

**Transportation Impact Assessment for  
Proposed Gas Station  
16621 ON HWY12, Midland, ON**

Ref. No: DES21-03-13A  
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Prepared for: 2825951 ONTARIO Ltd.

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## Contents

<b>1. INTRODUCTION</b> .....	<b>2</b>
<b>1.1 Background</b> .....	<b>2</b>
<b>1.2 Study Scope and Objectives</b> .....	<b>3</b>
<b>1.3 Horizon Year and Analysis Periods</b> .....	<b>4</b>
<b>2. CONTEXT</b> .....	<b>4</b>
<b>2.1 Streets and Intersections</b> .....	<b>4</b>
<b>2.2 Proposed Land Use on the Site</b> .....	<b>5</b>
<b>2.3 Local Transportation Infrastructure Improvements</b> .....	<b>6</b>
<b>2.4 Transit Access</b> .....	<b>8</b>
<b>2.5 Transportation Systems</b> .....	<b>8</b>
<b>3. TRAVEL DEMAND FORECASTING</b> .....	<b>13</b>
<b>3.1 Development-Generated Traffic</b> .....	<b>13</b>
<b>3.2 Background Traffic</b> .....	<b>13</b>
<b>4.0 CONCLUSIONS and RECOMMENDATIONS</b> .....	<b>14</b>
<b>APPENDIX</b> .....	<b>15</b>

## **EXECUTIVE SUMMARY**

This Transportation Impact Assessment (TIA) report has been prepared for the project at 16621 HWY 12. The subject site is bounded by a West-East bound HWY12 and North-South bound Brandon Street.

As per Transportation Impact Assessment Guideline, the traffic components and volume as well as the trend in horizontal year are evaluated. The conclusions and recommendations of this assessment are summarized as follows:

The additional traffic generated by the proposed development during the weekday peak hours is not anticipated to have a significant impact on Hwy 12 and Brandon Street, nor on intersection operations within the study area. The proposed subject is expected to generate a total of 43 AM and 59 PM peak hour trips.

All study area intersections are anticipated to continue to operate with a supposed LOS (Level of Service) D or E during weekday peak hours. No improvements are recommended within the study area.

## **1. INTRODUCTION**

### **1.1 Background**

FRONTOP Engineering Ltd has been retained to prepare a Transportation Impact Analysis Report for the proposed project at 16621 ON Hwy12. This report shall evaluate the traffic in horizontal year, and recommend the way to reduce the impacts on transportation in accordance with the policies and criteria of the Transportation & Engineering Department, the Simcoe County and Midland's "Transportation Impact Study (TIS) Guidelines for Development Applications"

The proposed building lot is planned to be a gas station located at north-east corner of Brandon Street and Hwy 12, Midland, ON. It is roughly rectangular in shape and 2792 m<sup>2</sup> in area. Refer to Figure 1 for location of the development site.

The gas station, including refueling pumps and a quick service restaurant, is anticipated that ultimate build-out will occur by 2021.

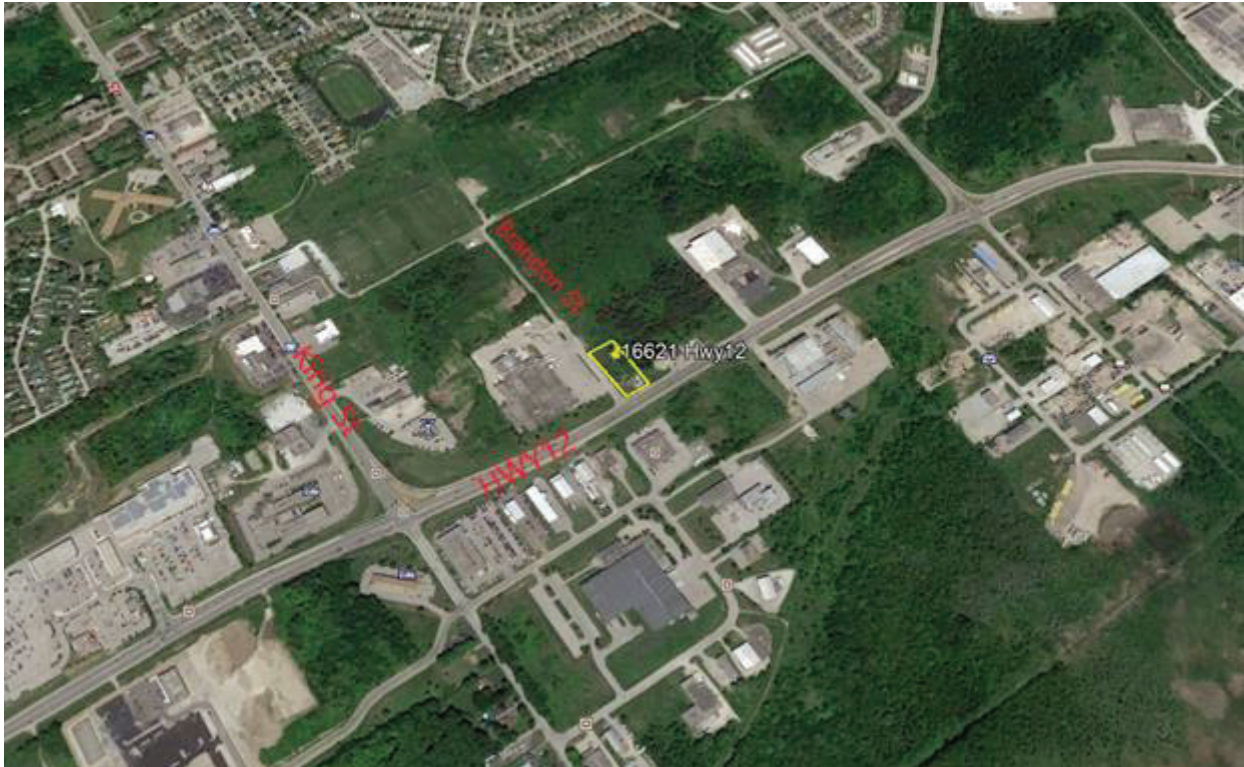


Figure 1 Location of the Site

## 1.2 Study Scope and Objectives

The purpose of the assessment is to identify the potential impacts to traffic flow at the site accesses and on the surrounding roadway network. The study analysis includes the following tasks:

- Determine current traffic volumes and circulation patterns;
- Estimate future traffic volumes, including the impact of additional proposed developments in the area;



- Complete level-of-service [LOS] analysis of horizon year (without the proposed development) traffic conditions and identify operational deficiencies;
- Estimate the amount of traffic that would be generated by the proposed project and assign the added traffic amount to roadway networks;
- Complete LOS analysis of horizon year (with the proposed development) traffic conditions and identify additional operational deficiencies.

### **1.3 Horizon Year and Analysis Periods**

Traffic scenarios for the existing year and ultimate building horizon year (2022) were selected for analysis of traffic operations in the study area. The weekday morning (AM) and weekday afternoon (PM) peak hours have been selected as the analysis periods for this study.

## **2. CONTEXT**

### **2.1 Streets and Intersections**

The key roadways in the vicinity are shown in Figure 1. These roads included Trans-Canada Highway 12, Brandon Street, and King Street. They have been identified as the roads most directly affected by transportation along access roads. All other roadways within the study area fall under the jurisdiction of the township of Simcoe County.

The following intersections are included in the traffic impact study:

- Highway 12 / Brandon Street;
- Highway 12 / King Street.

There is no entrance to the site along the Highway 12.

Brandon Street is a dead end drive with 2 lanes (7~10 meters width). Its un-posted speed limit is 50km/h.

King Street is a local main road that runs from South-East of the town to Midland harbor. It has a 4-lane with sidewalk on both sides. It has a supposed speed limit of 50km/h.

## 2.2 Proposed Land Use on the Site

2825951 Ontario Ltd. intends to develop the vacant land, and an independent Transportation Assessment Study has been filed in support of the implementation.

The site Plan is shown in Figure 2.

