Out
East	Highway 401 via Guelph Line	3.8%
	Parkside Drive	4.7%
	Dundas Street	4.7%
West	Highway 401 via Highway 6	7.7%
	Concession 11 East	3.8%
North	Highway 6	1.0%
South	Highway 6	49.6%
	Centre Road	18.9%
	Milburough Townline	5.7%
Total		**100%**

The quarry employee site peak hour traffic volumes are shown in **Exhibit 4-1**.

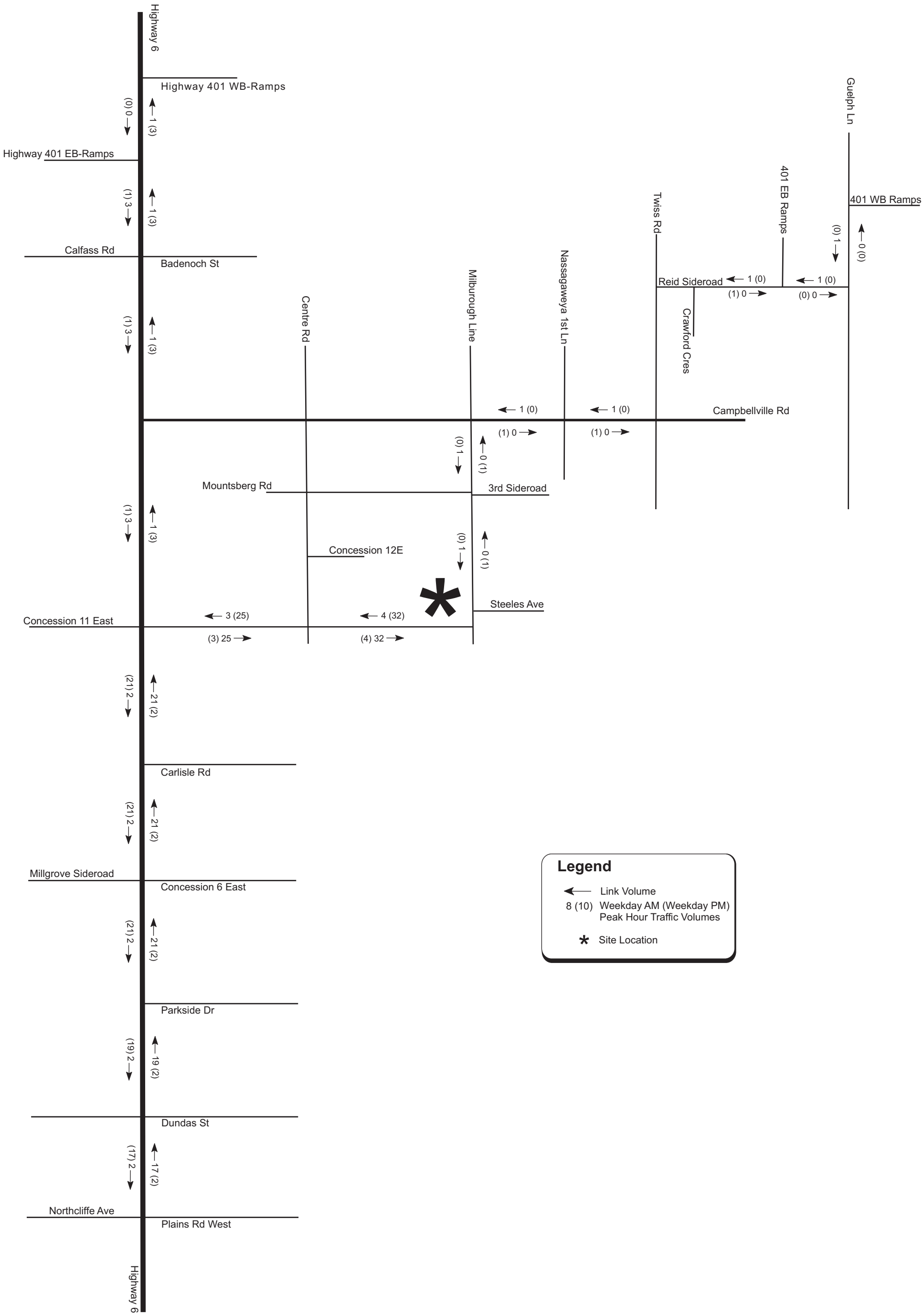

Exhibit 4-1
Quarry Employee Site Traffic

5. AGGREGATES SUPPLY AND DEMAND

Mineral aggregates are a non-renewable resource that consist of predominantly sand, gravel, clay and bedrock. Aggregates are a required construction material, and are consumed in very large quantities to meet society's needs for construction and infrastructure development. Aggregate requirements are supplied through the establishment of pits and quarries (operations located in sand, gravel and clay deposits are called pits, and excavations in bedrock materials are called quarries[17]). The location of mineral aggregate pits and quarries depends on local geology and physiographic features, and whether the quantity and quality of the deposits warrant extraction.

To understand the origin and destination patterns of Flamborough Quarry truck trips, it is important to understand where the markets for aggregates are located, and how these markets develop. An area where the demand for aggregates exceeds the supply is said to have an aggregates deficiency. Knowledge of areas with a deficiency will provide a basis for analyzing potential haul routes and the distribution of truck trips.

5.1 Location of Mineral Aggregates

Mineral aggregate resources can be found in pockets across the province. Each source varies in quality and significance. **Exhibit 5-1** shows the location of deposits of primary aggregate resources in southern Ontario. (The map was prepared by the Ontario Ministry of Natural Resources, and does not take into account any land use, social, economic, or environmental constraints.)

Some areas have abundant resources, while others have little or none. **Exhibit 5-1** shows that the unconstrained Amabel Dolostone deposits of southern Ontario are concentrated in the Niagara Escarpment, Hamilton, Halton Region, and Grey County areas. They are coloured brown in **Exhibit 5-1** (the Amabel/Lockport formation).

[17] Hollingsworth, Brian, "Mineral Aggregates Issues Paper," prepared for the Smart Growth Central Ontario Zone, Ontario Ministry of Natural Resources, October 2002.

