

Chemong East Traffic Study
Mason Homes Limited
Franklin Phase 1
Preliminary Traffic Report

Prepared for
Mason Homes Ltd.



Prepared by
Tranplan Associates
December, 2006





December 14, 2006

Mason Homes
30 Pennsylvania Avenue, Unit 6
Concord, ON L4K 4A5

Attn: Ms. Ashley Mason

Dear Ms. Mason:

**RE: Preliminary Traffic Impact Assessment - Chemong East
Franklin Phase 1 - Proposed Mason Homes Limited Development**

1.0 Background

Further to your request, I have completed a preliminary traffic impact assessment of the proposed *Franklin Phase 1* of the Chemong East, Mason Homes Limited development. Based on current plans, it will contain about 105 residential units which will be the initial phase of the overall site development. Full site development was assessed in an initial traffic report completed in December, 2005. This Phase 1 plan with 105 residential units will connect to Franklin Dr. at Neptune St. just west of Hilliard Street (see *Exhibit 1 - Site Plan* following the report text). Beyond 2011, as the Phase 2 lands develop, it is expected that there will be a link constructed to connect Phase 1 with Phase 2. This link will be designed to provide connectivity for non-auto travel and will also provide for emergency vehicle access. Over the last two years three traffic study reports have been completed for overall Mason Homes development in the Chemong East lands. The conclusions and recommendations of the original traffic study for full site development (December, 2005) remain valid. Two additional traffic studies were completed for an initial phase that would have contained 225 units. This study for the *Franklin Phase 1* supercede these two studies. The previous traffic study reports were submitted and reviewed by city staff at an earlier date and found to be acceptable.

2.0 Present Conditions

The revised site plan for the proposed *Franklin Phase 1* will alter the site traffic patterns at the Franklin/Hilliard intersection from those assumed in December, 2005 traffic study. In the initial study there was no Franklin Dr. connection to the Mason Homes Limited development. With the Franklin access point, the pattern of site traffic that will travel through the Franklin Dr./Hilliard Street intersection will be different than the pattern assumed in the initial studies. In addition, site traffic traveling to the west and south

towards the Chemong Road corridor will now travel along Neptune Street to access the Towerhill Rd. corridor.

Additional traffic counts were carried out in November, 2006 to collect current traffic data to assess the *Franklin Phase 1* site traffic impacts on background traffic. AM and PM peak hour counts were collected at the following intersections:

- Franklin Dr. & Towerhill Rd.
- Hilliard St. & Towerhill Rd.
- Neptune St. & Towerhill Rd.
- Milroy Dr. & Towerhill Rd.

These counts were compared to the original traffic counts carried out in November, 2004. In general, the two data sets were found to be consistent with minor acceptable differences. The one exception was the Milroy/Towerhill intersection. With the change in the WalMart store location to Milroy Dr. South, there has been a significant shift in the turning movement volumes at this intersection. The observed 2004 and 2006 peak hour volumes are illustrated in *Exhibits 2A* and *2B* following the report text. In reviewing these exhibits it will be noted that there has been a drop in total peak hour east-west traffic volumes along the Towerhill Road corridor. Much of this change is likely a result of the shift in the WalMart store from Portage Place to a new location south of Milroy Drive South on Chemong Road.

The 2006 traffic count data was collected over two consecutive weeks in November, 2006. There is close agreement among the observed 2006 data. It is therefore concluded that the 2006 traffic data represents current peak hour traffic patterns on the Phase 1 study road network. The 2006 traffic count data and evaluation have been reviewed with city staff and found to be acceptable.

3.0 Site Trip Generation and Distribution

The proposed Franklin Phase 1 will contain 105 residential units that will generate about 105 PM peak hour trips. This is based on a maximum trip generation scenario where site development will be comprised of traditional single family dwelling units. However, the site will also contain semi-detached and townhouse units. These denser forms of housing will generate fewer trips per household so that actual site trip generation could be less than 100 trips in the PM peak hour. Applied forecast site trip generation for the study analyses was as follows:

AM Peak Hour Trips		PM Peak Hour Trips	
Inbound	20	Inbound	66
Outbound	59	Outbound	39
Total	79	Total	105

Site trip distribution to adjacent roads and intersections was based on the original residential site trip distribution derived for the initial December, 2005 traffic study¹. Some adjustments were made to the original trip distribution assumptions to account for the specific location of the phase 1 development and its direct connection to Franklin Drive.

The trip generation calculations and the trip distribution assumptions have been reviewed with city staff and found to be acceptable for application to the study analyses.

4.0 Future Traffic Volumes

The 2006 observed volumes were used as the basis to develop future background traffic for the study road network. The 2006 volumes were expanded at the rate of 2% per year (compounded) for five years to compute 2011 background traffic. Based on discussions with city staff, traffic from the expansion of Portage Place which is now underway, will be added to these 2011 background volumes.