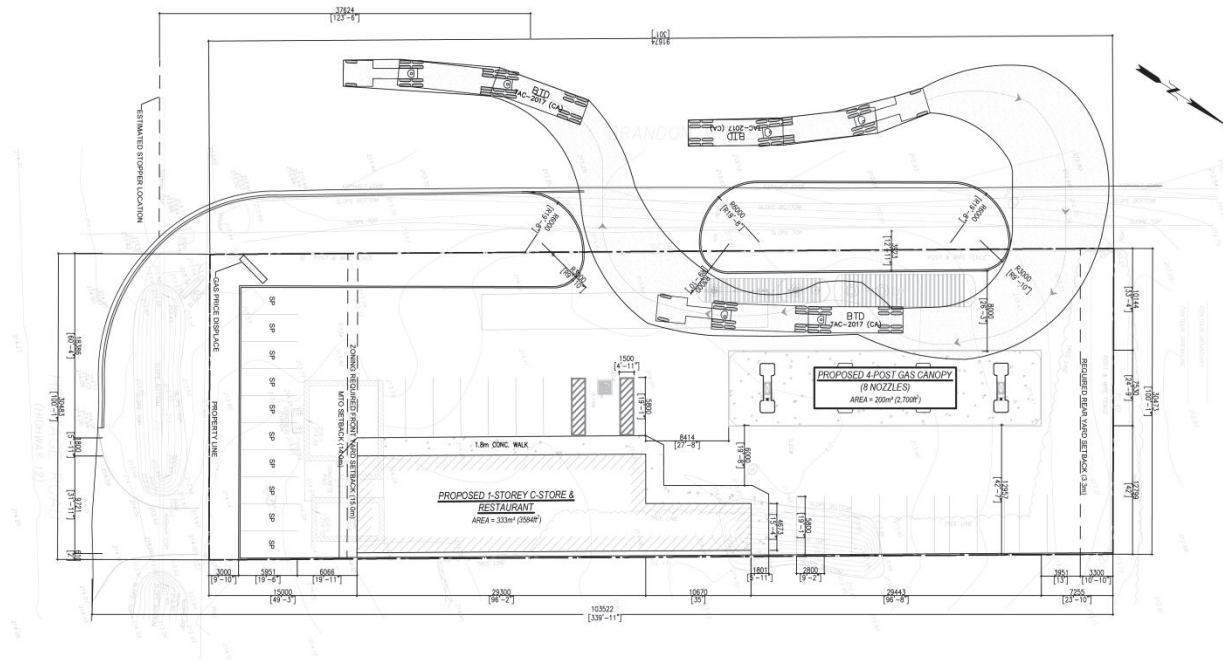


Figure 2 Site Plan

Table1. Site Statistics

Item	Existing Building	Proposed Gross Area	Proposed Canopy	Parking seats (not including surplus parking)
Size	102.1 m <sup>2</sup>	533 m <sup>2</sup>	4 Pumps	12(including 1 handicap spaces)

### 2.3 Local Transportation Infrastructure Improvements

According to Transportation Master Plan (TMP) of town of Midland under existing peak hour traffic conditions the relative intersections operate at all levels of service, the forecasted trips will have little impacts on existing road network till 2041. The short-term and long-term plan shows, no improvements along HWY 12 and King Street are needed during the time, see Figure 3 and Figure 4.

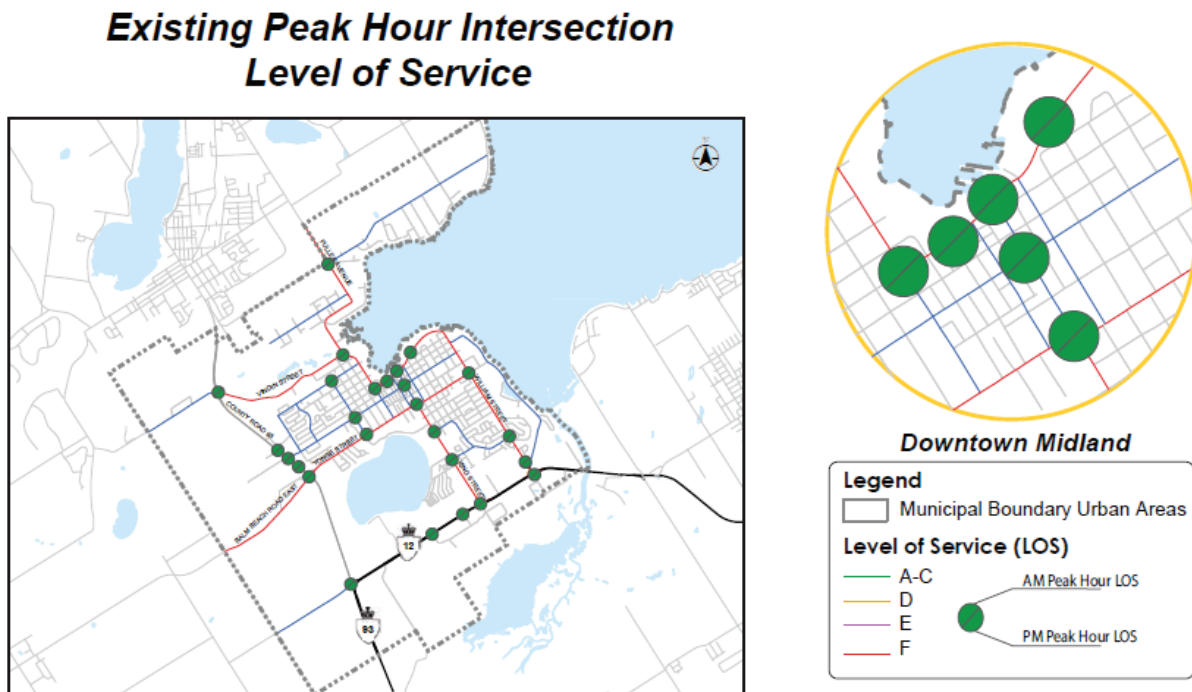


Figure 3 Level of Service at Intersections in Midland

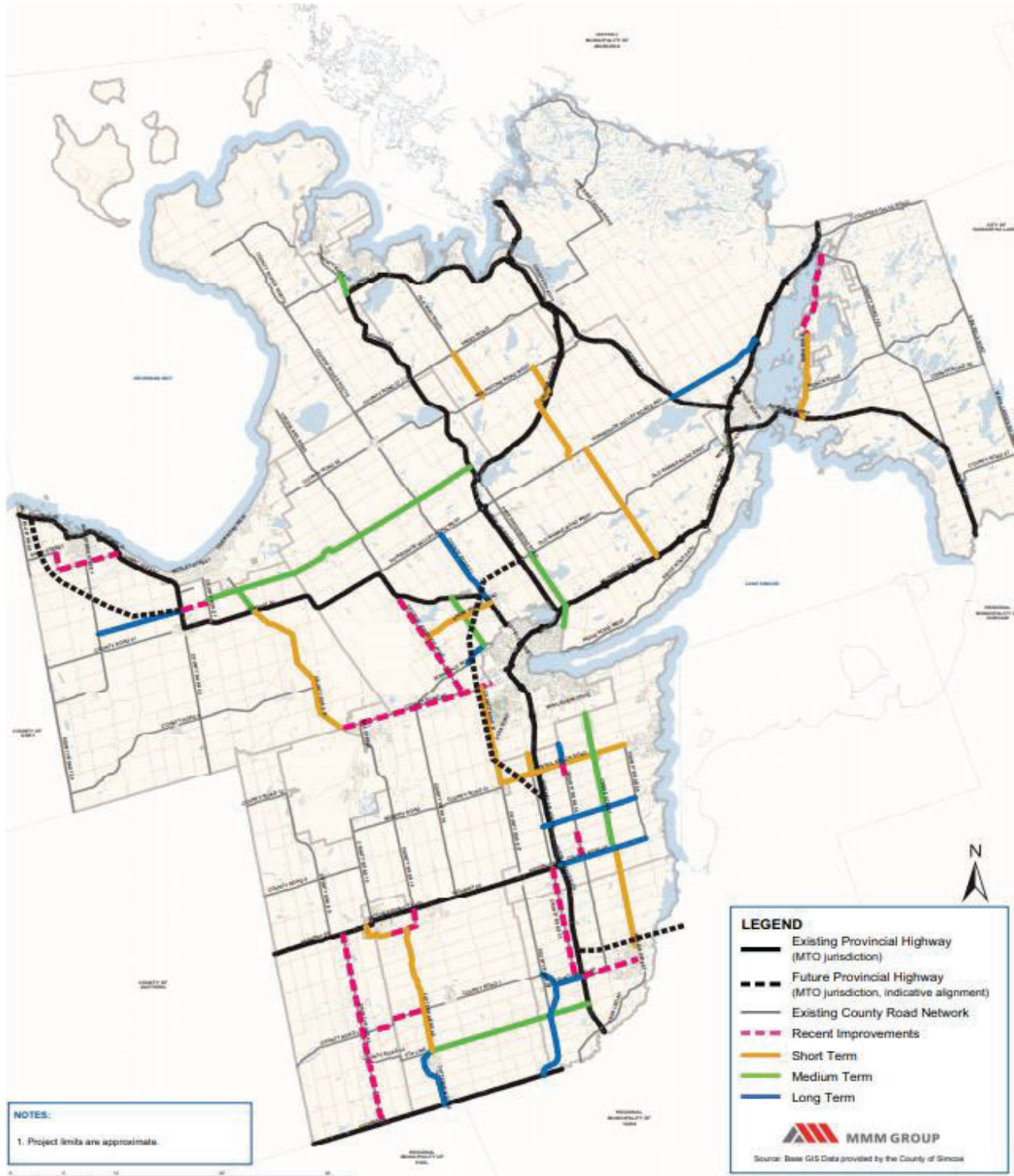


Figure 4 Road Improvements Plan (short term 0~5a)



## 2.4 Transit Access

The Midland South transit route provides various services within the Town for travelling along the streets adjacent the study area.

This bus operates between 07:15 – 17:15 on weekdays and 09:15 – 16:15 on Saturdays with service every 60 minutes, and no bus service is available on Sundays or Holidays.

## 2.5 Transportation Systems

Hwy12 is a four-lane Class 2B Arterial road through the study area. It has a rural cross-section with gravel shoulders and ditches on both sides of the road. At its intersection with King Street, Highway 12 has curb on both sides of the road. West of King Street, Highway 12 has sidewalk on the north side of the road. Highway 12 has a posted speed limit of 60 km/h and is under the jurisdiction of MTO.

Brandon St. is a two-lane local road with a rural cross-section, with un-posted (assumed) speed limit of 50 km/h, and is under the jurisdiction of the Town.