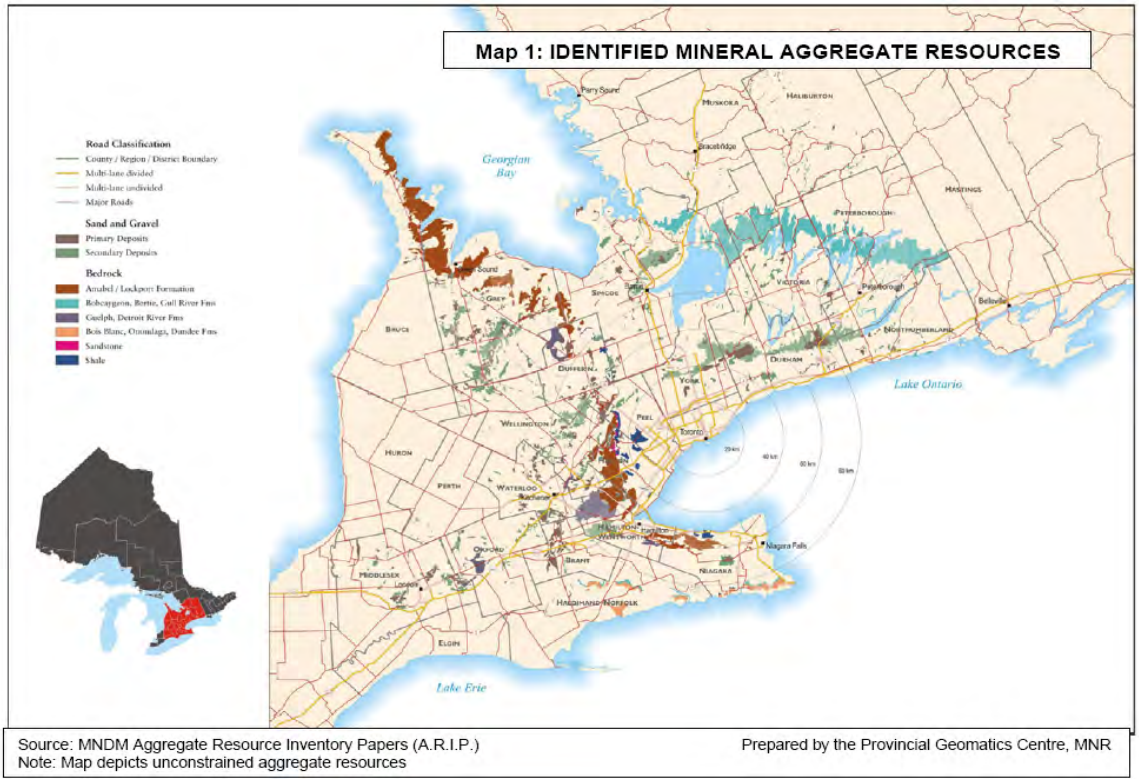

Exhibit 5-1: Identified Mineral Aggregate Resources in Southern Ontario

5.2 Areas of Supply and Demand for Aggregates

The demand for mineral aggregates fluctuates, and depends on local, regional, and provincial requirements. A deposit may have a local, regional and provincial significance, but because mineral aggregates are heavy, bulky and relatively low in price, local resources are always significant.

Clayton Research undertook a study which examined the difference between areas of aggregate supply and areas of aggregate demand. The study was documented in a paper prepared for the Smart Growth Central Ontario Zone in 2002[17].

Exhibit 5-2 shows the areas of aggregate production and consumption in Ontario in 1998 to 2000, as reported by Clayton Research. The Greater Toronto Area (GTA) (the largest population centre in the province) consumes far more aggregates than the area produces.

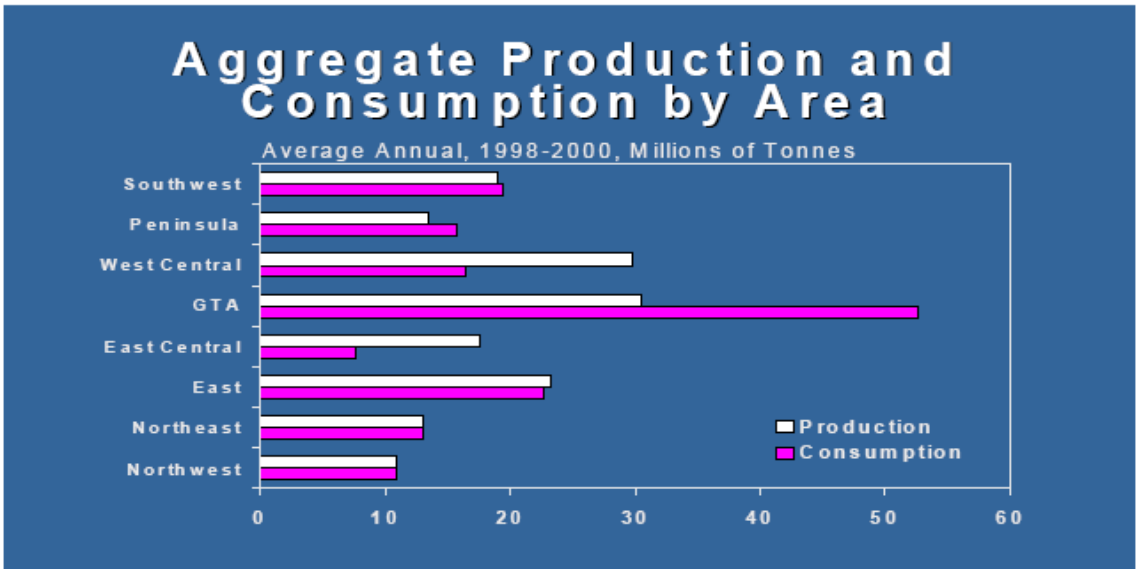

Exhibit 5-2: Aggregate Production and Consumption in Ontario by Area

The Clayton Research Study found that municipalities that have aggregate resources and are located close to the Greater Toronto Area (GTA) have the highest aggregate production. This finding confirms the significance of a local supply. This emphasizes the importance of the resource not only as a local supply but also as a regionally and provincially significant resource. The underlying message was that areas rich in aggregate resources need to share them with those without aggregate resources.

It is proposed that understanding the sources and markets on a Regional scale helps to provide an estimate of the current and future market demand for the Amabel Dolostone from the proposed quarry and can therefore be used to establish trip distribution patterns for the quarry trucks.

5.3 Assumptions for Analyzing the Market for Aggregates

The approach used in this study is to analyze the market for the mineral aggregates to be produced by the proposed Flamborough quarry based on the best information available.

The following assumptions are made:

3. All of the key market locations for the proposed quarry are located within the Greater Golden Horseshoe (GGH) area. This assumption is based on the discussion in **Sections 5.1** and **5.2**.
4. Population and employment growth is a surrogate for aggregate demand. This assumption is based on a study by the California Department of Conservation. The Department found that population change had a strong correlation with historical aggregate demand[18].
5. Licensed Permit Production by a lower tier municipality is a surrogate for aggregate supply. This assumption was necessary because tonnages by quarry are not available from any source as this information is considered proprietary data. Staff at The Ontario Aggregate Resources Corporation (TOARC) said that their 2006 statistical update is the best source of production information.

5.4 Population and Employment Data

Table 5-1 summarizes projected population and employment data for the GGH. The data are from the Places to Grow Growth Plan[19]. Due to the way the data were presented for the year 2031, some of the municipalities were combined. The combined municipalities are:

- County of Peterborough and the City of Peterborough
- County of Simcoe, City of Barrie, and City of Orillia
- County of Wellington and City of Guelph
- County of Brant and City of Bradford

The last two columns show the combined population and employment growth (our surrogate for aggregate demand (**Section 5.3**)), and the expected growth between 2011 and 2031.