The initial forecast of 2011 total peak hour traffic used in this reporting does not include the traffic from the Portage Place expansion. The 2011 total peak hour forecasts used in this initial analyses include only the 2011 background traffic volumes based on the expanded 2006 volumes and the forecast peak hour site traffic (see *Section 3.0*). *Exhibits 3A and 3B* illustrate this initial estimate of total 2011 peak hour traffic. The addition of future Portage Place traffic will be carried out and 2011 site traffic impacts revised to account for this additional traffic. This work will be the basis for the traffic impact analyses contained in the full traffic report to be completed in early January, 2007. It is recognized that the new Portage Place expansion will generate additional background traffic volumes. However, given the location of the *Franklin Phase 1* study road network, it is not expected that the new Portage Place traffic will have a significant impact on the intersections adjacent to the *Franklin Phase 1* development.

5.0 Site Traffic Impacts

A preliminary assessment of the Franklin/Hilliard and Neptune/Towerhill intersections was carried out based on the 2011 total peak hour forecast volumes illustrated in *Exhibit(s) 3*. Highway Capacity Manual (HCM) intersection capacity analyses procedures were used to assess the potential impact of the *Franklin Phase 1* development on the Franklin/Hilliard intersection. The critical westbound traffic movement is forecast to operate at Level of Service (LoS)² "D" during the 2011 PM

¹ Table 3.2, East Chemong Secondary Plan Area Traffic Impact Study, prepared for Mason Homes Limited by Tranplan Associates, December, 2005.

² See *Technical Appendix* for definitions of Levels of Service

peak hour period. There will continue to be sufficient gaps in the Hilliard Street traffic stream to accept traffic from Franklin Drive including new traffic from the study site. LoS "D" is an acceptable LoS for urban peak hour conditions. There will be residual capacity for future growth in traffic beyond the 2011 planning horizon.

The Franklin/Hilliard intersection was also tested with Always Stop Control (AWSC) to determine if this would provide additional intersection capacity beyond 2011. With AWSC, for 2011 peak hour conditions, the Franklin/Hilliard intersection is forecast to operate an overall LoS of "B" with considerable residual capacity for future growth in traffic beyond 2011. Summary printouts of the HCM capacity analyses are contained in the *Technical Appendix*.

Franklin Phase 1 site traffic on Neptune Street will amount to about 42 vehicles per hour (vph) (see *Exhibit 3B*) during the PM peak hour or an average of one vehicle every 1.4 minutes. This level of traffic should have little impact on the R. F. Downey elementary school since the normal background traffic PM peak hour period (4:30 to 5:30 PM) will occur when most of the school traffic will have exited the immediate study area.

Site traffic volumes on Franklin Drive east of Hilliard during the 2011 PM peak hour are forecast to be 8 vph in the eastbound direction and 14 vph in the westbound direction. Site traffic will be about 6% of the total traffic on Franklin Dr. East during the PM peak hour. This will probably be less than the normal daily variation in the peak hour traffic on this street.

A 2011 PM peak hour capacity analysis was also completed for the Neptune/Towerhill intersection. This intersection is forecast to operate at good LoS with the worst traffic movement operating at LoS "C". There will be considerable residual capacity at this intersection for future growth in traffic beyond the 2011 planning horizon. The summary printouts for this analysis is contained in the *Technical Appendix*.

6.0 Preliminary Study Conclusions

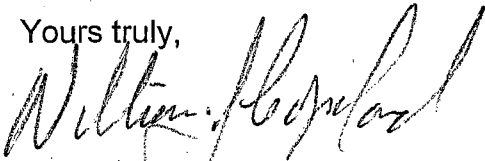
Based on these initial traffic analyses, the proposed Mason Homes Limited *Franklin Phase 1* development is forecast to have an acceptable level of traffic impact on adjacent streets and intersections. There will be residual capacity in these roads and intersections for additional growth in traffic beyond the 2011 planning horizon used in the study analyses.

These initial findings will be revisited when the new traffic from the Portage Place expansion has been established. It is expected that the Portage Place expansion traffic will influence the operation of the Milroy/Towerhill intersection. However, it is not

expected that this traffic will have a significant impact on streets and intersections adjacent to *Franklin Phase 1 development* or the findings of these preliminary analyses.

If you should require any additional background information on the analyses presented in this assessment, details of the background assignments and capacity analyses are available in the study working papers.