Figure 5 Hwy 12/King St. Intersection



Figure 6 Hwy 12/Brandon St. Intersection

King Street is a four-lane arterial road with an urban cross-section and sidewalk on both sides of the road and a posted speed limit of 50 km/h. It is under the jurisdiction of the Town.

### Intersections

The intersections along HWY12 have stop controls for the road.

#### HWY12/King Street

- Signalized intersection
- One left-turn lane and one right-turn lane on HWY12

#### HWY12/ Brandon Street

- Unsignalized intersection
- No left-turn lane on HWY12

### Signage and Pavement Markings

Regulatory signage and pavement markings are in accordance with MTO's requirements. MTO will be updating the signage and pavement markings in the vicinity of the interchange.

### Pedestrians, Cyclists and Transit

Sidewalk is currently only provided on part of Hwy12, for example in the vicinity of intersection with King Street.

Within the study area, bike lanes and cycling tracks are not provided.

The Midland South bus route provides bus service at several points of interest within the Town travelling along Birchwood Drive, Galloway Boulevard, and William Street, adjacent the study area. This bus run from 07:15 to 17:15 on weekdays and from 09:15 to 16:15 on Saturdays with service at intervals of 60 minutes, albeit no bus service on Sundays or Holidays. In addition, the bus route can provide a "flag on" service where passengers are not required to be at a bus stop and can flag down the bus along its route to get on the bus.

## **2.6 Existing Traffic Volumes**

Detailed turning movement traffic and pedestrian counts were obtained from MTO at the study intersections. Table 2 summarizes the AM and PM peak hour traffic volumes in 2020.



Table2. Intersection Total Traffic Volume (2020)

Intersection	AM Peak Hour	PM Peak Hour
HWY12/King St	1080	1480
HWY12/William St	1065	1630

It is noted that the 1.25% growth rate has been applied to all movements at the study intersections (rather than just the through movements) to ensure a conservative estimate in forecasting the 2020 volumes. The magnitude of the increase was a conservative estimate, based on a comparison of the 2017 and 2020 traffic data from MTO. In addition, the TIS report for 16533 Highway 12 Town of Midland has been referred to.

In addition, TRW Vehicle Safety System Ltd., which is the manufacturer of automotive safety products, is located opposite the gas station. It has a parking lot accommodating around 90 spaces

Historical collision data from the 2018 and 2019 Annual Collision Statistics Report for the study area intersection show that there were no traffic accidents and pedestrian injured in the vicinity.



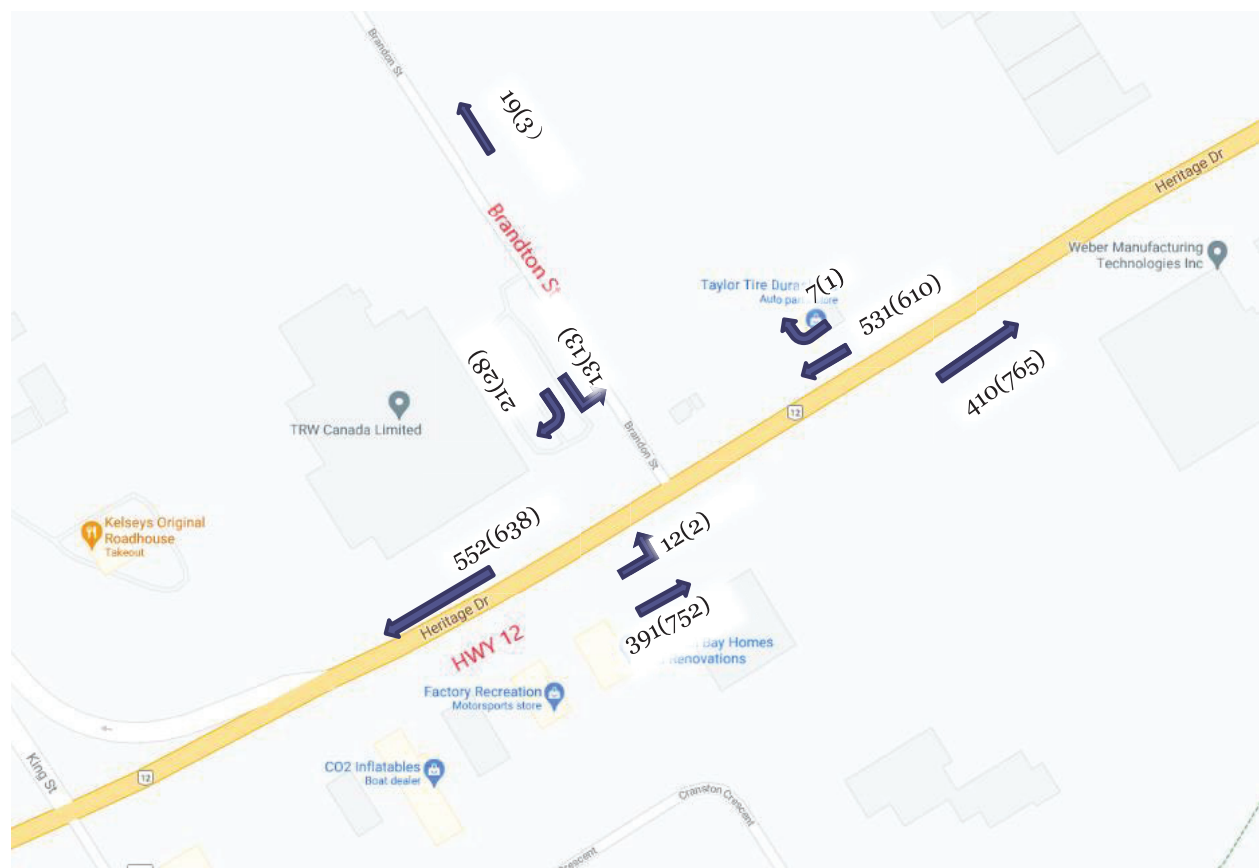


Figure 7 HWY12 & Brandon St. Traffic Volume (inside bracket is the value of PM hour)

## 2.5 Study Area and Time Periods

The study area intersections include the proposed accesses and following intersections:

- HWY12/ Brandon Street

The selected time periods for the analysis are the weekday AM and PM peak hours, as they represent the ‘worst case’ combination of site generated traffic and adjacent street traffic. Analysis will be completed for the 2022 build-out year (supposed).

Weekday AM peak: 1107 vehicles per hour

Weekday PM peak: 1517 vehicles per hour



### 3. TRAVEL DEMAND FORECASTING

#### 3.1 Development-Generated Traffic

The trip generation for this development was computed based on the 10th edition of the ITE Trip Generation Manual. The expected trips generated by the site were computed based on peak hour traffic on adjacent streets, and considering the existing neighbor gas station along the HWY 12. The trip generation calculations are provided in Table 4 below.

Table 3 Trip Generation Calculations

Land Use	Code	1000sq-ft GFA	Period	Trips/h
Gas Station	945	5.737	AM	43
			PM	59

The total adjusted trips that have impacts to adjacent streets are summarized in Table 4.

Table 4 Volume Added to Adjacent Streets Inbound / Outbound Trip Distribution

Period	Total	Inbound	Outbound
AM	43	22	21
PM	59	30	29

#### 3.2 Background Traffic

A review of historic traffic counts, as well as Master Plan of town of Midland was reviewed to determine an appropriate background growth rate along the study area roadways.

Based on the historic traffic counts (2020 at HWY12), traffic volumes generally had a growth of 1.25% annually along the study area roadways. This is consistent with the prediction of 2025 Transportation Master Plan.

#### 4.0 CONCLUSIONS and RECOMMENDATIONS

The additional traffic generated by the proposed development during the weekday peak hours is not anticipated to have a significant impact on Hwy 12 and Brandon Street, nor on intersection operations within the study area. The proposed subject is expected to generate a total of 43 AM and 59 PM peak hour trips. Considering about the shift time trips generated in TRW, the extreme trips will be 135 but little impacts on LOS (Level of Service) are made in the situation. The results are summarized in Table 5.

Table 5 Results of Analysis

Items		Hwy12/Brandon St. (Un-signalized)	Hwy12/King St.
ICU(Intersection capacity Utilization) Level of Service	AM(Peak Hours)	A	D
	PM(Peak Hours)	A	D
	Considering Shift Time of TRW	A	D
Intersection Delay (Level of Service)	AM(Peak Hours)	N/A	E
	PM(Peak Hours)	N/A	E
	Considering Shift Time of TRW	N/A	E

All study area intersections are anticipated to continue to operate with a supposed LOS (Level of Service) D or E during weekday peak hours. No improvements are recommended within the study area.