[18] Department of Conservation –California Geological Survey, "Aggregate Availability in California," 2006.

Table 5-1: Distribution of Projected Population and Employment in the Greater Golden Horseshoe, 2011 and 2031[19]

	Population 000's			Employment 000's			Population + Employment Growth	
	2011	2031	Growth	2011	2031	Growth	Total Growth 000's	Total Growth
Region of Durham	660	960	300	260	350	90	390	11.7%
Region of York	1,060	1,500	440	590	780	190	630	18.9%
City of Toronto	2,760	3,080	320	1,540	1,640	100	420	12.6%
Region of Peel	1,320	1,640	320	730	870	140	460	13.8%
Halton Region	520	780	260	280	390	110	370	11.1%
City of Hamilton	540	660	120	230	300	70	190	5.7%
County of Northumberland	87	96	9	32	33	1	10	0.3%
County of Peterborough/City of Peterborough	137	149	12	58	60	2	14	0.4%
City of Kawartha Lakes	80	100	20	23	27	4	24	0.7%
County of Simcoe/City of Barrie/City of Orillia	484	667	183	196	254	58	241	7.2%
County of Dufferin	62	80	18	22	27	5	23	0.7%
County of Wellington/City of Guelph	223	321	98	117	158	41	139	4.2%
Region of Waterloo	526	729	203	282	366	84	287	8.6%
County of Brant/City of Brantford	141	173	32	62	71	9	41	1.2%
County of Haldimand	49	56	7	19	20	1	8	0.2%
Region of Niagara	442	511	69	201	218	17	86	2.6%
Total GGH	**9,091**	**11,502**	**2,411**	**4,642**	**5,564**	**922**	**3,333**	

[19] Ministry of Public Infrastructure Renewal, "Places to Grow Growth Plan for the Greater Golden Horseshoe," 2006. Schedule 3 – Distribution of Population & Employment for the Greater Golden Horseshoe 2001-2031.

5.5 Production of Aggregates (All Types), 2006

Table 5-2 shows licensed permit production for aggregates for each municipality in 2006, as published by TOARC. These data do not distinguish between aggregate types, and include sand and gravel, crushed stone, clay/shale, and other stone.

The number of tonnes produced by each municipality is the municipality's supply of aggregates. The total supply for the GGH in 2006 was 93,045,000 metric tonnes. **Table 5-2** also shows the percentage of the total supply produced in each municipality. Halton region and the City of Hamilton are major suppliers of aggregates in the GGH, together accounting for 20.6 percent of the total supply.

Table 5-2: Licensed Permit Production of Aggregates by Municipality (metric tonnes), 2006[20]

Municipality	**Aggregate Supply**	
	Metric Tonnes	**%**
Region of Durham	12,239,000	13.2%
Region of York	959,000	1.0%
City of Toronto	0	0.0%
Region of Peel	5,316,000	5.7%
Halton Region	9,589,000	10.3%
City of Hamilton	9,589,000	10.3%
County of Northumberland	3,387,000	3.6%
County of Peterborough/City of Peterborough	2,600,000	2.8%
City of Kawartha Lakes	6,453,000	6.9%
County of Simcoe/City of Barrie/City of Orillia	13,350,000	14.3%
County of Dufferin	3,057,000	3.3%
County of Wellington/ City of Guelph	8,354,000	9.0%
Region of Waterloo	9,174,000	9.9%
County of Brant/City of Brantford	2,268,000	2.4%
County of Haldimand	1,819,000	2.0%
Region of Niagara	4,891,000	5.3%
Total GGH	**93,045,000**	**100.0%**

[20] The Ontario Aggregate Resources Corporation (TOARC), "Preliminary Aggregates in Ontario Statistical Update," 2006. Table 2-Licence and Wayside Permit Production by Lower Tier Municipality.

5.5.1 Areas of Aggregate Surplus and Deficiency (All Aggregate Types), 2006

Table 5-3 shows the difference between each municipality's supply of aggregates and demand for aggregates. Where the difference is positive, the municipality has an aggregate surplus. Where the difference is negative, the municipality has an aggregate deficiency.

Table 5-3: Identification of Aggregate Surplus and Deficiencies, 2006

	Aggregate Supply	**Aggregate Demand**	**Difference (Supply – Demand)**
Region of Durham	13.2%	11.7%	1.5%
Region of York	1.0%	19.0%	-17.9%
City of Toronto	0.0%	12.6%	-12.6%
Region of Peel	5.7%	13.8%	-8.1%
Halton Region	10.3%	11.1%	-0.8%
City of Hamilton	10.3%	5.7%	4.6%
County of Northumberland	3.6%	0.3%	3.3%
County of Peterborough/City of Peterborough	2.8%	0.4%	2.4%
City of Kawartha Lakes	6.9%	0.7%	6.2%
County of Simcoe/City of Barrie/City of Orillia	14.3%	7.2%	7.1%
County of Dufferin	3.3%	0.7%	2.6%
County of Wellington/ City of Guelph	9.0%	4.2%	4.8%
Region of Waterloo	9.9%	8.6%	1.2%
County of Brant/ City of Brantford	2.4%	1.2%	1.2%
County of Haldimand	2.0%	0.2%	1.7%
Region of Niagara	5.3%	2.6%	2.7%
Total GGH	**100%**	**100.**	**0.0%**

Four municipalities are likely to experience an aggregate deficiency in the years ahead: Region of York (-18%), City of Toronto (-13%), Region of Peel (-8%), and Halton Region (-1%). The four municipalities are shown in purple in **Exhibit 5-3**.

