

APPENDIX E
Transportation Modeling Approach

1. INTRODUCTION

The following appendix documents the demand forecasting exercise conducted for the Whitby Transportation Master Plan up to and including the 2031 planning horizon. The purpose of this was to determine the existing and forecasted travel demand associated with planned land use in the Town of Whitby, and to evaluate physical and operation improvements and policy initiatives which will satisfy the transportation needs identified.

The Region of Durham PM Peak demand forecasting (EMME/2) model was used to provide information to identify deficiencies, evaluate capacity-related infrastructure solutions and assess strategies aimed at reducing travel demand and/or auto use. The Durham model is a custom adaptation of the “Simplified GTA Model” P.M. version developed by Peter Dalton. The simplified approach is based on the extrapolation of existing (observed) travel behaviour patterns to the future as opposed to using mathematical equations to synthesize those relationships. The model covers the same geographic area as the GTA models, but uses a more detailed zone system within the Region of Durham.

2. APPROACH

The model contains coded road and transit network infrastructure for both existing facilities and planned long-range improvements and is based on the regional traffic zone system (approximately 500 zones in Durham), and included the network and zones west of Durham Region. The mathematical processes allow for travel demands based on shortest trip times to be calculated for each origin and destination pair and results in a total assignment of auto vehicle traffic to the network in consideration of the congested travel times. The model was most recently revised and calibrated as part of the 2003 Transportation Master Plan and forecasts derived based on land use, travel and demographic characteristics developed as part of the 2003 Region of Durham Development Charges Background Study.

Forecasts from the model were used to derive p.m. peak hour screenline forecasts (by road link crossing the screenline) for existing, future planned and future alternative networks. The p.m. peak hour was selected because it represents the highest traffic loading in the network.

The following outlines the approach used for the analysis:

- Create a 2006 travel demand matrix based on the input of 2006 land use information (population and employment);
- Review and code a base transportation network reflecting the 2006 network condition;
- Assess the level of calibration for the Town by comparing the observed p.m. peak hour volumes (counts ranging from 2003 to 2006) with 2006 p.m. peak hour volumes resulting from the assignment of the 2006 demand using the strategic demand forecasting model;
- Using the existing count information, identify existing screenline deficiencies;
- Review and update as necessary the mid-term (2021) and long-term (2031) land use in the model to reflect population and employment targets from the Town of Whitby’s Official Plan;
- Review and update as necessary; the Study Area network assumptions in the model, including number of lanes, speeds and capacities, to ensure they are consistent with the planned improvements as identified in the Region of Durham’s Transportation Master Plan;
- Develop horizon year forecast volumes for 2031 for the base future network;
- Input a 2031 auto reduction target based on the strategic direction identified in this plan;
- Identify strategic level Town-wide north-south and east-west deficiencies;

- Define sub-areas within which it was reasonable to assess the unique deficiencies and special characteristics of the Town;
- Identify improvements to address capacity deficiencies within each sub-area; and
- Incorporate the assessment of capacity needs in the identification assessment and evaluation of strategic and sub-area alternatives and recommendations.

3. MODEL APPLICATION

The following section identifies the inputs and approach to the use of the forecasting model.

3.1 Land Use

Population and employment forecasts were used to estimate the traffic generation potential of a development area. The Durham model includes assumptions for land use based on current available information from the Official Plans. The land use forecasts contained in the Official Plans are frequently reviewed as a result of changing economic climates. **Table E.1** provides a summary of the land use assumptions in the model.

While land use is always/often a dynamic element in any demand forecasting, the analysis for the purpose of the TMP is sufficiently robust to ensure recommendations to the transportation network are flexible to adapt to fluctuations in land use and that the affect may be in implementation timing.

Table E.1 - Region of Durham Land Use Forecasts [2003 Development Charges]

	Population			Employment		
	2006	2021	2031	2006	2021	2031
Durham Region	588,941	852,286	1,022,753	194,369	313,233	350,814
Pickering	105,182	166,577	199,896	34,224	62,712	70,238
Ajax	88,797	141,395	169,675	25,749	45,609	51,081
Whitby	104,441	164,612	197,536	34,951	64,062	71,749
Oshawa	151,381	183,226	219,875	63,275	86,283	96,633
Clarington	83,507	130,149	156,179	20,625	34,473	38,608
Scugog	22,423	26,217	31,460	6,226	7,771	8,703
Uxbridge	19,898	23,862	28,634	5,728	7,333	8,213
Brock	13,312	16,248	19,498	3,591	4,990	5,589
Whitby Specific Development Areas						
<i>West Whitby</i>	18,667	43,058	51,669	1,358	6,541	7,326
* Durham Region Pop/Emp from 2003 DC						
** For the rest of GTA traffic zone level Land Use data, OGTA (MPC Model) data was used						

With respect to the 2021 and 2031 land use forecasts and their incorporation into the Regional model, the following assumptions should be noted:

2021 Forecasts

- 2021 population/employment from 2003 DC in Durham;
- Population and Employment was reviewed in detail to reflect most recent plans for West Whitby (see **Table E.1**) and for the commercial activity in the Taunton Road corridor; and
- Provincial Places to Grow Land Use targets for the rest of the GTA, with traffic zone allocation based on current distribution contained within the model.

2031 Forecasts

- Regional growth factor of 1.12 was applied to each individual traffic zone in Region of Durham to estimate growth from 2021 to 2031. This was based on the Places to Grow forecasts for Durham Region; and
- Provincial Places to Grow Land Use targets for the rest of the GTA, with traffic zone allocation based on current distribution contained within the model.