Yours truly,

**Frontop Engineering Limited**

Andy Zhong

Traffic Analyst





## Appendix

# Lanes, Volumes, Timings

## 3: Hwy12 & Brandon St.

Existing(AM)  
06-10-2021



Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (vph)	12	391	531	7	21	13
Future Volume (vph)	12	391	531	7	21	13
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Util. Factor	0.95	0.95	0.95	0.95	1.00	1.00
Frt			0.998			0.850
Fit Protected		0.999			0.950	
Satd. Flow (prot)	0	3536	3532	0	1770	1583
Fit Permitted		0.999			0.950	
Satd. Flow (perm)	0	3536	3532	0	1770	1583
Link Speed (mph)		37	37		25	
Link Distance (ft)		1181	2280		145	
Travel Time (s)		21.8	42.0		4.0	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	13	425	577	8	23	14
Shared Lane Traffic (%)						
Lane Group Flow (vph)	0	438	585	0	23	14
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Left	Left	Right	Left	Right
Median Width(ft)		12	12		12	
Link Offset(ft)		0	0		0	
Crosswalk Width(ft)		16	16		16	
Two way Left Turn Lane						
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	16			9	16	9
Sign Control		Stop	Stop		Stop	
<b>Intersection Summary</b>						
Area Type:	Other					
Control Type:	Unsignalized					
Intersection Capacity Utilization	29.5%		ICU Level of Service A			
Analysis Period (min)	15					

Lanes, Volumes, Timings  
5: King St. & Hwy12

Existing(AM)  
06-10-2021



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	236	250	80	90	334	293	27	48	28	103	92	184
Future Volume (vph)	236	250	80	90	334	293	27	48	28	103	92	184
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0		0	66		131	0		0	0		0
Storage Lanes	1		0	1		1	1		1	1		1
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	1.00	0.95	0.95	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frnt		0.964				0.850			0.850			0.850
Fit Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1770	3412	0	1770	1863	1583	1770	1863	1583	1770	1863	1583
Fit Permitted	0.474			0.537			0.692			0.723		
Satd. Flow (perm)	883	3412	0	1000	1863	1583	1289	1863	1583	1347	1863	1583
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		87				318			36			200
Link Speed (mph)		37			37			31				31
Link Distance (ft)		74			1181			163				273
Travel Time (s)		1.4			21.8			3.6				6.0
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	257	272	87	98	363	318	29	52	30	112	100	200
Shared Lane Traffic (%)												
Lane Group Flow (vph)	257	359	0	98	363	318	29	52	30	112	100	200
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		12			12			12				12
Link Offset(ft)		0			0			0				0
Crosswalk Width(ft)		16			16			16				16
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	16		9	16		9	16		9	16		9
Turn Type	Perm	NA		Perm	NA	Perm	Perm	NA	Perm	Perm	NA	Perm
Protected Phases		2			6		8		8		4	
Permitted Phases	2			6		6	8		8	4		4
Minimum Split (s)	22.5	22.5		22.5	22.5	22.5	22.5	22.5	22.5	22.5	22.5	22.5
Total Split (s)	22.5	22.5		22.5	22.5	22.5	22.5	22.5	22.5	22.5	22.5	22.5
Total Split (%)	50.0%	50.0%		50.0%	50.0%	50.0%	50.0%	50.0%	50.0%	50.0%	50.0%	50.0%
Maximum Green (s)	18.0	18.0		18.0	18.0	18.0	18.0	18.0	18.0	18.0	18.0	18.0
Yellow Time (s)	3.5	3.5		3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	1.0	1.0		1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	4.5	4.5		4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
Lead/Lag												
Lead-Lag Optimize?												
Walk Time (s)	7.0	7.0		7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0
Flash Dont Walk (s)	11.0	11.0		11.0	11.0	11.0	11.0	11.0	11.0	11.0	11.0	11.0
Pedestrian Calls (#/hr)	0	0		0	0	0	0	0	0	0	0	0
Act Effct Green (s)	18.0	18.0		18.0	18.0	18.0	18.0	18.0	18.0	18.0	18.0	18.0
Actuated g/C Ratio	0.40	0.40		0.40	0.40	0.40	0.40	0.40	0.40	0.40	0.40	0.40
v/c Ratio	0.73	0.25		0.24	0.49	0.39	0.06	0.07	0.05	0.21	0.13	0.27
Control Delay	27.8	7.3		11.1	12.8	3.1	8.7	8.7	3.6	10.2	9.2	2.9
Queue Delay	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	27.8	7.3		11.1	12.8	3.1	8.7	8.7	3.6	10.2	9.2	2.9
LOS	C	A		B	B	A	A	A	A	B	A	A
Approach Delay		15.8			8.6			7.4				6.4
Approach LOS		B			A			A				A
Queue Length 50th (ft)	55	23		17	69	0	5	8	0	19	16	0
Queue Length 95th (ft)	#159	45		43	127	36	16	23	10	45	38	28
Internal Link Dist (ft)		1			1101			83			193	
Turn Bay Length (ft)				66		131						
Base Capacity (vph)	353	1417		400	745	824	515	745	654	538	745	753
Starvation Cap Reductn	0	0		0	0	0	0	0	0	0	0	0

Lanes, Volumes, Timings  
5: King St. & Hwy12

Existing(AM)  
06-10-2021

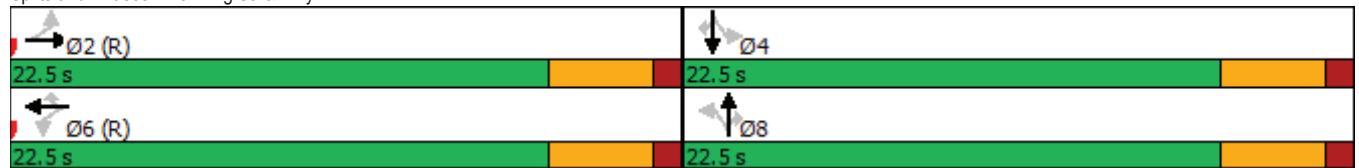


Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Spillback Cap Reductn	0	0		0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0		0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.73	0.25		0.24	0.49	0.39	0.06	0.07	0.05	0.21	0.13	0.27

Intersection Summary

Area Type:	Other
Cycle Length:	45
Actuated Cycle Length:	45
Offset:	22.5 (50%), Referenced to phase 2:EBTL and 6:WBTL, Start of Green
Natural Cycle:	55
Control Type:	Pretimed
Maximum v/c Ratio:	0.73
Intersection Signal Delay:	10.4
Intersection LOS:	B
Intersection Capacity Utilization	54.3%
ICU Level of Service	A
Analysis Period (min)	15
#	95th percentile volume exceeds capacity, queue may be longer. Queue shown is maximum after two cycles.

Splits and Phases: 5: King St. & Hwy12





# Lanes, Volumes, Timings

## 3: Hwy12 & Brandon St.

Existing(PM)  
06-10-2021



Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (vph)	2	752	610	1	13	28
Future Volume (vph)	2	752	610	1	13	28
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Util. Factor	0.95	0.95	0.95	0.95	1.00	1.00
Frt						0.850
Fit Protected					0.950	
Satd. Flow (prot)	0	3539	3539	0	1770	1583
Fit Permitted					0.950	
Satd. Flow (perm)	0	3539	3539	0	1770	1583
Link Speed (mph)		37	37		25	
Link Distance (ft)		1181	2280		145	
Travel Time (s)		21.8	42.0		4.0	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	2	817	663	1	14	30
Shared Lane Traffic (%)						
Lane Group Flow (vph)	0	819	664	0	14	30
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Left	Left	Right	Left	Right
Median Width(ft)		12	12		12	
Link Offset(ft)		0	0		0	
Crosswalk Width(ft)		16	16		16	
Two way Left Turn Lane						
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	16			9	16	9
Sign Control		Stop	Stop		Stop	
<b>Intersection Summary</b>						
Area Type:	Other					
Control Type:	Unsignalized					
Intersection Capacity Utilization	32.2%			ICU Level of Service A		
Analysis Period (min)	15					

# Lanes, Volumes, Timings

## 5: King St. & Hwy12

Existing(PM)  
06-10-2021



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	336	584	80	32	454	178	71	105	64	205	63	341
Future Volume (vph)	336	584	80	32	454	178	71	105	64	205	63	341
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0		0	66		131	0		0	0		0
Storage Lanes	1		0	1		1	1		1	1		1
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	1.00	0.95	0.95	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frnt		0.982				0.850			0.850			0.850
Fit Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1770	3476	0	1770	1863	1583	1770	1863	1583	1770	1863	1583
Fit Permitted	0.331			0.320			0.713			0.684		
Satd. Flow (perm)	617	3476	0	596	1863	1583	1328	1863	1583	1274	1863	1583
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		40				193			70			218
Link Speed (mph)		37			37			31				31
Link Distance (ft)		74			1181			163				273
Travel Time (s)		1.4			21.8			3.6				6.0
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	365	635	87	35	493	193	77	114	70	223	68	371
Shared Lane Traffic (%)												
Lane Group Flow (vph)	365	722	0	35	493	193	77	114	70	223	68	371
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		12			12			12				12
Link Offset(ft)		0			0			0				0
Crosswalk Width(ft)		16			16			16				16
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	16		9	16		9	16		9	16		9
Turn Type	Perm	NA		Perm	NA	Perm	Perm	NA	Perm	Perm	NA	Perm
Protected Phases		2			6		8		8		4	
Permitted Phases	2			6		6	8		8	4		4
Minimum Split (s)	22.5	22.5		22.5	22.5	22.5	22.5	22.5	22.5	22.5	22.5	22.5
Total Split (s)	22.5	22.5		22.5	22.5	22.5	22.5	22.5	22.5	22.5	22.5	22.5
Total Split (%)	50.0%	50.0%		50.0%	50.0%	50.0%	50.0%	50.0%	50.0%	50.0%	50.0%	50.0%
Maximum Green (s)	18.0	18.0		18.0	18.0	18.0	18.0	18.0	18.0	18.0	18.0	18.0
Yellow Time (s)	3.5	3.5		3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	1.0	1.0		1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	4.5	4.5		4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
Lead/Lag												
Lead-Lag Optimize?												
Walk Time (s)	7.0	7.0		7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0
Flash Dont Walk (s)	11.0	11.0		11.0	11.0	11.0	11.0	11.0	11.0	11.0	11.0	11.0
Pedestrian Calls (#/hr)	0	0		0	0	0	0	0	0	0	0	0
Act Effct Green (s)	18.0	18.0		18.0	18.0	18.0	18.0	18.0	18.0	18.0	18.0	18.0
Actuated g/C Ratio	0.40	0.40		0.40	0.40	0.40	0.40	0.40	0.40	0.40	0.40	0.40
v/c Ratio	1.48	0.51		0.15	0.66	0.26	0.15	0.15	0.10	0.44	0.09	0.49
Control Delay	259.1	11.1		10.6	16.3	2.9	9.5	9.4	3.4	13.2	8.9	6.8
Queue Delay	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	259.1	11.1		10.6	16.3	2.9	9.5	9.4	3.4	13.2	8.9	6.8
LOS	F	B		B	B	A	A	A	A	B	A	A
Approach Delay		94.4			12.5			7.8				9.2
Approach LOS		F			B			A				A
Queue Length 50th (ft)	~143	67		6	102	0	12	18	0	41	11	26
Queue Length 95th (ft)	#271	107		21	186	28	33	43	17	88	28	75
Internal Link Dist (ft)		1			1101			83			193	
Turn Bay Length (ft)				66		131						
Base Capacity (vph)	246	1414		238	745	749	531	745	675	509	745	764
Starvation Cap Reductn	0	0		0	0	0	0	0	0	0	0	0