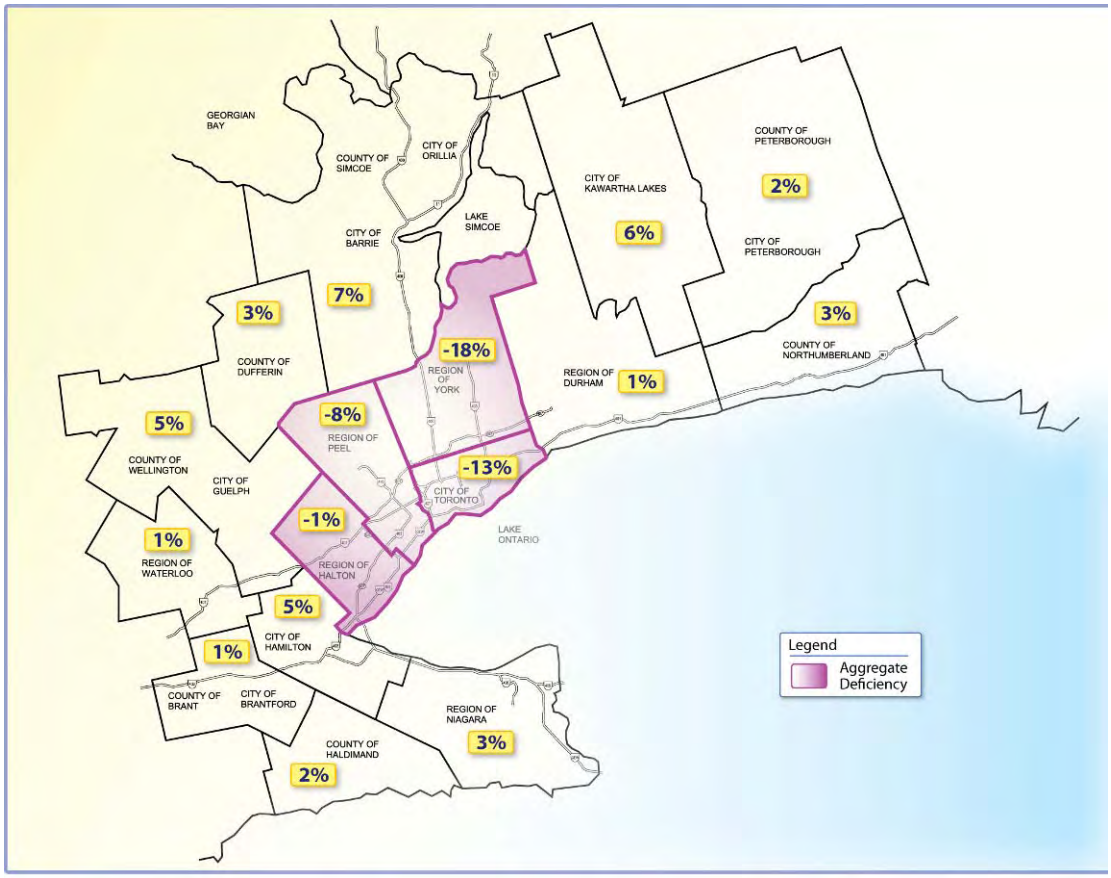

Exhibit 5-3: Areas with an Aggregate Demand Surplus and Deficiency, 2006

5.5.2 Reconciliation of Supply and Demand for Aggregates (All Types) across Greater Golden Horseshoe

The information shown in **Table 5-3** and **Exhibit 5-3** was used to distribute the aggregates from the surplus regions to the regions with deficiencies. The assumptions made to conduct the distribution were established to be reasonable and conservative.

The distribution of the aggregates was carried out in two stages. In Stage 1, aggregate distribution was estimated by assuming that demand was first met from bordering municipalities that had a surplus. **Table 5-4** presents a matrix for Stage 1. Aggregate deficient municipalities are shown across the top, and aggregate surplus municipalities are shown down the left side. The cells in the matrix show the percentage that we estimate will be transported between neighbouring municipalities.

Table 5-4: Matrix of Stage 1 of the Aggregate Distribution for 2006

			Deficient Municipalities				
			Region of York	City of Toronto	Region of Peel	Halton Region	Surplus Remaining
Original Deficiency			*-18.00%*	*-13.00%*	*-8.00%*	*-1.00%*	
Stage 1 Resulting Deficiency			*-13.00%*	*-9.50%*	*-1.25%*	*0.00%*	
Surplus Municipalities	Region of Durham	1.00%	0.50%	0.50%			0.00%
	City of Hamilton	5.00%	1.00%	2.50%	1.00%	0.50%	0.00%
	County of Northumberland	3.00%		0.50%			2.50%
	County of Peterborough/City of Peterborough	2.00%					2.00%
	City of Kawartha Lakes	6.00%					6.00%
	County of Simcoe/City of Barrie/City of Orillia	7.00%	3.50%		1.75%		1.75%
	County of Dufferin	3.00%			1.50%		1.50%
	County of Wellington/City of Guelph	5.00%			2.50%	0.50%	2.00%
	Region of Waterloo	1.00%					1.00%
	County of Brant/City of Brantford	1.00%					1.00%
	County of Haldimand	2.00%					2.00%
	Region of Niagara	3.00%					3.00%

The Region of Durham, for example, has a 1.0% surplus. We assume that 0.5% will go to York Region and 0.5% will go to the City of Toronto to help alleviate the aggregate deficiencies in these two areas. Durham is left in equilibrium and the two bordering municipalities have a smaller deficit. It is important to note that as demand from outside of the GGH is also anticipated, we do not expect that all of the municipalities will achieve equilibrium.

Exhibit 5-4 provides a map showing how the Stage 1 distribution shown in **Table 5-4** was applied. The Stage 1 distribution is shown in red.

Exhibit 5-4: Stage 1 and Stage 2 of the Aggregate Distribution for 2006

The matrix shown in **Table 5-5** shows how Stage 2 of the distribution of the aggregates was carried out. The blue text shows our estimates of the aggregate transfers from municipalities that are not on the border of a deficient region, but are connected by a 400 series highway.

The last column in **Table 5-5** shows the surplus aggregates remaining in each municipality. The Stage 2 surpluses are also shown in yellow in **Exhibit 5-4**. The surpluses are mostly very low (0.0% to 2.0%).

Table 5-5: Matrix of Stage 2 of the Aggregate Distribution for 2006

			Deficient Municipalities				
			Region of York	City of Toronto	Region of Peel	Halton Region	Surplus Remaining
Original Deficiency			*-18.00%*	*-13.00%*	*-8.00%*	*-1.00%*	
Stage 1 Resulting Deficiency			*-13.00%*	*-10.00%*	*-1.00%*	*0.00%*	
Stage 2 Resulting Deficiency			*-11.75%*	*-7.75%*	*-0.25%*	*0.00%*	
Surplus Municipalities	Region of Durham	1.00%	0.50%	0.50%			0.00%
	City of Hamilton	5.00%	1.00%	2.50%	1.00%	0.50%	0.00%
	County of Northumberland	3.00%		0.50%			2.50%
	County of Peterborough/City of Peterborough	2.00%					2.00%
	City of Kawartha Lakes	6.00%					6.00%
	County of Simcoe/City of Barrie/City of Orillia	7.00%	3.50%		1.75%		1.75%
	County of Dufferin	3.00%			1.50%		1.50%
	County of Wellington/City of Guelph	5.00%			2.50%	0.50%	2.00%
	Region of Waterloo	1.00%	0.50%	0.25%	0.25%		0.00%
	County of Brant/City of Brantford	1.00%	0.25%	0.25%	0.25%		0.25%
	County of Haldimand	2.00%					2.00%
	Region of Niagara	3.00%	0.50%	1.00%	0.50%		1.00%

Table 5-5 shows that existing aggregate supply can eliminate the deficiency in Halton Region and significantly reduce it to a negligible level in the Region of Peel (to -0.25%). Although the analysis tried to balance the supply and demand of the aggregates among the municipalities, two areas continue to have a significant deficiency after the Stage 2 distribution: the Region of York (-11.75%), and the City of Toronto (-7.75%).