3.2 Model Calibration

Table E.2 provides a summary of the calibration results at a screenline level. Screenlines were developed that run through the extent of the Town in both a north-south and east-west direction. It is generally considered that to model within 15% at a screenline level means the model is calibrated to an acceptable level. The results of the screenline comparisons of modeled to observed volumes indicate that most of the screenlines were calibrated between 15% and 20%, or at an adequate level. Of the screenlines that were above 20%, the screenlines had a volume difference which wasn't considered to be significant (low volume difference).

Table E.2 - Model Calibration – 2006 P.M. Peak Hour – Screenline Modeled/Observed Ratio

Screenline	Description	Northbound/Eastbound		Mod/Obs	Southbound/Westbound		Mod/Obs
		Modelled	Observed		Modelled	Observed	
East-West Travel							
1	East of Lake Ridge Rd	13,474	13,957	0.97	5,297	8,583	0.62
2	West of Brock St	11,973	12,726	0.94	6,547	9,274	0.71
3	East of Brock St	10,268	12,965	0.79	5,652	8,352	0.68
4	West of Thickson Rd	4,533	5,542	0.82	3,215	3,819	0.84
5	East of Thickson Rd	5,538	7,467	0.74	3,188	4,978	0.64
North-South Travel							
6	South of Myrtle Rd	689	1,276	0.54	658	865	0.76
7	South of Columbus Rd	544	1,321	0.41	992	880	1.13
8	South of Winchester Rd	1,107	2,256	0.49	1,338	2,231	0.60
9	South of Taunton Rd	3,120	5,458	0.57	3,189	3,817	0.84
10	South of Rossland Rd	4,986	5,964	0.84	2,895	4,348	0.67
11	South of Dundas St	4,820	6,270	0.77	2,424	4,180	0.58
12	South of 401	1,617	2,903	0.56	922	1,637	0.56
All Screenlines		62,669	78,105	0.80	36,316	52,964	0.69

Another statistically acceptable measure of accuracy is the Root Mean Square Error (RMSE) approach. The RMSE is a measure of the differences between values predicted by a model and the values observed on the field. **Table E.3** provides a summary of the RMSE output. The lower the RSME the better, but an RSM of 10% or below is considered a very good fit. The results of the RMSE for the Whitby screenlines indicate that generally, the model is calibrated to an acceptable level. The ability to replicate observed traffic volumes relatively closely provides an indication that the travel demand forecasting tool provides reasonable results and is a useful tool for forecasting future demands.

In those cases where the model was significantly underestimating travel, adjustments were made to the assigned volumes to account for the shortfall in the base year (adjustment factor applied to the horizon year results).

Table E.3- Model Calibration – 2006 P.M. Peak Hour – Screenline Root Mean Square Error

Screenline	Description	Northbound/Eastbound			Southbound/Westbound		
		Modelled	Observed	RMSE	Modelled	Observed	RMSE
East-West Travel							
1	East of Lake Ridge Rd	13,474	13,957	0.12%	5,297	8,583	14.66%
2	West of Brock St	11,973	12,726	0.35%	6,547	9,274	8.65%
3	East of Brock St	10,268	12,965	4.33%	5,652	8,352	10.45%
4	West of Thickson Rd	4,533	5,542	3.32%	3,215	3,819	2.50%
5	East of Thickson Rd	5,538	7,467	6.68%	3,188	4,978	12.94%
North-South Travel							
6	South of Myrtle Rd	689	1,276	21.14%	658	865	5.70%
7	South of Columbus Rd	544	1,321	34.62%	992	880	1.62%
8	South of Winchester Rd	1,107	2,256	25.94%	1,338	2,231	16.02%
9	South of Taunton Rd	3,120	5,458	18.34%	3,189	3,817	2.71%
10	South of Rossland Rd	4,986	5,964	2.69%	2,895	4,348	11.17%
11	South of Dundas St	4,820	6,270	5.35%	2,424	4,180	17.66%
12	South of 401	1,617	2,903	19.62%	922	1,637	19.08%
All Screenlines		62,669	78,105	3.45%	36,316	52,964	10.96%
			E-W	2.10%			10.82%
			N-S	10.24%			11.57%

3.3 Horizon Year Assessment

Strategic volume forecasts were prepared for the ultimate (2031) horizon year, for Do Nothing and Base Future. The base future network condition assumes the following:

Network

- Recommended infrastructure improvements from the Regional Transportation Master Plan
- Planned provincial improvements to Highway 401 (10 lanes through Oshawa)
- Planned 407 East Transportation Corridor through the Region of Durham to Highway 35/Highway 115, including both the West Durham and East Durham highway links to Highway 401. The cross section of the 407 East Transportation Corridor was assumed to be 6 lanes west of West Durham Link and 4 lanes easterly, including the two north-south links

Travel Demand

- The Regional TMP identified a bold peak period auto reduction target of 15% to be achieved by the year 2021. It is assumed that most drivers will divert to transit (change from 4% to 7%), while walking, cycling, ridesharing, and work-at-home are all expected to increase over this period. Total afternoon peak period travel demand is expected to grow from 285,000 trips in 2001 to about 552,000 person trips in 2021. Nearly 60,000 additional peak period automobile trips, on top of what would have occurred in the year 2021 without this target, would be diverted to other modes to achieve this 15% target.
- This target is consistent with the conclusions of other long-range planning exercises done in the GTA and surrounding communities, particularly the Ministry of Transportation Places to Grow Growth Plan and the Metrolinx Regional Transportation Master Plan.
- The 15% auto reduction target by 2021 was maintained in the Town of Whitby TMP to be consistent with the Region's TMP.