Lanes, Volumes, Timings  
5: King St. & Hwy12

Existing(PM)  
06-10-2021

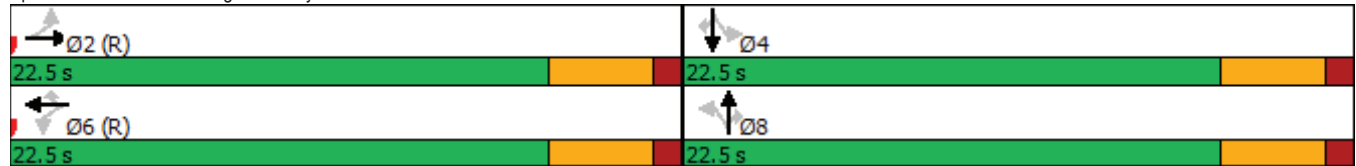


Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Spillback Cap Reductn	0	0		0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0		0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	1.48	0.51		0.15	0.66	0.26	0.15	0.15	0.10	0.44	0.09	0.49

Intersection Summary

Area Type:	Other
Cycle Length:	45
Actuated Cycle Length:	45
Offset:	22.5 (50%), Referenced to phase 2:EBTL and 6:WBTL, Start of Green
Natural Cycle:	65
Control Type:	Pretimed
Maximum v/c Ratio:	1.48
Intersection Signal Delay:	43.8
Intersection LOS:	D
Intersection Capacity Utilization:	71.8%
ICU Level of Service:	C
Analysis Period (min):	15
~ Volume exceeds capacity, queue is theoretically infinite. Queue shown is maximum after two cycles.	
# 95th percentile volume exceeds capacity, queue may be longer. Queue shown is maximum after two cycles.	

Splits and Phases: 5: King St. & Hwy12

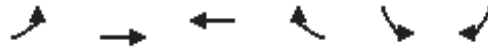


# Lanes, Volumes, Timings

## 3: Hwy12 & Brandon St.

Background(2022)(AM)

06-10-2021



Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (vph)	13	437	673	8	14	23
Future Volume (vph)	13	437	673	8	14	23
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Util. Factor	0.95	0.95	0.95	0.95	1.00	1.00
Frt			0.998			0.850
Fit Protected		0.999			0.950	
Satd. Flow (prot)	0	3536	3532	0	1770	1583
Fit Permitted		0.999			0.950	
Satd. Flow (perm)	0	3536	3532	0	1770	1583
Link Speed (mph)		37	37		25	
Link Distance (ft)		1181	2280		145	
Travel Time (s)		21.8	42.0		4.0	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	14	475	732	9	15	25
Shared Lane Traffic (%)						
Lane Group Flow (vph)	0	489	741	0	15	25
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Left	Left	Right	Left	Right
Median Width(ft)		12	12		12	
Link Offset(ft)		0	0		0	
Crosswalk Width(ft)		16	16		16	
Two way Left Turn Lane						
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	16			9	16	9
Sign Control		Stop	Stop		Stop	

### Intersection Summary

Area Type: Other

Control Type: Unsignalized

Intersection Capacity Utilization 31.5%

ICU Level of Service A

Analysis Period (min) 15

Lanes, Volumes, Timings  
5: King St. & Hwy12



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	256	281	80	90	364	294	51	27	28	105	97	218
Future Volume (vph)	256	281	80	90	364	294	51	27	28	105	97	218
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0		0	66		131	0		0	0		0
Storage Lanes	1		0	1		1	1		1	1		1
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	1.00	0.95	0.95	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frnt		0.967				0.850			0.850			0.850
Fit Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1770	3422	0	1770	1863	1583	1770	1863	1583	1770	1863	1583
Fit Permitted	0.437			0.520			0.689			0.738		
Satd. Flow (perm)	814	3422	0	969	1863	1583	1283	1863	1583	1375	1863	1583
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		87				320			36			237
Link Speed (mph)		37			37			31				31
Link Distance (ft)		74			1181			163				273
Travel Time (s)		1.4			21.8			3.6				6.0
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	278	305	87	98	396	320	55	29	30	114	105	237
Shared Lane Traffic (%)												
Lane Group Flow (vph)	278	392	0	98	396	320	55	29	30	114	105	237
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		12			12			12				12
Link Offset(ft)		0			0			0				0
Crosswalk Width(ft)		16			16			16				16
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	16		9	16		9	16		9	16		9
Turn Type	Perm	NA		Perm	NA	Perm	Perm	NA	Perm	Perm	NA	Perm
Protected Phases		2			6		8		8		4	
Permitted Phases	2			6		6	8		8	4		4
Minimum Split (s)	22.5	22.5		22.5	22.5	22.5	22.5	22.5	22.5	22.5	22.5	22.5
Total Split (s)	22.5	22.5		22.5	22.5	22.5	22.5	22.5	22.5	22.5	22.5	22.5
Total Split (%)	50.0%	50.0%		50.0%	50.0%	50.0%	50.0%	50.0%	50.0%	50.0%	50.0%	50.0%
Maximum Green (s)	18.0	18.0		18.0	18.0	18.0	18.0	18.0	18.0	18.0	18.0	18.0
Yellow Time (s)	3.5	3.5		3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	1.0	1.0		1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	4.5	4.5		4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
Lead/Lag												
Lead-Lag Optimize?												
Walk Time (s)	7.0	7.0		7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0
Flash Dont Walk (s)	11.0	11.0		11.0	11.0	11.0	11.0	11.0	11.0	11.0	11.0	11.0
Pedestrian Calls (#/hr)	0	0		0	0	0	0	0	0	0	0	0
Act Effct Green (s)	18.0	18.0		18.0	18.0	18.0	18.0	18.0	18.0	18.0	18.0	18.0
Actuated g/C Ratio	0.40	0.40		0.40	0.40	0.40	0.40	0.40	0.40	0.40	0.40	0.40
v/c Ratio	0.86	0.28		0.25	0.53	0.39	0.11	0.04	0.05	0.21	0.14	0.31
Control Delay	42.4	7.6		11.2	13.5	3.1	9.2	8.5	3.6	10.1	9.3	2.9
Queue Delay	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	42.4	7.6		11.2	13.5	3.1	9.2	8.5	3.6	10.1	9.3	2.9
LOS	D	A		B	B	A	A	A	A	B	A	A
Approach Delay		22.0			9.1			7.6				6.2
Approach LOS		C			A			A				A
Queue Length 50th (ft)	64	26		17	76	0	9	5	0	19	17	0
Queue Length 95th (ft)	#183	50		43	141	36	25	16	10	45	40	31
Internal Link Dist (ft)		1			1101			83			193	
Turn Bay Length (ft)				66		131						
Base Capacity (vph)	325	1421		387	745	825	513	745	654	550	745	775
Starvation Cap Reductn	0	0		0	0	0	0	0	0	0	0	0

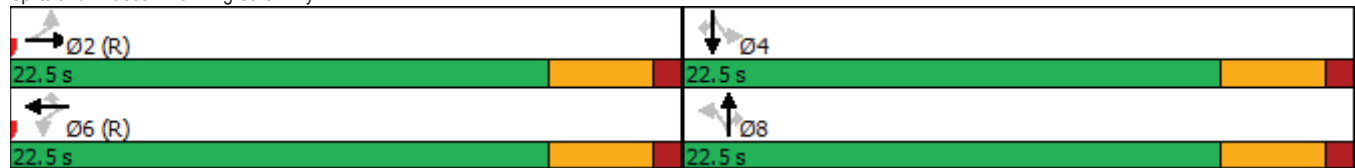
# Lanes, Volumes, Timings

## 5: King St. & Hwy12

Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Spillback Cap Reductn	0	0		0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0		0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	0.86	0.28		0.25	0.53	0.39	0.11	0.04	0.05	0.21	0.14	0.31

Intersection Summary	
Area Type:	Other
Cycle Length:	45
Actuated Cycle Length:	45
Offset:	22.5 (50%), Referenced to phase 2:EBTL and 6:WBTL, Start of Green
Natural Cycle:	60
Control Type:	Pretimed
Maximum v/c Ratio:	0.86
Intersection Signal Delay:	12.6
Intersection LOS:	B
Intersection Capacity Utilization	57.1%
ICU Level of Service	B
Analysis Period (min)	15
#	95th percentile volume exceeds capacity, queue may be longer. Queue shown is maximum after two cycles.