Yours truly,

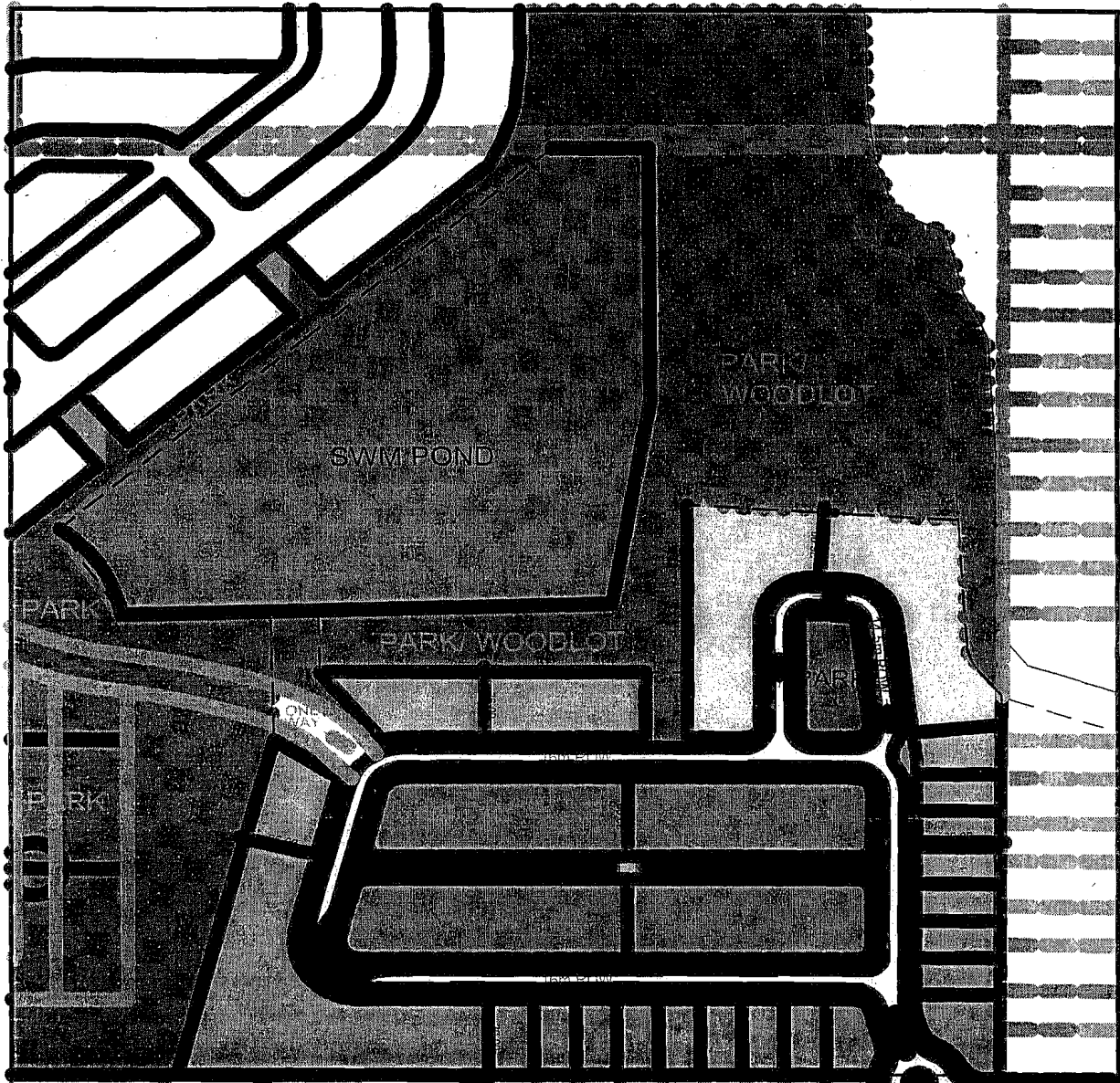
A handwritten signature in black ink, appearing to read "William Copeland". The signature is written in a cursive style with a large, sweeping initial "W".

William Copeland, P.Eng.
Principal






WJC/tlg

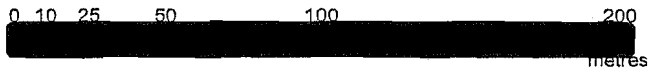
REPORT EXHIBITS

Exhibit 1 Site Plan



LEGEND

-  Front Loading Lots
-  Rear Loading Lots
-  Singles/Semis/Townhouses
-  Park
-  Storm Water Management Facility