- The recent Durham Region Transit Master Plan identifies that most of the higher order infrastructure improvements will be in place beyond 2021. Therefore, a 15% auto reduction target was conservatively maintained for the 2031 time horizon in the Town of Whitby TMP.

4. SCREENLINE SUMMARY

A summary of the 2021 and 2031 base case screenline assessment is included in the tables below.

It is important to note that the future “base-case” condition assumed the transportation network consists of the planned infrastructure improvements identified in **Section 4.0** of this report. This included approved roadway expansions, transit improvements and active transportation improvements identified by the Province and the Region.

Due to the significant regional and provincial proposed initiatives to transit infrastructure and service, a 15% reduction in automobile modal share was assumed for the 2031 ‘base case’ analysis. This also incorporates any recommended Town initiatives to promote non-auto travel as identified in **Part III** of this report and supported by the Transportation Vision for Whitby. This target was identified by the Region in its Transportation Master Plan to be reached by 2021. The reduction in automobile mode share is to be achieved through diversion to transit, an increase in walking, cycling, ridesharing and work at home.

Exhibits

**TOWN OF WHITBY TRANSPORTATION MASTER PLAN
AVERAGE WEEKDAY P.M. PEAK HOUR VOLUMES
2031 FUTURE BASE CASE NETWORK WITH HWY 407
SCREENLINE SUMMARIES**

Screenline	Description	Link	Volume	Capacity	V/C	Volume	Capacity	V/C
1	East of Lake Ridge Rd	Myrtle Rd	403	800	0.50	27	800	0.03
		Brawley Rd	235	500	0.47	108	500	0.22
		Columbus Rd	401	800	0.50	143	800	0.18
		Hwy 407	3,046	3,600	0.85	482	3,600	0.13
		Winchester Rd	1,272	1,600	0.80	533	1,600	0.33
		Taunton Rd	2,201	3,000	0.73	1,191	3,000	0.40
		Rossland Rd	1,466	1,400	1.05	993	1,400	0.71
		Dundas St	1,520	1,600	0.95	330	1,600	0.21
		Hwy 401	9,481	9,000	1.05	5,703	9,000	0.63
		Victoria St	1,257	2,000	0.63	612	2,000	0.31
Screenline Totals			21,281	24,300	0.88	10,123	24,300	0.42
2	West of Brock St	Myrtle Rd	400	800	0.50	47	800	0.06
		Brawley Rd	388	500	0.78	133	500	0.27
		Columbus Rd	642	800	0.80	294	800	0.37
		Winchester Rd	1,224	1,600	0.76	582	1,600	0.36
		Hwy 407	2,976	3,600	0.83	895	3,600	0.25
		Taunton Rd	2,191	2,700	0.81	1,783	2,700	0.66
		Rossland Rd	1,212	1,400	0.87	1,143	1,400	0.82
		Dundas St	438	800	0.55	374	800	0.47
		Burns St	308	500	0.62	286	500	0.57
		Hwy 401	8,682	9,000	0.96	5,703	9,000	0.63
Victoria St	1,788	1,800	0.99	1,144	1,800	0.64		
Screenline Totals			20,249	22,600	0.90	12,385	22,600	0.55
3	East of Brock St	Myrtle Rd	478	800	0.60	38	800	0.05
		Brawley Rd	368	500	0.74	204	500	0.41
		Columbus Rd	532	700	0.76	240	700	0.34
		Winchester Rd	632	700	0.90	490	700	0.70
		Hwy 407	3,281	3,600	0.91	1,624	3,600	0.45
		Taunton Rd	1,799	1,800	0.98	1,405	1,800	0.78
		Rossland Rd	857	1,400	0.61	767	1,400	0.55
		Manning Rd	441	1,200	0.37	288	1,200	0.24
		Dundas St	409	800	0.51	362	800	0.45
		Burns St	245	500	0.49	178	500	0.36
		Consumers	1,088	1,400	0.78	643	1,400	0.46
		Hwy 401	7,808	9,000	0.87	5,205	9,000	0.58
		Victoria St	1,141	1,800	0.63	785	1,800	0.44
Screenline Totals			19,048	24,200	0.79	12,228	24,200	0.51
4	West of Thickson Rd	Myrtle Rd	487	800	0.61	163	800	0.20
		Brawley Rd	279	500	0.56	208	500	0.42
		Columbus Rd	313	700	0.45	189	700	0.27
		Winchester Rd	680	800	0.85	666	800	0.83
		Hwy 407	3,281	3,600	0.91	1,624	3,600	0.45
		Conlin Rd	355	500	0.71	406	500	0.81
		Taunton Rd	1,339	1,800	0.74	1,400	1,800	0.78
		Rossland Rd	879	1,400	0.63	846	1,400	0.60
		Manning Rd	565	1,200	0.47	594	1,200	0.50
		Dundas St	639	1,400	0.46	644	1,400	0.46
		Consumers	1,036	1,400	0.74	512	1,400	0.37
		Hwy 401	9,266	9,000	1.03	5,148	9,000	0.57
		Victoria St	635	1,800	0.35	965	1,800	0.54
Screenline Totals			19,754	24,900	0.79	13,365	24,900	0.54
5	East of Thickson Rd	Myrtle Rd	318	800	0.40	70	800	0.09
		Columbus Rd	342	700	0.49	260	700	0.37
		Winchester Rd	657	800	0.82	642	800	0.80
		Hwy 407	2,634	3,600	0.73	1,256	3,600	0.35
		Conlin Rd	489	500	0.98	534	500	1.07
		Taunton Rd	1,566	1,800	0.87	1,625	1,800	0.90
		Rossland Rd	1,270	1,400	0.91	1,161	1,400	0.83
		Manning Rd	499	1,200	0.42	527	1,200	0.44
		Dundas St	1,008	1,400	0.72	818	1,400	0.58
		Burns St	231	600	0.38	95	600	0.16
		Consumers	656	1,400	0.47	571	1,400	0.41
		Hwy 401	9,174	9,000	1.02	3,380	9,000	0.38
		Victoria St	298	1,800	0.17	950	1,800	0.53
Screenline Totals			19,143	25,000	0.77	11,889	25,000	0.48
6	South of Myrtle Rd	Lake Ridge Rd	610	1,000	0.61	355	1,000	0.36
		Ashburn Rc	181	800	0.23	119	800	0.15
		Hwy 7/12	561	1,000	0.56	447	1,000	0.45
Screenline Totals			1,352	2,800	0.48	921	2,800	0.33
7	South of Columbus Rd	Lake Ridge Rd	827	1,000	0.83	535	1,000	0.54
		Ashburn Rc	144	800	0.18	230	800	0.29
		Baldwin St	208	700	0.30	153	700	0.22
Screenline Totals			1,180	2,500	0.47	918	2,500	0.37
8	South of Winchester Rd	Lake Ridge Rd	1,140	1,000	1.14	849	1,000	0.85
		Halls Rd	623	500	1.25	389	500	0.78
		407 N-S Link	1,395	3,600	0.39	1,427	3,600	0.40
		Coronation Rd	297	500	0.59	725	500	1.45
		Ashburn Rd	527	500	1.05	459	500	0.92
		Baldwin St	1,269	1,400	0.91	678	1,400	0.48
		St. Thomas St.	314	400	0.79	231	400	0.58
		Anderson St	755	700	1.08	415	700	0.59
		Thickson Rd	1,287	1,800	0.72	779	1,800	0.43
Garrard Rd	45	600	0.08	94	600	0.16		
Screenline Totals			7,653	11,000	0.70	6,045	11,000	0.55