Exhibit 5-5 shows the final estimated aggregate surplus and aggregate deficiency by municipality after the Stage 1 and Stage 2 analysis.

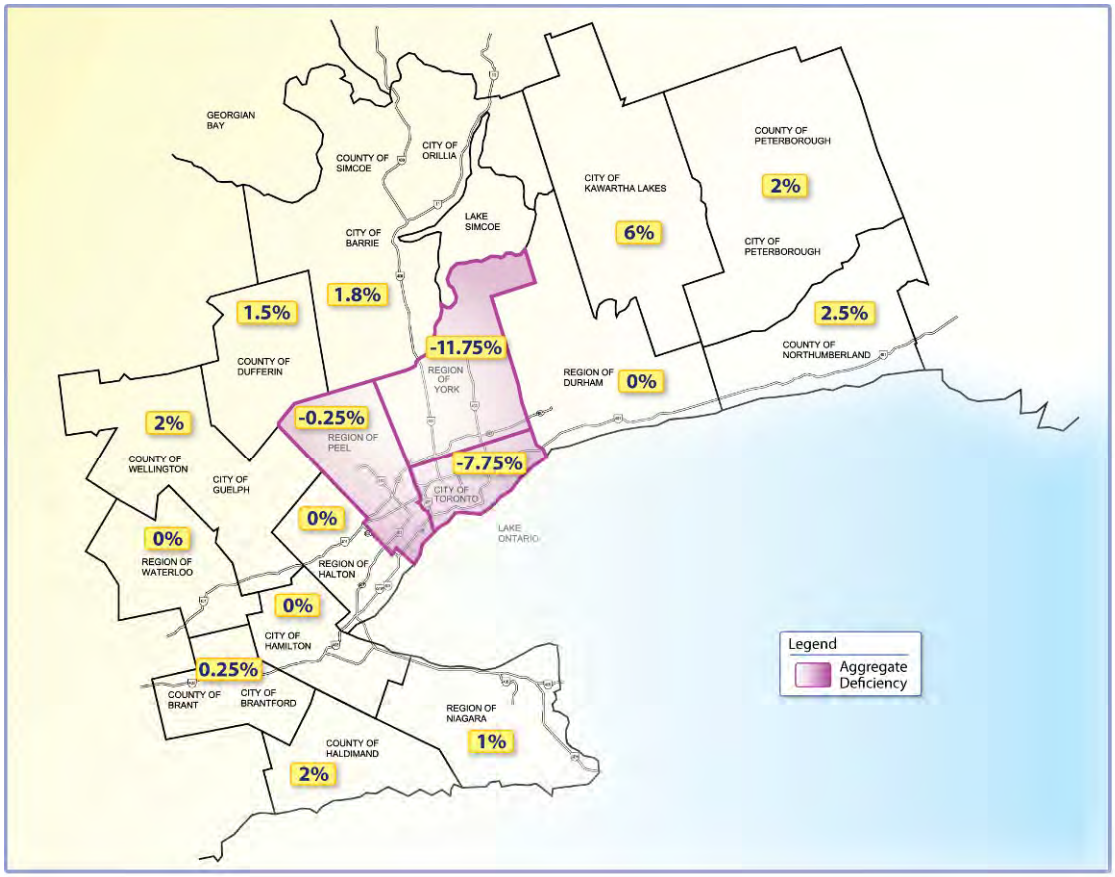

Exhibit 5-5: Estimated Aggregate Surplus and Aggregate Deficiency by Municipality after Stage 1 and Stage 2 Analysis

5.6 Production of Crushed Stone, 2007

The proposed quarry will produce Amabel Dolostone, a high quality crushed stone. As mentioned in **Section 1.1.1**, Amabel Dolostone is the most durable aggregate material found in Southern Ontario.

Unfortunately, it is very difficult to obtain detailed information about quarry operations because the information is proprietary. We were, however, able to approach the author of the 2002 “Mineral Aggregates Issues Paper” to update our data on aggregate supply, and in particular separate crushed stone supply from sand and gravel[21]. MNR makes a distinction between "crushed stone" which is derived from bedrock sources (mainly limestone and dolomite including Amabel formation) and "sand and gravel" or unconsolidated material.

[21] Hollingsworth, Brian, “Mineral Aggregates Issues Paper – Update,” not yet published, 2007.

The interchangeability of the aggregate type is largely dependant on its intended application. Either type of aggregate may be used for base and granular materials, however, certain product specifications, notably high strength concrete and some types of asphalt paving (e.g., for 400 series highways), require high quality limestone. The chemical properties of the Amabel formation make it the highest quality of limestone available in the province.

Exhibit 5-6 shows the total aggregate production in 2007 and compares the sand/gravel and crushed stone produced by municipality. The 2007 data do not include the County of Northumberland.