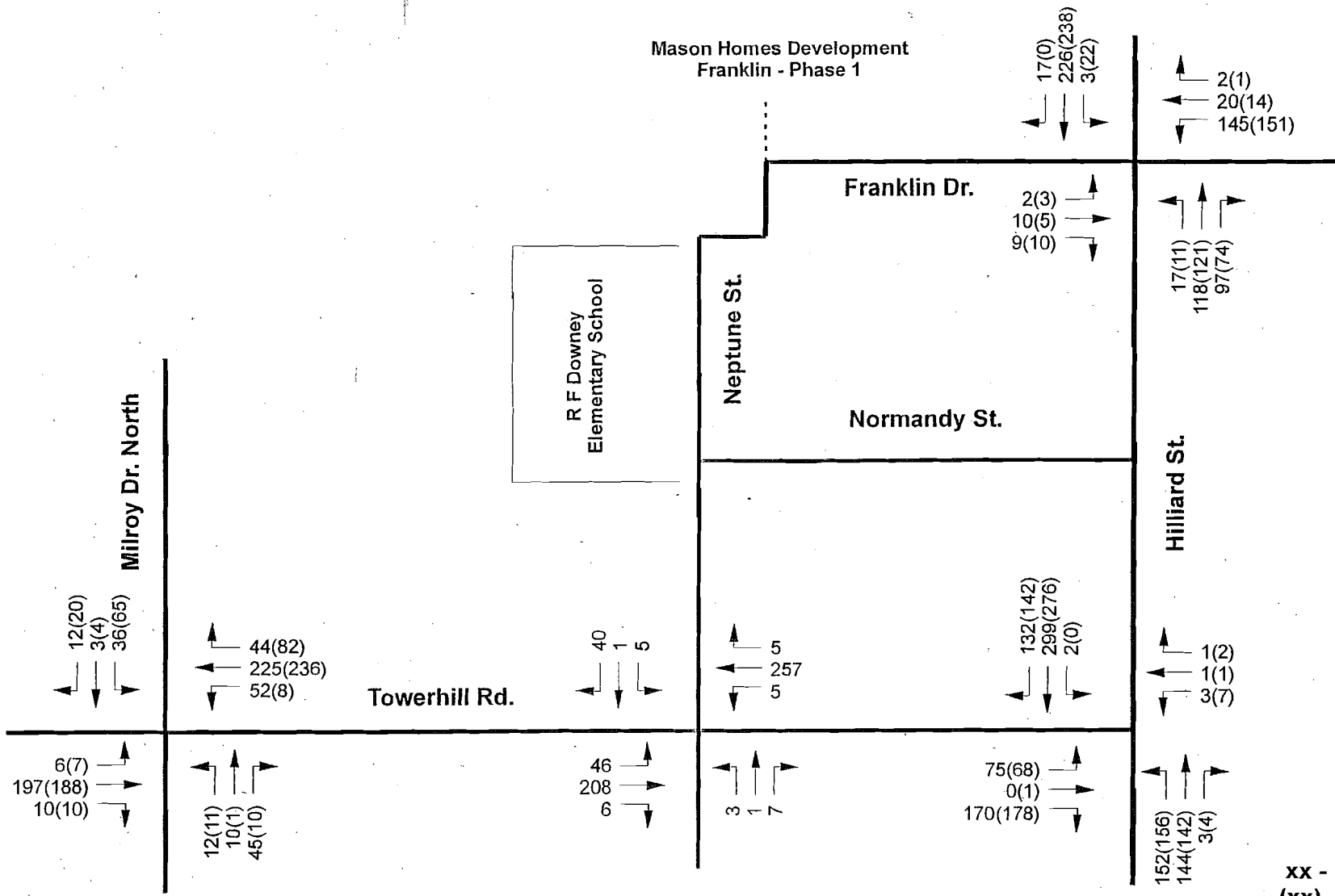
PROJECT:
MASON HOMES
Residential Phase One
Peterborough, Ontario
PROJECT No.: Y5142 B