Northbound/Eastbound		
15,924	17,000	0.94

Northbound/Eastbound			Northbound/Eastbound		
14,619	16,200	0.90	12,428	13,500	0.92

Northbound/Eastbound		
5,682	6,100	0.93

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 SCREENLINE SUMMARIES**

Screenline	Description	Link	Volume	Capacity	V/C	Volume	Capacity	V/C
9	North of Taunton Rd	Lake Ridge Rd	978	2,000	0.49	809	2,000	0.30
		407 N-S Link	1,395	3,600	0.39	1,427	3,600	0.40
		Coronation Rd	102	500	0.20	26	500	0.05
		Brock St	1,351	1,400	0.97	1,158	1,400	0.83
		Garden St	1,184	1,200	0.99	799	1,200	0.67
		Anderson St	1,030	700	1.47	968	700	1.38
		Thickson Rd	2,100	1,800	1.17	1,680	1,800	0.93
		Garrard Rd	887	700	1.27	987	700	1.41
		Screenline Totals		9,028	11,900	0.76	7,655	11,900
10	South of Taunton Rd	Lake Ridge Rd	1,773	2,000	0.89	1,539	2,000	0.77
		407 N-S Link	2,718	3,600	0.75	2,462	3,600	0.68
		Coronation Rd	313	800	0.39	721	800	0.90
		Cochrane St	268	550	0.49	381	550	0.69
		Brock St	966	1,400	0.69	1,233	1,400	0.88
		Garden St	628	550	1.14	868	550	1.58
		Anderson St	848	700	1.21	1,167	700	1.67
		Thickson Rd	1,614	1,800	0.90	2,114	1,800	1.17
		Garrard Rd	1,088	1,200	0.91	1,342	1,200	1.12
		Screenline Totals		10,215	12,600	0.81	11,827	12,600
11	South of Rossland Rd	Lake Ridge Rd	1,731	2,000	0.87	1,179	2,000	0.59
		407 N-S Link	3,176	3,600	0.88	2,366	3,600	0.66
		Cochrane St	302	550	0.55	343	550	0.62
		Brock St	1,159	1,400	0.83	753	1,400	0.54
		Garden St	623	1,100	0.57	364	1,100	0.33
		Anderson St	916	1,400	0.65	840	1,400	0.60
		Thickson Rd	1,621	1,800	0.90	1,351	1,800	0.75
		Garrard Rd	312	550	0.57	157	550	0.29
		Screenline Totals		9,838	12,400	0.79	7,353	12,400
12	South of Dundas St	Lake Ridge Rd	1,957	2,000	0.98	1,153	2,000	0.58
		407 N-S Link	3,387	3,600	0.94	2,543	3,600	0.71
		Annes St	461	550	0.84	435	550	0.79
		Henry St	483	500	0.97	405	500	0.81
		Brock St	859	1,400	0.61	411	1,400	0.29
		Garden St	819	1,200	0.68	163	1,200	0.14
		Hopkins St	1,159	1,400	0.83	677	1,400	0.48
		Thickson Rd	2,648	2,700	0.98	1,856	2,700	0.69
		Kendalwood Rd	314	550	0.57	263	550	0.48
Screenline Totals		12,088	13,900	0.87	7,907	13,900	0.57	
13	South of 401	Lake Ridge Rd	1,089	2,000	0.54	1,083	2,000	0.54
		Henry St	339	500	0.68	118	500	0.24
		Brock St	954	1,400	0.68	522	1,400	0.37
		Hopkins St	1,649	1,400	1.18	894	1,400	0.64
		Thickson Rd	2,685	2,700	0.99	656	2,700	0.24
Screenline Totals		6,716	8,000	0.84	3,273	8,000	0.41	
All Screenline Totals			157,544	196,100	0.80	105,888	196,100	0.54