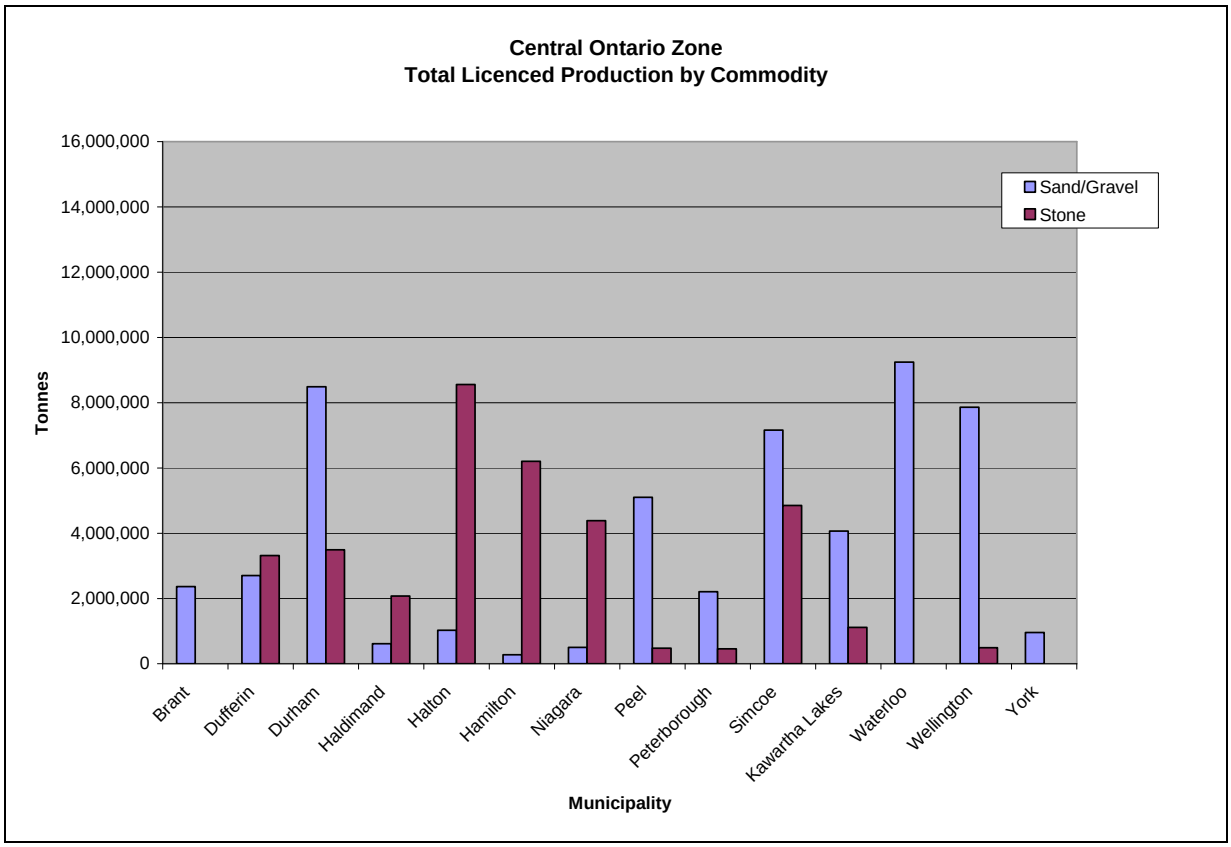

Exhibit 5-6: Comparison of Sand/Gravel Production and Crushed Stone Aggregate Production by Municipality, 2007

5.6.1 Areas of Crushed Stone Surplus and Deficiency, 2007

Table 5-2 showed that the total GGH supply of aggregates in 2006 was 93,045,000 metric tonnes. **Table 5-6** shows that the crushed stone production in the GGH in 2007 was 35,447,869 metric tonnes. **Table 5-6** also shows the percentage of crushed stone production for each municipality.

Table 5-6: Crushed Stone Production by Municipality, 2007

	Crushed Stone Supply	
	Metric Tonnes	**%**
Region of Durham	3,495,297	9.9%
Region of York	0	0.0%
City of Toronto	0	0.0%
Region of Peel	481,578	1.4%
Halton Region	8,559,670	24.1%
City of Hamilton	6,204,388	17.5%
County of Peterborough/City of Peterborough	458,534	1.3%
City of Kawartha Lakes	1,115,968	3.1%
County of Simcoe/City of Barrie/City of Orillia	4,851,831	13.7%
County of Dufferin	3,320,385	9.4%
County of Wellington/City of Guelph	492,741	1.4%
Region of Waterloo	0	0.0%
County of Brant/City of Brantford	0	0.0%
County of Haldimand	2,078,295	5.9%
Region of Niagara	4,389,182	12.4%
Total GGH	**35,447,869**	**100.0%**

Like **Table 5-3**, **Table 5-7** shows the difference between each municipality's supply of crushed stone and demand for crushed stone. Where the difference is positive, the municipality has a crushed stone surplus. Where the difference is negative, the municipality has a crushed stone deficiency.

Table 5-7: Identification of Crushed Stone Surplus and Deficiencies, 2007

	Aggregate Supply	**Aggregate Demand**	**Difference (Supply – Demand)**
Region of Durham	9.9%	11.7%	-1.9%
Region of York	0.0%	18.9%	-19.0%
City of Toronto	0.0%	12.6%	-12.6%
Region of Peel	1.4%	13.8%	-12.5%
Halton Region	24.1%	11.1%	13.0%
City of Hamilton	17.5%	5.7%	11.8%
County of Peterborough/City of Peterborough	1.3%	0.4%	0.9%
City of Kawartha Lakes	3.1%	0.7%	2.4%
County of Simcoe/City of Barrie /City of Orillia	13.7%	7.3%	6.4%
County of Dufferin	9.4%	0.7%	8.7%
County of Wellington/City of Guelph	1.4%	4.2%	-2.8%
Region of Waterloo	0.0%	8.6%	-8.6%
County of Brant/City of Brantford	0.0%	1.2%	-1.2%
County of Haldimand	5.9%	0.2%	5.6%
Region of Niagara	12.4%	2.6%	9.8%
Total GGH	**100.0%**	**100.0%**	**0.0%**

Seven municipalities have a crushed stone deficiency. The seven municipalities are Durham Region (-1.9%), the Region of York (-19%), the City of Toronto (-12.6%), the Region of Peel (-12.5%), the County of Wellington (-2.8%), the Region of Waterloo (-8.6%), and the County of Brant (-1.2%).

All the municipalities are shown on the map in **Exhibit 5-7**. Municipalities with a crushed stone deficiency are shown in purple.