Date: November 14, 2006

Scale: 1:1500



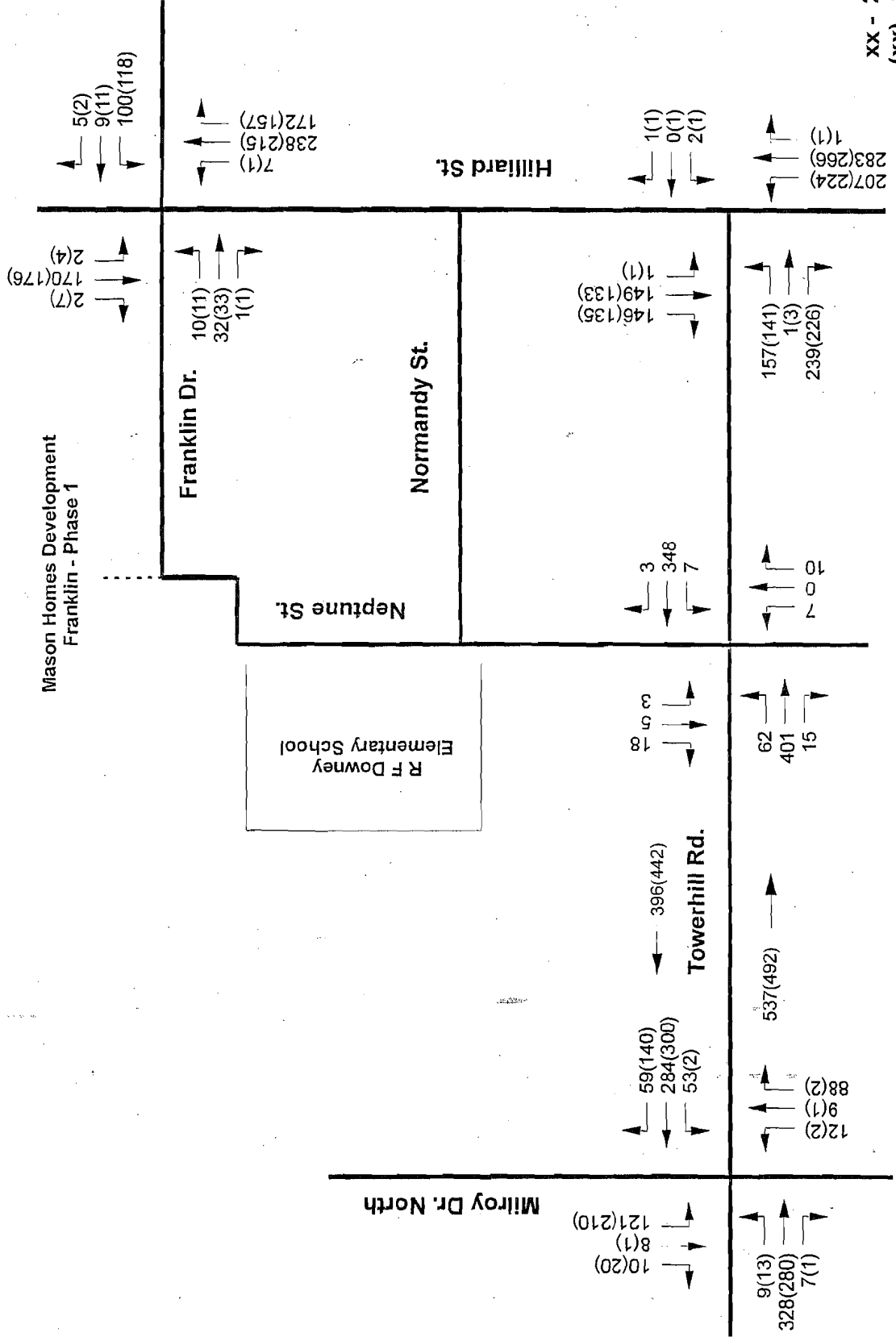
Exhibit 2A Observed AM Peak Hr Volumes



xx - 2006
(xx) - 2004



Exhibit 2B Observed PM Peak Hr Volumes



xx - 2006
(xx) - 2004

Exhibit 3A 2011 Total AM Peak Hr Traffic

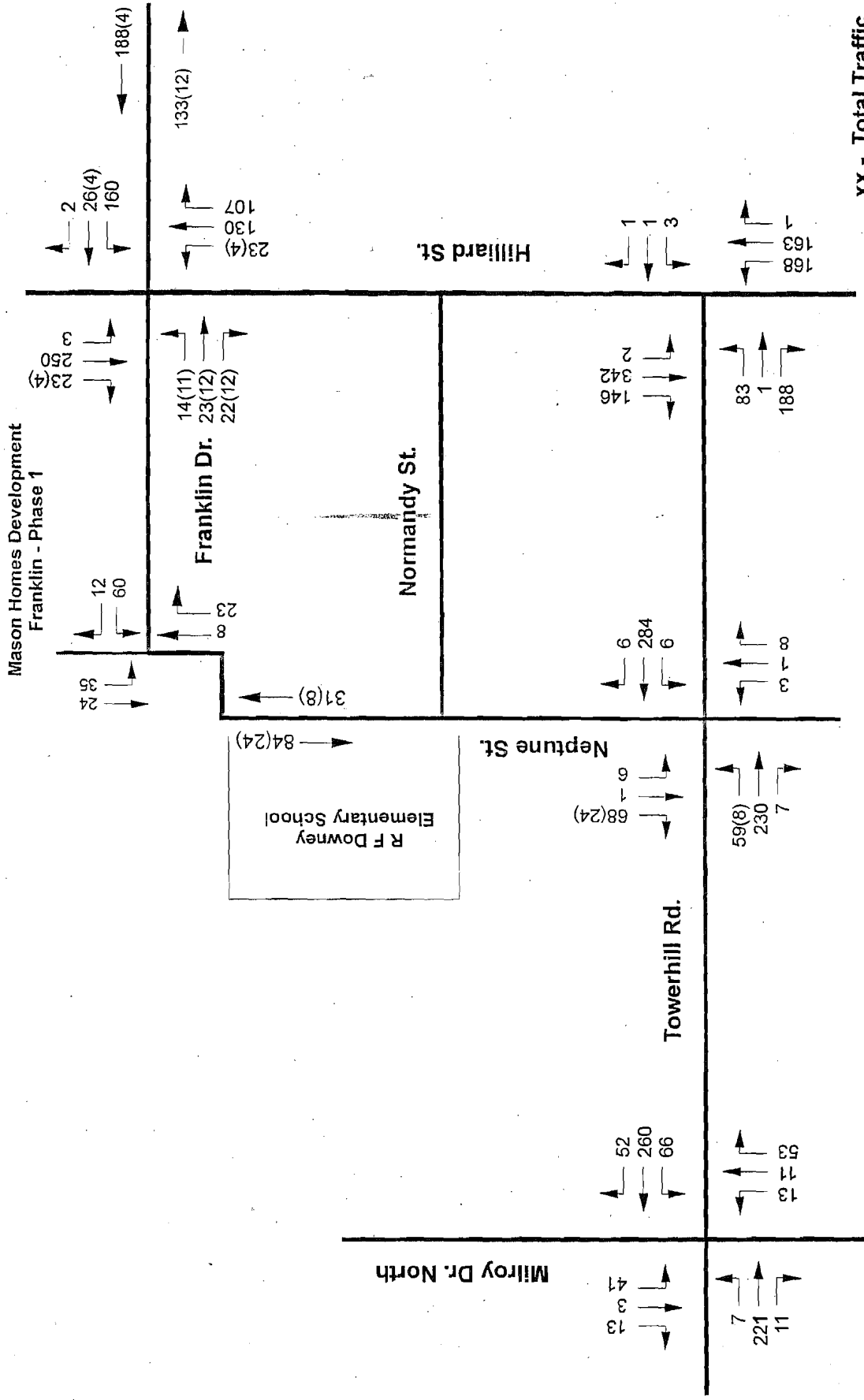
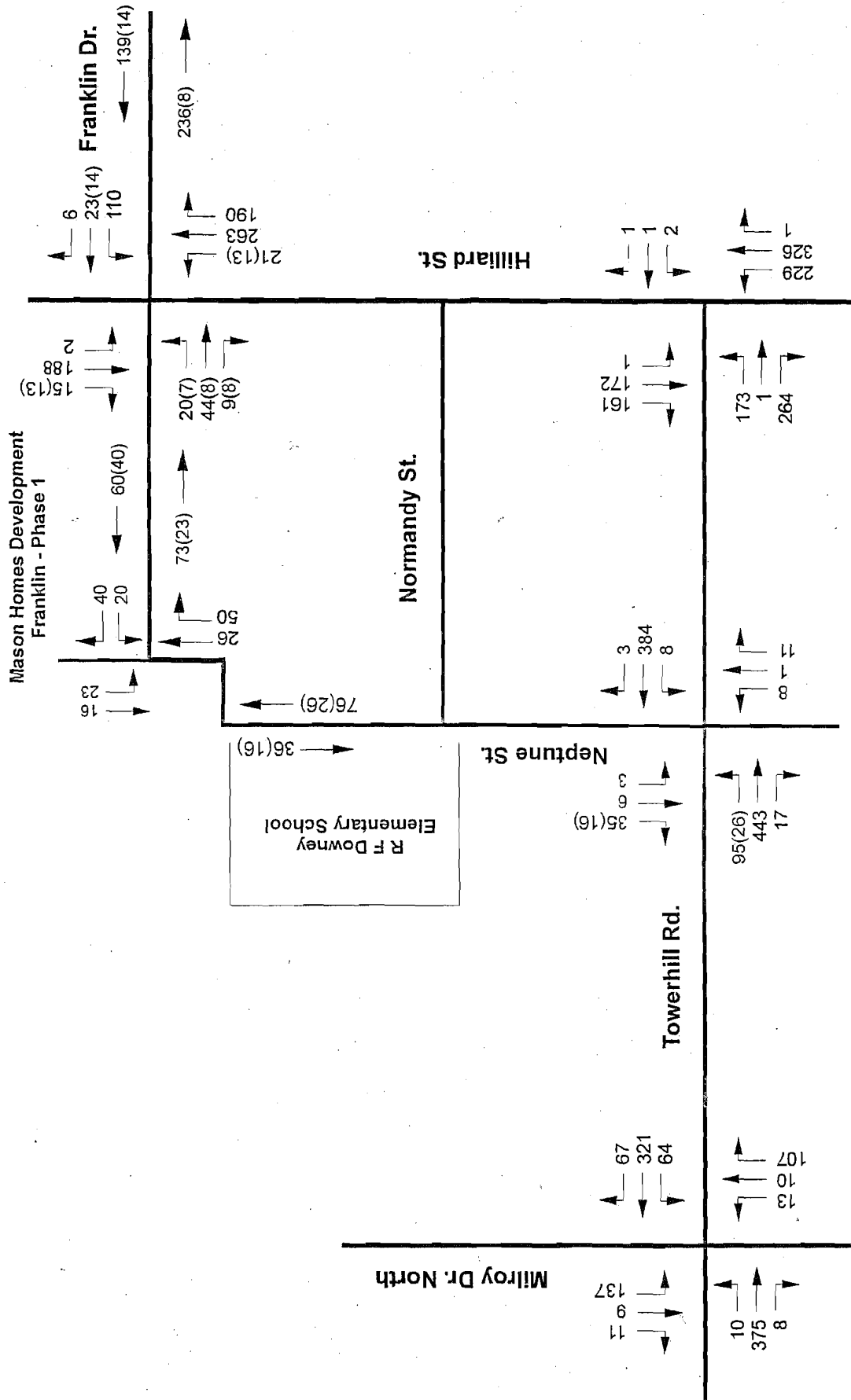


Exhibit 3B 2011 Total PM Peak Hr Traffic



xx - Total Traffic
(xx) - Site Traffic



TECHNICAL APPENDIX

DEFINITION OF LEVELS OF SERVICE

UNSIGNALIZED INTERSECTIONS

Analysis of the Level of Service for unsignalized intersections is based on the **Highway Capacity Manual (HCM 2000)** procedures using the *Highway Capacity Software HCS+, Release 5.2* for unsignalized intersections. The Level of Service for intersections is based on *Control Delay*. At two way stop controlled intersections (TWSC), *Control Delay* is the total elapsed time from a vehicle joining the queue until its departure from the stopped position at the head of the queue. The *Control Delay* also includes the time required to decelerate from a stop and to accelerate to the free-flow speed. Level of Service definitions for unsignalized intersections as defined by the **Highway Capacity Manual** are summarized in the table below.