Northbound/Eastbound		
6,655	6,300	1.06

Southbound/Westbound		
5,618	6,300	0.89

Northbound/Eastbound		
5,412	6,200	0.87

Southbound/Westbound		
7,105	6,200	1.15

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SCREENLINE SUMMARIES**

Screenline	Description	Link	Volume	Capacity	V/C	Volume	Capacity	V/C		
1	East of Lake Ridge Rd	Myrtle Rd	287	800	0.36	19	800	0.02		
		Brawley Rd	216	500	0.43	95	500	0.19		
		Columbus Rd	334	800	0.42	108	800	0.14		
		Hwy 407	2,711	3,600	0.75	261	3,600	0.07		
		Winchester Rc	1,137	1,600	0.71	546	1,600	0.34		
		Taunton Rc	1,842	3,000	0.61	973	3,000	0.32		
		Rossland Rd	1,314	1,400	0.94	946	1,400	0.68		
		Dundas St	1,345	1,600	0.84	214	1,600	0.13		
		Hwy 401	8,962	9,000	1.00	5,313	9,000	0.59		
		Victoria St	1,044	2,000	0.52	499	2,000	0.25		
		Screenline Totals			19,191	24,300	0.79	8,973	24,300	0.37
2	West of Brock St	Myrtle Rd	284	800	0.36	37	800	0.05		
		Brawley Rd	354	500	0.71	84	500	0.17		
		Columbus Rd	578	800	0.72	277	800	0.35		
		Winchester Rc	1,059	700	1.51	490	700	0.70		
		Hwy 407	2,622	3,600	0.73	653	3,600	0.18		
		Taunton Rc	1,986	2,700	0.74	1,709	2,700	0.63		
		Rossland Rd	1,107	1,400	0.79	1,053	1,400	0.75		
		Dundas St	394	800	0.49	326	800	0.41		
		Burns St	279	500	0.56	239	500	0.48		
		Hwy 401	8,161	9,000	0.91	5,313	9,000	0.59		
		Victoria St	1,552	1,800	0.86	1,009	1,800	0.56		
Screenline Totals			18,377	22,600	0.81	11,191	22,600	0.50		
3	East of Brock St	Myrtle Rd	394	800	0.49	29	800	0.04		
		Brawley Rd	339	500	0.68	176	500	0.35		
		Columbus Rd	483	700	0.69	204	700	0.29		
		Winchester Rc	580	700	0.83	404	700	0.58		
		Hwy 407	2,967	3,600	0.82	1,285	3,600	0.36		
		Taunton Rc	1,610	1,800	0.89	1,350	1,800	0.75		
		Rossland Rd	815	1,400	0.58	749	1,400	0.53		
		Manning Rc	354	1,200	0.29	184	1,200	0.15		
		Dundas St	354	800	0.44	304	800	0.38		
		Burns St	212	500	0.42	185	500	0.37		
		Consumers	892	1,400	0.64	569	1,400	0.41		
		Hwy 401	7,357	9,000	0.82	4,835	9,000	0.54		
		Victoria St	1,019	1,800	0.57	685	1,800	0.38		
		Screenline Totals			17,376	24,200	0.72	10,958	24,200	0.45
		4	West of Thickson Rd	Myrtle Rd	375	800	0.47	141	800	0.18
Brawley Rd	272			500	0.54	197	500	0.39		
Columbus Rd	235			700	0.34	160	700	0.23		
Winchester Rc	589			800	0.74	642	800	0.80		
Hwy 407	2,967			3,600	0.82	1,285	3,600	0.36		
Conlin Rd	320			500	0.64	369	500	0.74		
Taunton Rc	1,299			1,800	0.72	1,358	1,800	0.75		
Rossland Rd	831			1,400	0.59	812	1,400	0.58		
Manning Rc	480			1,200	0.40	504	1,200	0.42		
Dundas St	552			1,400	0.39	573	1,400	0.41		
Consumers	899			1,400	0.64	444	1,400	0.32		
Hwy 401	8,753			9,000	0.97	4,829	9,000	0.54		
Victoria St	554			1,800	0.31	825	1,800	0.46		
Screenline Totals				18,128	24,900	0.73	12,140	24,900	0.49	
5	East of Thickson Rd			Myrtle Rd	272	800	0.34	56	800	0.07
		Columbus Rd	251	700	0.36	218	700	0.31		
		Winchester Rc	642	800	0.80	615	800	0.77		
		Hwy 407	2,218	3,600	0.62	949	3,600	0.26		
		Conlin Rd	480	500	0.96	487	500	0.97		
		Taunton Rc	1,470	1,800	0.82	1,570	1,800	0.87		
		Rossland Rd	1,144	1,400	0.82	1,056	1,400	0.75		
		Manning Rc	403	1,200	0.34	433	1,200	0.36		
		Dundas St	915	1,400	0.65	780	1,400	0.56		
		Burns St	170	600	0.28	73	600	0.12		
		Consumers	551	1,400	0.39	500	1,400	0.36		
Hwy 401	8,666	9,000	0.96	3,187	9,000	0.35				
Victoria St	243	1,800	0.14	810	1,800	0.45				
Screenline Totals			17,427	25,000	0.70	10,732	25,000	0.43		
6	South of Myrtle Rd	Lake Ridge Rd	549	1,000	0.55	375	1,000	0.38		
		Ashburn Rc	172	800	0.22	94	800	0.12		
		Hwy 7/12	563	1,000	0.56	393	1,000	0.39		
Screenline Totals			1,285	2,800	0.46	862	2,800	0.31		
7	South of Columbus Rd	Lake Ridge Rd	786	1,000	0.79	547	1,000	0.55		
		Ashburn Rc	128	800	0.16	179	800	0.22		
		Baldwin St	173	700	0.25	141	700	0.20		
Screenline Totals			1,086	2,500	0.43	867	2,500	0.35		
8	South of Winchester Rd	Lake Ridge Rd	1,013	1,000	1.01	786	1,000	0.79		
		Halls Rd	571	500	1.14	362	500	0.72		
		407 N-S Link	1,143	3,600	0.32	1,129	3,600	0.31		
		Coronation Rd	253	500	0.51	660	500	1.32		
		Ashburn Rd	485	500	0.97	403	500	0.81		
		Baldwin St	919	1,400	0.66	641	1,400	0.46		
		St. Thomas St.	261	400	0.65	180	400	0.45		
		Anderson St	619	700	0.88	351	700	0.50		
		Thickson Rd	1,272	1,800	0.71	647	1,800	0.36		
		Garrard Rd	39	600	0.06	85	600	0.14		
Screenline Totals			6,576	11,000	0.60	5,243	11,000	0.48		