Splits and Phases: 5: King St. & Hwy12





# Lanes, Volumes, Timings

## 3: Hwy12 & Brandon St.



Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (vph)	2	865	664	1	14	31
Future Volume (vph)	2	865	664	1	14	31
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Util. Factor	0.95	0.95	0.95	0.95	1.00	1.00
Frt						0.850
Flt Protected					0.950	
Satd. Flow (prot)	0	3539	3539	0	1770	1583
Flt Permitted					0.950	
Satd. Flow (perm)	0	3539	3539	0	1770	1583
Link Speed (mph)		37	37		25	
Link Distance (ft)		1181	2280		145	
Travel Time (s)		21.8	42.0		4.0	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	2	940	722	1	15	34
Shared Lane Traffic (%)						
Lane Group Flow (vph)	0	942	723	0	15	34
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Left	Left	Right	Left	Right
Median Width(ft)		12	12		12	
Link Offset(ft)		0	0		0	
Crosswalk Width(ft)		16	16		16	
Two way Left Turn Lane						
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	16			9	16	9
Sign Control		Stop	Stop		Stop	

Intersection Summary	
Area Type:	Other
Control Type:	Unsignalized
Intersection Capacity Utilization	35.3%
Analysis Period (min)	15
	ICU Level of Service A

Lanes, Volumes, Timings  
5: King St. & Hwy12

Background(2022)(PM)  
06-10-2021



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	366	637	80	32	499	182	73	110	64	207	66	375
Future Volume (vph)	366	637	80	32	499	182	73	110	64	207	66	375
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0		0	66		131	0		0	0		0
Storage Lanes	1		0	1		1	1		1	1		1
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	1.00	0.95	0.95	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frnt		0.983				0.850			0.850			0.850
Fit Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1770	3479	0	1770	1863	1583	1770	1863	1583	1770	1863	1583
Fit Permitted	0.279			0.288			0.710			0.680		
Satd. Flow (perm)	520	3479	0	536	1863	1583	1323	1863	1583	1267	1863	1583
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		36				198			70			185
Link Speed (mph)		37			37			31				31
Link Distance (ft)		74			1181			163				273
Travel Time (s)		1.4			21.8			3.6				6.0
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	398	692	87	35	542	198	79	120	70	225	72	408
Shared Lane Traffic (%)												
Lane Group Flow (vph)	398	779	0	35	542	198	79	120	70	225	72	408
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		12			12			12				12
Link Offset(ft)		0			0			0				0
Crosswalk Width(ft)		16			16			16				16
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	16		9	16		9	16		9	16		9
Turn Type	Perm	NA		Perm	NA	Perm	Perm	NA	Perm	Perm	NA	Perm
Protected Phases		2			6		8		8			4
Permitted Phases	2			6		6	8		8	4		4
Minimum Split (s)	22.5	22.5		22.5	22.5	22.5	22.5	22.5	22.5	22.5	22.5	22.5
Total Split (s)	22.5	22.5		22.5	22.5	22.5	22.5	22.5	22.5	22.5	22.5	22.5
Total Split (%)	50.0%	50.0%		50.0%	50.0%	50.0%	50.0%	50.0%	50.0%	50.0%	50.0%	50.0%
Maximum Green (s)	18.0	18.0		18.0	18.0	18.0	18.0	18.0	18.0	18.0	18.0	18.0
Yellow Time (s)	3.5	3.5		3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	1.0	1.0		1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	4.5	4.5		4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
Lead/Lag												
Lead-Lag Optimize?												
Walk Time (s)	7.0	7.0		7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0
Flash Dont Walk (s)	11.0	11.0		11.0	11.0	11.0	11.0	11.0	11.0	11.0	11.0	11.0
Pedestrian Calls (#/hr)	0	0		0	0	0	0	0	0	0	0	0
Act Effct Green (s)	18.0	18.0		18.0	18.0	18.0	18.0	18.0	18.0	18.0	18.0	18.0
Actuated g/C Ratio	0.40	0.40		0.40	0.40	0.40	0.40	0.40	0.40	0.40	0.40	0.40
v/c Ratio	1.91	0.55		0.16	0.73	0.26	0.15	0.16	0.10	0.44	0.10	0.55
Control Delay	447.5	11.7		11.1	19.2	2.9	9.6	9.4	3.4	13.4	8.9	8.8
Queue Delay	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	447.5	11.7		11.1	19.2	2.9	9.6	9.4	3.4	13.4	8.9	8.8
LOS	F	B		B	B	A	A	A	A	B	A	A
Approach Delay		159.1			14.7			7.9				10.3
Approach LOS		F			B			A				B
Queue Length 50th (ft)	~174	75		6	116	0	13	19	0	42	11	39
Queue Length 95th (ft)	#267	118		21	#252	28	34	45	17	89	30	101
Internal Link Dist (ft)		1			1101			83				193
Turn Bay Length (ft)				66		131						
Base Capacity (vph)	208	1413		214	745	752	529	745	675	506	745	744
Starvation Cap Reductn	0	0		0	0	0	0	0	0	0	0	0

Lanes, Volumes, Timings  
5: King St. & Hwy12

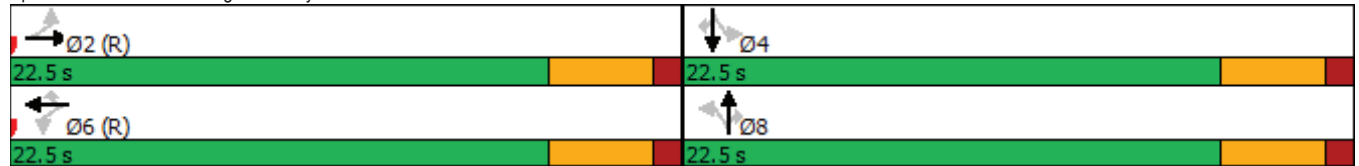


Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Spillback Cap Reductn	0	0		0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0		0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	1.91	0.55		0.16	0.73	0.26	0.15	0.16	0.10	0.44	0.10	0.55

Intersection Summary

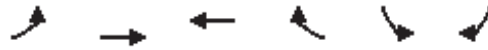
Area Type:	Other
Cycle Length:	45
Actuated Cycle Length:	45
Offset:	22.5 (50%), Referenced to phase 2:EBTL and 6:WBTL, Start of Green
Natural Cycle:	80
Control Type:	Pretimed
Maximum v/c Ratio:	1.91
Intersection Signal Delay:	71.1
Intersection LOS:	E
Intersection Capacity Utilization:	75.9%
ICU Level of Service:	D
Analysis Period (min):	15
~ Volume exceeds capacity, queue is theoretically infinite. Queue shown is maximum after two cycles.	
# 95th percentile volume exceeds capacity, queue may be longer. Queue shown is maximum after two cycles.	

Splits and Phases: 5: King St. & Hwy12



Lanes, Volumes, Timings  
3: Hwy12 & Brandon St.

Total(2022)(AM)  
06-12-2021



Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (vph)	33	437	673	10	21	43
Future Volume (vph)	33	437	673	10	21	43
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Util. Factor	0.91	0.91	0.95	0.95	1.00	1.00
Fr			0.998			0.850
Flt Protected	0.950				0.950	
Satd. Flow (prot)	1610	3390	3532	0	1770	1583
Flt Permitted	0.950				0.950	
Satd. Flow (perm)	1610	3390	3532	0	1770	1583
Link Speed (mph)		37	37		25	
Link Distance (ft)		1181	2280		145	
Travel Time (s)		21.8	42.0		4.0	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	36	475	732	11	23	47
Shared Lane Traffic (%)	10%					
Lane Group Flow (vph)	32	479	743	0	23	47
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Left	Left	Right	Left	Right
Median Width(ft)		24	24		12	
Link Offset(ft)		0	0		0	
Crosswalk Width(ft)		16	16		16	
Two way Left Turn Lane						
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	16			9	16	9
Sign Control		Stop	Stop		Stop	

Intersection Summary	
Area Type:	Other
Control Type:	Unsignalized
Intersection Capacity Utilization	34.8%
ICU Level of Service	A
Analysis Period (min)	15