Definition of Level of Service for Unsignalized Intersections

Level of Service	Average Delay (seconds)
A	Less than 10
B	10-15
C	15-25
D	25-35
E	35-50
F	More than 50

Level of Service (LoS) for a TWSC intersection is determined by the computed or measured *Control Delay* and is defined for each minor movement at the intersection. LoS is not defined for the intersection as a whole. LoS "F" is considered to be undesirable for design or planning purposes. However, many individual turning movements at TWSC intersections and commercial entrances along urban arterial corridors operate at LoS "F" during peak hour periods.

The analysis of individual movements at TWSC intersections can also include the estimate of the ratio of volume or demand to available capacity for the movements. This is commonly known as the (v/c) ratio. The v/c ratio provides some indication of how well these individual intersection movements will function during peak hour periods.

TWO-WAY STOP CONTROL SUMMARY

General Information		Site Information					
Analyst	WJC	Intersection	Hilliard/Franklin				
Agency/Co.	Tranplan Associates	Jurisdiction	City of Peterborough				
Date Performed	11/14/2006	Analysis Year	2011				
Analysis Time Period	AM Peak Hour						
Project Description Chemong East - Franklin P1 - Total Based on 2006 Obs							
East/West Street: Franklin			North/South Street: Hilliard				
Intersection Orientation: North-South			Study Period (hrs): 0.25				
Vehicle Volumes and Adjustments							
Major Street Movement	Northbound			Southbound			
	1 L	2 T	3 R	4 L	5 T	6 R	
Volume (veh/h)	23	130	107	3	250	23	✓
Peak-Hour Factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	
Hourly Flow Rate, HFR (veh/h)	14	24	23	168	27	2	
Percent Heavy Vehicles	5	--	--	5	--	--	
Median Type	Undivided						
RT Channelized			0			0	
lanes	0	1	0	0	1	0	
Configuration	LTR			LTR			
Upstream Signal		0			0		
Minor Street Movement	Eastbound			Westbound			
	7 L	8 T	9 R	10 L	11 T	12 R	
Volume (veh/h)	14	23	22	160	26	2	✓
Peak-Hour Factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95	
Hourly Flow Rate, HFR (veh/h)	3	263	24	24	136	112	
Percent Heavy Vehicles	5	5	5	5	5	5	
Percent Grade (%)		1			1		
Shared Approach		N			N		
Storage		0			0		
RT Channelized			0			0	
lanes	0	1	0	0	1	0	
Configuration		LTR			LTR		
Delay, Queue Length, and Level of Service							
Approach	Northbound	Southbound	Westbound			Eastbound	
Movement	1	4	7	8	9	10	11 12
Lane Configuration	LTR	LTR	LTR			LTR	
v (veh/h)	24	3		197			61
C (m) (veh/h)	1216	1257		363			454
c	0.02	0.00		0.54			0.13
95% queue length	0.06	0.01		3.10			0.46
Control Delay (s/veh)	8.0	7.9		26.1			14.2
LOS	A	A		D			B
Approach Delay (s/veh)	--	--		26.1			14.2
Approach LOS	--	--		D			B

TWO-WAY STOP CONTROL SUMMARY

General Information		Site Information	
Analyst	WJC	Intersection	Hilliard/Franklin
Agency/Co.	Tranplan Associates	Jurisdiction	City of Peterborough
Date Performed	11/14/2006	Analysis Year	2011
Analysis Time Period	PM Peak Hour		

Project Description: Chemong East - Franklin P1 -Total based on 2006 obs	
East/West Street: Franklin	North/South Street: Hilliard
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)	21	263	190	2	188	15
Peak-Hour Factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95
Hourly Flow Rate, HFR (veh/h)	21	46	9	115	24	6
Percent Heavy Vehicles	5	--	--	5	--	--
Median Type	Undivided					
RT Channelized			0			0
Lanes	0	1	0	0	1	0
Configuration	LTR			LTR		
Upstream Signal		0			0	

Minor Street	Eastbound			Westbound		
Movement	7	8	9	10	11	12
	L	T	R	L	T	R
Volume (veh/h)	20	44	9	110	23	6
Peak-Hour Factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95
Hourly Flow Rate, HFR (veh/h)	2	197	15	22	276	200
Percent Heavy Vehicles	5	5	5	5	5	5
Percent Grade (%)		1			1	
Flared Approach		N			N	
Storage		0			0	
RT Channelized			0			0
Lanes	0	1	0	0	1	0
Configuration		LTR			LTR	

Delay, Queue Length, and Level of Service

Approach	Northbound	Southbound	Westbound			Eastbound		
Movement	1	4	7	8	9	10	11	12
Lane Configuration	LTR	LTR		LTR			LTR	
Volume (veh/h)	22	2		145			76	
Queue Length (m) (veh/h)	1296	1034		301			333	
Delay (s/veh)	0.02	0.00		0.48			0.23	
95% queue length	0.05	0.01		2.47			0.86	
Control Delay (s/veh)	7.8	8.5		27.6			19.0	
LOS	A	A		D			C	
Approach Delay (s/veh)	--	--		27.6			19.0	
Approach LOS	--	--		D			C	