Northbound/Eastbound		
14,507	17,000	0.85

Northbound/Eastbound			Northbound/Eastbound		
13,480	16,200	0.83	11,493	13,500	0.85

Northbound/Eastbound		
5,158	6,100	0.85

**TOWN OF WHITBY TRANSPORTATION MASTER PLAN
 AVERAGE WEEKDAY P.M. PEAK HOUR VOLUMES
 2021 BASE CASE FUTURE NETWORK WITH HWY 407
 SCREENLINE SUMMARIES**

Screenline	Description	Link	Volume	Capacity	V/C	Volume	Capacity	V/C
9	North of Taunton Rd	Lake Ridge Rd	869	2,000	0.43	564	2,000	0.28
		407 N-S Link	1,143	3,600	0.32	1,129	3,600	0.31
		Coronation Rd	83	500	0.17	18	500	0.04
		Brock St	1,285	1,400	0.92	1,109	1,400	0.79
		Garden St	1,066	1,200	0.89	726	1,200	0.61
		Anderson St	828	700	1.18	814	700	1.16
		Thickson Rd	1,957	1,800	1.09	1,598	1,800	0.89
		Garrard Rd	723	700	1.03	929	700	1.33
		Screenline Totals		7,953	11,900	0.67	6,887	11,900
10	South of Taunton Rd	Lake Ridge Rd	1,500	2,000	0.75	1,384	2,000	0.69
		407 N-S Link	2,511	3,600	0.70	2,292	3,600	0.64
		Coronation Rd	273	800	0.34	674	800	0.84
		Cochrane St	222	550	0.40	292	550	0.53
		Brock St	848	1,400	0.61	1,084	1,400	0.77
		Garden St	484	550	0.88	576	550	1.05
		Anderson St	743	700	1.06	1,063	700	1.52
		Thickson Rd	1,575	1,800	0.87	2,079	1,800	1.16
		Garrard Rd	987	1,200	0.82	1,223	1,200	1.02
Screenline Totals		9,143	12,600	0.73	10,668	12,600	0.85	
14	North of Rossland Rd	Lake Ridge Rd	1,254	2,000	0.63	922	2,000	0.46
		407 N-S Link	2,511	3,600	0.70	2,292	3,600	0.64
		Coronation Rd	228	800	0.29	449	800	0.56
		Cochrane St	282	550	0.51	183	550	0.33
		Brock St	892	1,400	0.64	850	1,400	0.61
		Garden St	396	1,100	0.36	173	1,100	0.16
		Anderson St	792	1,400	0.57	713	1,400	0.51
		Thickson Rd	1,235	1,800	0.69	1,220	1,800	0.68
		Garrard Rd	397	1,200	0.33	511	1,200	0.43
Screenline Totals		7,987	13,850	0.58	7,313	13,850	0.53	
11	South of Rossland Rd	Lake Ridge Rd	1,464	2,000	0.73	1,071	2,000	0.54
		407 N-S Link	2,986	3,600	0.83	2,201	3,600	0.61
		Cochrane St	264	550	0.48	323	550	0.59
		Brock St	1,044	1,400	0.75	886	1,400	0.64
		Garden St	528	1,100	0.48	263	1,100	0.24
		Anderson St	876	1,400	0.63	815	1,400	0.58
		Thickson Rd	1,574	1,800	0.87	1,320	1,800	0.73
		Garrard Rd	208	550	0.38	105	550	0.19
		Screenline Totals		8,945	12,400	0.72	6,786	12,400
12	South of Dundas St	Lake Ridge Rd	1,728	2,000	0.86	975	2,000	0.49
		407 N-S Link	3,071	3,600	0.85	2,317	3,600	0.64
		Annes St	425	550	0.77	406	550	0.74
		Henry St	432	500	0.86	363	500	0.73
		Brock St	760	1,400	0.54	380	1,400	0.27
		Garden St	709	1,200	0.59	89	1,200	0.07
		Hopkins St	1,019	1,400	0.73	606	1,400	0.43
		Thickson Rd	2,401	2,700	0.89	1,751	2,700	0.65
		Kendalwood Rd	284	550	0.52	244	550	0.44
Screenline Totals		10,829	13,900	0.78	7,131	13,900	0.51	
13	South of 401	Lake Ridge Rd	942	2,000	0.47	1,003	2,000	0.50
		Henry St	318	500	0.64	115	500	0.23
		Brock St	865	1,400	0.62	472	1,400	0.34
		Hopkins St	1,481	1,400	1.06	763	1,400	0.55
		Thickson Rd	2,412	2,700	0.89	610	2,700	0.23
Screenline Totals		6,018	8,000	0.75	2,962	8,000	0.37	
All Screenline Totals			142,335	196,100	0.73	95,399	196,100	0.49