Lanes, Volumes, Timings  
5: King St. & Hwy12

Total(2022)(AM)  
06-12-2021



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	366	637	80	32	499	182	73	110	64	207	66	375
Future Volume (vph)	366	637	80	32	499	182	73	110	64	207	66	375
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0		0	66		131	0		0	0		0
Storage Lanes	1		0	1		1	1		1	1		1
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	1.00	0.95	0.95	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frnt		0.983				0.850			0.850			0.850
Fit Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1770	3479	0	1770	1863	1583	1770	1863	1583	1770	1863	1583
Fit Permitted	0.279			0.288			0.710			0.680		
Satd. Flow (perm)	520	3479	0	536	1863	1583	1323	1863	1583	1267	1863	1583
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		36				198			70			185
Link Speed (mph)		37			37			31				31
Link Distance (ft)		74			1181			163				273
Travel Time (s)		1.4			21.8			3.6				6.0
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	398	692	87	35	542	198	79	120	70	225	72	408
Shared Lane Traffic (%)												
Lane Group Flow (vph)	398	779	0	35	542	198	79	120	70	225	72	408
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		12			12			12				12
Link Offset(ft)		0			0			0				0
Crosswalk Width(ft)		16			16			16				16
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	16		9	16		9	16		9	16		9
Turn Type	Perm	NA		Perm	NA	Perm	Perm	NA	Perm	Perm	NA	Perm
Protected Phases		2			6		8		8			4
Permitted Phases	2			6		6	8		8	4		4
Minimum Split (s)	22.5	22.5		22.5	22.5	22.5	22.5	22.5	22.5	22.5	22.5	22.5
Total Split (s)	22.5	22.5		22.5	22.5	22.5	22.5	22.5	22.5	22.5	22.5	22.5
Total Split (%)	50.0%	50.0%		50.0%	50.0%	50.0%	50.0%	50.0%	50.0%	50.0%	50.0%	50.0%
Maximum Green (s)	18.0	18.0		18.0	18.0	18.0	18.0	18.0	18.0	18.0	18.0	18.0
Yellow Time (s)	3.5	3.5		3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	1.0	1.0		1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	4.5	4.5		4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
Lead/Lag												
Lead-Lag Optimize?												
Walk Time (s)	7.0	7.0		7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0
Flash Dont Walk (s)	11.0	11.0		11.0	11.0	11.0	11.0	11.0	11.0	11.0	11.0	11.0
Pedestrian Calls (#/hr)	0	0		0	0	0	0	0	0	0	0	0
Act Effct Green (s)	18.0	18.0		18.0	18.0	18.0	18.0	18.0	18.0	18.0	18.0	18.0
Actuated g/C Ratio	0.40	0.40		0.40	0.40	0.40	0.40	0.40	0.40	0.40	0.40	0.40
v/c Ratio	1.91	0.55		0.16	0.73	0.26	0.15	0.16	0.10	0.44	0.10	0.55
Control Delay	447.5	11.7		11.1	19.2	2.9	9.6	9.4	3.4	13.4	8.9	8.8
Queue Delay	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	447.5	11.7		11.1	19.2	2.9	9.6	9.4	3.4	13.4	8.9	8.8
LOS	F	B		B	B	A	A	A	A	B	A	A
Approach Delay		159.1			14.7			7.9				10.3
Approach LOS		F			B			A				B
Queue Length 50th (ft)	~174	75		6	116	0	13	19	0	42	11	39
Queue Length 95th (ft)	#267	118		21	#252	28	34	45	17	89	30	101
Internal Link Dist (ft)		1			1101			83				193
Turn Bay Length (ft)				66		131						
Base Capacity (vph)	208	1413		214	745	752	529	745	675	506	745	744
Starvation Cap Reductn	0	0		0	0	0	0	0	0	0	0	0

Lanes, Volumes, Timings  
5: King St. & Hwy12

Total(2022)(AM)  
06-12-2021

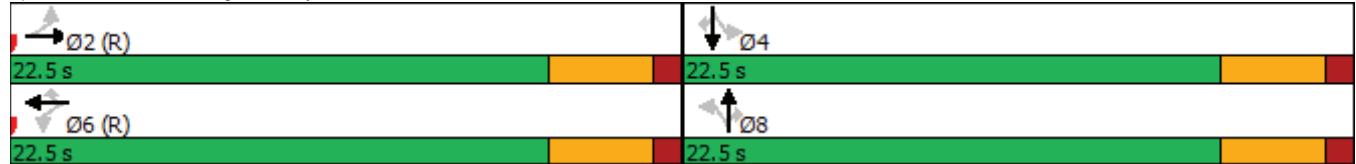


Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Spillback Cap Reductn	0	0		0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0		0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	1.91	0.55		0.16	0.73	0.26	0.15	0.16	0.10	0.44	0.10	0.55

Intersection Summary

Area Type:	Other
Cycle Length:	45
Actuated Cycle Length:	45
Offset:	22.5 (50%), Referenced to phase 2:EBTL and 6:WBTL, Start of Green
Natural Cycle:	80
Control Type:	Pretimed
Maximum v/c Ratio:	1.91
Intersection Signal Delay:	71.1
Intersection LOS:	E
Intersection Capacity Utilization:	75.9%
ICU Level of Service:	D
Analysis Period (min):	15
~ Volume exceeds capacity, queue is theoretically infinite. Queue shown is maximum after two cycles.	
# 95th percentile volume exceeds capacity, queue may be longer. Queue shown is maximum after two cycles.	

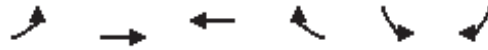
Splits and Phases: 5: King St. & Hwy12





Lanes, Volumes, Timings  
3: Hwy12 & Brandon St.

Total(2022)(PM)  
06-12-2021



Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (vph)	28	865	664	5	24	51
Future Volume (vph)	28	865	664	5	24	51
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Util. Factor	0.91	0.91	0.95	0.95	1.00	1.00
Frt			0.999			0.850
Flt Protected	0.950				0.950	
Satd. Flow (prot)	1610	3390	3536	0	1770	1583
Flt Permitted	0.950				0.950	
Satd. Flow (perm)	1610	3390	3536	0	1770	1583
Link Speed (mph)		37	37		25	
Link Distance (ft)		1181	2280		145	
Travel Time (s)		21.8	42.0		4.0	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	30	940	722	5	26	55
Shared Lane Traffic (%)	10%					
Lane Group Flow (vph)	27	943	727	0	26	55
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Left	Left	Right	Left	Right
Median Width(ft)		24	24		12	
Link Offset(ft)		0	0		0	
Crosswalk Width(ft)		16	16		16	
Two way Left Turn Lane						
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	16			9	16	9
Sign Control		Stop	Stop		Stop	

Intersection Summary	
Area Type:	Other
Control Type:	Unsignalized
Intersection Capacity Utilization	39.5%
ICU Level of Service	A
Analysis Period (min)	15

Lanes, Volumes, Timings  
5: King St. & Hwy12

Total(2022)(PM)  
06-12-2021



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	366	637	80	32	499	182	73	110	64	207	66	375
Future Volume (vph)	366	637	80	32	499	182	73	110	64	207	66	375
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0		0	66		131	0		0	0		0
Storage Lanes	1		0	1		1	1		1	1		1
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	1.00	0.95	0.95	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frnt		0.983				0.850			0.850			0.850
Fit Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1770	3479	0	1770	1863	1583	1770	1863	1583	1770	1863	1583
Fit Permitted	0.279			0.288			0.710			0.680		
Satd. Flow (perm)	520	3479	0	536	1863	1583	1323	1863	1583	1267	1863	1583
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		36				198			70			185
Link Speed (mph)		37			37			31				31
Link Distance (ft)		74			1181			163				273
Travel Time (s)		1.4			21.8			3.6				6.0
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	398	692	87	35	542	198	79	120	70	225	72	408
Shared Lane Traffic (%)												
Lane Group Flow (vph)	398	779	0	35	542	198	79	120	70	225	72	408
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		12			12			12				12
Link Offset(ft)		0			0			0				0
Crosswalk Width(ft)		16			16			16				16
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	16		9	16		9	16		9	16		9
Turn Type	Perm	NA		Perm	NA	Perm	Perm	NA	Perm	Perm	NA	Perm
Protected Phases		2			6		8		8		4	
Permitted Phases	2			6		6	8		8	4		4
Minimum Split (s)	22.5	22.5		22.5	22.5	22.5	22.5	22.5	22.5	22.5	22.5	22.5
Total Split (s)	22.5	22.5		22.5	22.5	22.5	22.5	22.5	22.5	22.5	22.5	22.5
Total Split (%)	50.0%	50.0%		50.0%	50.0%	50.0%	50.0%	50.0%	50.0%	50.0%	50.0%	50.0%
Maximum Green (s)	18.0	18.0		18.0	18.0	18.0	18.0	18.0	18.0	18.0	18.0	18.0
Yellow Time (s)	3.5	3.5		3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	1.0	1.0		1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	4.5	4.5		4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
Lead/Lag												
Lead-Lag Optimize?												
Walk Time (s)	7.0	7.0		7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0
Flash Dont Walk (s)	11.0	11.0		11.0	11.0	11.0	11.0	11.0	11.0	11.0	11.0	11.0
Pedestrian Calls (#/hr)	0	0		0	0	0	0	0	0	0	0	0
Act Effct Green (s)	18.0	18.0		18.0	18.0	18.0	18.0	18.0	18.0	18.0	18.0	18.0
Actuated g/C Ratio	0.40	0.40		0.40	0.40	0.40	0.40	0.40	0.40	0.40	0.40	0.40
v/c Ratio	1.91	0.55		0.16	0.73	0.26	0.15	0.16	0.10	0.44	0.10	0.55
Control Delay	447.5	11.7		11.1	19.2	2.9	9.6	9.4	3.4	13.4	8.9	8.8
Queue Delay	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	447.5	11.7		11.1	19.2	2.9	9.6	9.4	3.4	13.4	8.9	8.8
LOS	F	B		B	B	A	A	A	A	B	A	A
Approach Delay		159.1			14.7			7.9				10.3
Approach LOS		F			B			A				B
Queue Length 50th (ft)	~174	75		6	116	0	13	19	0	42	11	39
Queue Length 95th (ft)	#267	118		21	#252	28	34	45	17	89	30	101
Internal Link Dist (ft)		1			1101			83				193
Turn Bay Length (ft)				66		131						
Base Capacity (vph)	208	1413		214	745	752	529	745	675	506	745	744
Starvation Cap Reductn	0	0		0	0	0	0	0	0	0	0	0