ALL-WAY STOP CONTROL ANALYSIS

General Information		Site Information	
Analyst	WJC	Intersection	Franklin/Hilliard
Agency/Co.	Tranplan Associates	Jurisdiction	City of Peterborough
Date Performed	12/10/2006	Analysis Year	2011
Analysis Time Period	PM Peak Hour		

Project ID Chemong East Franklin P1 - Total based on 2006 Observed

East/West Street: Franklin North/South Street: Hilliard

Volume Adjustments and Site Characteristics						
Approach	Eastbound			Westbound		
	L	T	R	L	T	R
Movement						
Volume (veh/h)	20	44	9	110	23	6
Thrus Left Lane						
Approach	Northbound			Southbound		
	L	T	R	L	T	R
Movement						
Volume (veh/h)	21	263	190	2	188	15
Thrus Left Lane						

	Eastbound		Westbound		Northbound		Southbound	
	L1	L2	L1	L2	L1	L2	L1	L2
Configuration	LTR		LTR		LTR		LTR	
PHF	0.95		0.95		0.95		0.95	
Flow Rate (veh/h)	76		145		498		214	
Heavy Vehicles	5		5		5		5	
No. Lanes	1		1		1		1	
Geometry Group	1		1		1		1	
Duration, T	0.25							

Saturation Headway Adjustment Worksheet								
Prop. Left-Turns	0.3		0.8		0.0		0.0	
Prop. Right-Turns	0.1		0.0		0.4		0.1	
Prop. Heavy Vehicle	0.0		0.0		0.0		0.0	
hLT-adj	0.2	0.2	0.2	0.2	0.2	0.2	0.2	0.2
RT-adj	-0.6	-0.6	-0.6	-0.6	-0.6	-0.6	-0.6	-0.6
HV-adj	1.7	1.7	1.7	1.7	1.7	1.7	1.7	1.7
hadj, computed	0.1		0.2		-0.1		0.0	

Departure Headway and Service Time								
t _l , initial value (s)	3.20		3.20		3.20		3.20	
x _l , initial	0.07		0.13		0.44		0.19	
t _l , final value (s)	6.08		6.07		4.78		5.32	
t _l , final value	0.13		0.24		0.66		0.32	
Move-up time, m (s)	2.0		2.0		2.0		2.0	
Service Time, t _s (s)	4.1		4.1		2.8		3.3	

Capacity and Level of Service								
	Eastbound		Westbound		Northbound		Southbound	
	L1	L2	L1	L2	L1	L2	L1	L2
Capacity (veh/h)	326		395		736		464	
Delay (s/veh)	9.98		11.02		16.57		10.77	
LOS	A		B		C		B	
Approach: Delay (s/veh)	9.98		11.02		16.57		10.77	
LOS	A		B		C		B	
Intersection Delay (s/veh)	13.84							
Intersection LOS	B							

TWO-WAY STOP CONTROL SUMMARY

General Information		Site Information	
Analyst	WJC	Intersection	Towerhill - Neptune
Agency/Co.	Tranplan Associates	Jurisdiction	City of Peterborough
Date Performed	11/27/2006	Analysis Year	2011
Analysis Time Period	PM Peak Hour		

Project Description	Chemong East - Franklin P1 - Total based on 2006 obs
East/West Street:	Towerhill Road
North/South Street:	Neptune St
Intersection Orientation:	East-West
Study Period (hrs):	0.25

Vehicle Volumes and Adjustments

Major Street	Eastbound			Westbound		
Movement	1	2	3	4	5	6
	L	T	R	L	T	R
Volume (veh/h)	95	443	17	8	384	3
Peak-Hour Factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95
Hourly Flow Rate, HFR (veh/h)	100	466	17	8	404	3
Percent Heavy Vehicles	5	--	--	5	--	--
Median Type	Undivided					
RT Channelized			0			0
Lanes	0	1	0	0	1	0
Configuration	LTR			LTR		
Upstream Signal		0			0	

Minor Street	Northbound			Southbound		
Movement	7	8	9	10	11	12
	L	T	R	L	T	R
Volume (veh/h)	8	1	11	3	6	35
Peak-Hour Factor, PHF	0.95	0.95	0.95	0.95	0.95	0.95
Hourly Flow Rate, HFR (veh/h)	8	1	11	3	6	36
Percent Heavy Vehicles	2	2	2	2	2	2
Percent Grade (%)		2			0	
Shared Approach		N			N	
Storage		0			0	
RT Channelized			0			0
Lanes	0	1	0	0	1	0
Configuration		LTR			LTR	

Delay, Queue Length, and Level of Service

Approach	Eastbound	Westbound	Northbound			Southbound		
Movement	1	4	7	8	9	10	11	12
Lane Configuration	LTR	LTR		LTR			LTR	
Volume (veh/h)	100	8		20			45	
Flow Capacity (veh/h)	1097	1029		233			384	
Flow Ratio	0.09	0.01		0.09			0.12	
95% queue length	0.30	0.02		0.28			0.39	
Control Delay (s/veh)	8.6	8.5		21.9			15.6	
LOS	A	A		C			C	
Approach Delay (s/veh)	--	--		21.9			15.6	
Approach LOS	--	--		C			C	