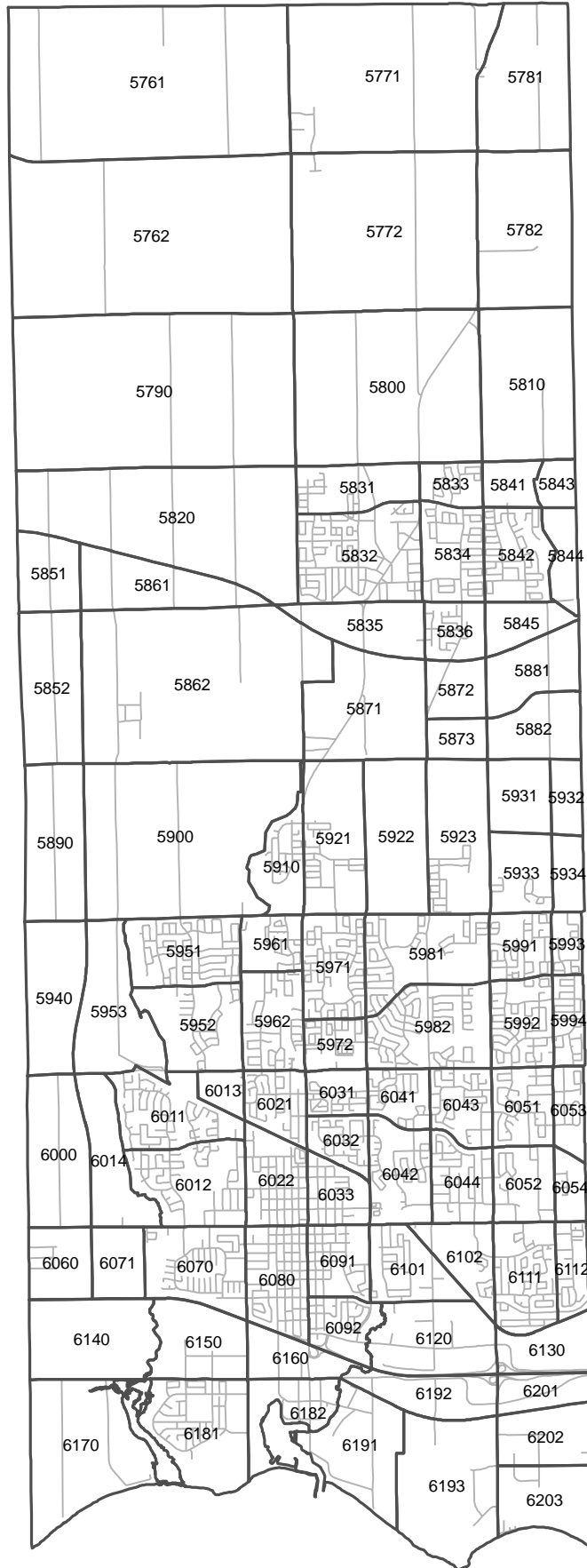
Northbound/Eastbound		
5,941	6,300	0.94

Southbound/Westbound		
5,194	6,300	0.82

Northbound/Eastbound		
4,859	6,200	0.78

Southbound/Westbound		
6,317	6,200	1.02

Town of Whitby Transportation Zones



**Whitby Traffic Zone Demographic and Forecast Trip Information
(2003 DC Review Forecasts with Adjustments for Place To Grow 2031 Targets)**