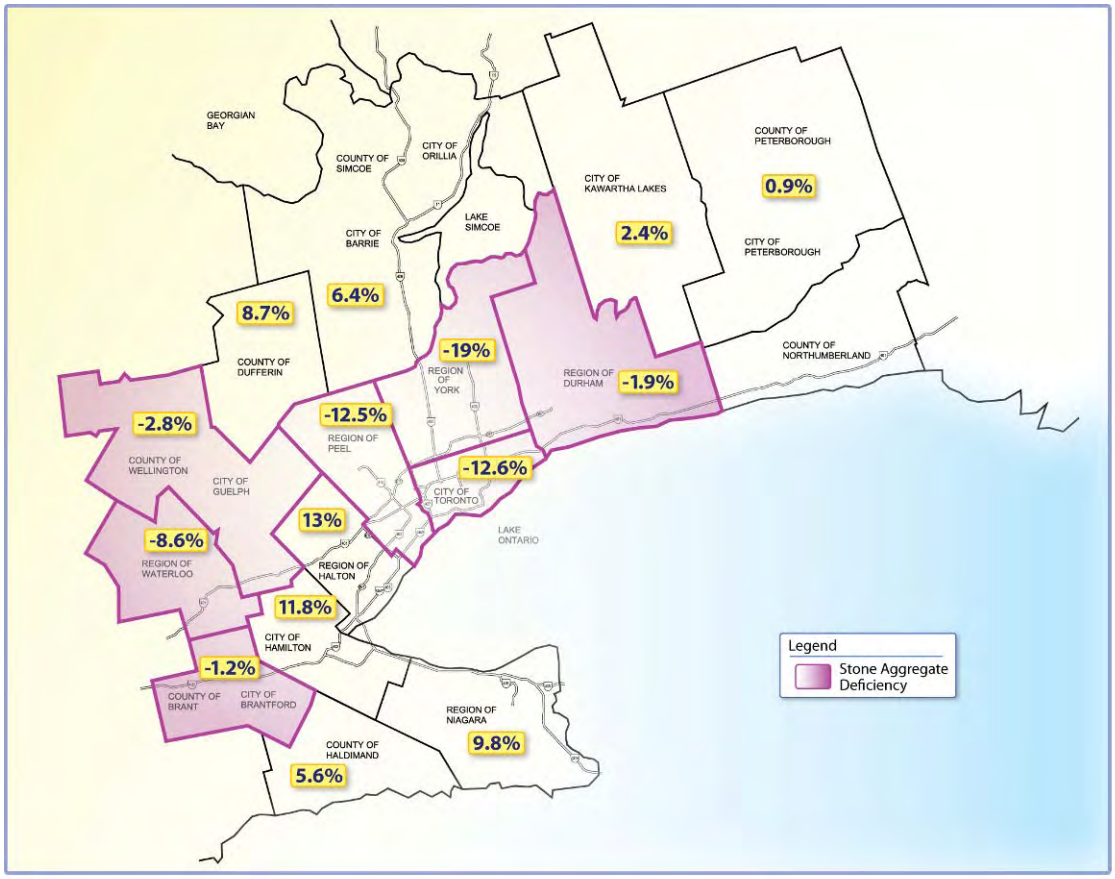

Exhibit 5-7: Areas with a Crushed Stone Surplus and Deficiency, 2007

If the deficient municipality is assigned to a geographical quadrant (relative to the location of the proposed quarry), and the quadrant's portion of the overall deficiency is calculated, the breakdown is as follows:

- Northwest (20.0 %)
  - County of Wellington
  - Region of Waterloo
- Northeast (78 %)
  - Region of Peel
  - Region of York
  - City of Toronto
  - Durham Region
- Southwest (2 %)
  - County of Brant
- Southeast (0 %)
  - (no deficient municipalities)

It is clear that most of the deficiency is in the northeast quadrant.

5.6.2 Reconciliation of Supply and Demand for Crushed Stone across Greater Golden Horseshoe

The information shown in **Table 5-8** and **Exhibit 5-7** was used to distribute the crushed stone from the surplus regions to the regions with deficiencies. The assumptions made to conduct the distribution were established to be reasonable and conservative.

The distribution of the aggregates was carried out and the crushed stone distribution was estimated by assuming that demand was first met from bordering municipalities that had a surplus and then by municipalities connected by a 400 series highway. The cells in the matrix show the percentage that we estimate will be transported between municipalities.

Table 5-8 presents a matrix that lists the crushed stone deficient municipalities across the top, and crushed stone surplus municipalities down the left side. After the distribution, two municipalities had a deficiency: the Region of York (-12.5 %), and the City of Toronto -9.1 %).

Table 5-8: Matrix of Stage of the Crushed Stone Distribution for 2007

			Deficient Municipalities							
			Region of Durham	Region of York	City of Toronto	Region of Peel	County of Welling-ton	Region of Waterloo	County of Brant	Surplus Remaining
Original Deficiency			*-1.9%*	*-19.0%*	*-12.6%*	*-12.5%*	*-2.8%*	*-8.6%*	*-1.2%*	
Resulting Deficiency			*0.0%*	*-12.5%*	*-9.1%*	*0.0%*	*0.0%*	*0.0%*	*0.0%*	
Surplus Municipalities	Halton Region	13.0%		1.5%	0.9%	6.0%	2.0%	2.6%		0.0%
	City of Hamilton	11.8%		1.5%	0.6%	2.5%				0.0%
	County of Peterborough	0.9%	0.4%							0.5%
	City of Kawartha Lakes	2.4%	1.5%							0.9%
	County of Simcoe	6.4%		2.0%		2.0%				2.4%
	County of Dufferin	8.7%				2.0%	0.8%			5.9%
	County of Haldimand	5.6%								5.6%
	Region of Niagara	9.8%		1.5%	2.0%					6.3%

Exhibit 5-8 provides a map showing how the distribution shown in **Table 5-8** was applied. The distribution is shown in red.

Exhibit 5-8: Crushed Stone Distribution for 2007

Exhibit 5-9 shows the final state of crushed stone deficiency in the GGH after the analysis.

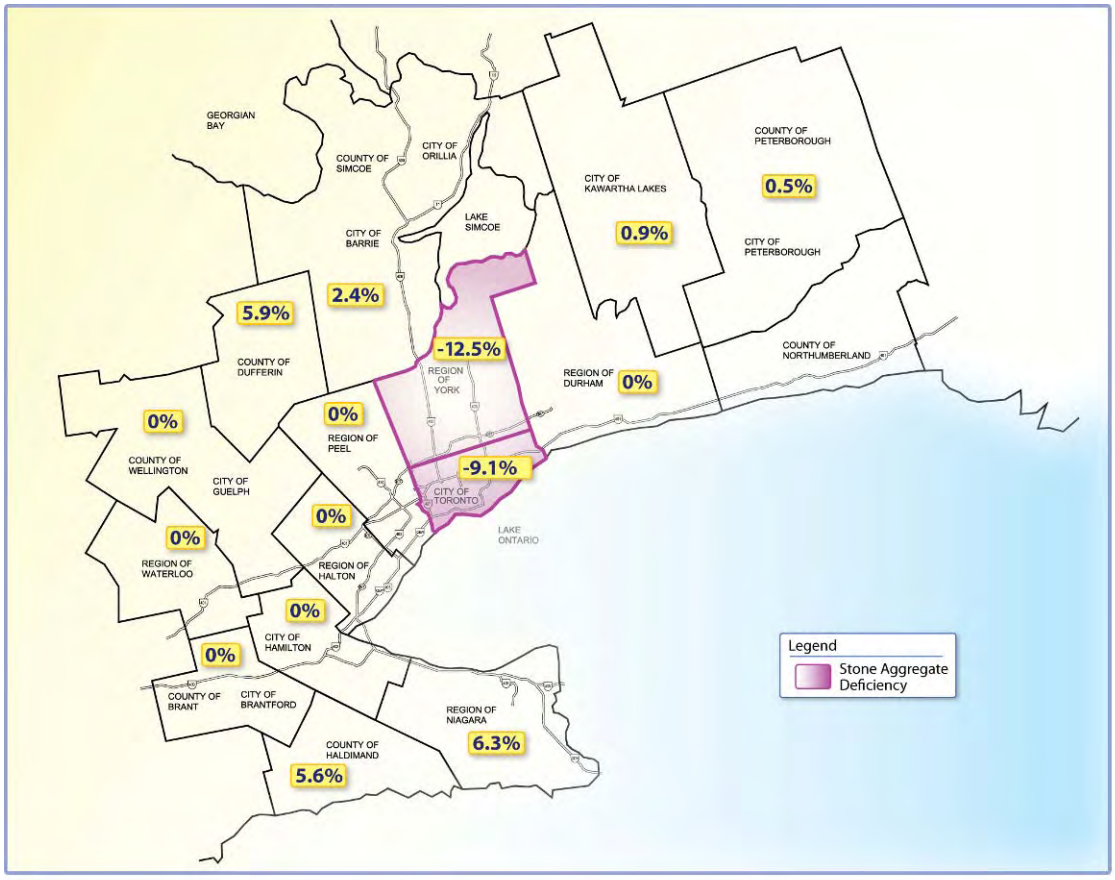

Exhibit 5-9: Final Demand for Crushed Stone, 2007

If the same quadrant breakdown used earlier is applied to the crushed stone deficiency values, it is clear that the northeast quadrant (which includes the Region of York and the City of Toronto) has 100 percent of the crushed stone deficiency.