Lanes, Volumes, Timings  
5: King St. & Hwy12

Total(2022)(PM)  
06-12-2021

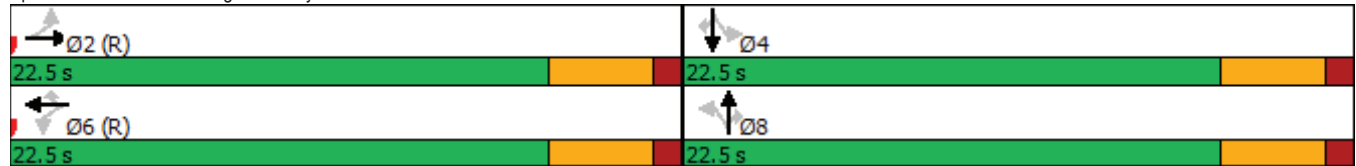


Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Spillback Cap Reductn	0	0		0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0		0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	1.91	0.55		0.16	0.73	0.26	0.15	0.16	0.10	0.44	0.10	0.55

Intersection Summary

Area Type:	Other
Cycle Length:	45
Actuated Cycle Length:	45
Offset:	22.5 (50%), Referenced to phase 2:EBTL and 6:WBTL, Start of Green
Natural Cycle:	80
Control Type:	Pretimed
Maximum v/c Ratio:	1.91
Intersection Signal Delay:	71.1
Intersection LOS:	E
Intersection Capacity Utilization:	75.9%
ICU Level of Service:	D
Analysis Period (min):	15
~ Volume exceeds capacity, queue is theoretically infinite. Queue shown is maximum after two cycles.	
# 95th percentile volume exceeds capacity, queue may be longer. Queue shown is maximum after two cycles.	

Splits and Phases: 5: King St. & Hwy12



Lanes, Volumes, Timings  
3: Hwy12 & Brandon St.

Total(2022)(considering shift)  
03-17-2022



Lane Group	EBL	EBT	WBT	WBR	SBL	SBR
Lane Configurations						
Traffic Volume (vph)	28	865	664	5	54	81
Future Volume (vph)	28	865	664	5	54	81
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900
Lane Util. Factor	0.91	0.91	0.95	0.95	1.00	1.00
Frt			0.999			0.850
Flt Protected	0.950				0.950	
Satd. Flow (prot)	1610	3390	3536	0	1770	1583
Flt Permitted	0.950				0.950	
Satd. Flow (perm)	1610	3390	3536	0	1770	1583
Link Speed (mph)		37	37		25	
Link Distance (ft)		1181	2280		145	
Travel Time (s)		21.8	42.0		4.0	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	30	940	722	5	59	88
Shared Lane Traffic (%)	10%					
Lane Group Flow (vph)	27	943	727	0	59	88
Enter Blocked Intersection	No	No	No	No	No	No
Lane Alignment	Left	Left	Left	Right	Left	Right
Median Width(ft)		24	24		12	
Link Offset(ft)		0	0		0	
Crosswalk Width(ft)		16	16		16	
Two way Left Turn Lane						
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	16			9	16	9
Sign Control		Stop	Stop		Stop	

Intersection Summary	
Area Type:	Other
Control Type:	Unsignalized
Intersection Capacity Utilization	39.5%
Analysis Period (min)	15
	ICU Level of Service A

Lanes, Volumes, Timings  
5: King St. & Hwy12

Total(2022)(considering shift)  
03-17-2022



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Traffic Volume (vph)	366	637	80	32	510	202	73	110	64	207	66	375
Future Volume (vph)	366	637	80	32	510	202	73	110	64	207	66	375
Ideal Flow (vphpl)	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900	1900
Storage Length (ft)	0		0	66		131	0		0	0		0
Storage Lanes	1		0	1		1	1		1	1		1
Taper Length (ft)	25			25			25			25		
Lane Util. Factor	1.00	0.95	0.95	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Frnt		0.983				0.850			0.850			0.850
Flt Protected	0.950			0.950			0.950			0.950		
Satd. Flow (prot)	1770	3479	0	1770	1863	1583	1770	1863	1583	1770	1863	1583
Flt Permitted	0.266			0.288			0.710			0.680		
Satd. Flow (perm)	495	3479	0	536	1863	1583	1323	1863	1583	1267	1863	1583
Right Turn on Red			Yes			Yes			Yes			Yes
Satd. Flow (RTOR)		36				220			70			177
Link Speed (mph)		37			37			31				31
Link Distance (ft)		74			1181			163				273
Travel Time (s)		1.4			21.8			3.6				6.0
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Adj. Flow (vph)	398	692	87	35	554	220	79	120	70	225	72	408
Shared Lane Traffic (%)												
Lane Group Flow (vph)	398	779	0	35	554	220	79	120	70	225	72	408
Enter Blocked Intersection	No	No	No	No	No	No	No	No	No	No	No	No
Lane Alignment	Left	Left	Right	Left	Left	Right	Left	Left	Right	Left	Left	Right
Median Width(ft)		12			12			12				12
Link Offset(ft)		0			0			0				0
Crosswalk Width(ft)		16			16			16				16
Two way Left Turn Lane												
Headway Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Turning Speed (mph)	16		9	16		9	16		9	16		9
Turn Type	Perm	NA		Perm	NA	Perm	Perm	NA	Perm	Perm	NA	Perm
Protected Phases		2			6		8		8			4
Permitted Phases	2			6		6	8		8		4	4
Minimum Split (s)	22.5	22.5		22.5	22.5	22.5	22.5	22.5	22.5	22.5	22.5	22.5
Total Split (s)	22.5	22.5		22.5	22.5	22.5	22.5	22.5	22.5	22.5	22.5	22.5
Total Split (%)	50.0%	50.0%		50.0%	50.0%	50.0%	50.0%	50.0%	50.0%	50.0%	50.0%	50.0%
Maximum Green (s)	18.0	18.0		18.0	18.0	18.0	18.0	18.0	18.0	18.0	18.0	18.0
Yellow Time (s)	3.5	3.5		3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5	3.5
All-Red Time (s)	1.0	1.0		1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
Lost Time Adjust (s)	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Lost Time (s)	4.5	4.5		4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5	4.5
Lead/Lag												
Lead-Lag Optimize?												
Walk Time (s)	7.0	7.0		7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0	7.0
Flash Dont Walk (s)	11.0	11.0		11.0	11.0	11.0	11.0	11.0	11.0	11.0	11.0	11.0
Pedestrian Calls (#/hr)	0	0		0	0	0	0	0	0	0	0	0
Act Effct Green (s)	18.0	18.0		18.0	18.0	18.0	18.0	18.0	18.0	18.0	18.0	18.0
Actuated g/C Ratio	0.40	0.40		0.40	0.40	0.40	0.40	0.40	0.40	0.40	0.40	0.40
v/c Ratio	2.01	0.55		0.16	0.74	0.29	0.15	0.16	0.10	0.44	0.10	0.55
Control Delay	490.6	11.7		11.1	20.0	2.9	9.6	9.4	3.4	13.4	8.9	9.1
Queue Delay	0.0	0.0		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Delay	490.6	11.7		11.1	20.0	2.9	9.6	9.4	3.4	13.4	8.9	9.1
LOS	F	B		B	B	A	A	A	A	B	A	A
Approach Delay		173.6			14.9			7.9				10.4
Approach LOS		F			B			A				B
Queue Length 50th (ft)	~177	75		6	120	0	13	19	0	42	11	41
Queue Length 95th (ft)	#273	118		21	#259	30	34	45	17	89	30	103
Internal Link Dist (ft)		1			1101			83				193
Turn Bay Length (ft)				66		131						
Base Capacity (vph)	198	1413		214	745	765	529	745	675	506	745	739
Starvation Cap Reductn	0	0		0	0	0	0	0	0	0	0	0

Lanes, Volumes, Timings  
5: King St. & Hwy12

Total(2022)(considering shift)  
03-17-2022



Lane Group	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Spillback Cap Reductn	0	0		0	0	0	0	0	0	0	0	0
Storage Cap Reductn	0	0		0	0	0	0	0	0	0	0	0
Reduced v/c Ratio	2.01	0.55		0.16	0.74	0.29	0.15	0.16	0.10	0.44	0.10	0.55

Intersection Summary

Area Type:	Other
Cycle Length:	45
Actuated Cycle Length:	45
Offset:	22.5 (50%), Referenced to phase 2:EBTL and 6:WBTL, Start of Green
Natural Cycle:	80
Control Type:	Pretimed
Maximum v/c Ratio:	2.01
Intersection Signal Delay:	76.3
Intersection LOS:	E
Intersection Capacity Utilization	76.5%
ICU Level of Service	D
Analysis Period (min)	15
~ Volume exceeds capacity, queue is theoretically infinite. Queue shown is maximum after two cycles.	
# 95th percentile volume exceeds capacity, queue may be longer. Queue shown is maximum after two cycles.	

Splits and Phases: 5: King St. & Hwy12