TZ	Demographics						Trip Forecasts			
	Population			Employment			2021		2031	
	2006	2021	2031	2006	2021	2031	inbound	outbound	inbound	outbound
5761	198	207	248	48	55	62	43	23	48	26
5762	114	119	143	53	61	68	15	19	17	21
5771	297	310	372	27	32	36	49	25	54	28
5772	228	238	286	-	1	1	31	15	34	17
5781	119	124	149	40	45	50	23	16	26	18
5782	94	98	118	7	8	9	12	7	13	8
5790	202	213	256	39	46	52	41	22	46	24
5800	157	166	199	38	45	50	35	19	39	21
5810	25	26	31	-	-	-	5	1	6	1
5820	104	109	131	-	1	1	13	8	14	9
5831	139	3,006	3,607	4	142	159	409	207	455	230
5832	3,485	6,232	7,478	403	629	704	887	497	986	552
5833	324	1,081	1,297	52	117	131	148	87	164	97
5834	2,946	4,166	4,999	253	379	424	592	324	658	360
5835	154	228	274	351	1,049	1,175	109	214	121	238
5836	1,148	1,759	2,111	85	650	728	301	231	335	257
5841	11	19	23	4	5	6	2	2	2	2
5842	1,956	6,494	7,793	175	547	613	909	497	1,010	552
5843	9	9	11	-	-	-	3	1	3	1
5844	4	4	5	20	23	26	1	4	1	4
5845	18	19	23	187	1,184	1,326	90	229	100	255
5851	12	13	16	-	-	-	-	1	-	1
5852	69	73	88	14	16	18	12	8	13	9
5861	47	50	60	9	10	11	7	4	8	4
5862	284	297	356	1	2	2	42	18	47	20
5871	206	436	523	371	1,482	1,660	167	311	186	346
5872	6	6	7	37	608	681	49	117	54	130
5873	24	24	29	206	1,051	1,177	74	202	82	225
5881	6	6	7	108	813	911	56	157	62	174
5882	30	30	36	322	3,561	3,988	255	684	283	760
5890	12	14	17	-	1,731	1,939	129	333	143	370
5900	119	7,723	9,268	86	83	93	1,072	482	1,191	536
5910	543	244	293	39	16	18	31	18	34	20
5921	51	2,787	3,344	278	497	557	419	263	466	292
5922	73	2,540	3,048	954	1,548	1,734	456	449	507	499
5923	647	2,182	2,618	471	713	799	349	268	388	298
5931	6	6	7	712	810	907	61	156	68	173
5932	15	15	18	146	273	306	14	53	16	59
5933	504	1,632	1,958	37	96	108	212	117	236	130
5934	98	294	353	166	879	984	111	186	123	207
5940	42	96	115	2	2,170	2,430	160	421	178	468
5951	404	4,896	5,875	33	29	32	681	300	757	333
5952	4,458	7,275	8,730	208	197	221	1,019	476	1,133	529
5953	-	-	-	-	-	-	8	-	9	-
5961	1,701	2,657	3,188	151	234	262	398	204	442	227
5962	2,581	2,793	3,352	30	50	56	392	178	436	198
5971	4,031	4,730	5,676	327	433	485	670	367	745	408
5972	427	433	520	174	304	340	97	84	108	93
5981	2,701	5,868	7,042	558	858	961	891	516	990	573
5982	5,668	6,745	8,094	178	280	314	967	459	1,075	510
5991	2,912	3,683	4,420	118	192	215	517	259	575	288
5992	4,486	5,167	6,200	222	304	340	706	370	785	411
5993	442	1,412	1,694	46	127	142	211	108	235	120
5994	2,297	2,565	3,078	41	67	75	367	168	408	187
6000	95	2,480	2,976	-	1,180	1,322	429	375	477	417
6011	3,563	5,911	7,093	116	118	132	813	377	904	419
6012	3,070	6,559	7,871	252	251	281	925	444	1,028	493
6013	154	117	140	21	17	19	24	10	27	11
6014	-	-	-	-	-	-	14	-	16	-
6021	2,305	2,473	2,968	178	216	242	379	190	421	211
6022	2,479	2,558	3,070	846	1,075	1,204	418	358	465	398
6031	1,552	1,592	1,910	308	416	466	260	175	289	194
6032	1,810	1,938	2,326	49	66	74	291	129	323	143
6033	2,336	2,363	2,836	835	1,064	1,192	402	345	447	383
6041	2,401	2,503	3,004	240	300	336	379	208	421	231
6042	3,245	3,464	4,157	386	449	503	498	294	553	327
6043	2,551	2,733	3,280	26	44	49	397	173	441	192
6044	2,364	2,574	3,089	459	541	606	414	258	460	287
6051	2,334	2,541	3,049	141	176	197	366	187	407	208
6052	1,577	1,758	2,110	569	667	747	290	233	322	259
6053	724	812	974	46	60	67	116	61	129	68
6054	296	344	413	102	121	136	65	44	72	49
6060	225	117	140	40	224	251	40	55	44	61
6070	5,982	7,626	9,151	561	525	588	1,182	669	1,314	744
6071	-	-	-	-	-	-	11	3	12	3
6080	2,834	2,994	3,593	1,087	1,349	1,511	590	498	656	553
6091	2,256	2,300	2,760	820	1,066	1,194	443	389	492	432
6092	1,165	1,295	1,554	275	322	361	244	161	271	179
6101	2,233	2,356	2,827	593	752	842	395	329	439	366
6102	1,130	1,227	1,472	433	729	816	237	241	263	268
6111	3,549	3,761	4,513	1,041	1,248	1,398	711	538	790	598
6112	1,127	1,244	1,493	17	29	32	200	100	222	111
6120	7	11	13	3,541	4,927	5,518	494	1,023	549	1,137
6130	-	1	1	1,067	1,912	2,141	196	398	218	442
6140	36	38	46	-	-	-	4	3	4	3
6150	5	5	6	1,231	2,613	2,927	280	544	311	605
6160	169	253	304	351	403	451	84	2,103	93	2,337
6170	36	38	46	11	13	15	7	5	8	6
6181	2,900	5,870	7,044	1,309	1,701	1,905	1,047	784	1,164	871
6182	1,204	1,312	1,574	94	115	129	216	119	240	132
6191	26	55	66	1,122	2,475	2,772	270	520	300	578
6192	12	12	14	2,410	3,895	4,362	385	811	428	901
6193	4	4	5	800	1,465	1,641	156	305	173	339
6201	2	2	2	518	749	839	72	156	80	173
6202	-	-	-	3,942	4,535	5,079	478	945	531	1,050
6203	49	52	62	1,283	1,801	2,017	194	378	216	420
Whitby Total	104,441	164,612	197,536	34,951	64,062	71,749	-	-	-	-
Sub Areas										
Brooklin	11,366	24,466	29,360	2,679	12,360	13,843	4,207	3,845	4,675	4,272
West Whitby	18,667	43,058	51,669	1,358	6,541	7,326	6,538	3,963	7,267	4,404