Although the approach used in the distributions allocated all of the unmet crushed stone demand to the north east, the proposed distribution of Amabel Dolostone, as shown in **Exhibit 5-10**, takes the conservative view that some demand would also be unmet in other areas. The proposed distribution is made even more conservative given the locations of existing licensed quarries identified in red (**Exhibit 5-10**). For example, there is a licensed quarry in the south eastern quadrant of the study area that would be the most direct supplier to Burlington and another one on the west side of Highway 6 that would be most likely to service the Hamilton and Niagara corridor. Nonetheless, the proposed distribution of crushed stone from the proposed quarry was identified as:

- 75 % will be transported northeast
- 10% will be transported northwest
- 10% will be transported southeast
- 5% will be transported southwest

This distribution was applied to the 570 inbound and outbound truck trips from the proposed quarry (**Table 5-9**).

Table 5-9: Estimated Distribution of Quarry Trucks

Direction	Percentage	Quarry Trucks
Northeast	75%	430
Northwest	10%	55
Southeast	10%	55
Southwest	5%	30

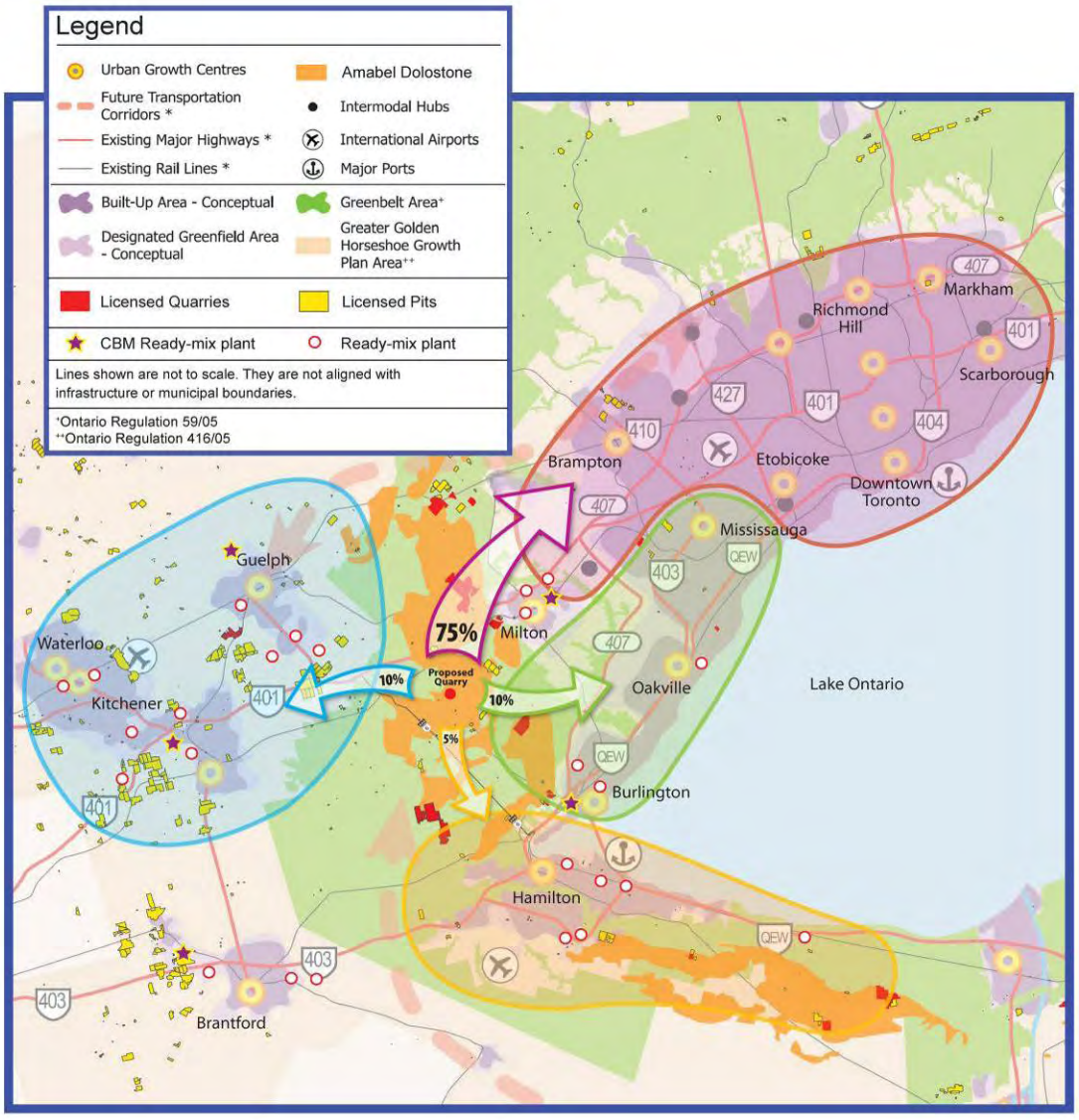

Exhibit 5-10: Proposed Distribution of Aggregate and illustration of Amabel Dolostone Deposits

5.7 Conclusion

To support the identified distribution patterns for the aggregate material from the proposed quarry, a review of regional sources and markets was undertaken. As detailed data are largely proprietary and unavailable for analysis, the study was limited to using the data available from the Ministry of Natural Resources and a limited number of other sources. It is, however, clear that Amabel Dolostone is not in abundant supply on a Regional level, and that it is in high demand due to its various uses in construction combined with the high rates of population and employment growth projected by the Places to Grow Growth Plan for the Greater Golden Horseshoe.

Deposits of Amabel Dolostone are concentrated in the Niagara Escarpment, Hamilton, Halton Region, and Grey County. Very few municipalities are able to obtain this type of aggregate from their own local resources.

After a careful and conservative analysis of the data available, the proposed distribution of Amabel Dolostone from the proposed St. Marys quarry was identified as follows:

- 75 % will be transported northeast
- 10% will be transported northwest
- 10% will be transported southeast
- 5% will be transported southwest